

# TURNING TOOLS



# TURNING TOOLS



## **QUALITY – HIGHEST STANDARDS ACROSS PRODUCTS AND SERVICES**

Turning tools from Mitsubishi Materials embody this philosophy and have been convincing the global market for more than 30 years!

Mitsubishi Materials precision tools enrich the metalworking industry with durability, speed and accuracy.

Whether it is a grooving tool, an ISO insert or vibration-damping boring bar, the extensive range of turning tools has performance in mind.





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**1**

GENERAL INFORMATION



# HOW TO READ THE STANDARD OF TURNING INSERTS

## ●How this section page is organised

- ① Organised according to the insert shape.  
(Refer to the index on the next page.)
- ② Inserts are arranged in order of :
  - Negative inserts (with hole→without hole)
  - Positive inserts (with hole→without hole)
- ③ Chipbreakers are arranged in order of :  
Finish Cutting→Light Cutting→Medium Cutting  
→Rough Cutting→Heavy Cutting

## ●Graph of chip control by material

Shows recommended chipbreakers and chip control range according to the material and cutting application.  
Graphs are coloured according to the applications  
(Finish→Light→Medium→Rough→Heavy)  
and contain recommended chipbreakers for each application.

Finish Cutting : — Light Cutting : — Medium Cutting : —  
Rough Cutting : — Heavy Cutting : —

### GRADE APPLICATION RECOMMENDED FOR EACH MATERIAL

Cutting conditions suitable for each type of material is shown as a general guide to select the grade.

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

SHAPE & ANGLE MARK

INDICATION OF NEGATIVE/ POSITIVE TYPE

PRODUCT SECTION

TITLE OF PRODUCT ACCORDING TO THE INSERT TYPE

**TURNING INSERTS [NEGATIVE]**

**80° CN TYPE INSERTS WITH HOLE**

**CHIP CONTROL RANGE FOR MATERIAL**

Material: P (Steel), M (Stainless Steel), K (Cast Iron), N (Non-ferrous Metal), S (Heat-resistant Alloy, Titanium Alloy)

Chip Control Range: Finish Cutting, Light Cutting, Medium Cutting, Rough Cutting, Heavy Cutting

Order Number, RE (mm), Cutting Conditions (Guide), Stock Status, Insert Grades, Applicable Holder Page

**LEGEND FOR STOCK STATUS MARK**  
Is shown on the left hand page of each double-page spread.

**CUTTING APPLICATION**  
Is shown in order of: Finish→Light→Medium→Rough→Heavy.

**PHOTO OF INSERT**

**INDICATION OF CHIPBREAKER**  
Indicates the designation for a chipbreaker.

INSERT NUMBER

STOCK STATUS

INSERT GRADES

**TURNING INSERTS [POSITIVE]**

**CHIP CONTROL RANGE FOR MATERIAL**

Material: P (Steel), M (Stainless Steel), K (Cast Iron), N (Non-ferrous Metal), S (Heat-resistant Alloy, Titanium Alloy)

Chip Control Range: Finish Cutting, Light Cutting, Medium Cutting, Rough Cutting, Heavy Cutting

Order Number, RE (mm), Cutting Conditions (Guide), Stock Status, Insert Grades, Applicable Holder Page

**LEGEND FOR STOCK STATUS MARK**  
Is shown on the left hand page of each double-page spread.

**CUTTING APPLICATION**  
Is shown in order of: Finish→Light→Medium→Rough→Heavy.

**PHOTO OF INSERT**

**INDICATION OF CHIPBREAKER**  
Indicates the designation for a chipbreaker.

PAGE REFERENCE

- CHIPBREAKERS
- GRADES
- TECHNICAL DATA

Indicates reference pages, on the right hand page of each double-page spread.

APPLICABLE HOLDER PAGE

Indicates reference pages for details of applicable holders.

CORNER RADIUS (RE)

● To Order : Please specify

① insert number and ② grade.

# TURNING

# INSERT GRADES INSERT STANDARDS

|                                                         |      |
|---------------------------------------------------------|------|
| IDENTIFICATION .....                                    | A002 |
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## STANDARD OF INSERTS

### NEGATIVE INSERTS WITH HOLE

|                       |                         |      |
|-----------------------|-------------------------|------|
| CN <sup>00</sup> TYPE | ...RHOMBIC 80° .....    | A098 |
| DN <sup>00</sup> TYPE | ...RHOMBIC 55° .....    | A106 |
| RN <sup>00</sup> TYPE | ...ROUND .....          | A113 |
| SN <sup>00</sup> TYPE | ...SQUARE 90° .....     | A114 |
| TN <sup>00</sup> TYPE | ...TRIANGULAR 60° ..... | A120 |
| VN <sup>00</sup> TYPE | ...RHOMBIC 35° .....    | A127 |
| WN <sup>00</sup> TYPE | ...TRIGON 80° .....     | A131 |

### NEGATIVE INSERTS WITHOUT HOLE

|                       |                          |      |
|-----------------------|--------------------------|------|
| KN <sup>00</sup> TYPE | ...PARALLELOGRAM 55° ... | A136 |
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| SN <sup>00</sup> TYPE | ...SQUARE 90° .....      | A138 |
| TN <sup>00</sup> TYPE | ...TRIANGULAR 60° .....  | A139 |

### POSITIVE INSERTS WITH HOLE

|                       |                      |      |
|-----------------------|----------------------|------|
| CC <sup>00</sup> TYPE | ...RHOMBIC 80° ..... | A140 |
| CP <sup>00</sup> TYPE | ...RHOMBIC 80° ..... | A149 |
| DC <sup>00</sup> TYPE | ...RHOMBIC 55° ..... | A152 |
| DE <sup>00</sup> TYPE | ...RHOMBIC 55° ..... | A159 |
| RC <sup>00</sup> TYPE | ...ROUND .....       | A160 |

|                       |                         |      |
|-----------------------|-------------------------|------|
| SC <sup>00</sup> TYPE | ...SQUARE 90° .....     | A161 |
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| TC <sup>00</sup> TYPE | ...TRIANGULAR 60° ..... | A165 |
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| VC <sup>00</sup> TYPE | ...RHOMBIC 35° .....    | A177 |
| VD <sup>00</sup> TYPE | ...RHOMBIC 35° .....    | A181 |
| VP <sup>00</sup> TYPE | ...RHOMBIC 35° .....    | A182 |
| WB <sup>00</sup> TYPE | ...TRIGON 80° .....     | A183 |
| WC <sup>00</sup> TYPE | ...TRIGON 80° .....     | A184 |
| WP <sup>00</sup> TYPE | ...TRIGON 80° .....     | A185 |
| XC <sup>00</sup> TYPE | ...RHOMBIC 25° .....    | A186 |

### POSITIVE INSERTS WITHOUT HOLE

|                       |                         |      |
|-----------------------|-------------------------|------|
| RTG TYPE              | .....                   | A187 |
| SP <sup>00</sup> TYPE | ...SQUARE 90° .....     | A188 |
| TC <sup>00</sup> TYPE | ...TRIANGULAR 60° ..... | A189 |
| TP <sup>00</sup> TYPE | ...TRIANGULAR 60° ..... | A190 |





## IDENTIFICATION

| Symbol                    | Insert Shape      |  |
|---------------------------|-------------------|--|
| H                         | Hexagonal         |  |
| O                         | Octagonal         |  |
| P                         | Pentagonal        |  |
| S                         | Square            |  |
| T                         | Triangular        |  |
| C                         | Rhombic 80°       |  |
| D                         | Rhombic 55°       |  |
| E                         | Rhombic 75°       |  |
| F                         | Rhombic 50°       |  |
| M                         | Rhombic 86°       |  |
| V                         | Rhombic 35°       |  |
| W                         | Trigon            |  |
| L                         | Rectangular       |  |
| A                         | Parallelogram 85° |  |
| B                         | Parallelogram 82° |  |
| K                         | Parallelogram 55° |  |
| R                         | Round             |  |
| X                         | Special Design    |  |
| ① Symbol for Insert Shape |                   |  |

Triangular insert with a facet  
(Secondary Cutting Edge)

### ③ Symbol for Tolerance Class

#### Detail of M Class Insert Tolerance

##### ● Tolerance of Nose Height M (mm)

| D.I.C.        | Triangular | Square | Rhombic 80° | Rhombic 55° | Rhombic 35° | Round |
|---------------|------------|--------|-------------|-------------|-------------|-------|
| <b>6.35</b>   | ±0.08      | ±0.08  | ±0.08       | ±0.11       | ±0.16       | —     |
| <b>9.525</b>  | ±0.08      | ±0.08  | ±0.08       | ±0.11       | ±0.16       | —     |
| <b>12.70</b>  | ±0.13      | ±0.13  | ±0.13       | ±0.15       | —           | —     |
| <b>15.875</b> | ±0.15      | ±0.15  | ±0.15       | ±0.18       | —           | —     |
| <b>19.05</b>  | ±0.15      | ±0.15  | ±0.15       | ±0.18       | —           | —     |
| <b>25.40</b>  | —          | ±0.18  | —           | —           | —           | —     |
| <b>31.75</b>  | —          | ±0.20  | —           | —           | —           | —     |

##### ● Tolerance of Inscribed Circle (mm)

| D.I.C.        | Triangular | Square | Rhombic 80° | Rhombic 55° | Rhombic 35° | Round |
|---------------|------------|--------|-------------|-------------|-------------|-------|
| <b>6.35</b>   | ±0.05      | ±0.05  | ±0.05       | ±0.05       | ±0.05       | —     |
| <b>9.525</b>  | ±0.05      | ±0.05  | ±0.05       | ±0.05       | ±0.05       | ±0.05 |
| <b>12.70</b>  | ±0.08      | ±0.08  | ±0.08       | ±0.08       | —           | ±0.08 |
| <b>15.875</b> | ±0.10      | ±0.10  | ±0.10       | ±0.10       | —           | ±0.10 |
| <b>19.05</b>  | ±0.10      | ±0.10  | ±0.10       | ±0.10       | —           | ±0.10 |
| <b>25.40</b>  | —          | ±0.13  | —           | —           | —           | ±0.13 |
| <b>31.75</b>  | —          | ±0.15  | —           | —           | —           | ±0.15 |

The surface of inserts with a \* mark is sintered.

### ③ Symbol for Tolerance Class

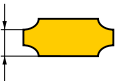
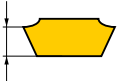
① C N M G

| ② Symbol for Normal Clearance |                        |
|-------------------------------|------------------------|
| Symbol                        | Normal Clearance       |
| A                             | 3°                     |
| B                             | 5°                     |
| C                             | 7°                     |
| D                             | 15°                    |
| E                             | 20°                    |
| F                             | 25°                    |
| G                             | 30°                    |
| N                             | 0°                     |
| P                             | 11°                    |
| O                             | Other Normal Clearance |
| Major Normal Clearance        |                        |

| ④ Symbol for Fixing and / or for Chipbreaker |           |                                                |              |        |        |              |                    |              |                |
|----------------------------------------------|-----------|------------------------------------------------|--------------|--------|--------|--------------|--------------------|--------------|----------------|
| Metric                                       |           |                                                |              |        |        |              |                    |              |                |
| Symbol                                       | Hole      | Hole Configuration                             | Chip Breaker | Figure | Symbol | Hole         | Hole Configuration | Chip Breaker | Figure         |
| W                                            | With Hole | Cylindrical Hole + One Countersink (40—60°)    | No           |        | A      | With Hole    | Cylindrical Hole   | No           |                |
| T                                            | With Hole | One Countersink (40—60°)                       | One Sided    |        | M      | With Hole    | Cylindrical Hole   | One Sided    |                |
| Q                                            | With Hole | Cylindrical Hole + Double Countersink (40—60°) | No           |        | G      | With Hole    | Cylindrical Hole   | Double Sided |                |
| U                                            | With Hole | Double Countersink (40—60°)                    | Double Sided |        | N      | Without Hole | —                  | No           |                |
| B                                            | With Hole | Cylindrical Hole + One Countersink (70—90°)    | No           |        | R      | Without Hole | —                  | One Sided    |                |
| H                                            | With Hole | One Countersink (70—90°)                       | One Sided    |        | F      | Without Hole | —                  | Double Sided |                |
| C                                            | With Hole | Cylindrical Hole + Double Countersink (70—90°) | No           |        | X      | —            | —                  | —            | Special Design |
| J                                            | With Hole | Double Countersink (70—90°)                    | Double Sided |        |        |              |                    |              |                |

| Symbol |    |    |    |    |    |    | Diameter of Inscribed Circle (mm) |
|--------|----|----|----|----|----|----|-----------------------------------|
|        |    |    |    |    |    |    |                                   |
|        | 02 |    | 04 | 03 | 03 | 06 | 3.97                              |
|        | L3 | 08 | 05 | 04 | 04 | 08 | 4.76                              |
|        | 03 | 09 | 06 | 05 | 05 | 09 | 5.56                              |
| 06     |    |    |    |    |    |    | 6.00                              |
|        | 04 | 11 | 07 | 06 | 06 | 11 | 6.35                              |
|        | 05 | 13 | 09 | 08 | 07 | 13 | 7.94                              |
| 08     |    |    |    |    |    |    | 8.00                              |
| 09     | 06 | 16 | 11 | 09 | 09 | 16 | 9.525                             |
| 10     |    |    |    |    |    |    | 10.00                             |
| 12     |    |    |    |    |    |    | 12.00                             |
|        | 08 | 22 | 15 | 12 | 12 | 22 | 12.70                             |
| 15     | 10 |    | 19 | 16 | 15 | 27 | 15.875                            |
| 16     |    |    |    |    |    |    | 16.00                             |
| 19     | 13 |    | 23 | 19 | 19 | 33 | 19.05                             |
| 20     |    |    |    |    |    |    | 20.00                             |
|        |    |    | 27 | 22 | 22 | 38 | 22.225                            |
| 25     |    |    |    |    |    |    | 25.00                             |
| 25     |    |    | 31 | 25 | 25 | 44 | 25.40                             |
| 31     |    |    | 38 | 32 | 31 | 54 | 31.75                             |
| 32     |    |    |    |    |    |    | 32.00                             |

⑤ Symbol for Insert Size

|   |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| *Thickness is from the bottom of the insert to the top of the cutting edge.                                                                                             |                |
| Symbol                                                                                                                                                                  | Thickness (mm) |
| <b>S1</b>                                                                                                                                                               | 1.39           |
| <b>01</b>                                                                                                                                                               | 1.59           |
| <b>T0</b>                                                                                                                                                               | 1.79           |
| <b>02</b>                                                                                                                                                               | 2.38           |
| <b>T2</b>                                                                                                                                                               | 2.78           |
| <b>03</b>                                                                                                                                                               | 3.18           |
| <b>T3</b>                                                                                                                                                               | 3.97           |
| <b>04</b>                                                                                                                                                               | 4.76           |
| <b>06</b>                                                                                                                                                               | 6.35           |
| <b>07</b>                                                                                                                                                               | 7.94           |
| <b>09</b>                                                                                                                                                               | 9.52           |

**⑥ Symbol for Insert Thickness**

⑤ 12 ⑥ 04 ⑦ 08 ⑧ (E) ⑨ (N)-MP ⑩

| ⑦ Symbol for Insert Corner Size |                    |
|---------------------------------|--------------------|
| Symbol                          | Corner Radius (mm) |
| 00                              | Sharp Nose         |
| V3                              | 0.03               |
| V5                              | 0.05               |
| 01                              | 0.1                |
| 02                              | 0.2                |
| 04                              | 0.4                |
| 08                              | 0.8                |
| 12                              | 1.2                |
| 16                              | 1.6                |
| 20                              | 2.0                |
| 24                              | 2.4                |
| 28                              | 2.8                |
| 32                              | 3.2                |
| 00 : Inch<br>M0 : Metric        | Round Insert       |

| ⑧ Symbol for Cutting Edge Type |                                     |        |
|--------------------------------|-------------------------------------|--------|
| Figure                         | Feature                             | Symbol |
|                                | Sharp Cutting Edges                 | F      |
|                                | Round Cutting Edges                 | E      |
|                                | Chamfered Cutting Edges             | T      |
|                                | Chamfered and Rounded Cutting Edges | S      |
| —                              | (-) Corner R tolerance              | M      |

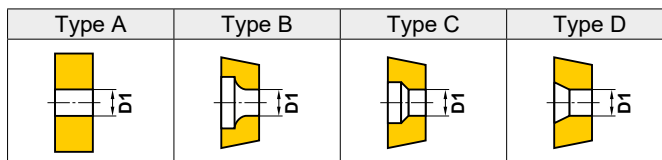
Mitsubishi Materials omit the honing symbol.

| ⑨ Symbol for Cutting Direction |         |        |
|--------------------------------|---------|--------|
| Figure                         | Hand    | Symbol |
|                                | Right   | R      |
|                                | Left    | L      |
|                                | Neutral | N      |

| ⑩ Symbol for Chipbreaker |    |    |
|--------------------------|----|----|
| LP                       | MP | RP |
|                          |    |    |
| LM                       | MM | RM |
|                          |    |    |
| LK                       | MK | RK |
|                          |    |    |
| LS                       | MS | RS |
|                          |    |    |
| MA                       | SW | MW |
|                          |    |    |

The table above is shown as reference example.

## HOLE GEOMETRY



## NEGATIVE

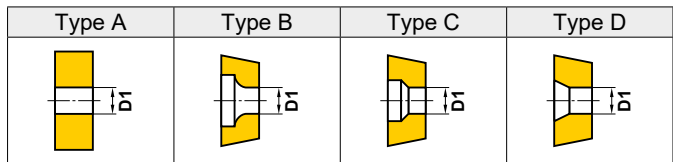
| Insert Number                                        |        | Dimension (mm) | Hole Type |
|------------------------------------------------------|--------|----------------|-----------|
|                                                      |        | D1             |           |
| CNGA<br>CNGG<br>CNGM<br>CNMA<br>CNMG<br>CNMM         | 0903   | 3.81           | A         |
|                                                      | 09T3   | 3.81           | A         |
|                                                      | 0904   | 3.81           | A         |
|                                                      | 1204   | 5.16           | A         |
|                                                      | 1606   | 6.35           | A         |
|                                                      | 1906   | 7.93           | A         |
|                                                      | 2509   | 9.12           | A         |
|                                                      |        |                |           |
| DNGA<br>DNGG<br>DNGM<br>DNMA<br>DNMG<br>DNMM<br>DNMX | 1104   | 3.81           | A         |
|                                                      | 1504   | 5.16           | A         |
|                                                      | 1506   | 5.16           | A         |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
| SNGA<br>SNGG<br>SNMA<br>SNMG<br>SNMM                 | 0903   | 3.81           | A         |
|                                                      | 1204   | 5.16           | A         |
|                                                      | 1506   | 6.35           | A         |
|                                                      | 1906   | 7.93           | A         |
|                                                      | 2507   | 9.12           | A         |
|                                                      | 2509   | 9.12           | A         |
|                                                      |        |                |           |
|                                                      |        |                |           |
| TNGA<br>TNGG<br>TNGM<br>TNMA<br>TNMG<br>TNMM<br>TNMX | 1103   | 2.26           | A         |
|                                                      | 1603   | 3.81           | A         |
|                                                      | 1604   | 3.81           | A         |
|                                                      | 2204   | 5.16           | A         |
|                                                      | 2706   | 6.35           | A         |
|                                                      | 3309   | 7.93           | A         |
|                                                      |        |                |           |
|                                                      |        |                |           |
| VNGA<br>VNGM<br>VNGG<br>VNMA<br>VNMG<br>VNMM         | 1604   | 3.81           | A         |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
|                                                      |        |                |           |
| WNGA<br>WNMA<br>WNMG                                 | 0603   | 3.81           | A         |
|                                                      | 06T3   | 3.81           | A         |
|                                                      | 0604   | 3.81           | A         |
|                                                      | 0804   | 5.16           | A         |
|                                                      | 1006   | 6.35           | A         |
| RNMG                                                 | 090300 | 3.81           | A         |
|                                                      | 120400 | 5.16           | A         |
|                                                      | 150600 | 6.35           | A         |
|                                                      | 190600 | 7.93           | A         |
|                                                      | 250900 | 9.12           | A         |
|                                                      | 310900 | 12.7           | A         |

## POSITIVE

| Insert Number                |        | Dimensions (mm) | Hole Type |
|------------------------------|--------|-----------------|-----------|
|                              |        | D1              |           |
| CCET                         | 0602   | 2.8             | B         |
|                              | 09T3   | 4.4             | B         |
| CCGB<br>CCMB<br>CCGH<br>CCMH | 0602   | 2.8             | B         |
|                              |        |                 |           |
|                              |        |                 |           |
|                              |        |                 |           |
| CCGT                         | 03S1   | 2.0             | B         |
|                              | 04T0   | 2.4             | B         |
|                              | 0602   | 2.8             | B         |
|                              | 09T3   | 4.4             | B         |
|                              | 1204   | 5.5             | B         |
| CCMT                         | 0602   | 2.8             | B         |
|                              | 0803   | 3.4             | B         |
|                              | 09T3   | 4.4             | B         |
|                              | 1204   | 5.5             | B         |
| CCGW<br>CCMW                 | 03S1   | 2.0             | B         |
|                              | 04T0   | 2.4             | B         |
|                              | 0602   | 2.8             | B         |
|                              | 09T3   | 4.4             | B         |
|                              | 1204   | 5.5             | B         |
| CPGT                         | 0802   | 3.4             | B         |
|                              | 0903   | 4.4             | B         |
| CPGB<br>CPMB<br>CPMH         | 0802   | 3.5             | D         |
|                              | 0903   | 4.5             | D         |
|                              |        |                 |           |
| CPMX<br>CPMH (Standard)      | 0802   | 3.5             | D         |
|                              | 0903   | 4.6             | D         |
| DCET<br>DCGT                 | 0702   | 2.8             | B         |
|                              | 11T3   | 4.4             | B         |
| DCGW<br>DCMW<br>DCMT         | 0702   | 2.8             | B         |
|                              | 11T3   | 4.4             | B         |
|                              | 1504   | 5.5             | B         |
| DEGX                         | 1504   | 5.1             | C         |
| RCMX                         | 1003M0 | 3.6             | D         |
|                              | 1204M0 | 4.2             | D         |
|                              | 1606M0 | 5.2             | D         |
|                              | 2006M0 | 6.5             | D         |
|                              | 2507M0 | 7.2             | D         |
|                              | 3209M0 | 9.5             | D         |

A

TURNING INSERTS



## POSITIVE

| Insert Number                |        | Dimensions (mm) | Hole Type |
|------------------------------|--------|-----------------|-----------|
|                              |        | D1              |           |
| RCGT<br>RCMT                 | 0602M0 | 2.8             | B         |
|                              | 0803M0 | 3.4             | B         |
|                              | 10T3M0 | 4.4             | B         |
| SCMT<br>SCMW                 | 09T3   | 4.4             | B         |
|                              | 1204   | 5.5             | B         |
| SPMW                         | 0903   | 4.6             | B         |
|                              | 1203   | 5.7             | B         |
| SPMT                         | 0903   | 4.4             | B         |
|                              | 1203   | 5.5             | B         |
| SPGX                         | 0903   | 4.8             | D         |
|                              | 1203   | 5.9             | D         |
| TCGT<br>TCMT<br>TCGW<br>TCMW | 0601   | 2.3             | B         |
|                              | 0802   | 2.3             | B         |
|                              | 0902   | 2.5             | B         |
|                              | 1102   | 2.8             | B         |
|                              | 1303   | 3.4             | B         |
|                              | 16T3   | 4.4             | B         |
| TEGX                         | 1603   | 4.4             | D         |
| TPGX                         | 0802   | 2.5             | C         |
|                              | 0902   | 3.0             | C         |
|                              | 1103   | 3.5             | C         |
|                              | 1603   | 4.8             | D         |
|                              | 1604   | 4.8             | D         |
| TPMX                         | 0902   | 3.2 *           | C         |
|                              | 1103   | 3.5             | C         |
|                              | 1103   | 3.7             | C         |
|                              | 1603   | 4.8             | D         |
| TPGB<br>TPMB<br>TPGH<br>TPMH | 0802   | 2.4             | D         |
|                              | 0902   | 2.9             | D         |
|                              | 1103   | 3.4             | D         |
|                              | 1603   | 4.4             | D         |
| TPGT                         | 1603   | 4.4             | B         |
| TPGV                         | 0902   | 2.8             | B         |
|                              | 1103   | 3.4             | B         |

\*D1 of MD220 is 3.0.

| Insert Number                |      | Dimensions (mm) | Hole Type |
|------------------------------|------|-----------------|-----------|
|                              |      | D1              |           |
| VBET<br>VBGT<br>VBMT<br>VBGW | 1103 | 2.9             | B         |
|                              | 1604 | 4.4             | B         |
|                              |      |                 |           |
|                              |      |                 |           |
| VCGT<br>VCMT<br>VCGW<br>VCMW | 0802 | 2.4             | B         |
|                              | 1103 | 2.8             | B         |
|                              | 1303 | 3.4             | B         |
|                              | 1604 | 4.4             | B         |
| VDGX                         | 1603 | 4.5             | D         |
| VPET<br>VPGT                 | 0802 | 2.42            | B         |
|                              | 1103 | 2.85            | B         |
| WBGT<br>WBMT                 | 0201 | 2.3             | B         |
|                              | L302 | 2.3             | B         |
| WCGT<br>WCMT<br>WCGW<br>WCMW | 0201 | 2.3             | B         |
|                              | L302 | 2.3             | B         |
|                              | 0402 | 2.8             | B         |
|                              | 06T3 | 4.4             | B         |
|                              |      |                 |           |
| WPGT<br>WPMT                 | 0402 | 2.8             | B         |
|                              | 0603 | 4.4             | B         |
| XCMT                         | 1503 | 2.8             | B         |

A

TURNING INSERTS

# PRECISION CHIPBREAKER SYSTEM

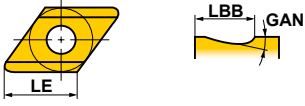
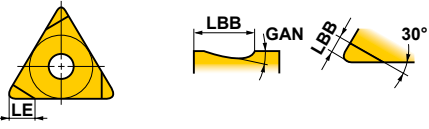
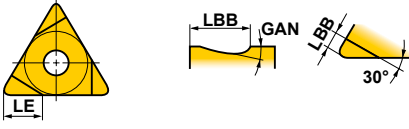
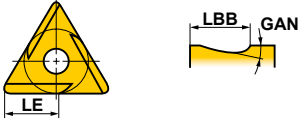
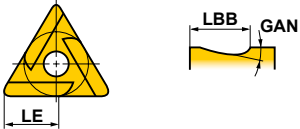
## STANDARD OF INSERTS WITH HAND OF TOOL

### ●NEGATIVE INSERTS

Unit : mm

TURNING INSERTS

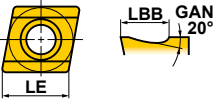
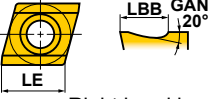
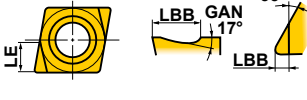
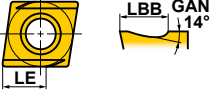
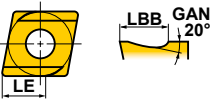
A

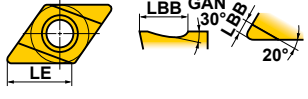
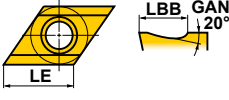
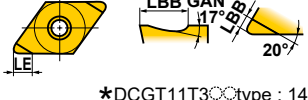
| Geometry                                                                                                        | Insert Number    | LBB | LE   | GAN |
|-----------------------------------------------------------------------------------------------------------------|------------------|-----|------|-----|
| <br>Right hand insert shown.   | DNGG150404R/L    | 2.8 | 14.9 | 15° |
|                                                                                                                 | DNGG150408R/L    | 2.8 | 14.3 | 15° |
|                                                                                                                 | DNGG150604R/L    | 2.8 | 14.9 | 15° |
|                                                                                                                 | DNGG150608R/L    | 2.8 | 14.3 | 15° |
| <br>Right hand insert shown.   | SNGG090304R/L    | 1.8 | 1.6  | 15° |
|                                                                                                                 | SNGG090308R/L    | 1.8 | 1.6  | 15° |
|                                                                                                                 | SNGG120404R/L    | 2.3 | 3.7  | 15° |
|                                                                                                                 | SNGG120408R/L    | 2.3 | 3.7  | 15° |
| <br>Right hand insert shown.   | TNGG160402R/L-FS | 1.3 | 2.7  | 15° |
|                                                                                                                 | TNGG160404R/L-FS | 1.3 | 2.8  | 15° |
|                                                                                                                 | TNGG160408R/L-FS | 1.3 | 3.1  | 15° |
| <br>Right hand insert shown.  | TNGG160402R/L-F  | 2.5 | 5.1  | 15° |
|                                                                                                                 | TNGG160404R/L-F  | 2.5 | 5.2  | 15° |
|                                                                                                                 | TNGG160408R/L-F  | 2.5 | 5.5  | 15° |
| <br>Right hand insert shown. | TNGG160402R/L-K  | 1.5 | 7.1  | 15° |
|                                                                                                                 | TNGG160404R/L-K  | 1.5 | 5.4  | 15° |
|                                                                                                                 | TNGG160408R/L-K  | 1.5 | 5.1  | 15° |
| <br>Right hand insert shown. | TNGG110302R/L    | 1.3 | 3.2  | 15° |
|                                                                                                                 | TNGG110304R/L    | 1.3 | 3.0  | 15° |
|                                                                                                                 | TNGG110308R/L    | 1.3 | 2.7  | 15° |
|                                                                                                                 | TNGG160304R/L    | 2.3 | 5.4  | 15° |
|                                                                                                                 | TNGG160402R/L    | 1.3 | 8.7  | 15° |
|                                                                                                                 | TNGG160404R/L    | 2.3 | 5.4  | 15° |
|                                                                                                                 | TNGG160408R/L    | 2.3 | 5.1  | 15° |
|                                                                                                                 | TNGG220404R/L    | 2.8 | 9.4  | 15° |
|                                                                                                                 | TNGG220408R/L    | 2.8 | 9.1  | 15° |
| <br>Right hand insert shown. | VNKG160404R/L    | 1.8 | 15.6 | 15° |
| <br>Right hand insert shown. | VNKG160402R/L-F  | 2.5 | 7.4  | 15° |
|                                                                                                                 | VNKG160404R/L-F  | 2.5 | 7.6  | 15° |



# ● POSITIVE INSERTS

Unit : mm

| Geometry                                                                                                            | Insert Number       | LBB | LE  |
|---------------------------------------------------------------------------------------------------------------------|---------------------|-----|-----|
|  <p>Right hand insert shown.</p>   | CCET0602V3R/L-SR    | 2.2 | 6.4 |
|                                                                                                                     | CCET060201R/L-SR    | 2.2 | 6.3 |
|                                                                                                                     | CCET060202R/L-SR    | 2.2 | 6.2 |
|                                                                                                                     | CCET060204R/L-SR    | 2.2 | 6.0 |
|                                                                                                                     | CCET09T3V3R/L-SR    | 3.2 | 9.6 |
|                                                                                                                     | CCET09T301R/L-SR    | 3.2 | 9.5 |
|                                                                                                                     | CCET09T302R/L-SR    | 3.2 | 9.4 |
|                                                                                                                     | CCET09T304R/L-SR    | 3.2 | 9.2 |
|                                                                                                                     | CCET060200R/L-SN    | 1.0 | 6.4 |
|  <p>Right hand insert shown.</p>   | CCET0602V3R/L-SN    | 1.0 | 6.4 |
|                                                                                                                     | CCET060201R/L-SN    | 1.0 | 6.3 |
|                                                                                                                     | CCET060202R/L-SN    | 1.0 | 6.2 |
|                                                                                                                     | CCET060204R/L-SN    | 1.0 | 6.0 |
|                                                                                                                     | CCET09T300R/L-SN    | 1.5 | 9.6 |
|                                                                                                                     | CCET09T3V3R/L-SN    | 1.5 | 9.6 |
|                                                                                                                     | CCET09T301R/L-SN    | 1.5 | 9.5 |
|                                                                                                                     | CCET09T302R/L-SN    | 1.5 | 9.4 |
|                                                                                                                     | CCET09T304R/L-SN    | 1.5 | 9.2 |
|  <p>Right hand insert shown.</p>  | CCET0602V3R/LW-SN   | 1.0 | 6.4 |
|                                                                                                                     | CCET09T3V3R/LW-SN   | 1.5 | 9.6 |
|                                                                                                                     |                     |     |     |
|  <p>Right hand insert shown.</p> | CCGH060202(M)R/L-F  | 1.2 | 3.6 |
|                                                                                                                     | CCGH060204(M)R/L-F  | 1.4 | 4.4 |
|                                                                                                                     |                     |     |     |
|  <p>Left hand insert shown.</p>  | CCGT03S1V3L-F       | 0.8 | 1.4 |
|                                                                                                                     | CCGT03S101(M)R/L-F  | 0.8 | 1.4 |
|                                                                                                                     | CCGT03S102(M)R/L-F  | 0.8 | 1.5 |
|                                                                                                                     | CCGT03S104(M)R/L-F  | 0.8 | 1.6 |
|                                                                                                                     | CCGT04T0V3L-F       | 1.0 | 1.7 |
|                                                                                                                     | CCGT04T001(M)R/L-F  | 1.0 | 1.8 |
|                                                                                                                     | CCGT04T002(M)R/L-F  | 1.0 | 1.8 |
|                                                                                                                     | CCGT04T004(M)R/L-F  | 1.0 | 2.0 |
|                                                                                                                     | CCGT0602V3R/L-SS    | 1.0 | 3.0 |
|                                                                                                                     | CCGT060201(M)R/L-SS | 1.0 | 3.0 |
|  <p>Right hand insert shown.</p> | CCGT060202(M)R/L-SS | 1.0 | 3.0 |
|                                                                                                                     | CCGT09T3V3R/L-SS    | 1.0 | 5.0 |
|                                                                                                                     | CCGT09T301(M)R/L-SS | 1.0 | 5.0 |
|                                                                                                                     | CCGT09T302(M)R/L-SS | 1.0 | 5.0 |
|                                                                                                                     | CCGT09T304MR/L-SS   | 1.0 | 5.0 |
|                                                                                                                     | CCGT0602V3R-SN      | 1.0 | 3.0 |
|                                                                                                                     | CCGT060201(M)R/L-SN | 1.0 | 3.0 |
|  <p>Right hand insert shown.</p> | CCGT060202(M)R/L-SN | 1.0 | 3.0 |
|                                                                                                                     | CCGT09T3V3R/L-SN    | 1.5 | 5.0 |
|                                                                                                                     | CCGT09T301(M)R/L-SN | 1.5 | 5.0 |
|                                                                                                                     | CCGT09T302(M)R/L-SN | 1.5 | 5.0 |
|                                                                                                                     | CCGT09T304(M)R/L-SN | 1.5 | 5.0 |
|                                                                                                                     | CPGT080204R/L-F     | 1.8 | 5.5 |
|                                                                                                                     | CPGT090302R/L-F     | 1.8 | 5.4 |
|  <p>Right hand insert shown.</p> | CPGT090304R/L-F     | 1.8 | 5.5 |
|                                                                                                                     |                     |     |     |

| Geometry                                                                                                                                        | Insert Number       | LBB | LE   |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----|------|
|  <p>Right hand insert shown.</p>                              | DCGT11T301MR-SRF    | 1.0 | 3.1  |
|                                                                                                                                                 | DCGT11T302MR-SRF    | 1.0 | 3.2  |
|                                                                                                                                                 | DCGT11T304MR-SRF    | 1.0 | 3.4  |
|                                                                                                                                                 |                     |     |      |
|  <p>Right hand insert shown.</p>                              | DCET0702V3R/L-SR    | 2.5 | 7.7  |
|                                                                                                                                                 | DCET070201R/L-SR    | 2.5 | 7.6  |
|                                                                                                                                                 | DCET070202R/L-SR    | 2.5 | 7.4  |
|                                                                                                                                                 | DCET070204R/L-SR    | 2.5 | 7.1  |
|                                                                                                                                                 | DCET11T3V3R/L-SR    | 3.7 | 11.6 |
|                                                                                                                                                 | DCET11T301R/L-SR    | 3.7 | 11.4 |
|                                                                                                                                                 | DCET11T302R/L-SR    | 3.7 | 11.3 |
|                                                                                                                                                 | DCET11T304R/L-SR    | 3.7 | 11.0 |
|                                                                                                                                                 | DCET070200R/L-SN    | 1.0 | 7.7  |
|                                                                                                                                                 | DCET0702V3R/L-SN    | 1.0 | 7.7  |
|  <p>Right hand insert shown.</p>                             | DCET070201R/L-SN    | 1.0 | 7.6  |
|                                                                                                                                                 | DCET070202R/L-SN    | 1.0 | 7.4  |
|                                                                                                                                                 | DCET070204R/L-SN    | 1.0 | 7.1  |
|                                                                                                                                                 | DCET11T300R/L-SN    | 1.5 | 11.6 |
|                                                                                                                                                 | DCET11T3V3R/L-SN    | 1.5 | 11.6 |
|                                                                                                                                                 | DCET11T301R/L-SN    | 1.5 | 11.4 |
|                                                                                                                                                 | DCET11T302R/L-SN    | 1.5 | 11.3 |
|                                                                                                                                                 | DCET11T304R/L-SN    | 1.5 | 11.0 |
|                                                                                                                                                 | DCET0702V3R/LW-SN   | 1.0 | 7.7  |
|                                                                                                                                                 | DCET11T3V3R/LW-SN   | 1.5 | 11.6 |
|  <p>Right hand insert shown.</p>                            | DCGT070202R/L-F     | 1.0 | 3.0  |
|                                                                                                                                                 | DCGT070204R/L-F     | 1.0 | 3.2  |
|                                                                                                                                                 | DCGT11T302R/L-F     | 1.0 | 3.0  |
|                                                                                                                                                 | DCGT11T304R/L-F     | 1.0 | 3.2  |
|                                                                                                                                                 |                     |     |      |
|  <p>*DCGT11T300 type : 14°<br/>Right hand insert shown.</p> | DCGT0702V3R/L-SS    | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT070201R/L-SS    | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT070202(M)R/L-SS | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT11T3V3R-SS      | 1.0 | 6.5  |
|                                                                                                                                                 | DCGT11T301(M)R/L-SS | 1.0 | 6.5  |
|                                                                                                                                                 | DCGT11T302(M)R/L-SS | 1.0 | 6.5  |
|                                                                                                                                                 | DCGT11T304MR/L-SS   | 1.0 | 6.5  |
|  <p>Right hand insert shown.</p>                            | DCGT0702V3R-SN      | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT070201(M)R/L-SN | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT070202(M)R/L-SN | 1.0 | 3.5  |
|                                                                                                                                                 | DCGT11T3V3R/L-SN    | 1.5 | 6.5  |
|                                                                                                                                                 | DCGT11T301(M)R/L-SN | 1.5 | 6.5  |
|                                                                                                                                                 | DCGT11T302(M)R/L-SN | 1.5 | 6.5  |
|                                                                                                                                                 | DCGT11T304(M)R/L-SN | 1.5 | 6.5  |
|  <p>Right hand insert shown.</p>                            | DEGX150402R/L       | 2.8 | 15.2 |
|                                                                                                                                                 | DEGX150404R/L       | 2.8 | 14.9 |

A

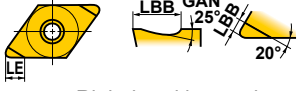
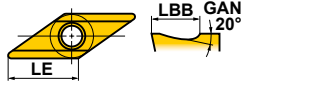
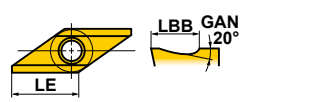
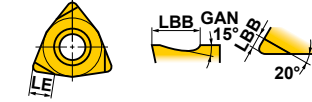
TURNING INSERTS

# PRECISION CHIPBREAKER SYSTEM

## STANDARD OF INSERTS WITH HAND OF TOOL

### ● POSITIVE INSERTS

Unit : mm

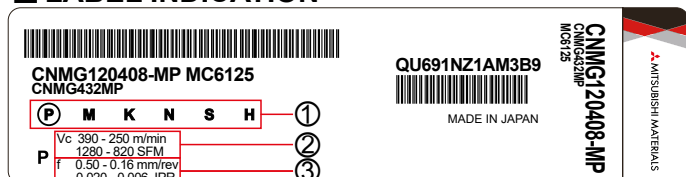
| Geometry                                                                                                                                | Insert Number                                                                                                                                                | LBB                                                  | LE                                                   | Geometry                                                                                                         | Insert Number                                                                                                                        | LBB                                                  | LE                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
| <br>Right hand insert shown.                           | DEGX150402R/L-F<br>DEGX150404R/L-F                                                                                                                           | 2.5<br>2.5                                           | 7.4<br>7.6                                           | <br>Right hand insert shown.   | VBGT110302R/L-F<br>VBGT110304R/L-F<br>VBGT160402R/L-F<br>VBGT160404R/L-F                                                             | 1.0<br>1.0<br>1.5<br>1.5                             | 3.0<br>3.2<br>4.5<br>4.7                             |
| <br>Right hand insert shown.                           | SPGR090304R                                                                                                                                                  | 1.8                                                  | 1.6                                                  | <br>Right hand insert shown.   | VBET1103V3R/L-SR<br>VBET110301R/L-SR<br>VBET110302R/L-SR<br>VBET110304R/L-SR                                                         | 2.5<br>2.5<br>2.5<br>2.5                             | 7.3<br>7.3<br>7.4<br>7.6                             |
| <br>Left hand insert shown.                            | TCGT0601V3L-F<br>TCGT060101L-F<br>TCGT060102R/L-F<br>TCGT060104R/L-F                                                                                         | 1.0<br>1.0<br>1.0<br>1.0                             | 2.9<br>3.0<br>3.0<br>3.2                             | <br>Right hand insert shown.   | VBET110300R/L-SN<br>VBET1103V3R/L-SN<br>VBET110301R/L-SN<br>VBET110302R/L-SN<br>VBET110304R/L-SN                                     | 1.0<br>1.0<br>1.0<br>1.0<br>1.0                      | 11.0<br>11.0<br>10.8<br>10.5<br>11.0                 |
| <br>Right hand insert shown.                           | TEGX160302R/L<br>TEGX160304R/L                                                                                                                               | 2.0<br>2.0                                           | 6.0<br>6.0                                           | <br>Right hand insert shown.   | VBET1103V3R/LW-SN                                                                                                                    | 1.0                                                  | 11.0                                                 |
| <br>*TPGH1603 type : 14°<br>Right hand insert shown. | TPGH080202R/L-FS<br>TPGH080204R/L-FS<br>TPGH090202R/L-FS<br>TPGH090204R/L-FS<br>TPGH110302R/L-FS<br>TPGH110304R/L-FS<br>TPGH160304R/L-FS<br>TPGH160308R/L-FS | 0.9<br>0.9<br>1.0<br>1.0<br>1.4<br>1.4<br>2.0<br>2.0 | 2.7<br>2.9<br>3.0<br>3.2<br>4.2<br>4.4<br>6.1<br>6.5 | <br>Right hand insert shown. | VCGT080202R/L-F<br>VCGT080204R/L-F                                                                                                   | 0.8<br>0.8                                           | 2.5<br>2.6                                           |
| <br>Right hand insert shown.                         | TPGR110304R/L<br>TPGR160304R/L<br>TPGR160308R/L                                                                                                              | 1.3<br>2.3<br>2.3                                    | 3.0<br>5.4<br>5.1                                    | <br>Right hand insert shown. | VDGX160302R/L<br>VDGX160304R/L                                                                                                       | 2.0<br>2.0                                           | 6.0<br>6.1                                           |
| <br>Right hand insert shown.                         | TPGX080202R/L<br>TPGX080204R/L<br>TPGX090202R/L<br>TPGX090204R/L<br>TPGX090208R/L<br>TPGX110302L<br>TPGX110304R/L<br>TPGX110308R/L                           | 1.3<br>1.3<br>1.6<br>1.6<br>1.4<br>1.8<br>1.8<br>1.8 | 3.9<br>4.1<br>4.8<br>5.0<br>4.7<br>5.4<br>5.5<br>5.9 | <br>Left hand insert shown.  | VPET080201R/L-SRF<br>VPET080202R/L-SRF<br>VPET1103V3R/L-SRF<br>VPET110301R/L-SRF<br>VPET110302R/L-SRF                                | 0.8<br>0.8<br>1.0<br>1.0<br>1.0                      | 2.4<br>2.5<br>2.9<br>3.0<br>3.0                      |
|                                                                                                                                         |                                                                                                                                                              |                                                      |                                                      | <br>Right hand insert shown. | WBG0201V3L-F<br>WBG020101L-F<br>WBG020102L-F<br>WBG020104L-F<br>WBGTL302V3L-F<br>WBGTL30201L-F<br>WBGTL30202R/L-F<br>WBGTL30204R/L-F | 1.0<br>1.0<br>1.0<br>1.0<br>1.0<br>1.0<br>1.0<br>1.0 | 2.0<br>2.0<br>2.1<br>2.2<br>2.0<br>2.0<br>2.1<br>2.2 |
|                                                                                                                                         |                                                                                                                                                              |                                                      |                                                      | <br>Right hand insert shown. | WCGT020102R/L<br>WCGT020104R/L<br>WCGTL30202L<br>WCGTL30204L                                                                         | 1.0<br>1.0<br>1.0<br>1.0                             | 2.1<br>2.2<br>2.1<br>2.2                             |
|                                                                                                                                         |                                                                                                                                                              |                                                      |                                                      |                                                                                                                  | WPGT040204R/L-FS<br>WPGT060304R/L-FS                                                                                                 | 1.0<br>1.0                                           | 3.2<br>3.2                                           |

# TOOL NAVI

## ■ OUTLINE

TOOL NAVI provides information and suitable cutting conditions for each material by selecting the optimum indexable insert together with a suitable tool life expectancy.

## ■ LABEL INDICATION



\*1 Some inserts will have multiple material recommendations.

\*2 Please contact us for recommended cutting conditions when using coefficient values other than above.

## ② Cutting speed standards (Performance versus tool life)

| Material | Tool Life |             | Material                  | Hardness |
|----------|-----------|-------------|---------------------------|----------|
|          | Life      | Performance |                           |          |
| P        | 90min     | 15min       | Carbon steel, alloy steel | 180HB    |
| M        | 90min     | 15min       | Stainless steel           | 180HB    |
| K        | 90min     | 15min       | Cast iron                 | 180HB    |
| S        | 25min     | 5min        | Titanium alloy            | 320HB    |
|          |           |             | Ni, Co-Based alloy        | 400HB    |
| H        | 80min     | 10min       | Hardened steel            | 60HRC    |

\*3 N : Life based on each grade. For stable conditions choose the performance cutting speed, for unstable conditions choose the tool life feed rate.

\*4 The tool life is based on the following (VB wear). Some materials include elements other than this.  
 PMKS ... VB=0.3mm  
 H ... VB=0.1mm

## ■ TOOL LIFE

Cutting speed has a large affect on tool life. TOOL NAVI is based on Taylor's equation (relationship  $V_c T^n = C$  between tool grade, cutting conditions, and tool life). Therefore, performance speed and tool life is found for each material. When a different tool life is required, obtain coefficient values of the grade used from the charts below. Multiply the coefficient values by the cutting speed to calculate a new cutting speed.

### ● P Grade (Steel) cutting speed coefficient values.

| Grade \ Tool life | 15min | 30min | 45min | 60min | 90min |
|-------------------|-------|-------|-------|-------|-------|
| MC6115            | 1.00  | 0.82  | 0.72  | 0.67  | 0.59  |
| MC6125            | 1.00  | 0.83  | 0.75  | 0.69  | 0.62  |
| MP3025            | 1.00  | 0.85  | 0.77  | 0.72  | 0.65  |
| NX2525            | 1.00  | 0.87  | 0.80  | 0.76  | 0.70  |

### ● M Grade (Stainless Steel) cutting speed coefficient values.

| Grade \ Tool life | 15min | 30min | 45min | 60min | 90min |
|-------------------|-------|-------|-------|-------|-------|
| MC7015            | 1.00  | 0.83  | 0.75  | 0.70  | 0.63  |
| MC7025            | 1.00  | 0.90  | 0.84  | 0.80  | 0.75  |
| MP7035            | 1.00  | 0.84  | 0.76  | 0.71  | 0.62  |
| US735             | 1.00  | 0.78  | 0.68  | 0.61  | 0.53  |

## ① Materials

P : Steel (Reference material : Carbon steel, alloy steel 180HB)  
 M : Stainless steel (Reference material : Austenitic stainless steel 180HB)  
 K : Cast iron (Reference material : Gray cast iron, ductile cast iron 180HB)  
 N : Aluminium alloy, non-ferrous metals  
 S : Reference material : Titanium alloy 320HB, Ni, Co-Based alloy 400HB  
 H : Hardened steel 60HRC

## ③ Feed rate standards

Minimum and maximum feed rates shown are based on the chip control range and are dependant on the chipbreaker geometry.

### ● K Grade (Cast Iron) cutting speed coefficient values.

| Grade \ Tool life | 15min | 30min | 45min | 60min | 90min |
|-------------------|-------|-------|-------|-------|-------|
| MC5115            | 1.00  | 0.79  | 0.69  | 0.62  | 0.54  |
| MC5125            | 1.00  | 0.76  | 0.65  | 0.58  | 0.50  |

(ex.) Medium cutting of steel  
 The 1st recommendation : MC6125  
 Indexable inserts : CNMG120408-MP  
 Recommended cutting speed :  $V_c=390\text{m/min}$   
 (Tool life : 15min.)



Tool life required : 30min.

$390 \times 0.83 \approx 323\text{m/min}$

## ■ HARDNESS OF THE MATERIAL

Hardness of the material also affects tool life. Mitsubishi's TOOL NAVI suggests cutting speed variations when material hardness differs. Obtain the suitable coefficient value for each type of material from the chart below. Multiply the coefficient value by the recommended cutting speed of the grade used to calculate a new cutting speed.

| Material | (Hardness of material) |       |       |       |       |       |       |       |       |       |       |       |
|----------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|          | 120HB                  | 140HB | 160HB | 180HB | 200HB | 220HB | 240HB | 260HB | 280HB | 300HB | 320HB | 340HB |
| P        | 1.34                   | 1.19  | 1.08  | 1.00  | 0.92  | 0.85  | 0.80  | 0.75  | 0.71  | 0.68  | 0.64  | 0.61  |
| M        | 1.41                   | 1.23  | 1.10  | 1.00  | 0.91  | 0.85  | 0.78  | 0.72  | 0.68  | 0.64  | 0.61  | 0.58  |
| K        | 1.27                   | 1.19  | 1.09  | 1.00  | 0.97  | 0.91  | 0.88  | 0.85  | 0.81  | 0.78  | 0.75  | 0.72  |

A

TURNING INSERTS

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

### ● Selection of optimum inserts for turning

The following diagrams show for each type of material, the optimal combination of suitable grades and chipbreakers for each application area in turning.

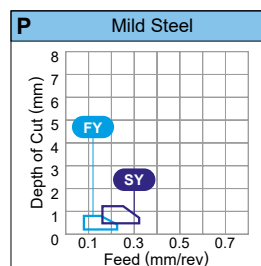
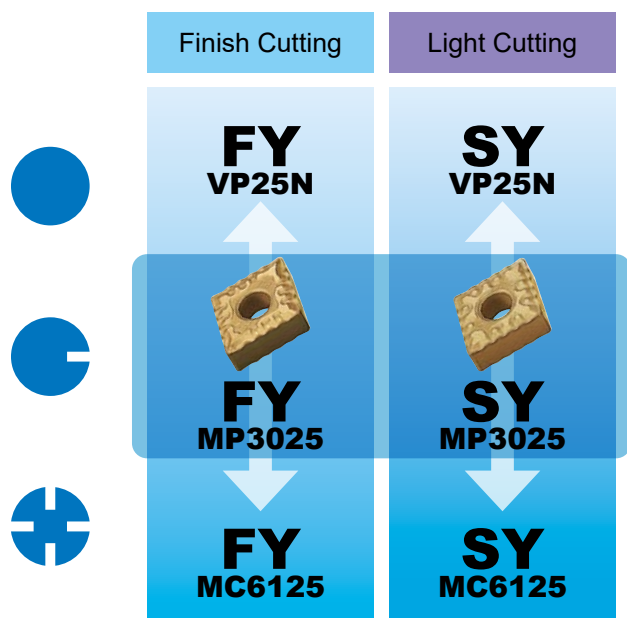
TURNING INSERTS

### ■ CUTTING CONDITIONS

- Stable Cutting  
Continuous Cutting  
Constant Depth of Cut  
Pre-Machined  
Securely Clamped Component Cutting
- General Cutting
- ⊕ Unstable Cutting  
Heavy Interrupted Cutting  
Irregular Depth of Cut  
Low Clamping Rigidity Cutting

### ■ CUTTING AREA

- F** Finish Cutting
- L** Light Cutting
- M** Medium Cutting
- R** Rough Cutting
- H** Heavy Cutting

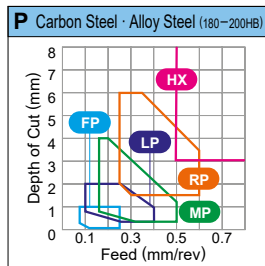


### **P** Mild Steel\* (ex. St37-2, Ck10) NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                    | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|--------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                    |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| ● Stable Cutting   | <b>F</b>     | <b>FY</b>   | <b>VP25N</b>  | 285—450            | 0.09—0.23  | 0.20—0.80 |
|                    | <b>L</b>     | <b>SY</b>   | <b>VP25N</b>  | 260—410            | 0.16—0.33  | 0.50—1.20 |
| ● General Cutting  | <b>F</b>     | <b>FY</b>   | <b>MP3025</b> | 275—425            | 0.09—0.23  | 0.20—0.80 |
|                    | <b>L</b>     | <b>SY</b>   | <b>MP3025</b> | 255—385            | 0.16—0.33  | 0.50—1.20 |
| ⊕ Unstable Cutting | <b>F</b>     | <b>FY</b>   | <b>MC6125</b> | 385—605            | 0.09—0.23  | 0.20—0.80 |
|                    | <b>L</b>     | <b>SY</b>   | <b>MC6125</b> | 350—550            | 0.16—0.33  | 0.50—1.20 |

\*Please refer to page A076 for other steels.



- Stable Cutting
- ◐ General Cutting
- ⊕ Unstable Cutting

- F** Finish Cutting
- L** Light Cutting
- M** Medium Cutting
- R** Rough Cutting
- H** Heavy Cutting

TURNING INSERTS

|   | Finish Cutting      | Light Cutting       | Medium Cutting      | Rough Cutting       | Heavy Cutting       |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|
| ● | <b>FP</b><br>NX2525 | <b>LP</b><br>MC6115 | <b>MP</b><br>MC6115 | <b>RP</b><br>MC6115 | <b>HX</b><br>MC6125 |
| ◐ | <b>FP</b><br>MP3025 | <b>LP</b><br>MC6115 | <b>MP</b><br>MC6125 | <b>RP</b><br>MC6125 | <b>HX</b><br>MC6135 |
| ⊕ | <b>FP</b><br>MC6135 | <b>LP</b><br>MC6135 | <b>MP</b><br>MC6135 | <b>RP</b><br>MC6135 | <b>HX</b><br>MC6135 |

**P** Carbon Steel • Alloy Steel\* (ex. Ck45, 42CrMo4)

NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

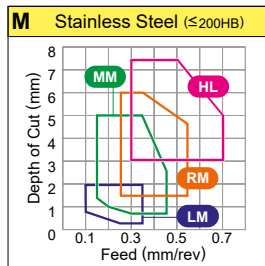
|                       | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |            |
|-----------------------|--------------|-------------|---------------|--------------------|------------|------------|
|                       |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)    |
| ●<br>Stable Cutting   | <b>F</b>     | <b>FP</b>   | <b>NX2525</b> | 210—300            | 0.08—0.25  | 0.10—1.00  |
|                       | <b>L</b>     | <b>LP</b>   | <b>MC6115</b> | 250—480            | 0.10—0.40  | 0.30—2.00  |
|                       | <b>M</b>     | <b>MP</b>   | <b>MC6115</b> | 230—440            | 0.16—0.50  | 0.30—4.00  |
|                       | <b>R</b>     | <b>RP</b>   | <b>MC6115</b> | 215—415            | 0.25—0.60  | 1.50—6.00  |
|                       | <b>H</b>     | <b>HX</b>   | <b>MC6125</b> | 210—330            | 0.50—1.26  | 3.00—11.00 |
| ◐<br>General Cutting  | <b>F</b>     | <b>FP</b>   | <b>MP3025</b> | 215—330            | 0.08—0.25  | 0.10—1.00  |
|                       | <b>L</b>     | <b>LP</b>   | <b>MC6115</b> | 250—480            | 0.10—0.40  | 0.30—2.00  |
|                       | <b>M</b>     | <b>MP</b>   | <b>MC6125</b> | 250—390            | 0.16—0.50  | 0.30—4.00  |
|                       | <b>R</b>     | <b>RP</b>   | <b>MC6125</b> | 235—370            | 0.25—0.60  | 1.50—6.00  |
|                       | <b>H</b>     | <b>HX</b>   | <b>MC6135</b> | 170—260            | 0.50—1.26  | 3.00—11.00 |
| ⊕<br>Unstable Cutting | <b>F</b>     | <b>FP</b>   | <b>MC6135</b> | 245—370            | 0.08—0.25  | 0.10—1.00  |
|                       | <b>L</b>     | <b>LP</b>   | <b>MC6135</b> | 225—340            | 0.10—0.40  | 0.30—2.00  |
|                       | <b>M</b>     | <b>MP</b>   | <b>MC6135</b> | 205—310            | 0.16—0.50  | 0.30—4.00  |
|                       | <b>R</b>     | <b>RP</b>   | <b>MC6135</b> | 190—290            | 0.25—0.60  | 1.50—6.00  |
|                       | <b>H</b>     | <b>HX</b>   | <b>MC6135</b> | 170—260            | 0.50—1.26  | 3.00—11.00 |

\*Please refer to page A076 for other steels.

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

TURNING INSERTS

A



Stable Cutting



General Cutting



Unstable Cutting



Light Cutting



Medium Cutting



Rough Cutting



Heavy Cutting

|                                                                                     | Light Cutting       | Medium Cutting      | Rough Cutting       | Heavy Cutting      |
|-------------------------------------------------------------------------------------|---------------------|---------------------|---------------------|--------------------|
|    | <b>LM</b><br>MC7015 | <b>MM</b><br>MC7015 | <b>RM</b><br>MC7015 | <b>HL</b><br>US735 |
|    | <b>LM</b><br>MC7025 | <b>MM</b><br>MC7025 | <b>RM</b><br>MC7025 | <b>HL</b><br>US735 |
|  | <b>LM</b><br>MP7035 | <b>MM</b><br>MP7035 | <b>RM</b><br>MP7035 | <b>HL</b><br>US735 |

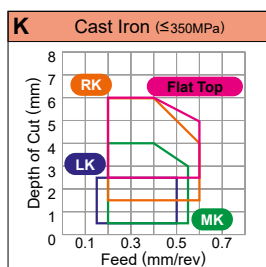
**M** Stainless Steel\* (ex. X5CrNi189, X5CrNiMo1810)  
NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                                                                                                         |              | 1st Recommendation |               |            |            |           |
|---------------------------------------------------------------------------------------------------------|--------------|--------------------|---------------|------------|------------|-----------|
|                                                                                                         | Cutting Area | Chipbreaker        | Grade         | Vc (m/min) | f (mm/rev) | ap (mm)   |
| <br>Stable Cutting   | <b>L</b>     | <b>LM</b>          | <b>MC7015</b> | 180—285    | 0.10—0.35  | 0.30—2.00 |
|                                                                                                         | <b>M</b>     | <b>MM</b>          | <b>MC7015</b> | 165—260    | 0.15—0.45  | 0.70—5.00 |
|                                                                                                         | <b>R</b>     | <b>RM</b>          | <b>MC7015</b> | 155—245    | 0.25—0.55  | 1.50—6.00 |
|                                                                                                         | <b>H</b>     | <b>HL</b>          | <b>US735</b>  | 75—140     | 0.30—0.70  | 3.00—7.50 |
| <br>General Cutting  | <b>L</b>     | <b>LM</b>          | <b>MC7025</b> | 165—220    | 0.10—0.35  | 0.30—2.00 |
|                                                                                                         | <b>M</b>     | <b>MM</b>          | <b>MC7025</b> | 150—200    | 0.15—0.45  | 0.70—5.00 |
|                                                                                                         | <b>R</b>     | <b>RM</b>          | <b>MC7025</b> | 140—190    | 0.25—0.55  | 1.50—6.00 |
|                                                                                                         | <b>H</b>     | <b>HL</b>          | <b>US735</b>  | 75—140     | 0.30—0.70  | 3.00—7.50 |
| <br>Unstable Cutting | <b>L</b>     | <b>LM</b>          | <b>MP7035</b> | 95—155     | 0.10—0.35  | 0.30—2.00 |
|                                                                                                         | <b>M</b>     | <b>MM</b>          | <b>MP7035</b> | 90—145     | 0.15—0.45  | 0.70—5.00 |
|                                                                                                         | <b>R</b>     | <b>RM</b>          | <b>MP7035</b> | 85—135     | 0.25—0.55  | 1.50—6.00 |
|                                                                                                         | <b>H</b>     | <b>HL</b>          | <b>US735</b>  | 75—140     | 0.30—0.70  | 3.00—7.50 |

\*Please refer to page A077 for other stainless steel.





- Stable Cutting
- General Cutting
- Unstable Cutting

- L** Light Cutting
- M** Medium Cutting
- R** Rough Cutting
- H** Heavy Cutting

TURNING INSERTS



**K** Cast Iron\* (ex. GG30)  
NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

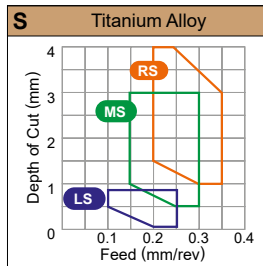
|  | Cutting Area | Chipbreaker     | Grade         | 1st Recommendation |            |           |
|--|--------------|-----------------|---------------|--------------------|------------|-----------|
|  |              |                 |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
|  | <b>L</b>     | <b>LK</b>       | <b>MC5105</b> | 230—365            | 0.10—0.50  | 0.50—2.50 |
|  | <b>M</b>     | <b>MK</b>       | <b>MC5105</b> | 210—335            | 0.20—0.55  | 0.50—4.00 |
|  | <b>R</b>     | <b>RK</b>       | <b>MC5105</b> | 195—315            | 0.20—0.60  | 1.50—6.00 |
|  | <b>H</b>     | <b>Flat Top</b> | <b>MC5105</b> | 195—315            | 0.20—0.60  | 2.50—6.00 |
|  | <b>L</b>     | <b>LK</b>       | <b>MC5105</b> | 205—335            | 0.10—0.50  | 0.50—2.50 |
|  | <b>M</b>     | <b>MK</b>       | <b>MC5105</b> | 190—305            | 0.20—0.55  | 0.50—4.00 |
|  | <b>R</b>     | <b>RK</b>       | <b>MC5105</b> | 180—285            | 0.20—0.60  | 1.50—6.00 |
|  | <b>H</b>     | <b>Flat Top</b> | <b>MC5105</b> | 180—285            | 0.20—0.60  | 2.50—6.00 |
|  | <b>L</b>     | <b>LK</b>       | <b>MC5115</b> | 205—335            | 0.10—0.50  | 0.50—2.50 |
|  | <b>M</b>     | <b>MK</b>       | <b>MC5115</b> | 190—305            | 0.20—0.55  | 0.50—4.00 |
|  | <b>R</b>     | <b>RK</b>       | <b>MC5115</b> | 180—285            | 0.20—0.60  | 1.50—6.00 |
|  | <b>H</b>     | <b>Flat Top</b> | <b>MC5115</b> | 180—285            | 0.20—0.60  | 2.50—6.00 |

\*Please refer to page A081 for other types of cast iron.

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

TURNING INSERTS

A



- Stable Cutting
- ◐ General Cutting
- ⊕ Unstable Cutting

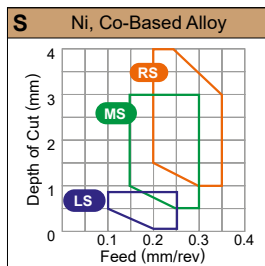
- F** Finish Cutting
- L** Light Cutting
- M** Medium Cutting
- R** Rough Cutting

|   | Finish Cutting      | Light Cutting       | Medium Cutting      | Rough Cutting       |
|---|---------------------|---------------------|---------------------|---------------------|
| ● | <b>LS</b><br>MT9015 | <b>LS</b><br>MT9015 | <b>MS</b><br>MT9015 | <b>RS</b><br>MT9015 |
| ◐ | <b>LS</b><br>MT9015 | <b>LS</b><br>MT9015 | <b>MS</b><br>MT9015 | <b>RS</b><br>MT9015 |
| ⊕ | <b>LS</b><br>MT9015 | <b>LS</b><br>MT9015 | <b>MS</b><br>MT9015 | <b>RS</b><br>MT9015 |

**S** Titanium Alloy (ex. Ti-6Al-4V)  
NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                       | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|-----------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                       |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| ●<br>Stable Cutting   | <b>F</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MT9015</b> | 40—80              | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MT9015</b> | 35—75              | 0.20—0.35  | 1.00—4.00 |
| ◐<br>General Cutting  | <b>F</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MT9015</b> | 40—80              | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MT9015</b> | 35—75              | 0.20—0.35  | 1.00—4.00 |
| ⊕<br>Unstable Cutting | <b>F</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MT9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MT9015</b> | 40—80              | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MT9015</b> | 35—75              | 0.20—0.35  | 1.00—4.00 |



- Stable Cutting
- ◐ General Cutting
- ⊕ Unstable Cutting

|          |                |
|----------|----------------|
| <b>F</b> | Finish Cutting |
| <b>L</b> | Light Cutting  |
| <b>M</b> | Medium Cutting |
| <b>R</b> | Rough Cutting  |

TURNING INSERTS

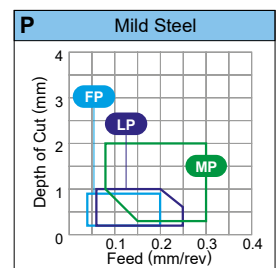
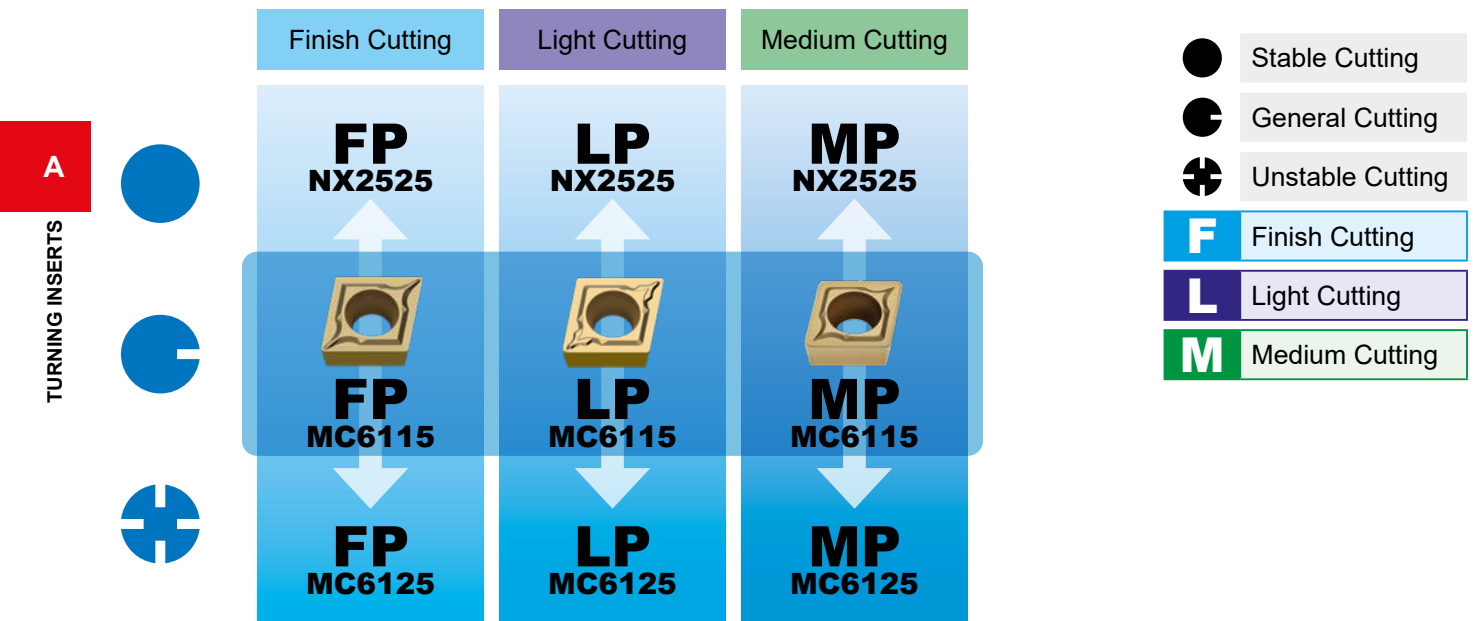
|   | Finish Cutting      | Light Cutting       | Medium Cutting      | Rough Cutting       |
|---|---------------------|---------------------|---------------------|---------------------|
| ● | <b>LS</b><br>MV9005 | <b>LS</b><br>MV9005 | <b>MS</b><br>MV9005 | <b>RS</b><br>MP9015 |
| ◐ | <b>LS</b><br>MP9015 | <b>LS</b><br>MP9015 | <b>MS</b><br>MP9015 | <b>RS</b><br>MP9015 |
| ⊕ | <b>LS</b><br>MP9025 | <b>LS</b><br>MP9025 | <b>MS</b><br>MP9025 | <b>RS</b><br>MP9025 |

**S** Ni, Co-Based Alloy (ex. Inconel®718)  
NEGATIVE INSERTS

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                       | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|-----------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                       |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| ●<br>Stable Cutting   | <b>F</b>     | <b>LS</b>   | <b>MV9005</b> | 75—140             | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MV9005</b> | 75—140             | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MV9005</b> | 70—130             | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MP9015</b> | 35—75              | 0.20—0.35  | 1.00—4.00 |
| ◐<br>General Cutting  | <b>F</b>     | <b>LS</b>   | <b>MP9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MP9015</b> | 40—85              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MP9015</b> | 40—80              | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MP9015</b> | 35—75              | 0.20—0.35  | 1.00—4.00 |
| ⊕<br>Unstable Cutting | <b>F</b>     | <b>LS</b>   | <b>MP9025</b> | 30—45              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>L</b>     | <b>LS</b>   | <b>MP9025</b> | 30—45              | 0.10—0.25  | 0.20—0.80 |
|                       | <b>M</b>     | <b>MS</b>   | <b>MP9025</b> | 30—45              | 0.15—0.30  | 0.50—3.00 |
|                       | <b>R</b>     | <b>RS</b>   | <b>MP9025</b> | 25—40              | 0.20—0.35  | 1.00—4.00 |

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

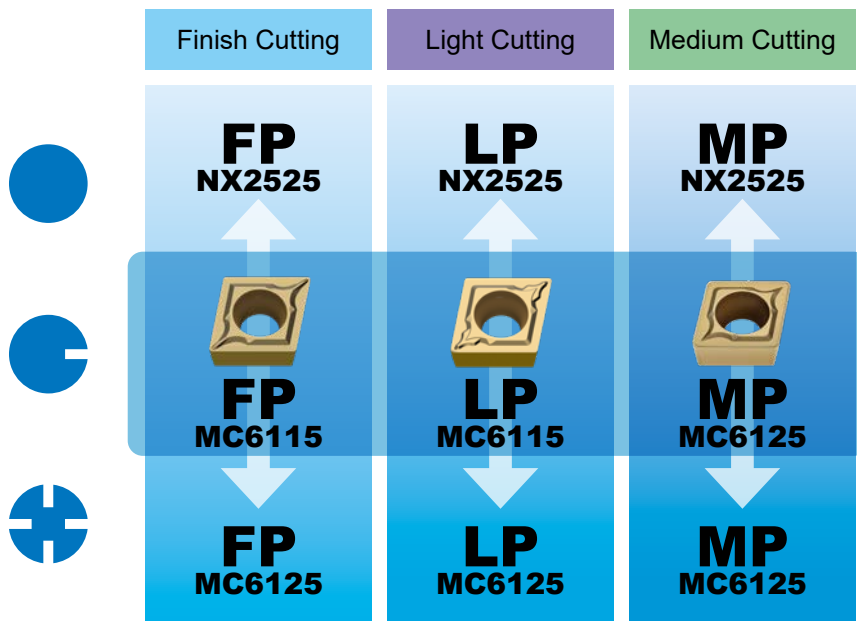


**P** Mild Steel\* (ex. St37-2, Ck10)  
7° POSITIVE INSERTS WITH HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

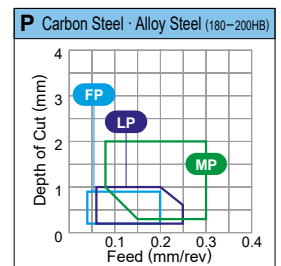
|                  | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                  |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>FP</b>   | <b>NX2525</b> | 225—320            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>NX2525</b> | 225—320            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>NX2525</b> | 185—270            | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>FP</b>   | <b>MC6115</b> | 295—570            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>MC6115</b> | 295—570            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>MC6115</b> | 245—475            | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>FP</b>   | <b>MC6125</b> | 320—505            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>MC6125</b> | 320—505            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>MC6125</b> | 270—420            | 0.08—0.30  | 0.30—2.00 |

\*Please refer to page A085 for other steel.



|          |                  |
|----------|------------------|
| ●        | Stable Cutting   |
| ●C       | General Cutting  |
| ⊕        | Unstable Cutting |
| <b>F</b> | Finish Cutting   |
| <b>L</b> | Light Cutting    |
| <b>M</b> | Medium Cutting   |

TURNING INSERTS



## P Carbon Steel • Alloy Steel\* (ex. Ck45, 42CrMo4)

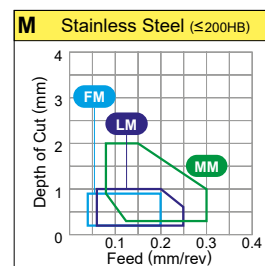
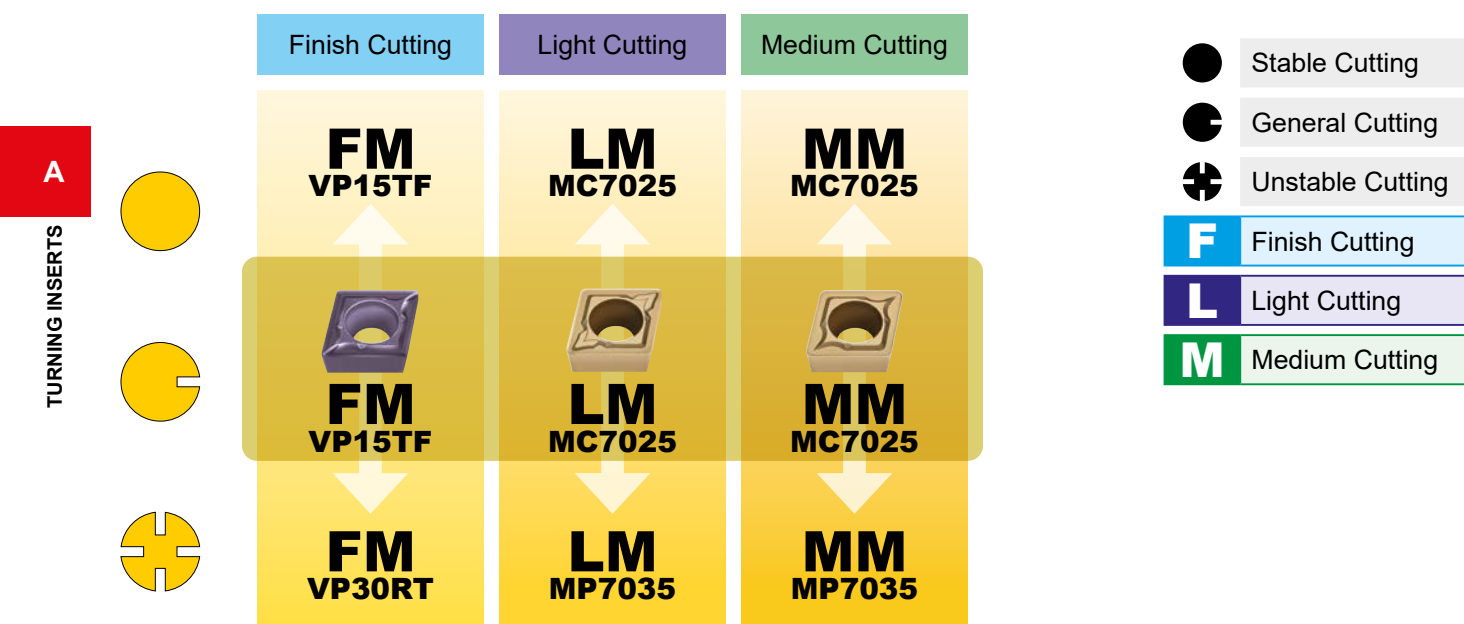
7° POSITIVE INSERTS WITH HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                  | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                  |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>FP</b>   | <b>NX2525</b> | 165—240            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>NX2525</b> | 165—240            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>NX2525</b> | 140—200            | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>FP</b>   | <b>MC6115</b> | 220—420            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>MC6115</b> | 220—420            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>MC6125</b> | 200—310            | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>FP</b>   | <b>MC6125</b> | 240—370            | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LP</b>   | <b>MC6125</b> | 240—370            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MP</b>   | <b>MC6125</b> | 200—310            | 0.08—0.30  | 0.30—2.00 |

\*Please refer to page A085 for other steel.

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING



### **M** Stainless Steel\* (ex. X5CrNi189, X5CrNiMo1810)

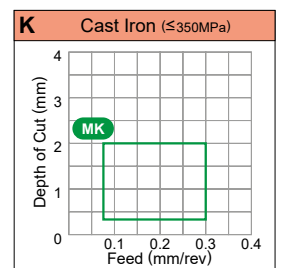
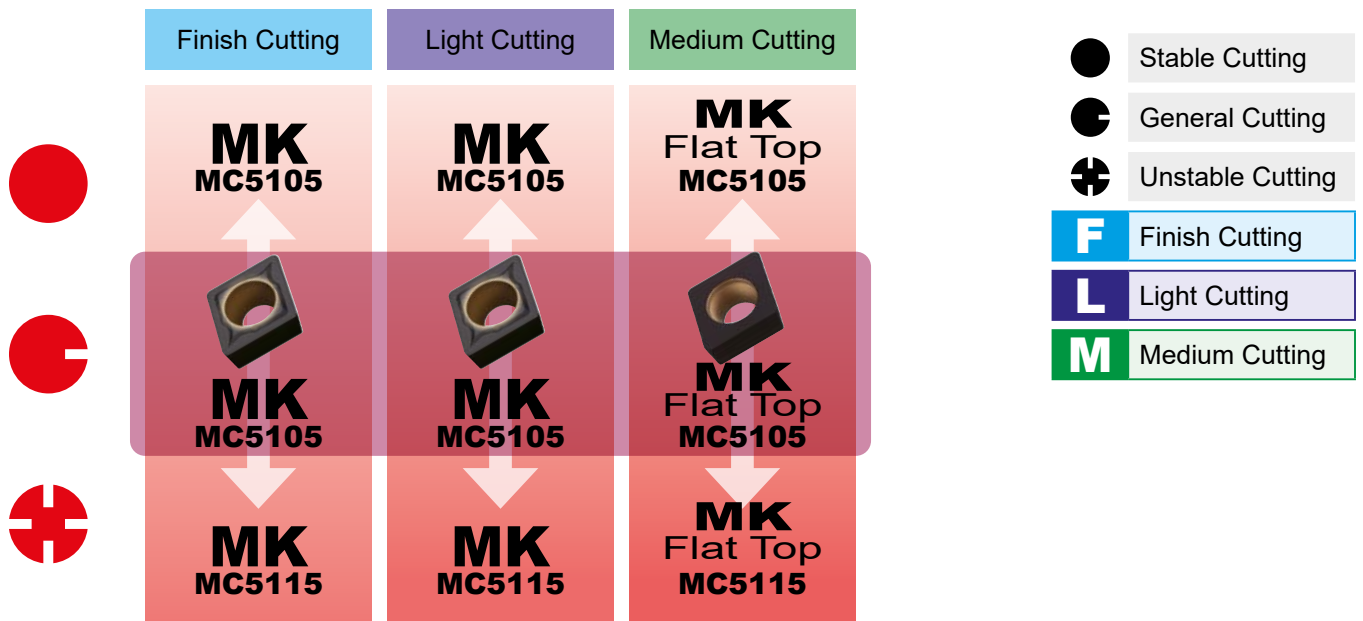
7° POSITIVE INSERTS WITH HOLE

**Vc** : Cutting Speed  
**f** : Feed  
**ap** : Depth of Cut

|                  | Cutting Area | Chipbreaker | Grade         | 1st Recommendation |            |           |
|------------------|--------------|-------------|---------------|--------------------|------------|-----------|
|                  |              |             |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>FM</b>   | <b>VP15TF</b> | 75—125             | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LM</b>   | <b>MC7025</b> | 140—190            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MM</b>   | <b>MC7025</b> | 120—160            | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>FM</b>   | <b>VP15TF</b> | 75—125             | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LM</b>   | <b>MC7025</b> | 140—190            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MM</b>   | <b>MC7025</b> | 120—160            | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>FM</b>   | <b>VP30RT</b> | 50—90              | 0.04—0.20  | 0.20—0.90 |
|                  | <b>L</b>     | <b>LM</b>   | <b>MP7035</b> | 85—135             | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MM</b>   | <b>MP7035</b> | 70—115             | 0.08—0.30  | 0.30—2.00 |

\*Please refer to page A086 for other stainless steel.





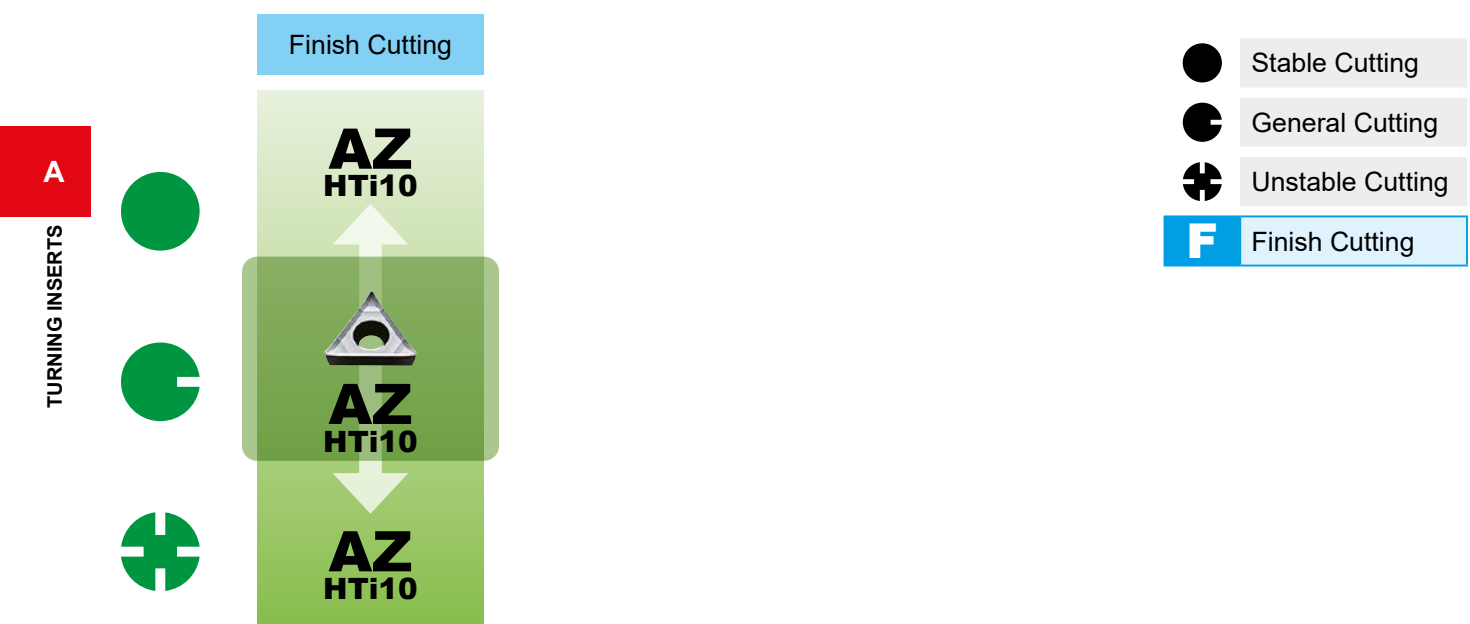
**K** Cast Iron\* (ex. GG30)  
7° POSITIVE INSERTS WITH HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                  | Cutting Area | Chipbreaker         | Grade         | 1st Recommendation |            |           |
|------------------|--------------|---------------------|---------------|--------------------|------------|-----------|
|                  |              |                     |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>MK</b>           | <b>MC5105</b> | 200—610            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>L</b>     | <b>MK</b>           | <b>MC5105</b> | 200—610            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MK, Flat Top</b> | <b>MC5105</b> | 165—510            | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>MK</b>           | <b>MC5105</b> | 200—610            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>L</b>     | <b>MK</b>           | <b>MC5105</b> | 200—610            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MK, Flat Top</b> | <b>MC5105</b> | 165—510            | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>MK</b>           | <b>MC5115</b> | 180—335            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>L</b>     | <b>MK</b>           | <b>MC5115</b> | 180—335            | 0.06—0.25  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MK, Flat Top</b> | <b>MC5115</b> | 150—280            | 0.08—0.30  | 0.30—2.00 |

\*Please refer to page A089 for other types of cast iron.

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

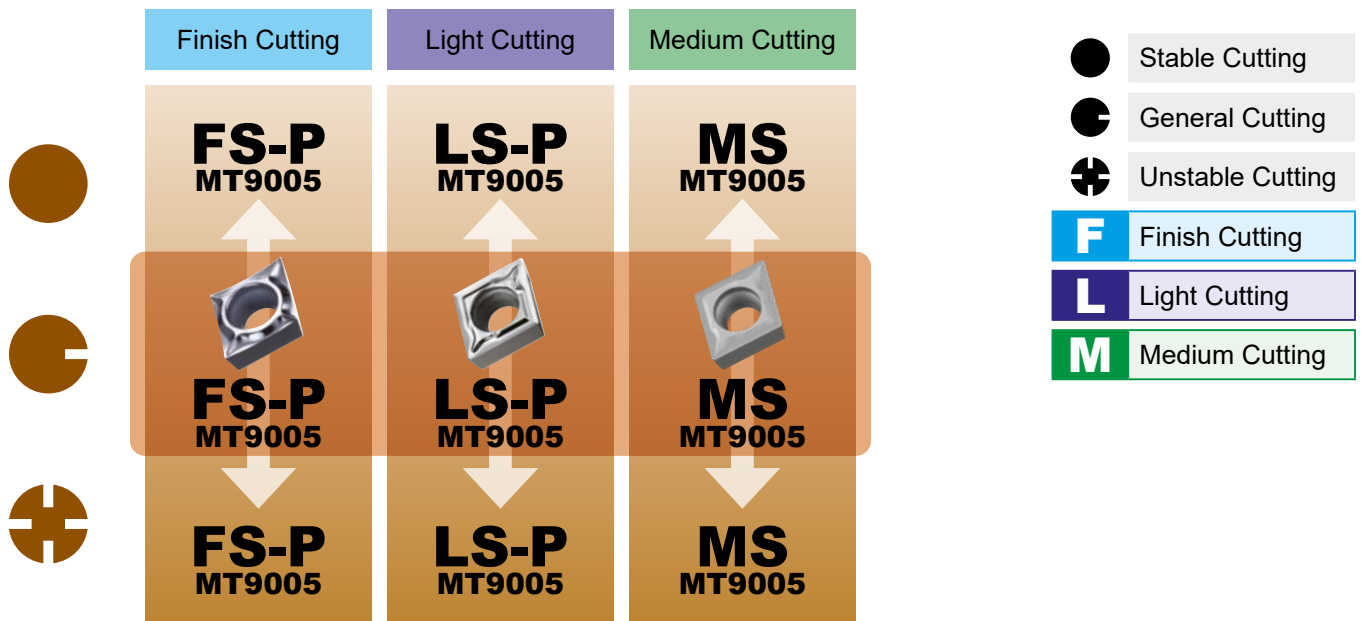


**N** Aluminium Alloy\* (ex. A6061, A7075)  
7° POSITIVE INSERTS WITH HOLE

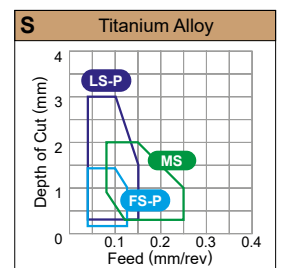
Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                    | Cutting Area | Chipbreaker | Grade        | 1st Recommendation |            |           |
|--------------------|--------------|-------------|--------------|--------------------|------------|-----------|
|                    |              |             |              | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| ● Stable Cutting   | <b>F</b>     | <b>AZ</b>   | <b>HTi10</b> | 300—700            | 0.10—0.40  | 0.20—3.00 |
| ● General Cutting  | <b>F</b>     | <b>AZ</b>   | <b>HTi10</b> | 300—700            | 0.10—0.40  | 0.20—3.00 |
| ⊕ Unstable Cutting | <b>F</b>     | <b>AZ</b>   | <b>HTi10</b> | 300—700            | 0.10—0.40  | 0.20—3.00 |

\*Please refer to page A091 for other aluminium alloys.



**A** TURNING INSERTS

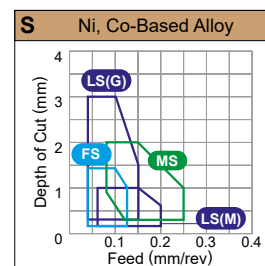
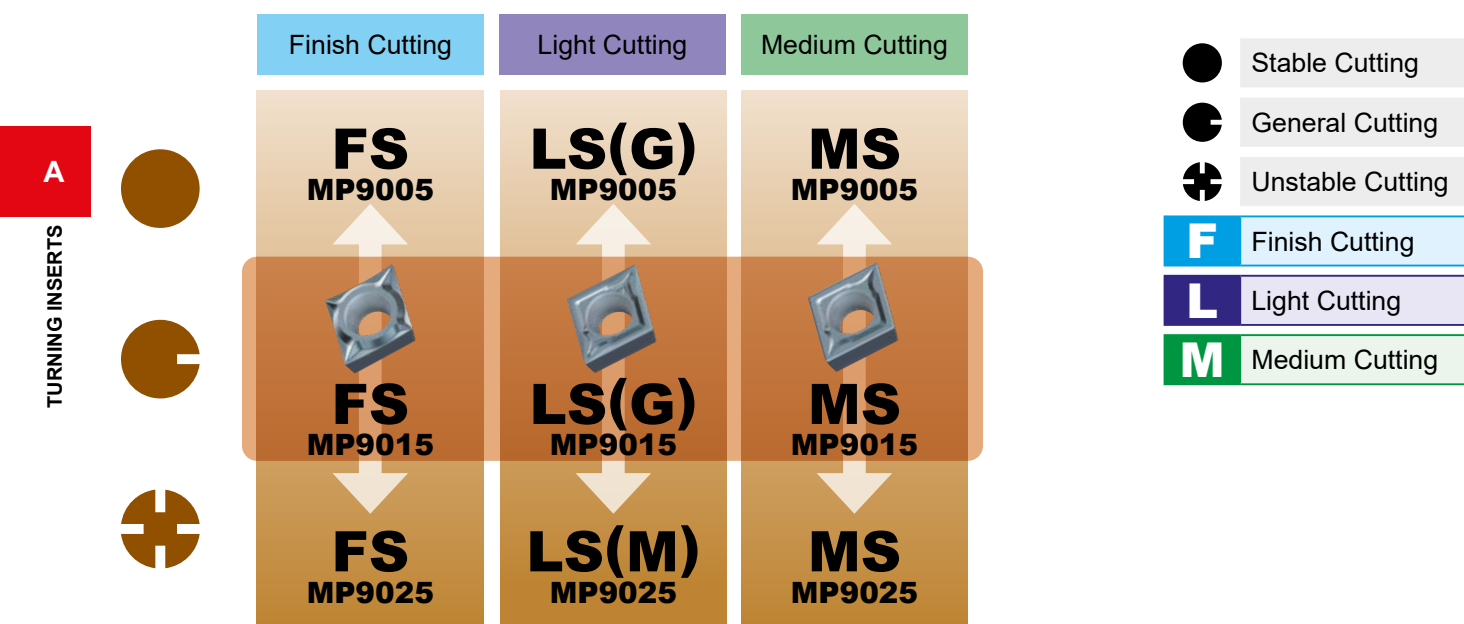


**S** **Titanium Alloy** (ex. Ti-6Al-4V)  
7° POSITIVE INSERTS WITH HOLE

**V<sub>c</sub>** : Cutting Speed  
**f** : Feed  
**a<sub>p</sub>** : Depth of Cut

|                    | Cutting Area | Chipbreaker | Grade         | 1st Recommendation     |            |                     |
|--------------------|--------------|-------------|---------------|------------------------|------------|---------------------|
|                    |              |             |               | V <sub>c</sub> (m/min) | f (mm/rev) | a <sub>p</sub> (mm) |
| ● Stable Cutting   | <b>F</b>     | <b>FS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.12  | 0.20—1.40           |
|                    | <b>L</b>     | <b>LS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.15  | 0.30—3.00           |
|                    | <b>M</b>     | <b>MS</b>   | <b>MT9005</b> | 35—65                  | 0.08—0.25  | 0.30—2.00           |
| ◐ General Cutting  | <b>F</b>     | <b>FS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.12  | 0.20—1.40           |
|                    | <b>L</b>     | <b>LS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.15  | 0.30—3.00           |
|                    | <b>M</b>     | <b>MS</b>   | <b>MT9005</b> | 35—65                  | 0.08—0.25  | 0.30—2.00           |
| ⊕ Unstable Cutting | <b>F</b>     | <b>FS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.12  | 0.20—1.40           |
|                    | <b>L</b>     | <b>LS-P</b> | <b>MT9005</b> | 40—80                  | 0.04—0.15  | 0.30—3.00           |
|                    | <b>M</b>     | <b>MS</b>   | <b>MT9005</b> | 35—65                  | 0.08—0.25  | 0.30—2.00           |

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING

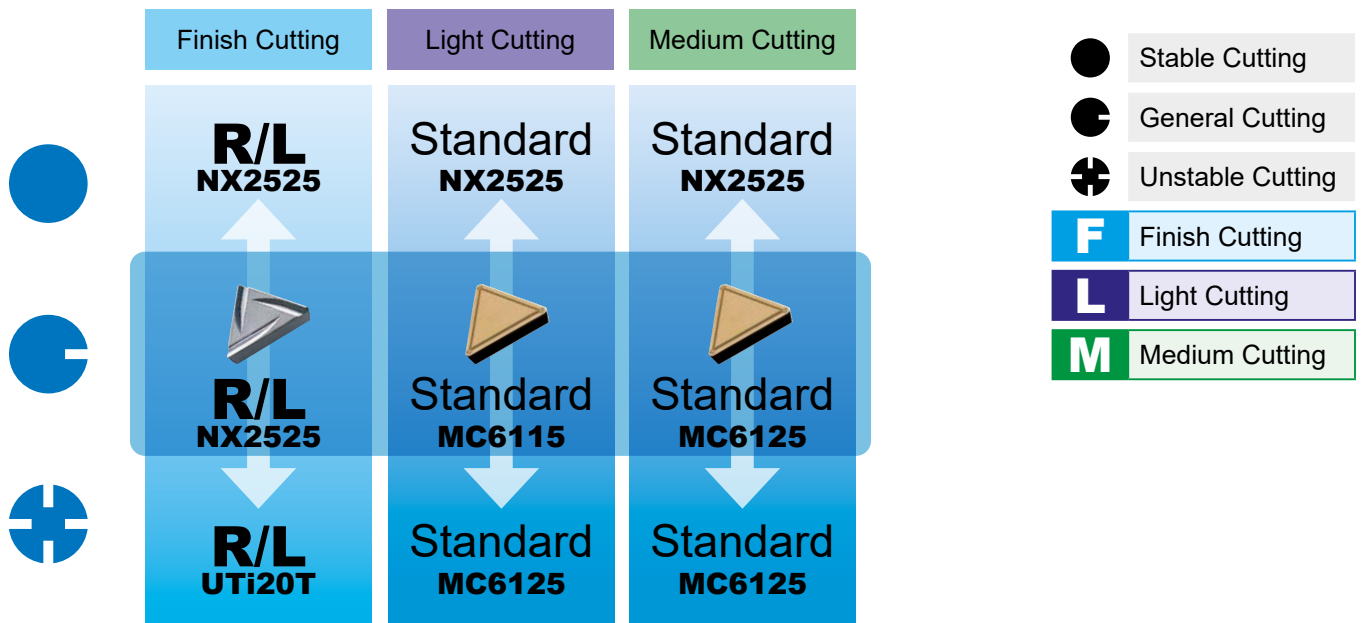


### **S** Ni, Co-Based Alloy\* (ex. Inconel®718) 7° POSITIVE INSERTS WITH HOLE

**Vc** : Cutting Speed  
**f** : Feed  
**ap** : Depth of Cut

|                  | Cutting Area | Chipbreaker  | Grade         | 1st Recommendation |            |           |
|------------------|--------------|--------------|---------------|--------------------|------------|-----------|
|                  |              |              |               | Vc (m/min)         | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>FS</b>    | <b>MP9005</b> | 45—95              | 0.04—0.12  | 0.20—1.40 |
|                  | <b>L</b>     | <b>LS(G)</b> | <b>MP9005</b> | 45—95              | 0.04—0.15  | 0.30—3.00 |
|                  | <b>M</b>     | <b>MS</b>    | <b>MP9005</b> | 40—80              | 0.08—0.25  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>FS</b>    | <b>MP9015</b> | 35—75              | 0.04—0.12  | 0.20—1.40 |
|                  | <b>L</b>     | <b>LS(G)</b> | <b>MP9015</b> | 35—75              | 0.04—0.15  | 0.30—3.00 |
|                  | <b>M</b>     | <b>MS</b>    | <b>MP9015</b> | 30—60              | 0.08—0.25  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>FS</b>    | <b>MP9025</b> | 25—40              | 0.04—0.12  | 0.20—1.40 |
|                  | <b>L</b>     | <b>LS(M)</b> | <b>MP9025</b> | 25—40              | 0.06—0.20  | 0.20—1.00 |
|                  | <b>M</b>     | <b>MS</b>    | <b>MP9025</b> | 20—35              | 0.08—0.25  | 0.30—2.00 |

\* G class is recommended for the above FS/LS chipbreaker

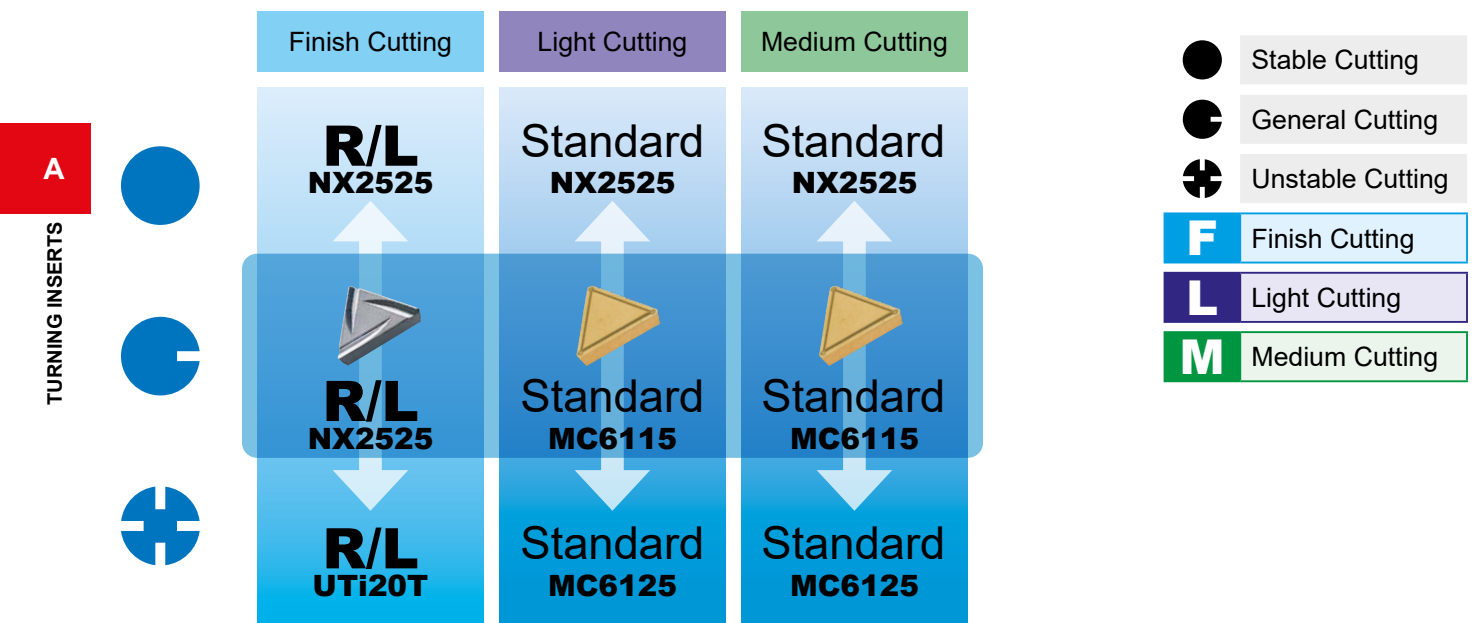


**P** Mild Steel (ex. St37-2, Ck10)  
11° POSITIVE INSERTS WITHOUT HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                  |              | 1st Recommendation |               |            |            |           |
|------------------|--------------|--------------------|---------------|------------|------------|-----------|
|                  | Cutting Area | Chipbreaker        | Grade         | Vc (m/min) | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 225—320    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>NX2525</b> | 185—270    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>NX2525</b> | 185—270    | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 225—320    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>MC6115</b> | 245—475    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>MC6125</b> | 270—420    | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>R/L</b>         | <b>UTi20T</b> | 115—165    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>MC6125</b> | 270—420    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>MC6125</b> | 270—420    | 0.08—0.30  | 0.30—2.00 |

## OPTIMUM GRADES AND CHIPBREAKERS FOR EXTERNAL TURNING



**P** Carbon Steel • Alloy Steel (ex. Ck45, 42CrMo4)  
11° POSITIVE INSERTS WITHOUT HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                  |              | 1st Recommendation |               |            |            |           |
|------------------|--------------|--------------------|---------------|------------|------------|-----------|
|                  | Cutting Area | Chipbreaker        | Grade         | Vc (m/min) | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 165—240    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>NX2525</b> | 140—200    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>NX2525</b> | 140—200    | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 165—240    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>MC6115</b> | 180—350    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>MC6115</b> | 180—350    | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>R/L</b>         | <b>UTi20T</b> | 85—120     | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Standard</b>    | <b>MC6125</b> | 200—310    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Standard</b>    | <b>MC6125</b> | 200—310    | 0.08—0.30  | 0.30—2.00 |



## K Cast Iron\* (ex. GG30)

11° POSITIVE INSERTS WITHOUT HOLE

Vc : Cutting Speed  
f : Feed  
ap : Depth of Cut

|                  |              | 1st Recommendation |               |            |            |           |
|------------------|--------------|--------------------|---------------|------------|------------|-----------|
|                  | Cutting Area | Chipbreaker        | Grade         | Vc (m/min) | f (mm/rev) | ap (mm)   |
| Stable Cutting   | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 145—200    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Flat Top</b>    | <b>MC5105</b> | 165—265    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Flat Top</b>    | <b>MC5105</b> | 165—265    | 0.08—0.30  | 0.30—2.00 |
| General Cutting  | <b>F</b>     | <b>R/L</b>         | <b>NX2525</b> | 145—200    | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Flat Top</b>    | <b>MC5115</b> | 150—240    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Flat Top</b>    | <b>MC5115</b> | 150—240    | 0.08—0.30  | 0.30—2.00 |
| Unstable Cutting | <b>F</b>     | <b>R/L</b>         | <b>UTi20T</b> | 80—115     | 0.06—0.25  | 0.30—1.50 |
|                  | <b>L</b>     | <b>Flat Top</b>    | <b>MC5125</b> | 115—160    | 0.08—0.30  | 0.30—2.00 |
|                  | <b>M</b>     | <b>Flat Top</b>    | <b>MC5125</b> | 115—160    | 0.08—0.30  | 0.30—2.00 |

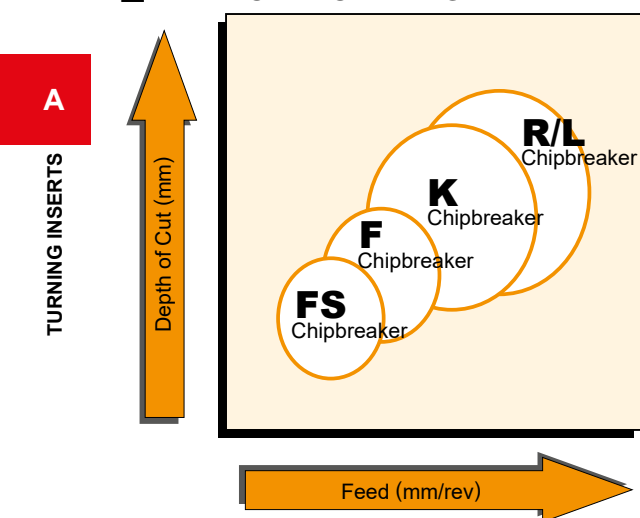
\*Please refer to page A095 for other types of cast iron.



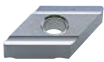
## PRECISION CHIPBREAKER SYSTEM

### ANGULAR AND PARALLEL CHIPBREAKERS (NEGATIVE INSERTS)

#### CHIP CONTROL RANGE

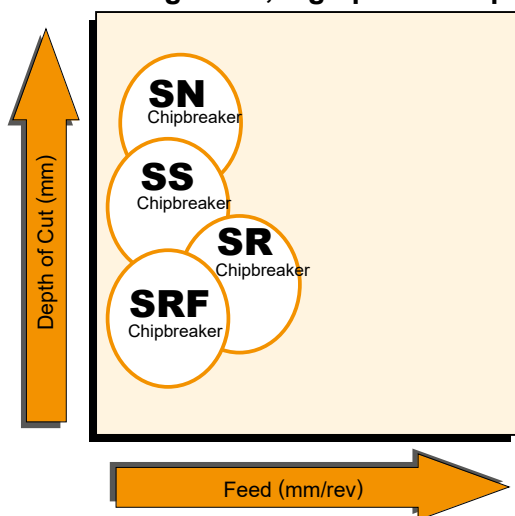


#### FEATURES OF CHIPBREAKER

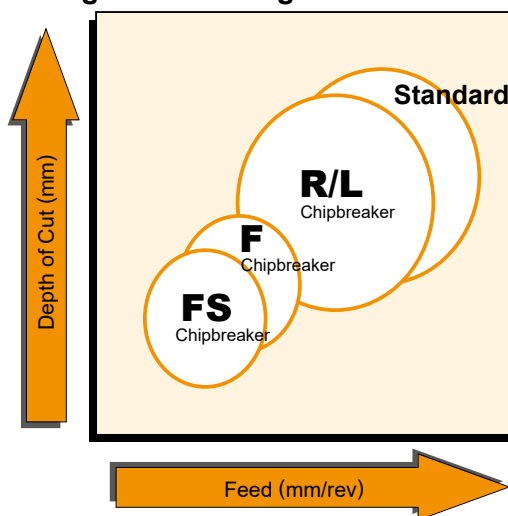
| Chipbreaker | Features                                                                                                                                                                                         | DNGG Type                                                                           | SNGG Type                                                                           | TNGG Type                                                                             | VNGG Type                                                                             |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FS          | <ul style="list-style-type: none"> <li>For precision finishing.</li> <li>Small width lead chipbreaker for good chip control.</li> <li>Sharp cutting edge gives a good surface finish.</li> </ul> | —                                                                                   | —                                                                                   |  | —                                                                                     |
| F           | <ul style="list-style-type: none"> <li>For finish cutting.</li> <li>Lead chipbreaker controls chip flow.</li> <li>Sharp cutting edge gives a good surface finish.</li> </ul>                     | —                                                                                   | —                                                                                   |  | —                                                                                     |
| K           | <ul style="list-style-type: none"> <li>Parallel chipbreaker for light cutting.</li> <li>Excellent chip control for low to medium feed rates.</li> </ul>                                          | —                                                                                   | —                                                                                   |  | —                                                                                     |
| R/L         | <ul style="list-style-type: none"> <li>Parallel chipbreaker for medium cutting.</li> <li>Good chip control for medium feed rates.</li> </ul>                                                     |  |  |  |  |

## ANGULAR AND PARALLEL CHIPBREAKER

■ For turning small, high precision parts



■ For general turning



## FEATURES OF CHIPBREAKER

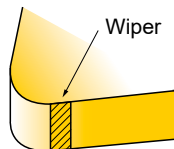
| Chipbreaker | Features                                                                                                                                                                                                      | CCET Type | CCGT Type | DCET Type | DCGT Type | VBET Type |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| SRF         | <ul style="list-style-type: none"> <li>The wide lead chipbreaker for medium cutting is suitable for automatic lathe machining.</li> <li>The insert designed for low resistance controls chip flow.</li> </ul> | —         | —         | —         |           |           |
| SR          | <ul style="list-style-type: none"> <li>The wide lead chipbreaker for medium cutting is suitable for automatic lathe machining.</li> <li>The insert designed for low resistance controls chip flow.</li> </ul> |           | —         |           | —         |           |
| SS          | <ul style="list-style-type: none"> <li>The parallel chipbreaker for light cutting is suitable for automatic lathe machining.</li> <li>Excellent chip control at low feed rates.</li> </ul>                    | —         |           | —         |           | —         |
| SN          | <ul style="list-style-type: none"> <li>The parallel chipbreaker for general purpose is suitable for automatic lathe machining.</li> <li>Excellent chip control for low to medium feed rates.</li> </ul>       |           |           |           |           |           |

| Chipbreaker | Features                                                                                                                                                                                              | CCGH/CCGT Type | CPGT Type | DCGT Type | TPGH Type | TCGT Type | VBGT/VCGT Type | WBGT Type | WCGT Type | WPGT Type |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-----------|-----------|-----------|----------------|-----------|-----------|-----------|
| FS          | <ul style="list-style-type: none"> <li>For precision finishing.</li> <li>Small width lead chipbreaker for excellent chip control.</li> <li>Sharp cutting edge gives a good surface finish.</li> </ul> | —              | —         | —         |           | —         | —              | —         | —         |           |
| F           | <ul style="list-style-type: none"> <li>For finish cutting.</li> <li>Lead chipbreaker controls chip flow.</li> <li>Sharp cutting edge gives a good surface finish.</li> </ul>                          |                |           |           | —         |           |                |           | —         | —         |
| R/L         | <ul style="list-style-type: none"> <li>Lead chipbreaker for light cutting.</li> <li>Good chip control for low to medium feed rates.</li> </ul>                                                        | —              | —         | —         | —         | —         | —              | —         |           | —         |
| Standard    | <ul style="list-style-type: none"> <li>For light cutting.</li> <li>Good chip control for low to medium feed rates.</li> </ul>                                                                         | —              |           | —         | —         | —         | —              | —         | —         | —         |

# WIPER INSERT

## What is a Wiper Insert?

- The wiper insert is designed with a wiper edge that is situated where the straight edge meets the corner radius.
- In comparison to conventional chipbreakers, the surface finish does not deteriorate even if the feed rate is doubled.
- Machining at high feed rates improves cutting efficiency.



## Improving Surface Finish

Under the same machining conditions as conventional chipbreakers, but with the feed rate increased, the surface finish of the material can be improved.

## Improving Efficiency

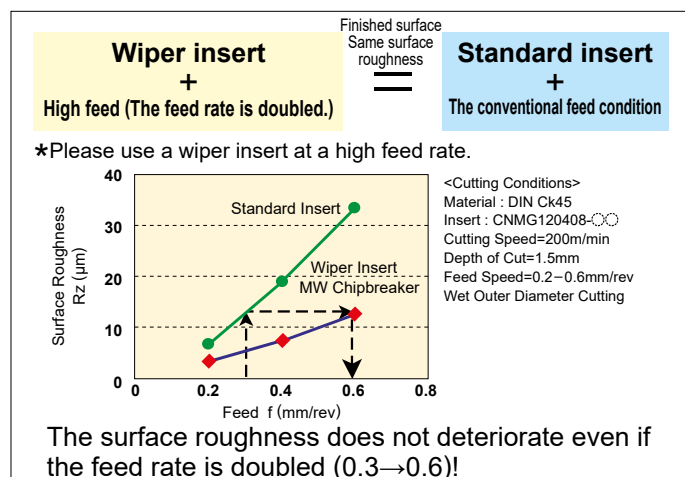
High feed rates not only shorten machining times but also make it possible to combine roughing and finishing operations.

## Increased Tool Life

When using to high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing, therefore, delaying the progression of wear and increasing the tool life of the insert.

## Improving Chip Control

Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.



## A wiper insert + machining at high feed rate

- Reduced machining time (per workpiece)
- Increased number of workpieces (per definitive time period)
- Improving chip control

## A wiper insert + machining at conventional feed rate

- Eliminating the finishing step by roughing and finishing together (Separate roughing and finishing steps → Single-step machining)

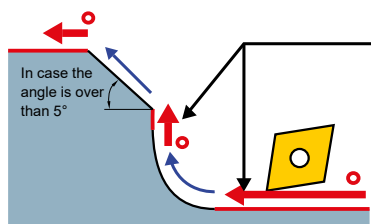
- Reducing cycle times
- Increased productivity
- Avoiding Line-Stoppage

## The Realisation of Reduced Costs!!

## Estimating the finished surface roughness when using a wiper insert

The effects of wiper inserts on external machining, boring and facing.

- The surface roughness when machining at a corner R or taper angle over 5°, is the same as machining with standard inserts.



$$R_z(W) = R_z \times 0.5$$

$R_z(W)$  = Finished surface roughness when using a wiper insert.  
 $R_z$  : Finished surface roughness from conventional conditions. (When using a standard insert)

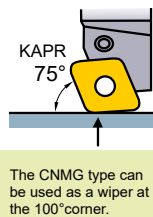
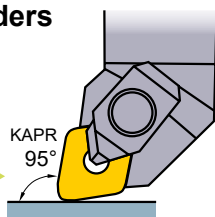
— Effective usage of a wiper insert  
— Non effective usage of a wiper insert

## Special attention is not necessary when using CNMG • WNMG • CCMT types

### No Restriction for Holders

A standard holder can be used.  
(\*A double clamp, high rigidity tool is recommended.)

No restriction

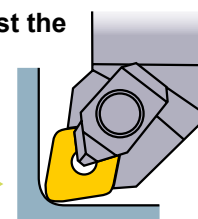


The CNMG type can be used as a wiper at the 100° corner.

### Not Necessary to Adjust the Machining Programme

Conventional machining programmes can be used. (The CNMG • WNMG • CCMT types are based on the ISO/ANSI.)

Not necessary to adjust



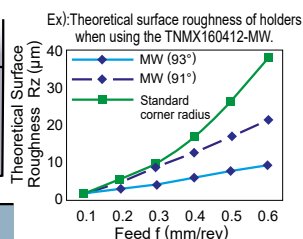
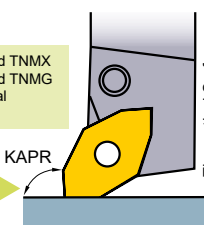
## Special attention is necessary when using the DNMX • TNMX types due to the special top face geometry

### Restriction for Holders

Use a holder with a cutting edge angle (KAPR) of 93° for improving wiper efficiency. A holder with an end cutting angle of 91° can also improve wiper efficiency (see the following figure), however, there is no wiper efficiency with other cutting edge angles (60°, 90°, 107° etc.).

The hole geometry of the DNMX and TNMX type are the same as the DNMG and TNMG types. The "X" represents the special geometry of the corner point.

93° (Specified)

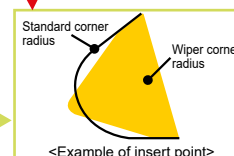


### Necessary to Adjust the Machining Programme

When machining errors occur, please adjust the programme.  
(The DNMX•TNMX types are not based on the ISO/ANSI. Please refer to the next page.)



Adjustment necessary

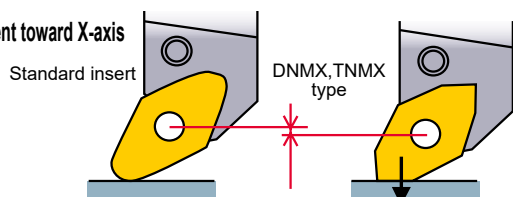


## ■ Adjustment of machining programmes for DNMX • TNMX types

### Basic Process) Adjusting Toward X-axis and Z-axis

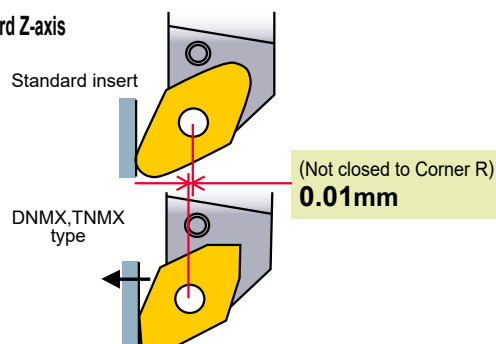
Adjusting the differential between a standard insert and Z-axis / X-axis.

#### Adjustment toward X-axis



Corner radius 0.4, 0.8: **0.04 mm**  
Corner radius 1.2 : **0.05 mm**

#### Adjustment toward Z-axis

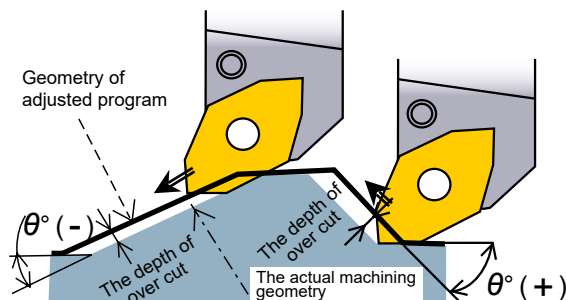


### A) Adjusting a Taper

\*Necessary to maintain a correct taper.

Adjust the relief angle toward the normal line.

Note 1) Adjust the angle toward the normal line in the case where the adjustment number is minus ( $\theta = 60^\circ - 70^\circ$ ) and is not machined completely.



### Classification

| Corner radius | Taper Angle $\theta^\circ$ |      |      |   |      |      |      |       |      |      |      |      |       |       |       |    |
|---------------|----------------------------|------|------|---|------|------|------|-------|------|------|------|------|-------|-------|-------|----|
|               | -25—-15                    | -10  | -5   | 0 | 5    | 10   | 15   | 20—35 | 40   | 45   | 50   | 55   | 60—65 | 70    | 75—85 | 90 |
| 1.2           | 0.04                       | 0.03 | 0.01 | 0 | 0.02 | 0.03 | 0.04 | 0.05  | 0.04 | 0.04 | 0.02 | 0.01 | -0.01 | 0     | 0.01  | 0  |
| 0.8           | 0.03                       | 0.02 | 0.01 | 0 | 0.01 | 0.02 | 0.03 | 0.04  | 0.03 | 0.03 | 0.02 | 0    | -0.01 | 0     | 0.01  | 0  |
| 0.4           | 0.02                       | 0.01 | 0.01 | 0 | 0.01 | 0.01 | 0.02 | 0.02  | 0.02 | 0.01 | 0.01 | 0    | -0.01 | -0.01 | 0     | 0  |

The number  $\rightarrow$  + numbers: adjustment of relief angle, - numbers: adjustment of drive-in angle (mm)

### B) Adjusting a Corner R

\*Necessary to maintain a correct corner radius.

Adjust the work diameter to the same as the taper to prevent over-cut.

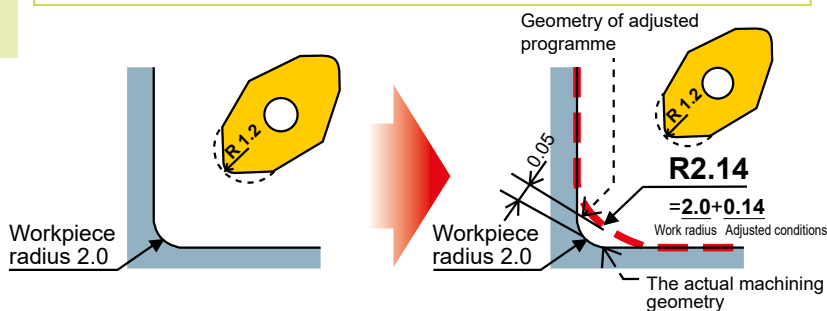
**The value of adjustment to workpiece R = Workpiece R + the adjustment value**

\*No adjustment of the corner radius in this case.

Ex : In case of machining R 2.0 when using a corner R 1.2 type insert.

The corner radius of the insert      The adjustment amount on the workpiece radius.

Corner Radius 0.4  $\rightarrow$  Work Radius **+0.05(mm)**  
Corner Radius 0.8  $\rightarrow$  Work Radius **+0.11(mm)**  
Corner Radius 1.2  $\rightarrow$  Work Radius **+0.14(mm)**



**When correcting corner radius:**

It is not necessary to adjust the machining programme, however, machining errors can occur within max.  $\pm 0.03$  mm due to corrections by an approximate number.

### The Easy-to-correct Method

**Corner Radius Correction** Input the correction number of each corner radius.

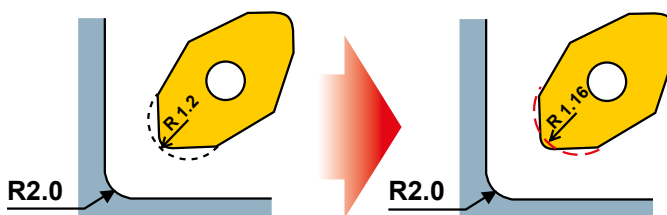
**The value of corrected corner radius = approximation**

\*No need to adjust the programme in this case.

The corner radius of the insert      The value of corrected corner radius = approximation

Corner Radius 0.4  $\rightarrow$  **R0.36(mm)**  
Corner Radius 0.8  $\rightarrow$  **R0.76(mm)**  
Corner Radius 1.2  $\rightarrow$  **R1.16(mm)**

Ex : In the case of machining a corner with a radius R 2.0 when using an insert with a corner radius R 1.2.



Others : The value of correction is same for both DNMX and TNMX. Differentiate between them by the size of corner radius.

# GRADES FOR TURNING

## ● INDEXABLE INSERT GRADES FOR TURNING

TURNING INSERTS

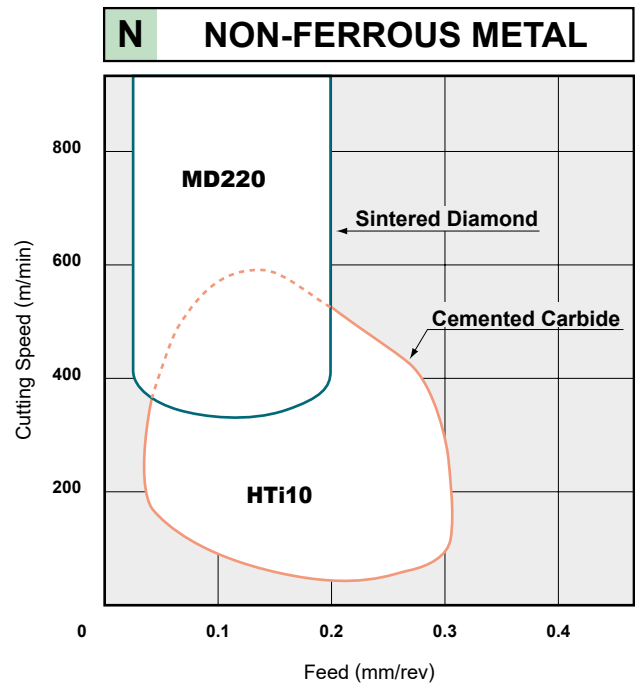
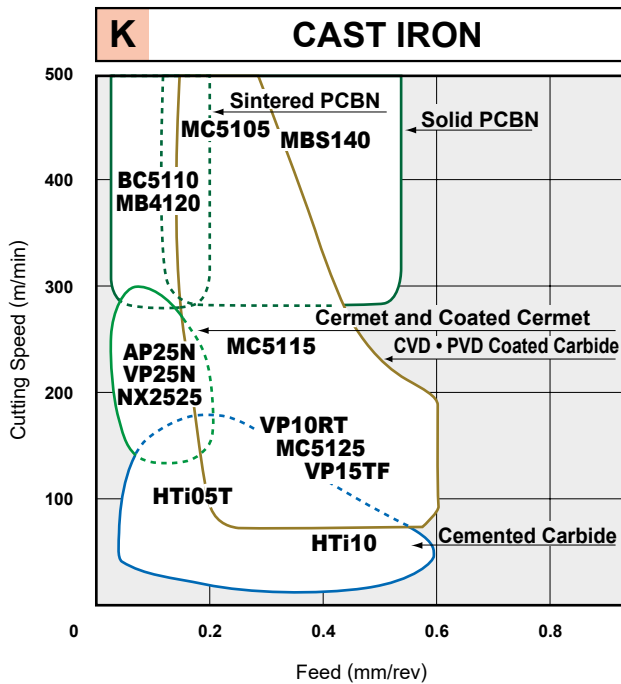
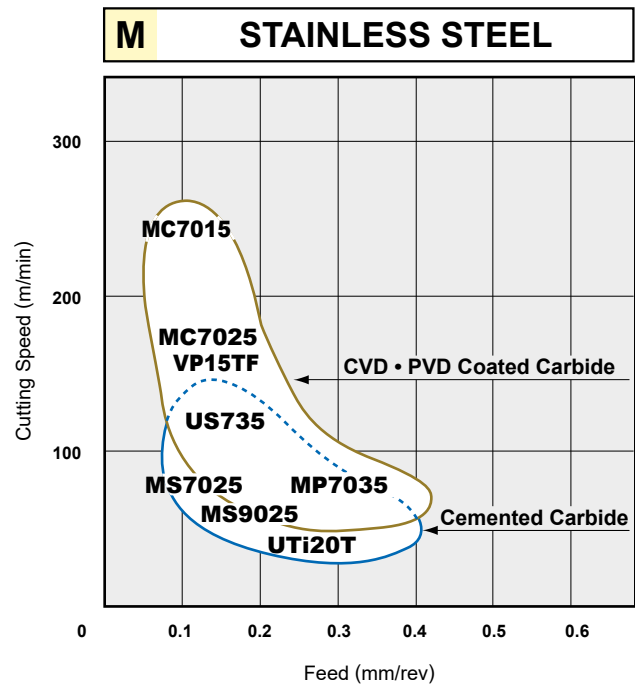
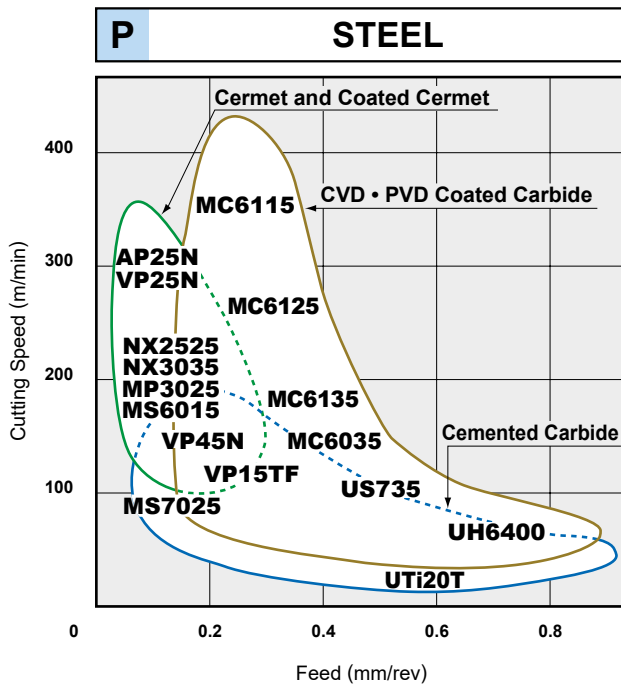
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| ISO                                         | Coated Carbide |                                   | Cermet           | Coated Cermet   | Cemented Carbide                     | Coated PCBN                                              | PCBN                       | PCD<br>(Sintered Diamond) |
|---------------------------------------------|----------------|-----------------------------------|------------------|-----------------|--------------------------------------|----------------------------------------------------------|----------------------------|---------------------------|
|                                             | CVD            | PVD                               |                  |                 |                                      |                                                          |                            |                           |
| Steel<br><b>P</b>                           | Continuous     |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 10             | MC6115<br>MY5015                  |                  | AP25N<br>VP25N  |                                      |                                                          |                            |                           |
|                                             | 20             | MC6125                            | NX2525<br>NX3035 | MP3025<br>VP45N |                                      |                                                          |                            |                           |
|                                             | 30             | MC6135<br>NEW<br>MC6035<br>UH6400 |                  |                 | UTi20T                               |                                                          |                            |                           |
|                                             | 40             |                                   |                  |                 |                                      |                                                          |                            |                           |
| Stainless Steel<br><b>M</b>                 | Continuous     |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 10             | MC7015<br>US7020                  |                  | AP25N<br>VP25N  |                                      |                                                          |                            |                           |
|                                             | 20             | MC7025                            | NX2525           |                 |                                      |                                                          |                            |                           |
|                                             | 30             | US735                             |                  |                 | UTi20T                               |                                                          |                            |                           |
|                                             | 40             |                                   |                  |                 |                                      |                                                          |                            |                           |
| Cast Iron<br><b>K</b>                       | Continuous     | NEW<br>MC5105                     |                  |                 | HTi05T                               | BC5110                                                   |                            |                           |
|                                             | 10             | NEW<br>MC5115                     |                  | AP25N<br>VP25N  | HTi10                                |                                                          |                            |                           |
|                                             | 20             | MY5015<br>MH515<br>NEW<br>MC5125  | NX2525           |                 | UTi20T                               |                                                          | MB4120<br>MB5140           |                           |
|                                             | 30             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | Interrupted    |                                   |                  |                 |                                      |                                                          |                            |                           |
| Non-Ferrous Metal<br><b>N</b>               | Continuous     |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 10             |                                   |                  |                 | NEW<br>MT2015<br>HTi10               |                                                          |                            |                           |
|                                             | 20             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 30             |                                   |                  |                 |                                      |                                                          |                            | MD220                     |
|                                             | Interrupted    |                                   |                  |                 |                                      |                                                          |                            |                           |
| Heat Resistant Alloy • Ti Alloy<br><b>S</b> | Continuous     | NEW<br>MV9005<br>US905            |                  |                 |                                      |                                                          |                            |                           |
|                                             | 10             |                                   |                  |                 | MT9005<br>RT9005<br>MT9015<br>RT9010 |                                                          |                            |                           |
|                                             | 20             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 30             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | Interrupted    |                                   |                  |                 |                                      |                                                          |                            |                           |
| Hardened Steel<br><b>H</b>                  | Continuous     |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 10             |                                   |                  |                 |                                      | BC8105<br>BC8110<br>BC8210<br>BC8120<br>BC8220<br>BC8130 | MB8110<br>MB8120<br>MB8130 |                           |
|                                             | 20             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | 30             |                                   |                  |                 |                                      |                                                          |                            |                           |
|                                             | Interrupted    |                                   |                  |                 |                                      |                                                          |                            |                           |

# TURNING APPLICATION RANGE

A

TURNING INSERTS

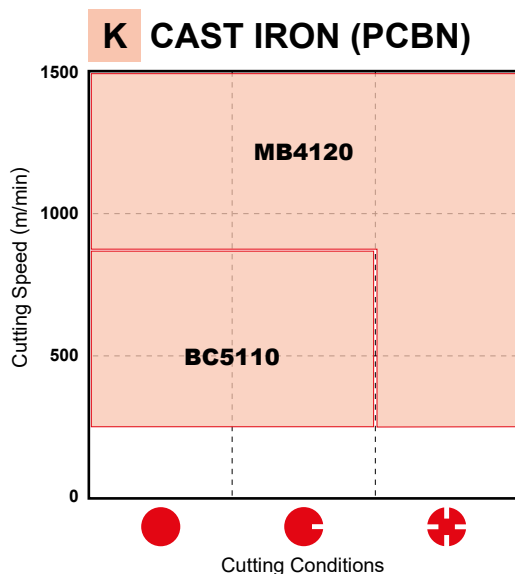
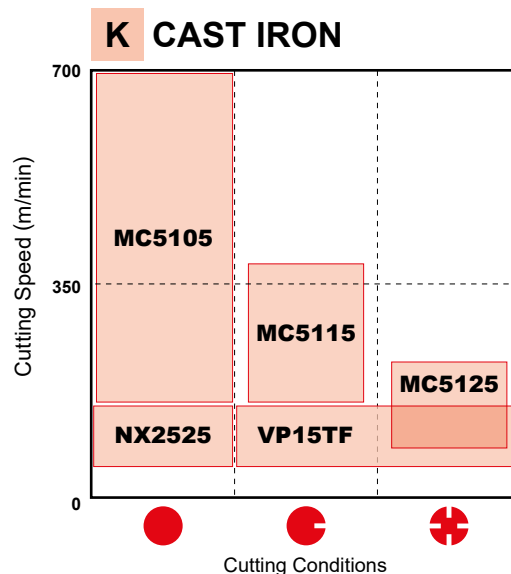
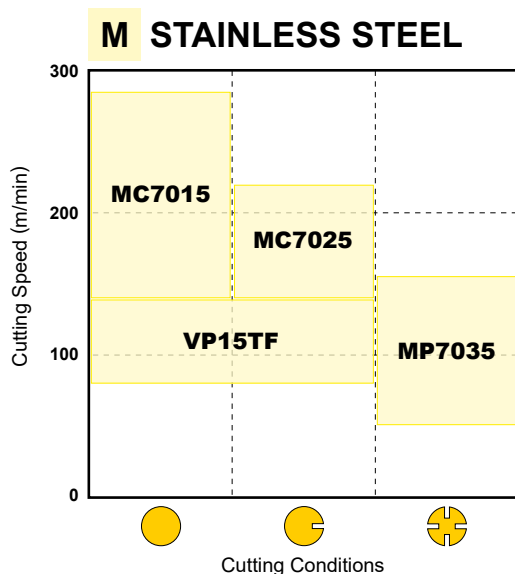
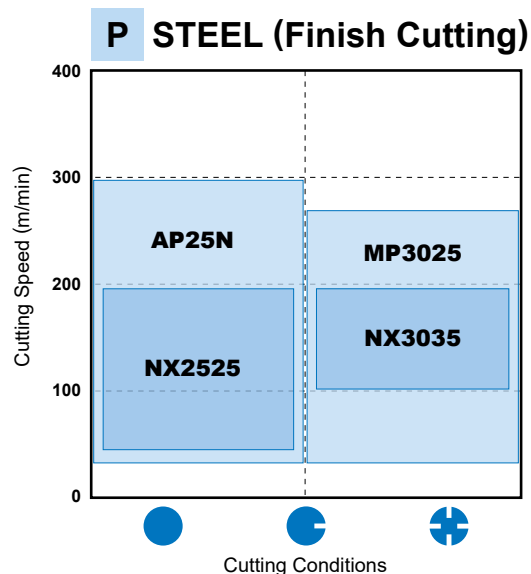
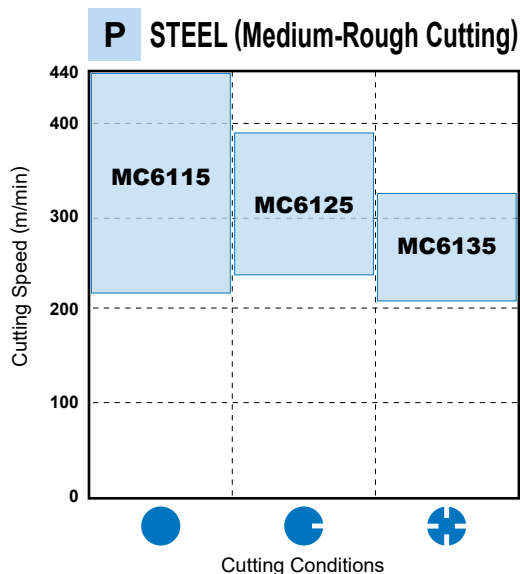


## TURNING APPLICATION RANGE

● Recommended insert grade based on cutting speed and conditions for each material.

TURNING INSERTS

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## CUTTING CONDITIONS



Stable Cutting

Continuous Cutting  
Constant Depth of Cut  
Pre-Machined  
Securely Clamped Component Cutting

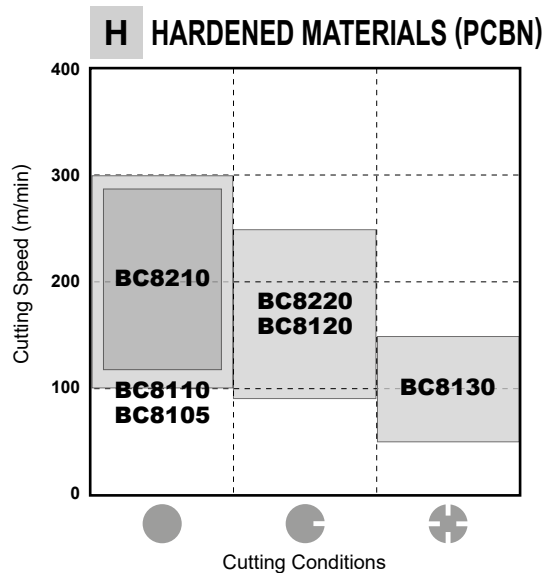
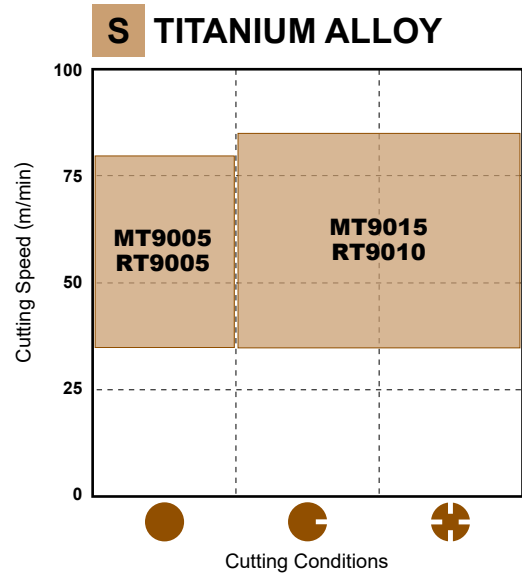
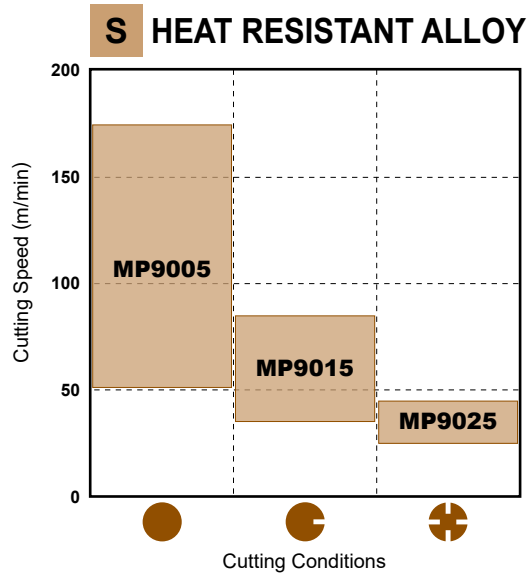
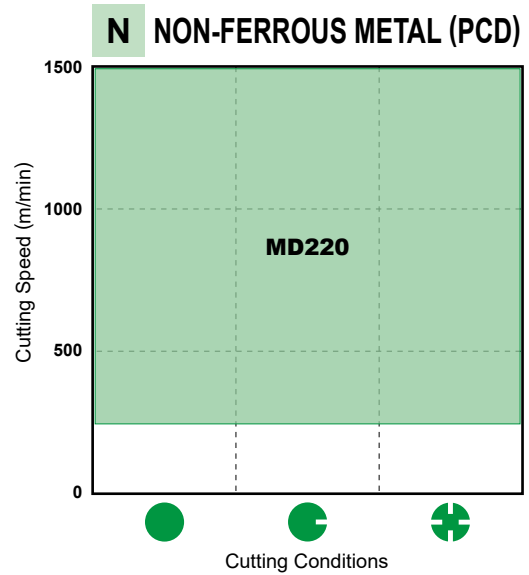
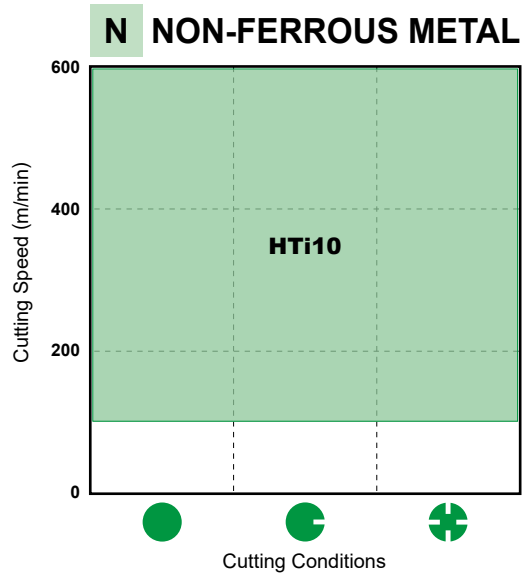


General Cutting



Unstable Cutting

Heavy Interrupted Cutting  
Irregular Depth of Cut  
Low Clamping Rigidity Cutting



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TURNING INSERTS



# COATED CARBIDE (CVD)

- Special tough fibrous structure improves wear and fracture resistance.
- Covers a wide application range and thus reduces the number of tools required.

## SELECTION STANDARD

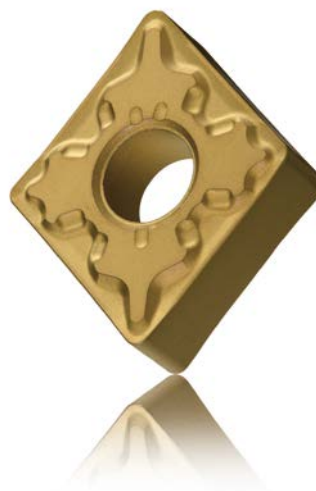
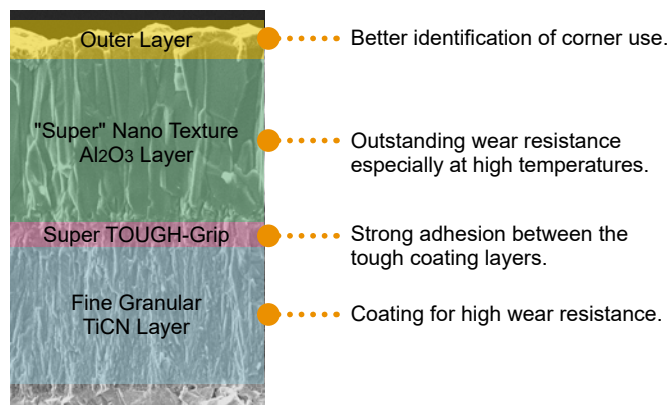
### TURNING

TURNING INSERTS

| Material                            | Cutting Mode                       | Recommended Grade | Recommended Cutting Speed (m/min) | ISO                                                              | Application Range |
|-------------------------------------|------------------------------------|-------------------|-----------------------------------|------------------------------------------------------------------|-------------------|
| P<br>Steel                          | Continuous Cutting                 | MC6115            | 340<br>(215 – 480)                | P<br>Continuous<br>↑<br>10<br>20<br>30<br>40<br>↓<br>Interrupted |                   |
|                                     |                                    | MC6125            | 330<br>(210 – 465)                |                                                                  |                   |
|                                     | Interrupted Cutting                | NEW MC6135        | 310<br>(140 – 480)                |                                                                  |                   |
|                                     |                                    |                   |                                   |                                                                  |                   |
| M<br>Stainless Steel                | Continuous Cutting                 | MC7015            | 220<br>(155 – 285)                | M<br>Continuous<br>↑<br>10<br>20<br>30<br>40<br>↓<br>Interrupted |                   |
|                                     |                                    | MC7025            | 180<br>(140 – 220)                |                                                                  |                   |
|                                     | Continuous and Interrupted Cutting | US735             | 130<br>(75 – 185)                 |                                                                  |                   |
|                                     |                                    |                   |                                   |                                                                  |                   |
| K<br>Cast Iron<br>Ductile Cast Iron | Continuous Cutting                 | NEW MC5105        | 430<br>(160 – 700)                | K<br>Continuous<br>↑<br>10<br>20<br>30<br>↓<br>Interrupted       |                   |
|                                     |                                    | NEW MC5115        | 270<br>(150 – 390)                |                                                                  |                   |
|                                     | Interrupted Cutting                | NEW MC5125        | 150<br>(80 – 220)                 |                                                                  |                   |
|                                     |                                    |                   |                                   |                                                                  |                   |
| S<br>Heat Resistant Alloy           | Continuous Cutting                 | NEW MV9005        | 105<br>(70 – 140)                 | S<br>Continuous<br>↑<br>5<br>↓<br>Interrupted                    |                   |
|                                     | Continuous and Interrupted Cutting | US905             | 70<br>(45 – 95)                   |                                                                  |                   |

**Dramatic increase in stability and wear resistance, enabled by utilising the improved coating adhesion and crystal orientation technology.**

## MC6115



### Super Nano Texture Technology

The standard Nano Texture Technology has been improved and developed to be an industry leading standard for crystal growth of Al<sub>2</sub>O<sub>3</sub> coatings. This Super Nano Texture Technology increases tool life and wear resistance due to the fine, dense crystal growth process.

### Super TOUGH-Grip

The Super TOUGH-Grip layer has finer crystal grains that enhance the strength of the adhesion between the coating layers.

## ■ GRADE CHARACTERISTICS

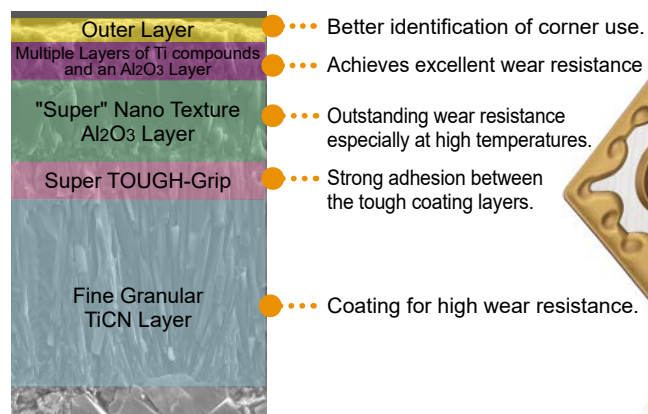
| Material |                                | Grade      | Substrate      | Coating Layer                       |           |
|----------|--------------------------------|------------|----------------|-------------------------------------|-----------|
|          |                                |            | Hardness (HRA) | Composition                         | Thickness |
| P        | Steel                          | MC6115     | 90.8           | Accumulated TiCN-Al2O3-TiN Compound | Thick     |
|          |                                | MC6125     | 90.0           | Accumulated TiCN-Al2O3-TiN Compound | Thick     |
|          |                                | NEW MC6135 | 90.0           | Accumulated TiCN-Al2O3-TiN Compound | Thick     |
|          |                                | MC6035     | 89.5           | TiCN-Al2O3                          | Thick     |
|          |                                | UH6400     | 89.5           | Accumulated TiCN-Al2O3-TiN Compound | Thick     |
| M        | Stainless Steel                | MC7015     | 90.7           | TiCN-Al2O3-TiN                      | Thin      |
|          |                                | US7020     | 90.5           | TiCN-Al2O3-TiN                      | Thin      |
|          |                                | MC7025     | 89.4           | TiCN-Al2O3-TiN                      | Thin      |
|          |                                | US735      | 89.0           | TiN Compound                        | Thin      |
| K        | Cast Iron<br>Ductile Cast Iron | NEW MC5105 | 92.2           | TiCN-Al2O3                          | Thick     |
|          |                                | NEW MC5115 | 91.0           | TiCN-Al2O3                          | Thick     |
|          |                                | NEW MC5125 | 91.0           | TiCN-Al2O3                          | Thick     |
|          | Heat Resistant<br>Cast Steel   | MH515      | 91.0           | TiCN-Al2O3                          | Thick     |
| S        | Heat Resistant<br>Alloy        | US905      | 92.2           | TiCN-Al2O3-TiN                      | Thin      |
|          |                                | MV9005     | 93.0           | Al, Ti N                            | Thick     |

Note 1) Hardness shows representative value of the substrate.

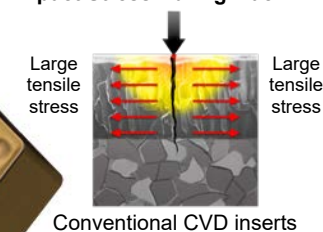
### Strengthened chipping resistance

Cracks that occur during unstable machining are prevented due to the relaxing of the tensile stress in the coating. MC6100 series has an 80% reduction in coating tensile stress compared to conventional CVD inserts.

## MC6125

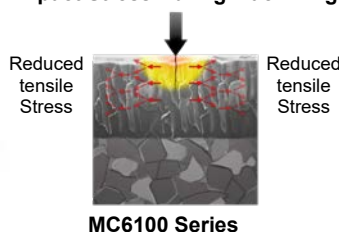


### Impact Stress During Machining



Cracks are generated in the surface of coatings during machining. They propagate through the coating into the substrate due to the large tensile stress in the coating structure. This creates one of the main causes of sudden insert breakage.

### Impact Stress During Machining



MC6100 series has a much lower level of stress than conventional CVD coatings due to the surface treatment. This divides the force of impacts during machining and protects from sudden fracturing.

Relaxing of the Tensile Stress

# COATED CARBIDE (PVD)

- PVD coating prolongs tool life under the same cutting conditions compared to uncoated carbide.
- Coating of tools with sharp edges is possible without softening or changing the quality of the substrate.

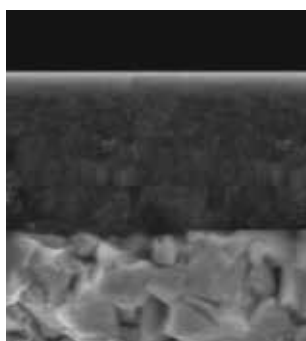
## SELECTION STANDARD

### TURNING

| Material               | Recommended Grade | Recommended Cutting Speed (m/min) | ISO | Application Range |
|------------------------|-------------------|-----------------------------------|-----|-------------------|
| P Steel                | VP10RT            | 120<br>(100 – 150)                | P   |                   |
|                        | VP15TF            | 100<br>(50 – 150)                 |     |                   |
| M Stainless Steel      | VP10RT            | 120<br>(100 – 150)                | M   |                   |
|                        | VP15TF            | 100<br>(80 – 135)                 |     |                   |
|                        | MP7035            | 120<br>(85 – 155)                 |     |                   |
| K Cast Iron            | VP10RT            | 120<br>(100 – 150)                | K   |                   |
|                        | VP15TF            | 120<br>(100 – 150)                |     |                   |
| S Heat Resistant Alloy | MP9005            | 80<br>(50 – 110)                  | S   |                   |
|                        | MP9015            | 60<br>(35 – 85)                   |     |                   |
|                        | MP9025            | 30<br>(25 – 45)                   |     |                   |

## ISO Turning Inserts for Difficult to Cut Materials

### MP9005/MP9015/MP9025



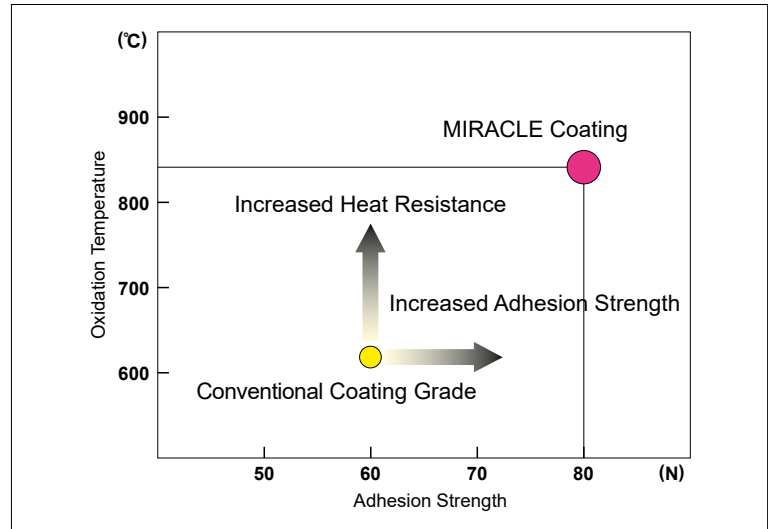
High Al-(Al,Ti)N single layer coating

Special carbide substrate

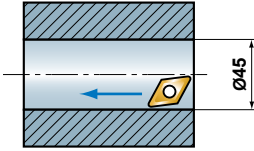
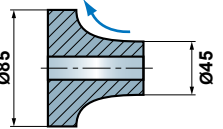
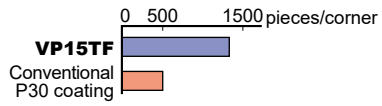
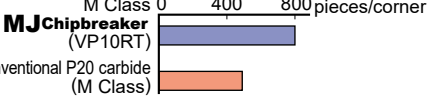
| ISO Grade | Grade  | Concept                                         | Application                                               |
|-----------|--------|-------------------------------------------------|-----------------------------------------------------------|
| S01       | MP9005 | Top-quality grade focusing on wear resistance   | Heat Resistant Alloy<br>Finish-Medium Cutting             |
| S10       | MP9015 | First recommendation for general applications   | Heat Resistant Alloy<br>Medium-Rough Cutting              |
| S30       | MP9025 | Prevents severe damage for increased stability. | Heat Resistant Alloy<br>Interrupted • Light-Rough Cutting |

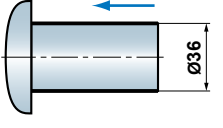
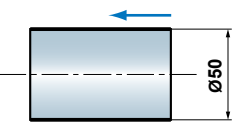
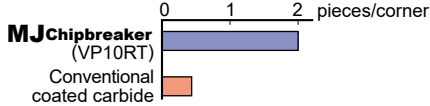
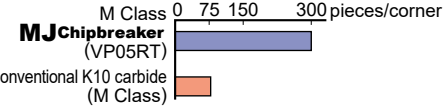
## FEATURES OF VP (MIRACLE) COATING

Compared to conventional coating technology, VP (MIRACLE) coating features (Al,Ti)N coating with an increased heat resistance and adhesion strength.



## APPLICATION EXAMPLES

| Insert (Grade)     |                       | DCMT11T304-MV(VP15TF)                                                                                                                                                                                  | CNMG120408-MJ(VP10RT)                                                                                                                           |
|--------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Workpiece          |                       | Alloy steel<br>                                                                                                      | Stainless Steel (Fan parts)<br>                             |
| Cutting Conditions | Cutting Speed (m/min) | 170                                                                                                                                                                                                    | 200                                                                                                                                             |
|                    | Feed (mm/rev)         | 0.14                                                                                                                                                                                                   | 0.25                                                                                                                                            |
|                    | Depth of Cut (mm)     | 0.25                                                                                                                                                                                                   | 0.5                                                                                                                                             |
|                    | Coolant               | Wet cutting                                                                                                                                                                                            | Wet cutting                                                                                                                                     |
| Result             |                       |  <p>The VP15TF type did not suffer from edge chipping. This enables stable machining and much longer tool life.</p> |  <p>MJ chipbreaker achieved 1.5 times longer tool life.</p> |

| Insert (Grade)     |                       | CNMG120408-MJ(VP10RT)                                                                                                                                                                                           | TNMG160408-MJ(VP05RT)                                                                                                                         |
|--------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Workpiece          |                       | Inconel®718 (Pin)<br>                                                                                                        | Sintered iron parts (FH655)<br>                          |
| Cutting Conditions | Cutting Speed (m/min) | 31                                                                                                                                                                                                              | 120                                                                                                                                           |
|                    | Feed (mm/rev)         | 0.2                                                                                                                                                                                                             | 0.05                                                                                                                                          |
|                    | Depth of Cut (mm)     | 2.3                                                                                                                                                                                                             | 0.5                                                                                                                                           |
|                    | Coolant               | Wet cutting                                                                                                                                                                                                     | Wet cutting                                                                                                                                   |
| Result             |                       |  <p>VP10RT achieved 4 times longer tool life. MJ chipbreaker for excellent chip disposal and vastly increased tool life.</p> |  <p>MJ chipbreaker achieved 5 times longer tool life.</p> |

# CERMET

- The optimized alloy structure and special alloy binder improves both wear and fracture resistance.
- It covers a wide application range and reduces the number of tools required.
- NX3035 for wet cutting.
- NX2525 for dry cutting.

A

TURNING INSERTS

## ■ SELECTION STANDARD

### ● TURNING

| Material | Cutting Mode        | Recommended Grade | Recommended Cutting Speed (m/min) | ISO                                                  | Application Range |
|----------|---------------------|-------------------|-----------------------------------|------------------------------------------------------|-------------------|
| P        | Continuous Cutting  | NX2525            | 230<br>(175 – 300)                | P<br>Continuous<br>↑<br>10<br>20<br>↓<br>Interrupted |                   |
|          | Interrupted Cutting | NX3035            | 220<br>(170 – 285)                |                                                      |                   |
| M        | Continuous Cutting  | NX2525            | 100<br>(65 – 135)                 | M<br>Continuous<br>↑<br>10<br>20<br>↓<br>Interrupted |                   |
| K        | Finishing           | NX2525            | 170<br>(130 – 210)                | K<br>Continuous<br>↑<br>10<br>20<br>↓<br>Interrupted |                   |

## ■ GRADE CHARACTERISTICS

| Grade  | Hardness (HRA) |
|--------|----------------|
| NX2525 | 92.2           |
| NX3035 | 91.5           |

Note 1) Hardness shows representative value of the substrate.

# COATED CERMET

- Coated cermet (PVD coating) has superior wear and fracture resistance, and therefore provides a stable cutting performance.

## ■ SELECTION STANDARD

### ● TURNING

| Material                            | Cutting Mode        | Recommended Grade | Recommended Cutting Speed (m/min) | ISO                                                  | Application Range        |
|-------------------------------------|---------------------|-------------------|-----------------------------------|------------------------------------------------------|--------------------------|
| P<br>Steel                          | Continuous Cutting  | VP25N<br>AP25N    | 270<br>(200 – 345)                | P<br>Continuous<br>↑ 10<br>20<br>↓ 30<br>Interrupted | VP25N AP25N MP3025 VP45N |
|                                     | Interrupted Cutting | MP3025            | 250<br>(180 – 330)                |                                                      |                          |
| K<br>Cast Iron<br>Ductile Cast Iron | Finishing           | VP25N<br>AP25N    | 190<br>(155 – 225)                | K<br>Continuous<br>↑ 10<br>20<br>↓ Interrupted       | VP25N AP25N              |

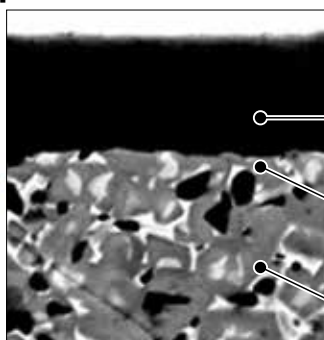
A

TURNING INSERTS

Effective for production of small parts.

## MP3025

MP3025 provides improved adhesion of the coating layer due to the newly-developed special substrate. Uniform flank wear allows prolonged machining and maintains excellent surface finishes.



Ti-compound PVD coating provides excellent wear and welding resistance.

Substrate surface provides excellent adhesion strength for coating layer.

Substrate with superior fracture resistance and thermal shock resistance.

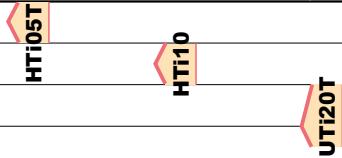
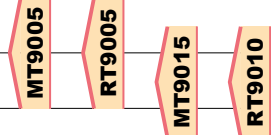
# CEMENTED CARBIDE

- UTi grades are available for steel and cast iron. HTi grades are available for non-ferrous and non-metal materials and are also suitable for cast iron.

## SELECTION STANDARD

### TURNING

TURNING INSERTS

|   | Material                         | Recommended Grade | Recommended Cutting Speed (m/min) | ISO                                             | Application Range                                                                     |
|---|----------------------------------|-------------------|-----------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------|
| P | Steel                            | UTi20T            | 110<br>(90 – 130)                 | Continuous<br>↑ 10<br>↓ 20<br>30<br>Interrupted |    |
|   |                                  |                   |                                   |                                                 |                                                                                       |
| M | Stainless Steel                  | UTi20T            | 100<br>(80 – 115)                 | Continuous<br>↑ 10<br>↓ 20<br>30<br>Interrupted |    |
|   |                                  |                   |                                   |                                                 |                                                                                       |
| K | Cast Iron                        | HTi05T            | 120<br>(80 – 165)                 | Continuous<br>↑ 10<br>↓ 20<br>30<br>Interrupted |   |
|   |                                  | HTi10             | 100<br>(75 – 135)                 |                                                 |                                                                                       |
|   |                                  | UTi20T            | 80<br>(60 – 110)                  |                                                 |                                                                                       |
| N | Non-Ferrous Metal                | HTi10             | 500<br>(300 – 700)                | Continuous<br>↑ 10<br>↓ 20<br>Interrupted       |  |
| S | Heat-resistant Alloy<br>Ti Alloy | MT9005<br>RT9005  | 50<br>(35 – 80)                   | Continuous<br>↑ 10<br>↓ 20<br>Interrupted       |  |
|   |                                  | MT9015<br>RT9015  | 60<br>(35 – 85)                   |                                                 |                                                                                       |

## MAIN COMPONENT AND APPLICATION

| ISO | Main Component | Characteristics                           | Material                                                 |
|-----|----------------|-------------------------------------------|----------------------------------------------------------|
| P   | WC-TiC-TaC-Co  | Heat / deformation resistance.            | Carbon steel, alloy steel, stainless steel and cast iron |
| K   | WC-Co          | High rigidity and wear resistance.        | Cast iron, non-ferrous metals, and non-metal             |
| S   | WC-Co          | High heat resistance and wear resistance. | Heat-resistant alloy, Ti alloy                           |

## GRADE CHARACTERISTICS

| ISO | Grade         | Hardness (HRA) |
|-----|---------------|----------------|
| P   | UTi20T        | 90.5           |
| K   | HTi05T        | 92.5           |
|     | HTi10         | 92.0           |
| S   | MT9005/RT9005 | 92.2           |
|     | MT9015/MT9010 | 91.8           |

Note 1) Hardness shows representative value of the substrate.

# MICRO-GRAIN CEMENTED CARBIDE (SOLID TOOLS)

- Compared to normal cemented carbide, micro-grain types have higher wear resistance and toughness.

A

TURNING INSERTS

## ■ SELECTION STANDARD

| Cutting Tool                                              | Recommended Grade                          | Material                |
|-----------------------------------------------------------|--------------------------------------------|-------------------------|
| Solid Carbide Drill<br>Turning Inserts<br>Milling Inserts | <b>TF15</b>                                | Steel • Cast Iron       |
| Solid End Mill                                            | <b>HTi10</b><br><b>TF15</b><br><b>MF10</b> | Steel • Cast Iron       |
| Gear Hob<br>Reamer<br>Tap etc.                            | <b>TF15</b><br><b>MF20</b><br><b>MF30</b>  | Steel • Cast Iron, etc. |

## ■ GRADE CHARACTERISTICS

| Grade        | Grade Characteristics ★ |             | ISO | Wear Resistance | Fracture Resistance | Corrosion Resistance |
|--------------|-------------------------|-------------|-----|-----------------|---------------------|----------------------|
|              | Hardness(HRA)           | T.R.S (GPa) |     |                 |                     |                      |
| <b>HTi10</b> | 92.0                    | 3.2         | K10 | ◎               | ○                   | ○                    |
| <b>TF15</b>  | 91.0                    | 4.0         | K20 | ◎               | ○                   | ◎                    |
| <b>MF10</b>  | 93.0                    | 4.0         | K01 | ◎               | ○                   | ◎                    |
| <b>MF20</b>  | 92.0                    | 4.4         | K10 | ○               | ◎                   | ◎                    |
| <b>MF30</b>  | 90.7                    | 4.3         | K20 | ○               | ◎                   | ◎                    |

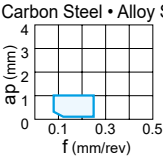
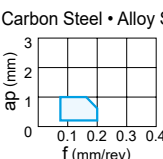
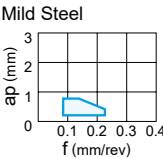
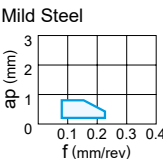
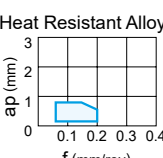
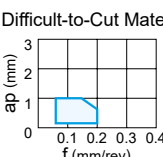
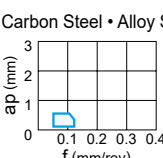
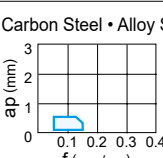
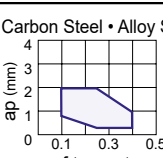
★ After HIP

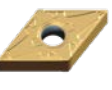
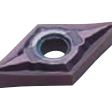
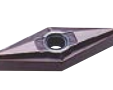
Note 1) Hardness shows representative value of the substrate.



# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                     | Cross Section Geometry                                                                                             |                                                                                    |
|-------------|-----------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|             |           |                                                                                                      |                                                                                                                                                                                                                                                                                                              |                                                                                                                    |                                                                                    |
| A           | M         | <b>FP</b><br>       | <b>First recommendation for finish cutting of carbon steel and alloy steels</b><br>Controls chip clogging during high-feed cutting and prevents chips of soft material from running onto their surfaces.<br>Large rake angle controls vibrations and work deformation when machining low-rigidity workpiece. | Carbon Steel • Alloy Steel<br>   | <b>Corner</b><br>20°<br><b>Flank</b><br>20°<br>CNMG120408-FP                       |
|             |           | <b>FH</b><br>       | <b>First recommendation for finish cutting of carbon steel and alloy steels</b><br>Double sided chipbreaker.<br>Stable chip control even at small depths of cut.                                                                                                                                             | Carbon Steel • Alloy Steel<br>   | <b>Corner</b><br>12°<br><b>Flank</b><br>12°<br>CNMG120408-FH                       |
|             |           | <b>FS</b><br>       | <b>Alternative chipbreaker for finish cutting of mild steel</b><br>Stable chip control even at small depth of cut.<br>Sharp edge gives best performance.                                                                                                                                                     | Mild Steel<br>                   | <b>Corner</b><br>16°<br><b>Flank</b><br>8°<br>CNMG120408-FS                        |
|             |           | <b>FY</b><br>     | <b>First recommendation for finish cutting of mild steel</b><br>Effectively controls adhesive chips.<br>Suitable for mild steel finishing.                                                                                                                                                                   | Mild Steel<br>                  | <b>Corner</b><br>15°<br><b>Flank</b><br>15°<br>0.2 mm<br>CNMG120408-FY             |
|             |           | <b>NEW FS</b><br> | <b>Excellent chip breaking even at very small depths of cut</b><br>The large rake angle and precision grade enables excellent sharpness.                                                                                                                                                                     | Heat Resistant Alloy<br>       | <b>Corner</b><br>25°<br>0.22 mm<br><b>Flank</b><br>25°<br>0.44 mm<br>CNGG120408-FS |
|             |           | <b>FJ</b><br>     | <b>Alternative chipbreaker for finish cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloy and titanium alloy.<br>The sharp edge produces good cutting surface.<br>The curved edge allows smooth chip discharge.                                                                      | Difficult-to-Cut Materials<br> | <b>Corner</b><br>14°<br><b>Flank</b><br>9°<br>CNGG120404-FJ                        |
|             |           | <b>R/L-FS</b><br> | <b>Precise finishing</b><br>A narrow lead chipbreaker for good chip control.<br>The sharp edge produces a good surface finish.                                                                                                                                                                               | Carbon Steel • Alloy Steel<br> | <b>Flank</b><br>14°<br>TNGG160404R-FS                                              |
|             |           | <b>R/L-F</b><br>  | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>The sharp edge produces a good surface finish.                                                                                                                                                                                                   | Carbon Steel • Alloy Steel<br> | <b>Flank</b><br>14°<br>TNGG160404R-F                                               |
|             |           | <b>LP</b><br>     | <b>First recommendation for light cutting of carbon and alloy steels</b><br>Stable chip control in the light cutting range.<br>The curved edge allows smooth chip discharge.                                                                                                                                 | Carbon Steel • Alloy Steel<br> | <b>Corner</b><br>15°<br>0.1 mm<br><b>Flank</b><br>11°<br>0.2 mm<br>CNMG120408-LP   |

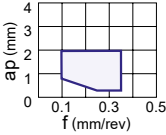
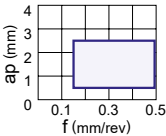
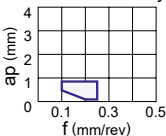
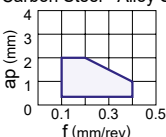
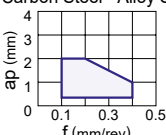
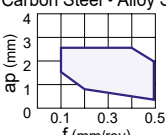
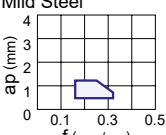
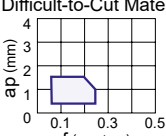
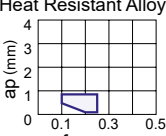
|  | Rhombic 80°<br>                    | Rhombic 55°<br>                    | Square 90°<br>          | Triangular 60°<br>                 | Rhombic 35°<br>                    | Trigon 80°<br>          | Round<br> | Chipbreaker Name and Cross Section                                                                     |
|--|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|  | CNMG_FP<br><br>➡ A098              | DNMG_FP<br><br>➡ A106              | SNMG_FP<br><br>➡ A114   | TNMG_FP<br><br>➡ A120              | VNMG_FP<br><br>➡ A127              | WNMG_FP<br><br>➡ A131   |                                                                                              | FP<br>              |
|  | CNMG_FH<br><br>➡ A098              | DNMG_FH<br><br>➡ A106              | SNMG_FH<br><br>➡ A114   | TNMG_FH<br><br>➡ A120              | VNMG_FH<br><br>➡ A127              | WNMG_FH<br><br>➡ A131   |                                                                                              | FH<br>              |
|  | CNMG_FS<br><br>➡ A098              | DNMG_FS<br><br>➡ A106              | SNMG_FS<br><br>➡ A114   | TNMG_FS<br><br>➡ A120              | VNMG_FS<br><br>➡ A127              | WNMG_FS<br><br>➡ A131   |                                                                                              | FS<br>              |
|  | CNMG_FY<br><br>➡ A098            | DNMG_FY<br><br>➡ A106            |                                                                                                          | TNMG_FY<br><br>➡ A120            |                                                                                                                     | WNMG_FY<br><br>➡ A131 |                                                                                              | FY<br>            |
|  | <b>NEW</b> CNGG_FS<br><br>➡ A098 | <b>NEW</b> DNGG_FS<br><br>➡ A106 |                                                                                                          | <b>NEW</b> TNGG_FS<br><br>➡ A120 | <b>NEW</b> VNGG_FS<br><br>➡ A127 |                                                                                                            |                                                                                              | <b>NEW</b> FS<br> |
|  | CNGG_FJ<br><br>➡ A098            | DNGG_FJ<br><br>➡ A106            |                                                                                                          |                                                                                                                     | VNGG_FJ<br><br>➡ A127            |                                                                                                            |                                                                                              | FJ<br>            |
|  |                                                                                                                     |                                                                                                                     |                                                                                                          | TNGG_R/L-FS<br><br>➡ A120        |                                                                                                                     |                                                                                                            |                                                                                              | R/L-FS<br>        |
|  |                                                                                                                     |                                                                                                                     |                                                                                                          | TNGG_R/L-F<br><br>➡ A121         | VNGG_R/L-F<br><br>➡ A127         |                                                                                                            |                                                                                              | R/L-F<br>         |
|  | CNMG_LP<br><br>➡ A098            | DNMG_LP<br><br>➡ A107            | SNMG_LP<br><br>➡ A114 | TNMG_LP<br><br>➡ A121            | VNMG_LP<br><br>➡ A127            | WNMG_LP<br><br>➡ A131 |                                                                                              | LP<br>            |

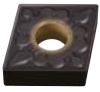
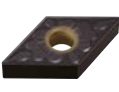
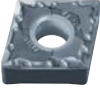
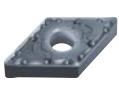
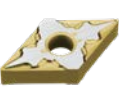
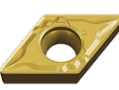
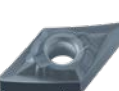
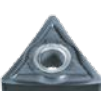
A

TURNING INSERTS

# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                | Cross Section Geometry                                                                                                    |                                                                                            |
|-------------|-----------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|             |           |                                                                                                      |                                                                                                                                                                                                                                                                                                         | ap (mm)                                                                                                                   | f (mm/rev)                                                                                 |
| A           | M         | <b>LM</b><br>       | <b>First recommendation for light cutting of stainless steel</b><br>Stable chip control at light cutting range.<br>Chipbreaker with high rake angle provides excellent burr control.                                                                                                                    | <b>Stainless Steel</b><br>              | <b>15°</b> 0.50 mm <b>Corner</b><br><b>20°</b> <b>Flank</b><br>CNMG120408-LM               |
|             |           | <b>LK</b><br>       | <b>First recommendation for light cutting of cast iron</b><br>Positive land allows sharp cutting edge and low cutting resistance.                                                                                                                                                                       | <b>Cast Iron</b><br>                    | <b>15°</b> 0.15 mm <b>Flank</b><br>6°<br>CNMG120408-LK                                     |
|             |           | <b>LS</b><br>       | <b>First recommendation for light cutting of difficult-to-cut materials.</b><br><b>Alternative chipbreaker for light cutting of stainless steel</b><br>Enhanced chip disposal for depths of cut smaller than the corner R.                                                                              | <b>Heat Resistant Alloy</b><br>         | <b>20°</b> 0.4 mm <b>Corner</b><br><b>20°</b> 0.6 mm <b>Flank</b><br>CNMG120408-LS         |
|             |           | <b>SH</b><br>     | <b>Alternative chipbreaker for light cutting of carbon and alloy steels</b><br>Can be used at low depth of cuts and high feed rates.<br>The curved edge allows smooth chip discharge.<br>Recommended for workpiece in the 160–250HB range.                                                              | <b>Carbon Steel • Alloy Steel</b><br>  | <b>15°</b> <b>Corner</b><br><b>15°</b> 0.2 mm <b>Flank</b><br>CNMG120408-SH                |
|             |           | <b>SA</b><br>     | <b>Alternative chipbreaker for light cutting of carbon and alloy steels</b><br>Superior chip control at small depth of cuts.<br>Covers copying and back turning with wavy edge.<br>Recommended for workpiece in the 200–300HB range.                                                                    | <b>Carbon Steel • Alloy Steel</b><br> | <b>25°</b> 0.3 mm <b>Corner</b><br><b>25°</b> 0.34 mm <b>Flank</b><br>8°<br>CNMG120408-SA  |
|             |           | <b>SW</b><br>     | <b>Wiper insert for light cutting of carbon, alloy and stainless steels, and cast iron</b><br>In comparison to conventional chipbreakers, the surface finish is maintained even if the feed per revolution is doubled.<br>Wiper design for increased productivity and improved surface finish.          | <b>Carbon Steel • Alloy Steel</b><br> | <b>18°</b> 0.15 mm <b>Corner</b><br><b>18°</b> 0.15 mm <b>Flank</b><br>7°<br>CNMG120408-SW |
|             |           | <b>SY</b><br>     | <b>First recommendation for light cutting of mild steel</b><br>Effectively controls adhesive chips.<br>Suitable for mild steel light cutting.                                                                                                                                                           | <b>Mild Steel</b><br>                 | <b>10°</b> <b>Corner</b><br><b>10°</b> 0.2 mm <b>Flank</b><br>CNMG120408-SY                |
|             |           | <b>MJ</b><br>     | <b>Alternative chipbreaker for light cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloy and titanium alloy.<br>The sharp edge produces a good surface finish.<br>The curved edge allows smooth chip discharge.<br>Excellent notch wear resistance for light to medium cutting. | <b>Difficult-to-Cut Materials</b><br> | <b>13°</b> <b>Corner</b><br><b>9°</b> <b>Flank</b><br>CNMG120408-MJ                        |
|             |           | <b>NEW LS</b><br> | <b>First recommendation for light cutting of difficult-to-cut materials.</b><br><b>Alternative chipbreaker for light cutting of stainless steel</b><br>Enhanced chip disposal for depths of cut smaller than the corner R.                                                                              | <b>Heat Resistant Alloy</b><br>       | <b>20°</b> 0.4 mm <b>Corner</b><br><b>20°</b> 0.6 mm <b>Flank</b><br>CNGG120408-LS         |

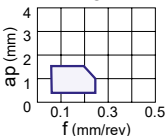
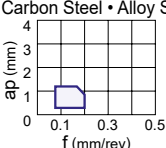
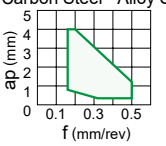
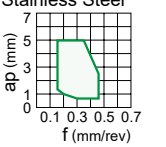
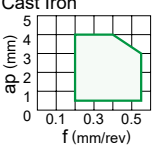
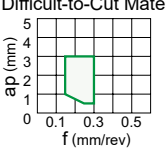
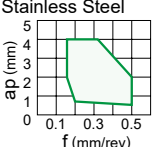
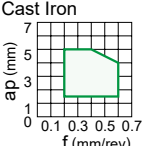
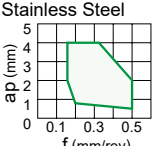
|  | Rhombic 80°<br>                    | Rhombic 55°<br>                    | Square 90°<br>          | Triangular 60°<br>                 | Rhombic 35°<br>                    | Trigon 80°<br>          | Round<br> | Chipbreaker Name and Cross Section                                                                     |
|--|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|  | CNMG_LM<br><br>↻ A099              | DNMG_LM<br><br>↻ A107              | SNMG_LM<br><br>↻ A114   | TNMG_LM<br><br>↻ A121              | VNMG_LM<br><br>↻ A128              | WNMG_LM<br><br>↻ A131   |                                                                                              | LM<br>              |
|  | CNMG_LK<br><br>↻ A099              | DNMG_LK<br><br>↻ A107              | SNMG_LK<br><br>↻ A114   | TNMG_LK<br><br>↻ A121              | VNMG_LK<br><br>↻ A128              | WNMG_LK<br><br>↻ A132   |                                                                                              | LK<br>              |
|  | CNMG_LS<br><br>↻ A099              | DNMG_LS<br><br>↻ A107              |                                                                                                          | TNMG_LS<br><br>↻ A121              | VNMG_LS<br><br>↻ A128              | WNMG_LS<br><br>↻ A132   |                                                                                              | LS<br>              |
|  | CNMG_SH<br><br>↻ A099            | DNMG_SH<br><br>↻ A107            | SNMG_SH<br><br>↻ A114 | TNMG_SH<br><br>↻ A121            | VNMG_SH<br><br>↻ A128            | WNMG_SH<br><br>↻ A132 |                                                                                              | SH<br>            |
|  | CNMG_SA<br><br>↻ A099            | DNMG_SA<br><br>↻ A108            | SNMG_SA<br><br>↻ A115 | TNMG_SA<br><br>↻ A121            | VNMG_SA<br><br>↻ A128            | WNMG_SA<br><br>↻ A132 |                                                                                              | SA<br>            |
|  | CNMG_SW<br><br>↻ A099            | DNMX_SW<br><br>↻ A108            |                                                                                                          | TNMX_SW<br><br>↻ A121            |                                                                                                                     | WNMG_SW<br><br>↻ A132 |                                                                                              | SW<br>            |
|  | CNMG_SY<br><br>↻ A099            | DNMG_SY<br><br>↻ A108            | SNMG_SY<br><br>↻ A115 | TNMG_SY<br><br>↻ A122            |                                                                                                                     | WNMG_SY<br><br>↻ A132 |                                                                                              | SY<br>            |
|  | CNMG_MJ<br><br>↻ A099            | DNMG_MJ<br><br>↻ A108            |                                                                                                          | TNMG_MJ<br><br>↻ A122            | VNMG_MJ<br><br>↻ A128            | WNMG_MJ<br><br>↻ A133 |                                                                                              | MJ(M)<br>         |
|  | <b>NEW</b> CNGG_LS<br><br>↻ A099 | <b>NEW</b> DNGG_LS<br><br>↻ A107 |                                                                                                          | <b>NEW</b> TNGG_LS<br><br>↻ A121 | <b>NEW</b> VNGG_LS<br><br>↻ A128 |                                                                                                            |                                                                                              | <b>NEW</b> LS<br> |

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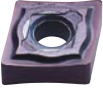
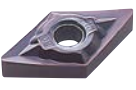
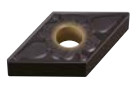
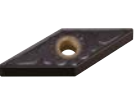
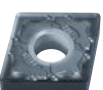
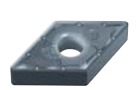
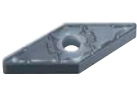
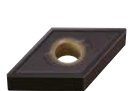
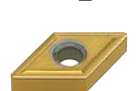
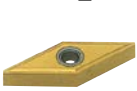
TURNING INSERTS

# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application | Tolerance       | Chipbreaker Name and Picture                                                                      | Features                                                                                                                                                                                                                                                                                                            | Cross Section Geometry                                                                                             |                                                                                    |
|-------------|-----------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|             |                 |                                                                                                   |                                                                                                                                                                                                                                                                                                                     |                                                                                                                    |                                                                                    |
| A           | TURNING INSERTS | Light Cutting                                                                                     | G                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |                                                                                    |
|             |                 |                                                                                                   |                                                                                                                                                                                                                                                                                                                     |                                                                                                                    |                                                                                    |
| M           | Medium Cutting  | <b>MJ</b><br>    | <b>Alternative chipbreaker for light cutting of difficult-to-cut materials</b><br>Double sided chipbreaker, single sided chipbreaker (D type, V type).<br>The sharp edge produces a good surface finish.<br>Ideal for heat-resistant materials and titanium alloy.<br>The curved edge allows smooth chip discharge. | Difficult-to-Cut Materials<br>   | 13° <b>Corner</b><br>9° <b>Flank</b><br>CNGG120408-MJ                              |
|             |                 | <b>R/L-K</b><br> | <b>Light cutting</b><br>Parallel chipbreaker.<br>Excellent chip control at low to medium feed rates.                                                                                                                                                                                                                | Carbon Steel • Alloy Steel<br>   | 14° <b>Flank</b><br>0.25 mm<br>TNGG160404R-K                                       |
|             |                 | <b>MP</b><br>    | <b>First recommendation for medium cutting of carbon and alloy steels</b><br>Suitable for medium to light cutting.<br>Chipbreaker geometry appropriate for copying and back turning.<br>Cutting edge geometry for an optimum balance of sharpness and fracture resistance.                                          | Carbon Steel • Alloy Steel<br>   | 15° <b>Corner</b> 0.15 mm<br>11° <b>Flank</b> 0.2 mm<br>CNMG120408-MP              |
|             |                 | <b>MM</b><br>  | <b>First recommendation for medium cutting of stainless steel</b><br>Optimized land geometry by simulation analysis technology controls the plastic deformation of the corner and achieves the long tool life.                                                                                                      | Stainless Steel<br>             | 6° <b>Corner</b> 0.3 mm<br>10° <b>Flank</b> 0.3 mm<br>CNMG120408-MM                |
|             |                 | <b>MK</b><br>  | <b>First recommendation for medium cutting of cast iron</b><br>Optimum balance between sharpness and high edge strength for general use.                                                                                                                                                                            | Cast Iron<br>                  | 15° <b>Flank</b> 0.25 mm<br>3°<br>CNMG120408-MK                                    |
|             |                 | <b>MS</b><br>  | <b>First recommendation for medium cutting of stainless steel, and mild steels, and difficult-to-cut materials</b><br>The large 2-step rake angle generates chips smoothly and without tangling during low feed cutting.                                                                                            | Difficult-to-Cut Materials<br> | 25° <b>Corner</b> 0.5 mm<br>15°<br>25° <b>Flank</b> 0.5 mm<br>15°<br>CNMG120408-MS |
|             |                 | <b>MS</b><br>  | <b>Alternative chipbreaker for medium cutting of stainless and mild steels, and difficult-to-cut materials</b><br>The sharp edge gives best performance.<br>Flat top chipbreaker shape offers high edge strength.<br>Applicable to grades other than MV9005, MP9005, MP9015, MP9025, MT9015.                        | Stainless Steel<br>            | 25° <b>Corner</b> 0.5 mm<br>15°<br>25° <b>Flank</b> 0.5 mm<br>15°<br>CNMG120408-MS |
|             |                 | <b>GK</b><br>  | <b>Alternative chipbreaker for medium cutting of cast iron</b><br>Versatile standard chipbreaker.<br>Flat land maintains a stable cutting edge.                                                                                                                                                                     | Cast Iron<br>                  | 15° <b>Flank</b> 0.25 mm<br>CNMG120408-GK                                          |
|             |                 | <b>GM</b><br>  | <b>Alternative chipbreaker for light to medium cutting of stainless steel</b><br>Alternative chipbreaker of main chipbreaker LM and MM.<br>Excellent notch wear resistance for light to medium cutting.                                                                                                             | Stainless Steel<br>            | 25° <b>Corner</b> 0.5 mm<br>15°<br>25° <b>Flank</b> 0.5 mm<br>15°<br>CNMG120408-GM |



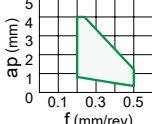
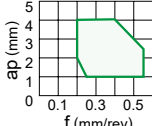
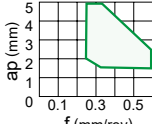
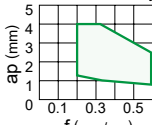
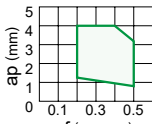
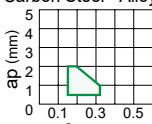
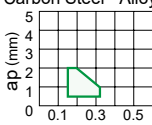
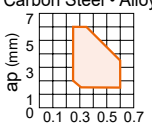
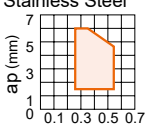
|  | Rhombic 80°<br>         | Rhombic 55°<br>         | Square 90°<br>          | Triangular 60°<br>       | Rhombic 35°<br>         | Trigon 80°<br>          | Round<br> | Chipbreaker Name and Cross Section                                                           |
|--|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  | CNGG_MJ<br><br>➡ A100   | DNGM_MJ<br><br>➡ A108   |                                                                                                          |                                                                                                           | VNGM_MJ<br><br>➡ A129   |                                                                                                            |                                                                                              | MJ(G)<br> |
|  |                                                                                                          |                                                                                                          |                                                                                                          | TNGG_R/L-K<br><br>➡ A122 |                                                                                                          |                                                                                                            |                                                                                              | R/L-K<br> |
|  | CNMG_MP<br><br>➡ A100   | DNMG_MP<br><br>➡ A109   | SNMG_MP<br><br>➡ A115   | TNMG_MP<br><br>➡ A122    | VNMG_MP<br><br>➡ A129   | WNMG_MP<br><br>➡ A133   |                                                                                              | MP<br>    |
|  | CNMG_MM<br><br>➡ A100 | DNMG_MM<br><br>➡ A109 | SNMG_MM<br><br>➡ A115 | TNMG_MM<br><br>➡ A122  | VNMG_MM<br><br>➡ A129 | WNMG_MM<br><br>➡ A133 |                                                                                              | MM<br>  |
|  | CNMG_MK<br><br>➡ A100 | DNMG_MK<br><br>➡ A109 | SNMG_MK<br><br>➡ A115 | TNMG_MK<br><br>➡ A122  | VNMG_MK<br><br>➡ A129 | WNMG_MK<br><br>➡ A133 |                                                                                              | MK<br>  |
|  | CNMG_MS<br><br>➡ A101 | DNMG_MS<br><br>➡ A109 | SNMG_MS<br><br>➡ A115 | TNMG_MS<br><br>➡ A123  | VNMG_MS<br><br>➡ A129 | WNMG_MS<br><br>➡ A133 |                                                                                              | MS<br>  |
|  | CNMG_MS<br><br>➡ A101 | DNMG_MS<br><br>➡ A109 | SNMG_MS<br><br>➡ A116 | TNMG_MS<br><br>➡ A123  | VNMG_MS<br><br>➡ A129 | WNMG_MS<br><br>➡ A133 |                                                                                              | MS<br>  |
|  | CNMG_GK<br><br>➡ A101 | DNMG_GK<br><br>➡ A109 | SNMG_GK<br><br>➡ A116 | TNMG_GK<br><br>➡ A123  | VNMG_GK<br><br>➡ A129 | WNMG_GK<br><br>➡ A133 |                                                                                              | GK<br>  |
|  | CNMG_GM<br><br>➡ A101 | DNMG_GM<br><br>➡ A110 | SNMG_GM<br><br>➡ A116 | TNMG_GM<br><br>➡ A123  | VNMG_GM<br><br>➡ A129 | WNMG_GM<br><br>➡ A134 |                                                                                              | GM<br>  |

A

TURNING INSERTS

# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                     | Cross Section Geometry                                                                                             |                                                          |  |
|----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--|
| Medium Cutting | M         | <b>MA</b><br>       | <b>Multi-assist chipbreaker</b><br>Ideal for general cutting applications.<br>Positive land provides sharp cutting action.                                                                                                                   | Carbon Steel • Alloy Steel<br>   | 22° 0.2 mm Corner<br>22° 0.2 mm Flank<br>CNMG120408-MA   |  |
|                |           | <b>MH</b><br>       | <b>Alternative chipbreaker for medium cutting of carbon and alloy steels</b><br><b>First recommendation for rough cutting of mild steel</b><br>Good chip control with suitable chip pocket.                                                  | Carbon Steel • Alloy Steel<br>   | 16° 0.25 mm Corner<br>16° 0.35 mm Flank<br>CNMG120408-MH |  |
|                |           | <b>Standard</b><br> | <b>Alternative chipbreaker for medium cutting of carbon and alloy steels</b><br><b>First recommendation for medium cutting of cast iron</b><br>Flat land offers high edge strength.<br>Flat top chipbreaker shape offers high edge strength. | Carbon Steel • Alloy Steel<br>   | 15° 0.25 mm Corner<br>15° 0.25 mm Flank<br>CNMG120408    |  |
|                |           | <b>MW</b><br>     | <b>Wiper insert for medium cutting carbon, alloy and, stainless steels, and cast iron</b><br>The wiper allows up to two times higher feed.<br>A wide chip pocket prevents chip jamming.                                                      | Carbon Steel • Alloy Steel<br> | 19° 0.25 mm Corner<br>19° 0.3 mm Flank<br>CNMG120408-MW  |  |
|                |           | <b>R/L-ES</b><br> | <b>Alternative chipbreaker for medium cutting of stainless steel</b><br>Good balance of edge strength and sharpness.<br>Right- or left-hand chipbreaker for unidirectional chip control.                                                     | Stainless Steel<br>            | 15° 0.16 mm Flank<br>TNMG160404R-ES                      |  |
|                |           | <b>R/L-2G</b><br> | <b>Alternative chipbreaker for medium cutting of carbon and alloy steel</b><br>Parallel chipbreaker controls chip flow.<br>Suitable for light to medium cutting.                                                                             | Carbon Steel • Alloy Steel<br> | 14° 0.2 mm Flank<br>TNMG160404R-2G                       |  |
|                |           | <b>R/L</b><br>    | <b>Medium cutting</b><br>Parallel chipbreaker.<br>Good chip control for medium feed rates.                                                                                                                                                   | Carbon Steel • Alloy Steel<br> | 14° 0.25 mm Flank<br>TNMG160408R                         |  |
| Rough Cutting  | M         | <b>RP</b><br>     | <b>First recommendation for rough cutting of carbon and alloy steels</b><br>For interrupted cuts and removing scale.<br>Good balance of cutting edge strength and low cutting resistance because of suitable rake angle.                     | Carbon Steel • Alloy Steel<br> | 3° 0.33 mm Corner<br>0.33 mm Flank<br>CNMG120408-RP      |  |
|                |           | <b>RM</b><br>     | <b>First recommendation for rough cutting of stainless steel</b><br>Excellent fracture resistance at interrupted cutting due to the optimum land angle and honing geometry.                                                                  | Stainless Steel<br>            | 3° 0.32 mm Corner<br>6° 0.32 mm Flank<br>CNMG120408-RM   |  |

|  | Rhombic 80°<br>                | Rhombic 55°<br>                 | Square 90°<br>                  | Triangular 60°<br>                 | Rhombic 35°<br>                 | Trigon 80°<br>                 | Round<br>                 | Chipbreaker Name and Cross Section                                                                     |
|--|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|  | <b>CNMG_MA</b><br><br>➡ A101   | <b>DNMG_MA</b><br><br>➡ A110    | <b>SNMG_MA</b><br><br>➡ A116    | <b>TNMG_MA</b><br><br>➡ A123       | <b>VNMG_MA</b><br><br>➡ A129    | <b>WNMG_MA</b><br><br>➡ A134   |                                                                                                              | <b>MA</b><br>       |
|  | <b>CNMG_MH</b><br><br>➡ A102   | <b>DNMG_MH</b><br><br>➡ A110    | <b>SNMG_MH</b><br><br>➡ A117    | <b>TNMG_MH</b><br><br>➡ A123       | <b>VNMG_MH</b><br><br>➡ A130    | <b>WNMG_MH</b><br><br>➡ A134   |                                                                                                              | <b>MH</b><br>       |
|  | <b>CNMG</b><br><br>➡ A102      | <b>DNMG</b><br><br>➡ A110       | <b>SNMG</b><br><br>➡ A117       | <b>TNMG</b><br><br>➡ A124          | <b>VNMG</b><br><br>➡ A130       | <b>WNMG</b><br><br>➡ A134      | <b>RNMG</b><br><br>➡ A113 | <b>Standard</b><br> |
|  | <b>CNMG_MW</b><br><br>➡ A102 | <b>DNMX_MW</b><br><br>➡ A111  |                                                                                                                  | <b>TNMX_MW</b><br><br>➡ A124     |                                                                                                                  | <b>WNMG_MW</b><br><br>➡ A134 |                                                                                                              | <b>MW</b><br>     |
|  |                                                                                                                 |                                                                                                                  |                                                                                                                  | <b>TNMG_R/L-ES</b><br><br>➡ A124 |                                                                                                                  |                                                                                                                   |                                                                                                              | <b>R/L-ES</b><br> |
|  |                                                                                                                 |                                                                                                                  |                                                                                                                  | <b>TNMG_R/L-2G</b><br><br>➡ A124 |                                                                                                                  |                                                                                                                   |                                                                                                              | <b>R/L-2G</b><br> |
|  |                                                                                                                 | <b>DNGG_R/L</b><br><br>➡ A111 | <b>SNGG_R/L</b><br><br>➡ A117 | <b>TNGG_R/L</b><br><br>➡ A125    | <b>VNGG_R/L</b><br><br>➡ A130 |                                                                                                                   |                                                                                                              | <b>R/L</b><br>    |
|  | <b>CNMG_RP</b><br><br>➡ A102 | <b>DNMG_RP</b><br><br>➡ A111  | <b>SNMG_RP</b><br><br>➡ A117  | <b>TNMG_RP</b><br><br>➡ A125     |                                                                                                                  | <b>WNMG_RP</b><br><br>➡ A135 |                                                                                                              | <b>RP</b><br>     |
|  | <b>CNMG_RM</b><br><br>➡ A103 | <b>DNMG_RM</b><br><br>➡ A111  | <b>SNMG_RM</b><br><br>➡ A117  | <b>TNMG_RM</b><br><br>➡ A125     |                                                                                                                  | <b>WNMG_RM</b><br><br>➡ A135 |                                                                                                              | <b>RM</b><br>     |

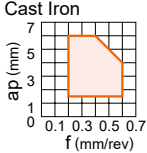
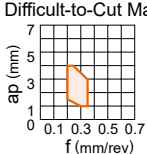
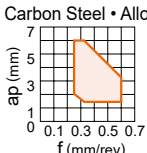
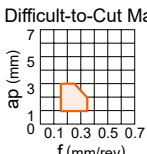
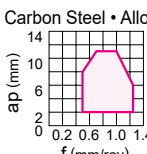
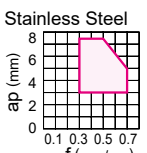
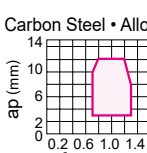
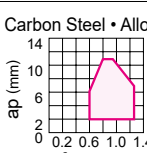
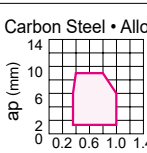
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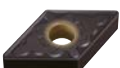
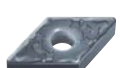
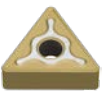
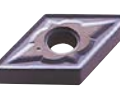
TURNING INSERTS



# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application                 | Tolerance                 | Chipbreaker Name and Picture                                                                     | Features                                                                                                                                                                                                                                                                                                                                                       | Cross Section Geometry                                                                                             |                                                                            |
|-----------------------------|---------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| TURNING INSERTS<br><b>A</b> | Rough Cutting<br><b>M</b> | <b>RK</b><br>   | <b>First recommendation for rough cutting of cast iron</b><br>Extra wide land provides a stable cutting edge for interrupted machining and removal of scale.                                                                                                                                                                                                   | Cast Iron<br>                    | Flank<br>15° 0.35 mm<br>CNMG120408-RK                                      |
|                             |                           | <b>RS</b><br>   | <b>First recommendation for rough cutting of difficult-to-cut materials</b><br><b>Alternative chipbreaker for rough cutting of stainless steel</b><br>During low speed cutting the positive land controls chip welding and abrasion at the depth of cut line.                                                                                                  | Difficult-to-Cut Materials<br>   | Corner<br>20° 0.2 mm<br>10°<br>Flank<br>20° 0.2 mm<br>10°<br>CNMG120408-RS |
|                             |                           | <b>GH</b><br>   | <b>Alternative chipbreaker for rough cutting of carbon and alloy steels, and cast iron</b><br>For interrupted cuts and removing scale.<br>A combination of wide land and a large chip pocket allows high feed rates.                                                                                                                                           | Carbon Steel • Alloy Steel<br>   | Corner<br>18° 0.32 mm<br>Flank<br>18° 0.32 mm<br>CNMG120408-GH             |
|                             |                           | <b>GJ</b><br> | <b>Alternative chipbreaker for rough cutting of difficult-to-cut materials</b><br>Excellent balance of edge sharpness and strength.<br>Edge geometry with high face wear resistance.                                                                                                                                                                           | Difficult-to-Cut Materials<br>  | Corner<br>18° 0.15 mm<br>Flank<br>18° 0.15 mm<br>CNMG120408-GJ             |
|                             | Heavy Cutting<br><b>M</b> | <b>HX</b><br> | <b>First recommendation for heavy cutting of carbon and alloy steels</b><br>Covers the medium range of the heavy cutting region.<br>Owing to the straight edge and chamfer, it gives a balance of sharpness and strength.<br>Variable land and a wavy chipbreaker for good chip control.                                                                       | Carbon Steel • Alloy Steel<br> | Corner<br>23° 0.43 mm<br>Flank<br>21° 0.52 mm<br>CNMM190616-HX             |
|                             |                           | <b>HL</b><br> | <b>First recommendation for heavy cutting of stainless steel</b><br><b>Alternative chipbreaker for heavy cutting of carbon and alloy steels</b><br>Covers the lower end of the heavy cutting region.<br>The curved edge and narrow chamfer allow good chip control and sharp cutting action. Dots on the nose radius ensure chip control at low depths of cut. | Stainless Steel<br>            | 15° 0.34 mm<br>CNMM190616-HL                                               |
|                             |                           | <b>HR</b><br> | <b>Alternative chipbreaker for heavy cutting of carbon and alloy steels</b><br>Covers the heavy cutting region by using a straight cutting edge with high edge strength.<br>It exhibits smooth chip control during large depths of cut and high feed rate machining.                                                                                           | Carbon Steel • Alloy Steel<br> | 20° 0.58 mm<br>CNMM250924-HR                                               |
|                             |                           | <b>HV</b><br> | <b>Alternative chipbreaker for heavy cutting of carbon and alloy steels</b><br>Covers the upper end of the heavy cutting region.<br>Wide land and large chamfer offer high edge strength.<br>A wide chipbreaker prevents chip jamming.                                                                                                                         | Carbon Steel • Alloy Steel<br> | Corner<br>20° 0.68 mm<br>Flank<br>20° 0.68 mm<br>SNMM190616-HV             |
|                             |                           | <b>HZ</b><br> | <b>Alternative chipbreaker for heavy cutting of carbon and alloy steels</b><br>Covers the lower end of the heavy cutting region.<br>Low cutting resistance due to positive land and curved edge.<br>Teardrop dots improve chip control without increasing cutting resistance.                                                                                  | Carbon Steel • Alloy Steel<br> | Corner<br>22° 0.42 mm<br>6°<br>Flank<br>22° 0.42 mm<br>6°<br>CNMM190616-HZ |

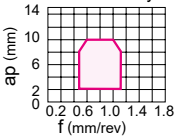
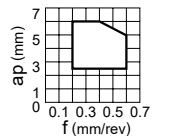
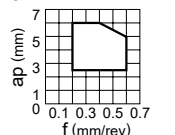
|  | Rhombic 80°<br>         | Rhombic 55°<br>         | Square 90°<br>          | Triangular 60°<br>      | Rhombic 35°<br> | Trigon 80°<br>          | Round<br> | Chipbreaker Name and Cross Section                                                                 |
|--|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  | CNMG_RK<br><br>➡ A103   | DNMG_RK<br><br>➡ A111   | SNMG_RK<br><br>➡ A117   | TNMG_RK<br><br>➡ A125   |                                                                                                  | WNMG_RK<br><br>➡ A135   |                                                                                              | <b>RK</b><br>   |
|  | CNMG_RS<br><br>➡ A103   | DNMG_RS<br><br>➡ A111   | SNMG_RS<br><br>➡ A118   | TNMG_RS<br><br>➡ A125   |                                                                                                  | WNMG_RS<br><br>➡ A135   |                                                                                              | <b>RS</b><br>   |
|  | CNMG_GH<br><br>➡ A103   | DNMG_GH<br><br>➡ A111   | SNMG_GH<br><br>➡ A118   | TNMG_GH<br><br>➡ A126   |                                                                                                  | WNMG_GH<br><br>➡ A135   |                                                                                              | <b>GH</b><br>   |
|  | CNMG_GJ<br><br>➡ A103 | DNMG_GJ<br><br>➡ A112 |                                                                                                          |                                                                                                          |                                                                                                  | WNMG_GJ<br><br>➡ A135 |                                                                                              | <b>GJ</b><br> |
|  | CNMM_HX<br><br>➡ A103 |                                                                                                          | SNMM_HX<br><br>➡ A118 |                                                                                                          |                                                                                                  |                                                                                                            |                                                                                              | <b>HX</b><br> |
|  | CNMM_HL<br><br>➡ A104 | DNMM_HL<br><br>➡ A112 | SNMM_HL<br><br>➡ A118 | TNMM_HL<br><br>➡ A126 |                                                                                                  |                                                                                                            |                                                                                              | <b>HL</b><br> |
|  | CNMM_HR<br><br>➡ A104 |                                                                                                          | SNMM_HR<br><br>➡ A118 |                                                                                                          |                                                                                                  |                                                                                                            |                                                                                              | <b>HR</b><br> |
|  | CNMM_HV<br><br>➡ A104 |                                                                                                          | SNMM_HV<br><br>➡ A119 |                                                                                                          |                                                                                                  |                                                                                                            |                                                                                              | <b>HV</b><br> |
|  | CNMM_HZ<br><br>➡ A104 | DNMM_HZ<br><br>➡ A112 | SNMM_HZ<br><br>➡ A119 | TNMM_HZ<br><br>➡ A126 |                                                                                                  |                                                                                                            |                                                                                              | <b>HZ</b><br> |

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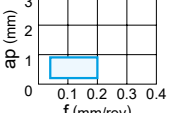
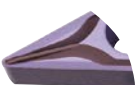
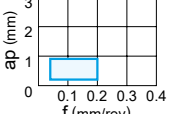
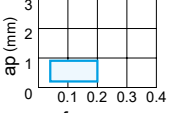
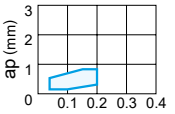
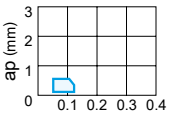
TURNING INSERTS

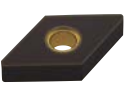
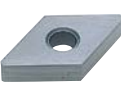
# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Application   | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                                                                          | Cross Section Geometry                                                                                                                              |  |
|---------------|-----------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Heavy Cutting | M         | <b>HM</b><br>       | <b>Alternative chipbreaker for heavy cutting of carbon, alloy and stainless steels</b><br>Covers the lower end through to the medium range of the heavy cutting region. The curved edge and narrow chamfer allow good chip control and sharp cutting action. Teardrop dots provided along the cutting edge ensures chip control even with variable depths of cut. | Carbon Steel • Alloy Steel<br><br>16°<br>0.32 mm<br>CNMM190616-HM |  |
|               |           | <b>Flat Top</b><br> | <b>First recommendation for heavy cutting of cast iron</b><br>Most effective for unstable machining due to its high edge strength.                                                                                                                                                                                                                                | Cast Iron<br><br>0°<br>CNMA120408                                 |  |
|               |           | <b>Flat Top</b><br> | <b>For heavy cutting of cast iron</b><br>Most effective for unstable machining due to its high edge strength. Can be used on workpiece requiring close tolerances due to G class insert tolerance.                                                                                                                                                                | Cast Iron<br><br>0°<br>DNGA150408                                 |  |

## 5° POSITIVE INSERTS WITH HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                        | Cross Section Geometry                                                                                                                                        |  |
|----------------|-----------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Finish Cutting | M         | <b>FP</b><br>     | <b>First recommendation for finish cutting of carbon, alloy and mild steels</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures. | Carbon Steel • Alloy Steel<br><br>6° Corner<br>6° Flank<br>VBMT110304-FP  |  |
|                |           | <b>FM</b><br>     | <b>First recommendation for finish cutting of stainless steel</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.               | Stainless Steel<br><br>6° Corner<br>6° Flank<br>VBMT110304-FM             |  |
|                |           | <b>NEW FS</b><br> | <b>First recommendation for finish cutting of difficult-to-cut materials</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut. Maintains the edge strength at the corner and prevents sudden fractures.    | Difficult-to-Cut Materials<br><br>6° Corner<br>6° Flank<br>VBMT110304-FS  |  |
|                |           | <b>FV</b><br>     | <b>First recommendation for finish cutting of carbon, alloy, mild and stainless steels</b><br>Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.           | Carbon Steel • Alloy Steel<br><br>18° Corner<br>8° Flank<br>VBMT110304-FV |  |
|                | G         | <b>R/L-F</b><br>  | <b>Finishing</b><br>Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.                                                                                                                                        | Carbon Steel • Alloy Steel<br><br>13° Flank<br>VBGT110304R-F              |  |

|  | Rhombic 80°<br>              | Rhombic 55°<br>           | Square 90°<br>               | Triangular 60°<br>        | Rhombic 35°<br>           | Trigon 80°<br>            | Round<br> | Chipbreaker Name and Cross Section                                                                        |
|--|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|  | <b>CNMM_HM</b><br><br>➡ A104 |                                                                                                            | <b>SNMM_HM</b><br><br>➡ A119 |                                                                                                            |                                                                                                            |                                                                                                              |                                                                                              | <b>HM</b><br>          |
|  | <b>CNMA</b><br><br>➡ A105    | <b>DNMA</b><br><br>➡ A112 | <b>SNMA</b><br><br>➡ A119    | <b>TNMA</b><br><br>➡ A126 | <b>VNMA</b><br><br>➡ A130 | <b>WNMA</b><br><br>➡ A135 |                                                                                              | <b>Flat Top(M)</b><br> |
|  |                                                                                                               | <b>DNGA</b><br><br>➡ A112 | <b>SNGA</b><br><br>➡ A119    | <b>TNGA</b><br><br>➡ A126 | <b>VNGA</b><br><br>➡ A130 |                                                                                                              |                                                                                              | <b>Flat Top(G)</b><br> |

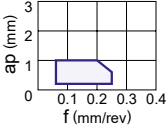
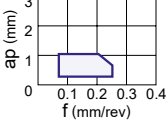
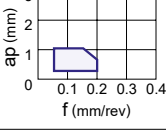
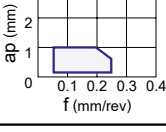
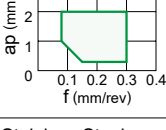
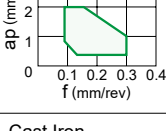
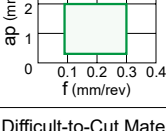
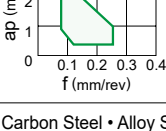
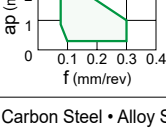
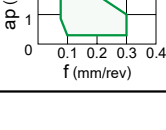
|  | Rhombic 80°<br> | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br>           | Rhombic 35°<br>                 | Trigon 80°<br>                  | Round<br> | Chipbreaker Name and Cross Section                                                                            |
|--|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
|  |                                                                                                    |                                                                                                    |                                                                                                   |                                                                                                                 | <b>VBMT_FP</b><br><br>➡ A174    |                                                                                                                      |                                                                                                | <b>FP</b><br>            |
|  |                                                                                                    |                                                                                                    |                                                                                                   |                                                                                                                 | <b>VBMT_FM</b><br><br>➡ A174    |                                                                                                                      |                                                                                                | <b>FM</b><br>            |
|  |                                                                                                    |                                                                                                    |                                                                                                   |                                                                                                                 | <b>VBMT_FS</b><br><br>➡ A174    |                                                                                                                      |                                                                                                | <b>NEW</b> <b>FS</b><br> |
|  |                                                                                                    |                                                                                                    |                                                                                                   | <b>TBMT_FV</b><br><br>➡ A164 | <b>VBMT_FV</b><br><br>➡ A174    |                                                                                                                      |                                                                                                | <b>FV</b><br>            |
|  |                                                                                                    |                                                                                                    |                                                                                                   |                                                                                                                 | <b>VBGT_R/L-F</b><br><br>➡ A174 | <b>WBGT_R/L-F</b><br><br>➡ A183 |                                                                                                | <b>R/L-F</b><br>         |

A

TURNING INSERTS

# CLASSIFICATION

## 5° POSITIVE INSERTS WITH HOLE

| Application | Tolerance      | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                                             | Cross Section Geometry                                                                                                                                          |  |
|-------------|----------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|             |                |                                                                                                      |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                 |  |
| A           | Light Cutting  | <b>LP</b><br>       | <b>First recommendation for light cutting of carbon steel and alloy steel</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and controls white turbidity of the surface finish.<br>Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.                 | Carbon Steel • Alloy Steel<br><br>18° Corner<br>8° Flank<br>VBMT110304-LP     |  |
|             |                | <b>LM</b><br>       | <b>First recommendation for light cutting of stainless steel</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and controls white turbidity of the surface finish.<br>Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.                              | Stainless Steel<br><br>18° Corner<br>8° Flank<br>VBMT110304-LM                |  |
|             |                | <b>LS</b><br>       | <b>First recommendation for light cutting of difficult-to-cut materials</b><br>Prevents welding of the insert and controls helps to prevent cloudy surface finishes.                                                                                                                                                                 | Difficult-to-Cut Materials<br><br>18° Corner<br>8° Flank<br>VBMT110304-LS     |  |
|             |                | <b>SV</b><br>     | <b>Alternative chipbreaker for carbon steel, alloy steel and stainless steel</b><br>Large rake angle provides sharp cutting action.<br>A peninsular dot ensures chip control at depths of cut under 1mm.                                                                                                                             | Carbon Steel • Alloy Steel<br><br>18° Corner<br>8° Flank<br>VBMT110304-SV    |  |
|             | Medium Cutting | <b>MP</b><br>     | <b>First recommendation for medium cutting of carbon steel, alloy steel and mild steel</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut. | Carbon Steel • Alloy Steel<br><br>25° Corner<br>25° Flank<br>VBMT160404-MP  |  |
|             |                | <b>MM</b><br>     | <b>First recommendation for medium cutting of stainless steel</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.                          | Stainless Steel<br><br>25° Corner<br>25° Flank<br>VBMT160404-MM             |  |
|             |                | <b>MK</b><br>     | <b>First recommendation for medium cutting of cast iron</b><br>Optimum balance between sharpness and high edge strength for general use.                                                                                                                                                                                             | Cast Iron<br><br>25° Flank<br>25° Corner<br>VBMT160404-MK                   |  |
|             |                | <b>MS</b><br>     | <b>First recommendation for medium cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloy and titanium alloy and cobalt chrome alloy.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.                                   | Difficult-to-Cut Materials<br><br>25° Corner<br>25° Flank<br>VBMT160404-MS  |  |
|             |                | <b>MV</b><br>     | <b>Alternative chipbreaker for medium cutting of carbon, alloy, mild and stainless steels</b><br>A positive insert with a large rake angle achieves sharp cutting edge performance.<br>The double chipbreaker and round-shaped dots in the rake face achieve a wide range of chip discharge.                                         | Carbon Steel • Alloy Steel<br><br>18° Corner<br>18° Flank<br>VBMT160404-MV  |  |
|             |                | <b>R/L-MV</b><br> | <b>Alternative chipbreaker for medium cutting of carbon, alloy, mild and stainless steels</b><br>A positive insert with a large rake angle achieves sharp cutting edge performance.<br>The double chipbreaker and round-shaped dots in the rake face achieve a wide range of chip discharge.                                         | Carbon Steel • Alloy Steel<br><br>20° Corner<br>20° Flank<br>WBMTL30204R-MV |  |

|  | Rhombic 80°<br> | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br> | Rhombic 35°<br>         | Trigon 80°<br>              | Round<br> | Chipbreaker Name and Cross Section                                                              |
|--|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_LP<br><br>⊖ A175   |                                                                                                                |                                                                                              | LP<br>       |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_LM<br><br>⊖ A175   |                                                                                                                |                                                                                              | LM<br>       |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_LS<br><br>⊖ A175   |                                                                                                                |                                                                                              | LS<br>       |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_SV<br><br>⊖ A175 |                                                                                                                |                                                                                              | SV<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_MP<br><br>⊖ A175 |                                                                                                                |                                                                                              | MP<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_MM<br><br>⊖ A175 |                                                                                                                |                                                                                              | MM<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_MK<br><br>⊖ A175 |                                                                                                                |                                                                                              | MK<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_MS<br><br>⊖ A175 |                                                                                                                |                                                                                              | MS<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMT_MV<br><br>⊖ A175 |                                                                                                                |                                                                                              | MV<br>     |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     |                                                                                                          | WBMT_R/L-MV<br><br>⊖ A183 |                                                                                              | R/L-MV<br> |

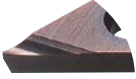
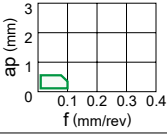
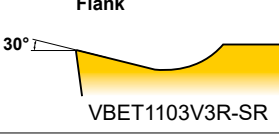
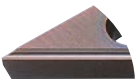
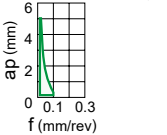
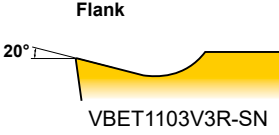
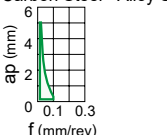
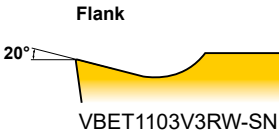
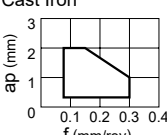
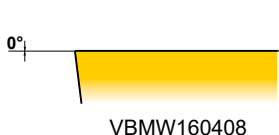
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TURNING INSERTS

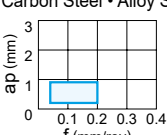
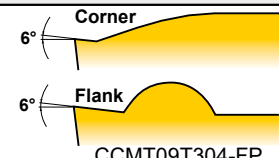
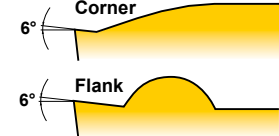
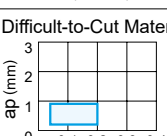
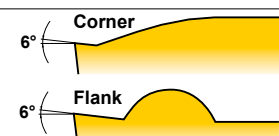
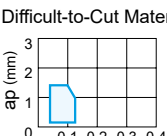
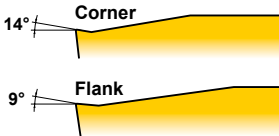
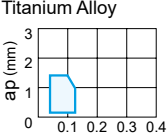
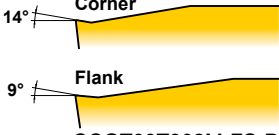


# CLASSIFICATION

## 5° POSITIVE INSERTS WITH HOLE

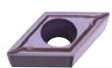
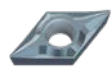
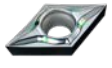
| Application    | Tolerance | Chipbreaker Name and Picture                                                                          | Features                                                                                                                                                                 |                                                                                                                  | Cross Section Geometry                                                                                                        |
|----------------|-----------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Medium Cutting | E         | <b>R/L-SR</b><br>    | <b>Medium cutting on automatic lathes</b><br>A wide lead chipbreaker.<br>Insert designed for low resistance chip control.                                                | Carbon Steel • Alloy Steel<br> | <b>Flank</b><br>30°<br><br>VBET1103V3R-SR  |
|                |           | <b>R/L-SN</b><br>    | <b>Medium cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control for low to medium feed rates.                                             | Carbon Steel • Alloy Steel<br> | <b>Flank</b><br>20°<br><br>VBET1103V3R-SN  |
|                |           | <b>R/LW-SN</b><br>   | <b>Medium cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control for low to medium feed rates.<br>The wiper produces good cutting surface. | Carbon Steel • Alloy Steel<br> | <b>Flank</b><br>20°<br><br>VBET1103V3RW-SN |
| For Cast Iron  | M         | <b>Flat Top</b><br> | <b>Rough cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to its high edge strength.                                                   | Cast Iron<br>                 | <b>Flank</b><br>0°<br><br>VBMW160408      |

## 7° POSITIVE INSERTS WITH HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                    | Cross Section Geometry                                                                                                                                  |
|----------------|-----------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Finish Cutting | M         | <b>FP</b><br>     | <b>First recommendation for finish cutting of carbon steel, alloy and mild steels</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut.<br>Maintains the edge strength at the corner and prevents sudden fractures.                                                                                                                      | Carbon Steel • Alloy Steel<br> | <b>Corner</b><br>6°<br><b>Flank</b><br>6°<br><br>CCMT09T304-FP     |
|                |           | <b>FM</b><br>     | <b>First recommendation for finish cutting of stainless steel</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut.<br>Maintains the edge strength at the corner and prevents sudden fractures.                                                                                                                                          | Stainless Steel<br>            | <b>Corner</b><br>6°<br><b>Flank</b><br>6°<br><br>CCMT09T304-FM     |
|                |           | <b>NEW FS</b><br> | <b>First recommendation for finish cutting of difficult-to-cut materials</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depth of cut.<br>Maintains the edge strength at the corner and prevents sudden fractures.                                                                                                                               | Difficult-to-Cut Materials<br> | <b>Corner</b><br>6°<br><b>Flank</b><br>6°<br><br>CCMT09T304-FS     |
|                | G         | <b>FS</b><br>     | <b>First recommendation for finish cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloys, titanium alloys, and cobalt chrome alloys.<br>Sharp cutting edges provide excellent surface precision.<br>Highly efficient chip discharge is possible due to curved cutting edges.                                                                           | Difficult-to-Cut Materials<br> | <b>Corner</b><br>14°<br><b>Flank</b><br>9°<br><br>CCGT09T302M-FS   |
|                |           | <b>FS-P</b><br>   | <b>First recommendation for finish cutting of titanium alloys</b><br>Ideal for titanium alloys and copper alloys.<br>Sharp cutting edges provide excellent surface precision.<br>Highly efficient chip discharge is possible due to curved cutting edges.<br>Polished (mirror-surface) finish of insert surfaces drastically improves welding resistance extending tool life. | Titanium Alloy<br>             | <b>Corner</b><br>14°<br><b>Flank</b><br>9°<br><br>CCGT09T302M-FS-P |

|  | Rhombic 80°<br> | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br> | Rhombic 35°<br>            | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                               |
|--|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBET_R/L-SR<br><br>➡ A176  |                                                                                                   |                                                                                              | R/L-SR<br>    |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBET_R/L-SN<br><br>➡ A176  |                                                                                                   |                                                                                              | R/L-SN<br>    |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBET_R/LW-SN<br><br>➡ A176 |                                                                                                   |                                                                                              | R/LW-SN<br>   |
|  |                                                                                                  |                                                                                                  |                                                                                                 |                                                                                                     | VBMW<br><br>➡ A176         |                                                                                                   |                                                                                              | Flat Top<br> |

**A**  
TURNING INSERTS

|  | Rhombic 80°<br>                  | Rhombic 55°<br>                  | Square 90°<br>        | Triangular 60°<br>    | Rhombic 35°<br>                    | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                                     |
|--|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|  | CCMT_FP<br><br>➡ A140            | DCMT_FP<br><br>➡ A152            | SCMT_FP<br><br>➡ A161 | TCMT_FP<br><br>➡ A165 | VCMT_FP<br><br>➡ A177              |                                                                                                     |                                                                                                | FP<br>            |
|  | CCMT_FM<br><br>➡ A140            | DCMT_FM<br><br>➡ A152            | SCMT_FM<br><br>➡ A161 | TCMT_FM<br><br>➡ A165 | VCMT_FM<br><br>➡ A177              |                                                                                                     |                                                                                                | FM<br>            |
|  | <b>NEW</b> CCMT_FS<br><br>➡ A140 | <b>NEW</b> DCMT_FS<br><br>➡ A152 |                                                                                                          |                                                                                                          |                                                                                                                       |                                                                                                     |                                                                                                | <b>NEW</b> FS<br> |
|  | CCGT_FS<br><br>➡ A140            | DCGT_FS<br><br>➡ A152            |                                                                                                          |                                                                                                          | <b>NEW</b> VCMT_FS<br><br>➡ A177   |                                                                                                     |                                                                                                | FS<br>            |
|  | CCGT_FS-P<br><br>➡ A140          | DCGT_FS-P<br><br>➡ A152          |                                                                                                          |                                                                                                          | <b>NEW</b> VCGT_FS-P<br><br>➡ A177 |                                                                                                     |                                                                                                | FS-P<br>          |

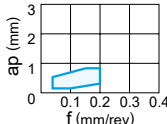
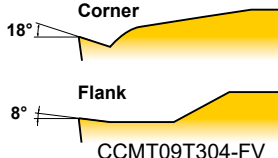
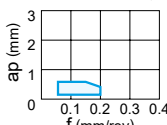
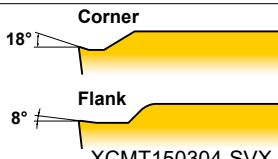
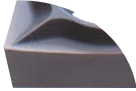
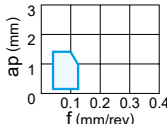
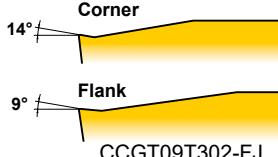
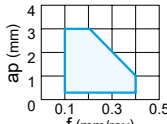
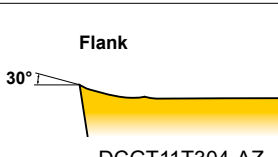
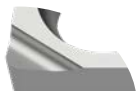
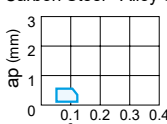
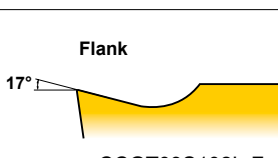
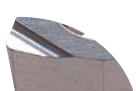
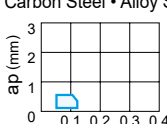
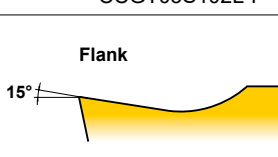
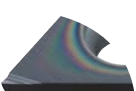
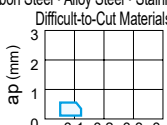
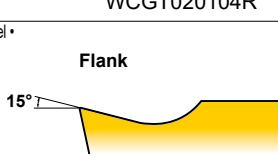
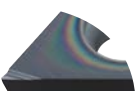
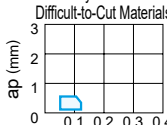
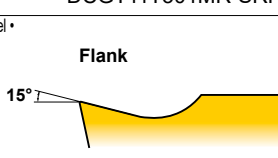
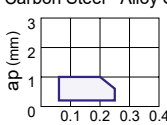
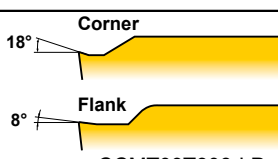
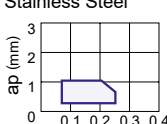
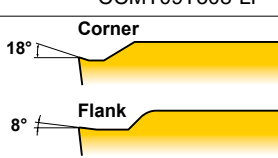


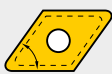
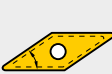
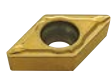
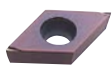
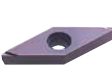
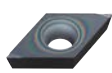
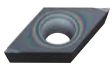
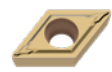
# CLASSIFICATION

## 7° POSITIVE INSERTS WITH HOLE

TURNING INSERTS

A

| Application    | Tolerance | Chipbreaker Name and Picture                                                                              | Features                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                   | Cross Section Geometry                                                                                                           |  |
|----------------|-----------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--|
| Finish Cutting | M         | <b>FV</b><br>            | <b>Alternative chipbreaker for finish cutting of carbon, alloy, mild and stainless steels</b><br>Suitable for low depths of cut and low feed rates.<br>Sharp cutting edge and low resistance design achieves excellent cutting performance.                                                                           | Carbon Steel • Alloy Steel<br>                                                  | <br>18° Corner<br>8° Flank<br>CCMT09T304-FV   |  |
|                |           | <b>SVX</b><br>           | <b>Alternative chipbreaker for light cutting of carbon and alloy steels</b><br>Chip control is improved by having a chipbreaker geometry suitable for copying.                                                                                                                                                        | Carbon Steel • Alloy Steel<br>                                                  | <br>18° Corner<br>8° Flank<br>XCMT150304-SVX  |  |
|                | G         | <b>FJ</b><br>            | <b>Alternative chipbreaker for light cutting of carbon and alloy steels</b><br>Ideal for heat-resistant alloy and titanium alloy.<br>The sharp edge produces a good surface finish.<br>The curved edge allows smooth chip discharge.                                                                                  | Difficult-to-Cut Materials<br>                                                  | <br>14° Corner<br>9° Flank<br>CCGT09T302-FJ   |  |
|                |           | <b>AZ</b><br>          | <b>For aluminium alloy</b><br>The high rake angle and 3D curved cutting edge provides sharpness at the cutting point.<br>Additionally the 3D shape of the rake face enables excellent chip control.<br>Lapping of the top surface gives a mirror finish for improved welding resistance.                              | Aluminium Alloy<br>                                                            | <br>30° Flank<br>DCGT11T304-AZ               |  |
|                |           | <b>R/L-F</b><br>       | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                           | Carbon Steel • Alloy Steel<br>                                                | <br>17° Flank<br>CCGT03S102L-F              |  |
|                |           | <b>R/L</b><br>         | <b>Finishing</b><br>Lead chipbreaker.<br>Excellent chip control at low feed rates.                                                                                                                                                                                                                                    | Carbon Steel • Alloy Steel<br>                                                | <br>15° Flank<br>WCGT020104R                |  |
|                |           | <b>R/L-SRF</b><br>     | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                           | Carbon Steel • Alloy Steel • Stainless Steel • Difficult-to-Cut Materials<br> | <br>15° Flank<br>DCGT11T301MR-SRF           |  |
|                |           | <b>NEW R/L-SRF</b><br> | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                           | Carbon Steel • Alloy Steel • Stainless Steel • Difficult-to-Cut Materials<br> | <br>15° Flank<br>DCET11T301ML-SRF           |  |
|                | M         | <b>LP</b><br>          | <b>First recommendation for light cutting of carbon, alloy and mild steels</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and controls white turbidity of the surface finish.<br>Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control. | Carbon Steel • Alloy Steel<br>                                                | <br>18° Corner<br>8° Flank<br>CCMT09T308-LP |  |
|                |           | <b>LM</b><br>          | <b>First recommendation for light cutting of stainless steel</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and controls white turbidity of the surface finish.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control.          | Stainless Steel<br>                                                           | <br>18° Corner<br>8° Flank<br>CCMT09T308-LM |  |

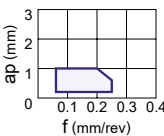
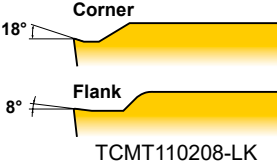
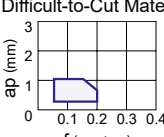
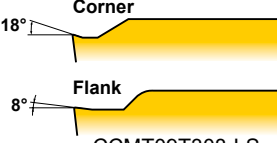
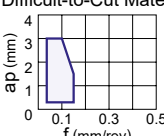
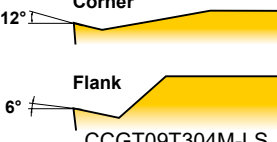
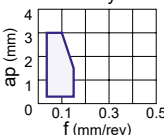
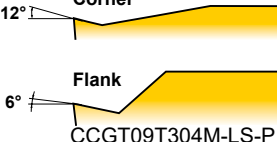
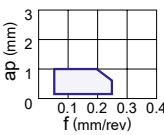
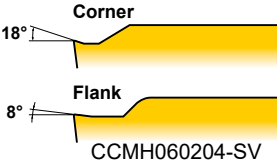
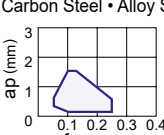
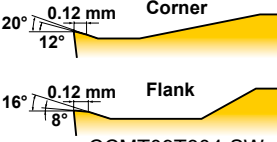
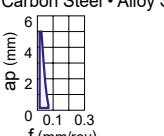
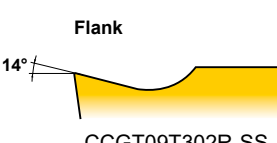
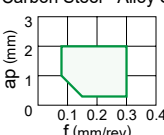
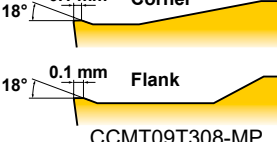
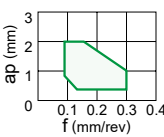
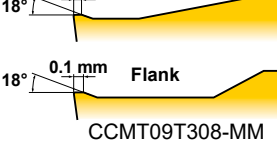
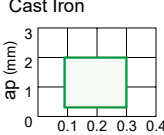
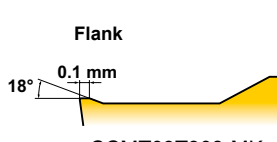
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|--|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|  | CCMT_FV<br><br>➡ A140                              | DCMT_FV<br><br>➡ A152                              | SCMT_FV<br><br>➡ A161   | TCMT_FV<br><br>➡ A165      | VCMT_FV<br><br>➡ A177                              | WCMT_FV<br><small>NEW</small><br><br>➡ A184 |                                                                                                           |                                                                                                            | FV<br>                           |
|  |                                                                                                                                     |                                                                                                                                     |                                                                                                          |                                                                                                             |                                                                                                                                     |                                                                                                                              | XCMT_SVX<br><br>➡ A186 |                                                                                                            | SVX<br>                          |
|  | CCGT_FJ<br><br>➡ A141                              |                                                                                                                                     |                                                                                                          |                                                                                                             |                                                                                                                                     |                                                                                                                              |                                                                                                           |                                                                                                            | FJ<br>                           |
|  | CCGT_AZ<br><br>➡ A141                            | DCGT_AZ<br><br>➡ A153                            |                                                                                                          | TCGT_AZ<br><br>➡ A165    | VCGT_AZ<br><br>➡ A177                            |                                                                                                                              |                                                                                                           | RCGT_AZ<br><br>➡ A160 | AZ<br>                         |
|  | CCGT_R/L-F<br>CCGH_R/L-F<br><br>➡ A141           | DCGT_R/L-F<br><br>➡ A153                         |                                                                                                          | TCGT_R/L-F<br><br>➡ A165 | VCGT_R/L-F<br><br>➡ A178                         |                                                                                                                              |                                                                                                           |                                                                                                            | R/L-F<br>                      |
|  |                                                                                                                                     |                                                                                                                                     |                                                                                                          |                                                                                                             |                                                                                                                                     | WCGT_R/L<br><br>➡ A184                    |                                                                                                           |                                                                                                            | R/L<br>                        |
|  | CCET_R/L-SRF<br><small>NEW</small><br><br>➡ A142 | DCGT_R-SRF<br><br>➡ A153                         |                                                                                                          |                                                                                                             | VCET_R/L-SRF<br><small>NEW</small><br><br>➡ A178 |                                                                                                                              |                                                                                                           |                                                                                                            | R/L-SRF<br>                    |
|  |                                                                                                                                     | DCET_R/L-SRF<br><small>NEW</small><br><br>➡ A153 |                                                                                                          |                                                                                                             |                                                                                                                                     |                                                                                                                              |                                                                                                           |                                                                                                            | <small>NEW</small> R/L-SRF<br> |
|  | CCMT_LP<br><br>➡ A142                            | DCMT_LP<br><br>➡ A153                            | SCMT_LP<br><br>➡ A161 | TCMT_LP<br><br>➡ A166    | VCMT_LP<br><br>➡ A178                            |                                                                                                                              |                                                                                                           |                                                                                                            | LP<br>                         |
|  | CCMT_LM<br><br>➡ A142                            | DCMT_LM<br><br>➡ A153                            | SCMT_LM<br><br>➡ A161 | TCMT_LM<br><br>➡ A166    | VCMT_LM<br><br>➡ A178                            |                                                                                                                              |                                                                                                           |                                                                                                            | LM<br>                         |

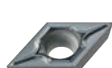
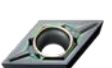
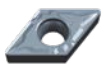
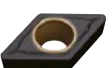
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TURNING INSERTS

# CLASSIFICATION

## 7° POSITIVE INSERTS WITH HOLE

| Application | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                    | Cross Section Geometry                                                                                   |  |
|-------------|-----------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|
| A           | M         | <b>NEW LK</b><br>   | <b>First recommendation for light cutting of cast iron</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for depth of cut area achieves a wide range of chip control.                                                                       | Cast Iron<br>                    | <br>TCMT110208-LK     |  |
|             |           | <b>LS</b><br>       | <b>First recommendation for light cutting of difficult-to-cut materials</b><br>Prevents welding of the insert and helps to prevent cloudy surface finishes.                                                                                                                                                                                                       | Difficult-to-Cut Materials<br>   | <br>CCMT09T308-LS     |  |
|             |           | <b>LS</b><br>       | <b>First recommendation for light cutting of difficult-to-cut materials</b><br>Ideal for heat resistant alloys, titanium alloys, and cobalt chromium alloys.<br>Designed with parallel cutting edges.<br>Achieves stable chip control over a wide range from low to medium depths of cut.                                                                         | Difficult-to-Cut Materials<br>   | <br>CCGT09T304M-LS    |  |
|             | G         | <b>LS-P</b><br>   | <b>First recommendation for light cutting of titanium alloys</b><br>Ideal for titanium alloys and copper alloys.<br>Designed with parallel cutting edges.<br>Achieves stable chip control over a wide range from low to medium depths of cut.<br>Polished (mirror-surface) finish of insert surfaces drastically improves welding resistance extending tool life. | Titanium Alloy<br>              | <br>CCGT09T304M-LS-P |  |
|             |           | <b>SV</b><br>     | <b>Alternative chipbreaker for light cutting of carbon steel, alloy, mild and stainless steels</b><br>Large rake angle provides sharp cutting action.<br>A peninsular dot ensures chip control at depths of cut under 1mm.                                                                                                                                        | Carbon Steel • Alloy Steel<br> | <br>CCMH060204-SV   |  |
|             |           | <b>SW</b><br>     | <b>Wiper insert for light cutting of carbon, alloy, mild and stainless steels</b><br>The wiper allows up to double the feed rate.<br>Positive land improves sharpness.                                                                                                                                                                                            | Carbon Steel • Alloy Steel<br> | <br>CCMT09T304-SW   |  |
|             | G         | <b>R/L-SS</b><br> | <b>Chipbreaker for light cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control at low feed rates.                                                                                                                                                                                                                                  | Carbon Steel • Alloy Steel<br> | <br>CCGT09T302R-SS  |  |
|             | M         | <b>MP</b><br>     | <b>First recommendation for medium cutting of carbon, alloy and mild steels</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.                                         | Carbon Steel • Alloy Steel<br> | <br>CCMT09T308-MP   |  |
|             |           | <b>MM</b><br>     | <b>First recommendation for medium cutting of stainless steel</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.                                                       | Stainless Steel<br>            | <br>CCMT09T308-MM   |  |
|             |           | <b>MK</b><br>     | <b>First recommendation for medium cutting of cast iron</b><br>Optimum balance between sharpness and high edge strength for general use.                                                                                                                                                                                                                          | Cast Iron<br>                  | <br>CCMT09T308-MK   |  |

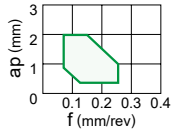
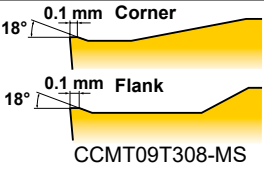
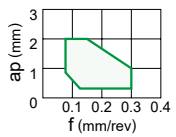
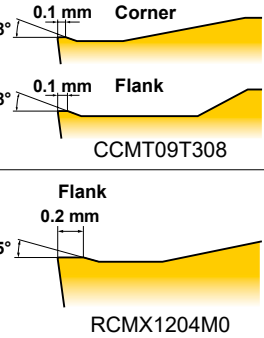
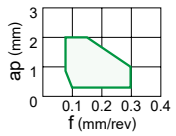
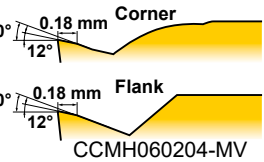
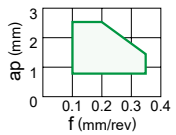
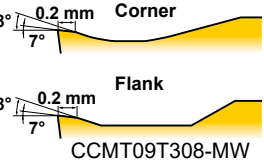
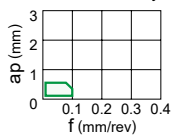
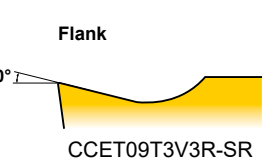
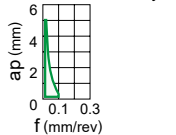
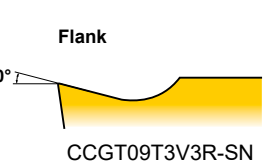
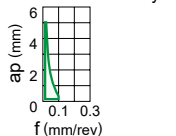
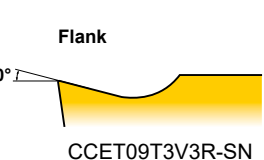
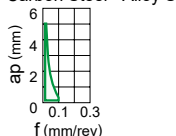
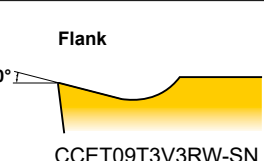
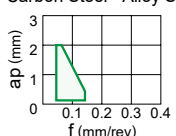
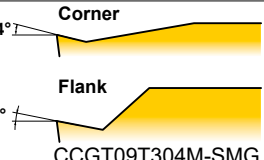
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|--|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  |                                                                                                              |                                                                                                                             |                                                                                                          | TCMT_LK<br><small>NEW</small><br><br>↻ A166 |                                                                                                            |                                                                                                                               |                                                                                              | <small>NEW</small> LK<br> |
|  | CCMT_LS<br><br>↻ A142       | DCMT_LS<br><br>↻ A153                      |                                                                                                          | TCMT_LS<br><br>↻ A166                       | VCMT_LS<br><br>↻ A178     |                                                                                                                               |                                                                                              | LS(M)<br>                 |
|  | CCGT_LS<br><br>↻ A142       | DCGT_LS<br><br>↻ A154                      |                                                                                                          |                                                                                                                              | VCGT_LS<br><br>↻ A179     |                                                                                                                               |                                                                                              | LS(G)<br>                 |
|  | CCGT_LS-P<br><br>↻ A143    | DCGT_LS-P<br><br>↻ A154                   |                                                                                                          |                                                                                                                              | VCGT_LS-P<br><br>↻ A179 |                                                                                                                               |                                                                                              | LS-P<br>                |
|  | CCMH_SV<br><br>↻ A143     | DCMT_SV<br><br>↻ A154                    |                                                                                                          |                                                                                                                              | VCMT_SV<br><br>↻ A179   |                                                                                                                               |                                                                                              | SV<br>                  |
|  | CCMT_SW<br><br>↻ A143     | <small>NEW</small> DCMX_SW<br><br>↻ A154 |                                                                                                          | <small>NEW</small> TCMX_SW<br><br>↻ A166  |                                                                                                            |                                                                                                                               |                                                                                              | SW<br>                  |
|  | CCGT_R/L-SS<br><br>↻ A143 | DCGT_R/L-SS<br><br>↻ A155                |                                                                                                          |                                                                                                                              |                                                                                                            |                                                                                                                               |                                                                                              | R/L-SS<br>              |
|  | CCMT_MP<br><br>↻ A144     | DCMT_MP<br><br>↻ A155                    | SCMT_MP<br><br>↻ A161 | TCMT_MP<br><br>↻ A167                     | VCMT_MP<br><br>↻ A179   | <small>NEW</small> WCMT_MP<br><br>↻ A184 |                                                                                              | MP<br>                  |
|  | CCMT_MM<br><br>↻ A144     | DCMT_MM<br><br>↻ A155                    | SCMT_MM<br><br>↻ A161 | TCMT_MM<br><br>↻ A167                     | VCMT_MM<br><br>↻ A179   |                                                                                                                               |                                                                                              | MM<br>                  |
|  | CCMT_MK<br><br>↻ A144     | DCMT_MK<br><br>↻ A155                    | SCMT_MK<br><br>↻ A162 | TCMT_MK<br><br>↻ A167                     | VCMT_MK<br><br>↻ A179   |                                                                                                                               |                                                                                              | MK<br>                  |

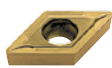
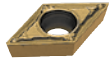
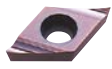
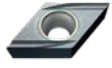
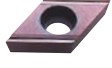
A

TURNING INSERTS

# CLASSIFICATION

## 7° POSITIVE INSERTS WITH HOLE

| Application | Tolerance | Chipbreaker Name and Picture                                                                          | Features                                                                                                                                                                                                                                                                                           |                                                                                                                    | Cross Section Geometry                                                                                                                                                       |  |
|-------------|-----------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| A           | M         | <b>MS</b><br>        | <b>First recommendation for medium cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloy and titanium alloy and cobalt chrome alloy.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut. | Difficult-to-Cut Materials<br>   | <br>18° 0.1 mm Corner<br>18° 0.1 mm Flank<br>CCMT09T308-MS                                |  |
|             |           | <b>Standard</b><br>  | <b>Alternative chipbreaker for medium cutting of carbon, alloy, mild and stainless steels, and cast iron</b><br>Balance of edge strength and sharpness due to a combination of a flat land and large rake angle.                                                                                   | Carbon Steel • Alloy Steel<br>   | <br>18° 0.1 mm Corner<br>18° 0.1 mm Flank<br>CCMT09T308<br>15° 0.2 mm Flank<br>RCMX1204M0 |  |
|             |           | <b>MV</b><br>      | <b>Alternative chipbreaker for medium cutting of carbon, alloy, mild and stainless steels</b><br>A positive insert and the large rake angle achieve sharp cutting edge performance.<br>The double chipbreaker and round shape in the rake face achieve a wide range of chip discharge.             | Carbon Steel • Alloy Steel<br>  | <br>20° 0.18 mm Corner<br>12°<br>20° 0.18 mm Flank<br>12°<br>CCMH060204-MV               |  |
|             |           | <b>MW</b><br>      | <b>Wiper insert for medium cutting of carbon, alloy, mild and stainless steels</b><br>The wiper allows up to double the feed rate.<br>A wide chip pocket prevents chip jamming.                                                                                                                    | Carbon Steel • Alloy Steel<br> | <br>18° 0.2 mm Corner<br>7°<br>18° 0.2 mm Flank<br>7°<br>CCMT09T308-MW                  |  |
|             |           | <b>R/L-SR</b><br>  | <b>Medium cutting on automatic lathes</b><br>A wide lead chipbreaker.<br>Insert designed for low resistance chip control.                                                                                                                                                                          | Carbon Steel • Alloy Steel<br> | <br>30° Flank<br>CCET09T3V3R-SR                                                         |  |
|             |           | <b>R/L-SN</b><br>  | <b>Medium cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control at low to medium feed rates.                                                                                                                                                                        | Carbon Steel • Alloy Steel<br> | <br>20° Flank<br>CCGT09T3V3R-SN                                                         |  |
|             |           | <b>R/L-SN</b><br>  | <b>Medium cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control at low to medium feed rates.<br>Suitable for precise machining with E class tolerance.                                                                                                              | Carbon Steel • Alloy Steel<br> | <br>20° Flank<br>CCET09T3V3R-SN                                                         |  |
|             |           | <b>R/LW-SN</b><br> | <b>Medium cutting on automatic lathes</b><br>A parallel chipbreaker.<br>Excellent chip control at low to medium feed rates.<br>The wiper produces a good surface finish.                                                                                                                           | Carbon Steel • Alloy Steel<br> | <br>20° Flank<br>CCET09T3V3RW-SN                                                        |  |
|             |           | <b>SMG</b><br>     | <b>Medium cutting on automatic lathes</b><br>3D moulded chipbreaker provides good chip control.<br>G class insert gives sharp cutting action, allowing high precision machining.<br>Chipbreaker geometry appropriate for copying and back turning.                                                 | Carbon Steel • Alloy Steel<br> | <br>14° Corner<br>9° Flank<br>CCGT09T304M-SMG                                           |  |

|  | Rhombic 80°<br>              | Rhombic 55°<br>              | Square 90°<br>        | Triangular 60°<br>    | Rhombic 35°<br>         | Trigon 80°<br>     | Round<br>          | Chipbreaker Name and Cross Section                                                                 |
|--|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  | CCMT_MS<br><br>➔ A145        | DCMT_MS<br><br>➔ A156        | SCMT_MS<br><br>➔ A162 | TCMT_MS<br><br>➔ A167 | VCMT_MS<br><br>➔ A179   |                                                                                                       |                                                                                                       | MS<br>          |
|  | CCMT<br><br>➔ A145           | DCMT<br><br>➔ A156           | SCMT<br><br>➔ A162    | TCMT<br><br>➔ A167    | VCMT<br><br>➔ A179      | WCMT<br><br>➔ A184 | RCMT<br><br>➔ A160 | Standard<br>    |
|  |                                                                                                               |                                                                                                               |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       | RCMX<br><br>➔ A160 |                                                                                                    |
|  | CCMH_MV<br><br>➔ A145      | DCMT_MV<br><br>➔ A156      |                                                                                                        |                                                                                                        | VCMT_MV<br><br>➔ A180 |                                                                                                       |                                                                                                       | MV<br>        |
|  | CCMT_MW<br><br>➔ A145      |                                                                                                               |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | MW<br>        |
|  | CCET_R/L-SR<br><br>➔ A146  | DCET_R/L-SR<br><br>➔ A156  |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | R/L-SR<br>    |
|  | CCGT_R/L-SN<br><br>➔ A146  | DCGT_R/L-SN<br><br>➔ A157  |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | R/L-SN(G)<br> |
|  | CCET_R/L-SN<br><br>➔ A147  | DCET_R/L-SN<br><br>➔ A157  |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | R/L-SN(E)<br> |
|  | CCET_R/LW-SN<br><br>➔ A147 | DCET_R/LW-SN<br><br>➔ A158 |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | R/LW-SN<br>   |
|  | CCGT_SMG<br><br>➔ A147     | DCGT_SMG<br><br>➔ A158     |                                                                                                        |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                       | SMG<br>       |

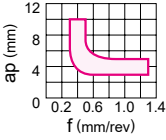
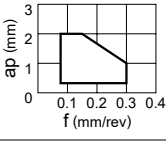
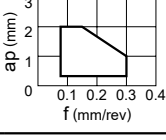
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TURNING INSERTS

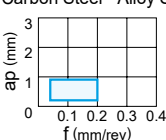
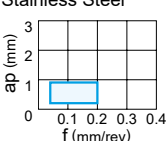
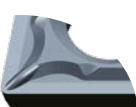
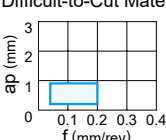
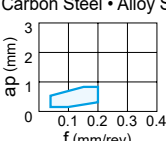
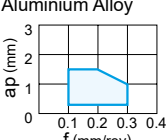


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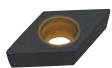
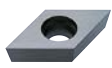
## 7° POSITIVE INSERTS WITH HOLE

| Application   | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                    | Cross Section Geometry                                                                                                                          |
|---------------|-----------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Heavy Cutting | M         | <b>RR</b><br>       | <b>Heavy cutting of carbon and alloy steels</b><br>A wide groove chipbreaker prevents chips from jamming at large depths of cut. Small dimples improve chip control at small depths of cut.                                 | Carbon Steel • Alloy Steel<br><br>28° 0.3 mm<br>RCMX2006M0-RR |
|               |           | <b>Flat Top</b><br> | <b>Rough cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to its high edge strength.                                                                                                      | Cast Iron<br><br>0°<br>CCMW09T308                             |
|               |           | <b>Flat Top</b><br> | <b>Chipbreaker for heavy cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to its high edge strength. Can be used on workpiece requiring close tolerances due to G class insert tolerance. | Cast Iron<br><br>0°<br>CCGW09T300                             |

## 11° POSITIVE INSERTS WITH HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                           | Features                                                                                                                                                                                                                                               | Cross Section Geometry                                                                                                                                        |
|----------------|-----------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Finish Cutting | M         | <b>NEW FP</b><br>   | <b>First recommendation for finish cutting of carbon steel, alloy and mild steels</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depths of cut. Maintains the edge strength at the corner and prevents sudden fractures. | Carbon Steel • Alloy Steel<br><br>6° Corner<br>6° Flank<br>CPMH090304-FP  |
|                |           | <b>NEW FM</b><br>   | <b>First recommendation for finish cutting of stainless steel</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depths of cut. Maintains the edge strength at the corner and prevents sudden fractures.                     | Stainless Steel<br><br>6° Corner<br>6° Flank<br>CPMH090304-FM             |
|                |           | <b>NEW FS</b><br>   | <b>First recommendation for finish cutting of difficult-to-cut materials</b><br>Chipbreaker protrusion at the corner tip controls chips even at small depths of cut. Maintains the edge strength at the corner and prevents sudden fractures.          | Difficult-to-Cut Materials<br><br>6° Corner<br>6° Flank<br>CPMH090304-FS  |
|                |           | <b>FV</b><br>       | <b>Alternative chipbreaker for finish cutting of carbon, alloy, mild and stainless steels</b><br>Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.               | Carbon Steel • Alloy Steel<br><br>18° Corner<br>8° Flank<br>CPMH090304-FV |
|                | G         | <b>Standard</b><br> | <b>Finishing</b><br>Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.                                                                                                                                               | Aluminium Alloy<br><br>25° Flank<br>CPGT090304                            |



|  | Rhombic 80°<br>    | Rhombic 55°<br>    | Square 90°<br>     | Triangular 60°<br>     | Rhombic 35°<br>    | Trigon 80°<br> | Round<br>             | Chipbreaker Name and Cross Section                                                                 |
|--|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  |                                                                                                     |                                                                                                     |                                                                                                     |                                                                                                         |                                                                                                     |                                                                                                   | RCMX_RR<br><br>➡ A160 | RR<br>          |
|  | CCMW<br><br>➡ A147 | DCMW<br><br>➡ A158 | SCMW<br><br>➡ A162 | TCMW<br><br>➡ A167     | VCMW<br><br>➡ A180 |                                                                                                   |                                                                                                          | Flat Top(M)<br> |
|  | CCGW<br><br>➡ A148 | DCGW<br><br>➡ A158 |                                                                                                     | NEW TCGW<br><br>➡ A168 |                                                                                                     |                                                                                                   |                                                                                                          | Flat Top(G)<br> |

|  | Rhombic 80°<br>           | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br>        | Rhombic 35°<br> | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                                |
|--|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  | NEW CPMH_FP<br><br>➡ A149 |                                                                                                    |                                                                                                   | NEW TPMH_FP<br><br>➡ A170 |                                                                                                    |                                                                                                     |                                                                                                | NEW FP<br>   |
|  | NEW CPMH_FM<br><br>➡ A149 |                                                                                                    |                                                                                                   | NEW TPMH_FM<br><br>➡ A170 |                                                                                                    |                                                                                                     |                                                                                                | NEW FM<br>   |
|  | NEW CPMH_FS<br><br>➡ A149 |                                                                                                    |                                                                                                   | NEW TPMH_FS<br><br>➡ A170 |                                                                                                    |                                                                                                     |                                                                                                | NEW FS<br>   |
|  | CPMH_FV<br><br>➡ A149     |                                                                                                    |                                                                                                   | TPMH_FV<br><br>➡ A170     |                                                                                                    |                                                                                                     |                                                                                                | FV<br>       |
|  | CPGT<br><br>➡ A149        |                                                                                                    |                                                                                                   |                                                                                                              |                                                                                                    |                                                                                                     |                                                                                                | Standard<br> |

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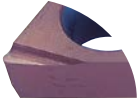
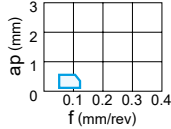
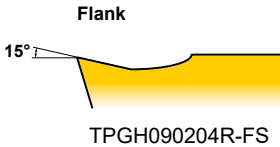
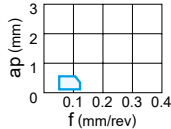
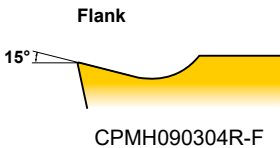
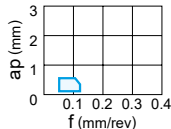
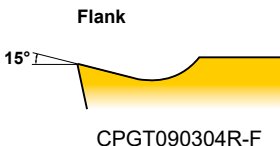
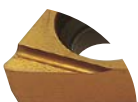
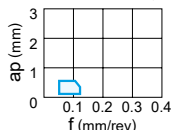
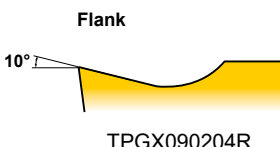
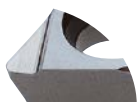
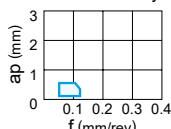
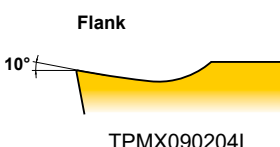
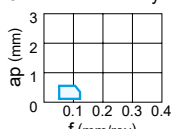
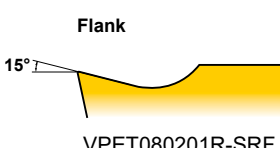
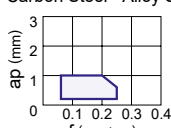
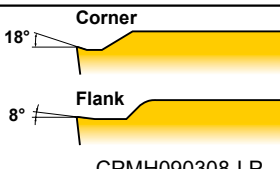
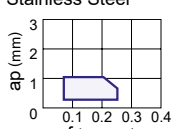
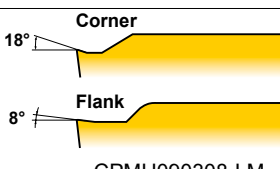
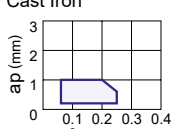
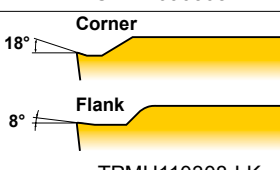
TURNING INSERTS

# CLASSIFICATION

## 11° POSITIVE INSERTS WITH HOLE

TURNING INSERTS

A

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                                                                                             |                                                                                                                    | Cross Section Geometry                                                                |                 |
|----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------|
| Finish Cutting | G         | <b>R/L-FS</b><br>   | <b>Chipbreaker for finish cutting of carbon, alloy and stainless steels, cast iron and aluminium alloy</b><br>Small wide lead chipbreaker.<br>Sharp cutting edge gives a good surface finish.                                                                                                                        | Carbon Steel • Alloy Steel<br>   |    | TPGH090204R-FS  |
|                | M         | <b>R/L-F</b><br>    | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                          | Carbon Steel • Alloy Steel<br>   |    | CPMH090304R-F   |
|                | G         | <b>R/L-F</b><br>    | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                          | Carbon Steel • Alloy Steel<br>   |    | CPGT090304R-F   |
|                |           | <b>R/L</b><br>    | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Good chip control for low to medium feed rates.                                                                                                                                                                                                          | Carbon Steel • Alloy Steel<br> |   | TPGX090204R     |
|                | M         | <b>L</b><br>      | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Good chip control for low to medium feed rates.                                                                                                                                                                                                          | Carbon Steel • Alloy Steel<br> |  | TPMX090204L     |
|                | E         | <b>SRF</b><br>    | <b>Finishing</b><br>Lead chipbreaker controls chip flow.<br>Sharp cutting edge gives a good surface finish.                                                                                                                                                                                                          | Carbon Steel • Alloy Steel<br> |  | VPET080201R-SRF |
| Light Cutting  | M         | <b>NEW LP</b><br> | <b>First recommendation for light cutting of carbon, alloy and mild steels</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control. | Carbon Steel • Alloy Steel<br> |  | CPMH090308-LP   |
|                |           | <b>NEW LM</b><br> | <b>First recommendation for light cutting of stainless steel</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control.               | Stainless Steel<br>            |  | CPMH090308-LM   |
|                |           | <b>NEW LK</b><br> | <b>First recommendation for light cutting of cast iron</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control.                     | Cast Iron<br>                  |  | TPMH110308-LK   |

|  | Rhombic 80°<br>             | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br>          | Rhombic 35°<br>              | Trigon 80°<br>            | Round<br> | Chipbreaker Name and Cross Section                                                              |
|--|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|  |                                                                                                              |                                                                                                  |                                                                                                 | TPGH_R/L-FS<br><br>➡ A171   |                                                                                                               | WPGT_R/L-FS<br><br>➡ A185 |                                                                                              | R/L-FS<br>   |
|  | CPMH_R/L-F<br><br>➡ A149    |                                                                                                  |                                                                                                 |                                                                                                              |                                                                                                               |                                                                                                              |                                                                                              | R/L-F(M)<br> |
|  | CPGT_R/L-F<br><br>➡ A150    |                                                                                                  |                                                                                                 |                                                                                                              |                                                                                                               |                                                                                                              |                                                                                              | R/L-F(G)<br> |
|  |                                                                                                              |                                                                                                  |                                                                                                 | TPGX_R/L<br><br>➡ A171    |                                                                                                               |                                                                                                              |                                                                                              | R/L<br>    |
|  |                                                                                                              |                                                                                                  |                                                                                                 | TPMX_L<br><br>➡ A171      |                                                                                                               |                                                                                                              |                                                                                              | L<br>      |
|  |                                                                                                              |                                                                                                  |                                                                                                 |                                                                                                              | VPET_R/L-SRF<br><br>➡ A182 |                                                                                                              |                                                                                              | SRF<br>    |
|  | NEW CPMH_LP<br><br>➡ A150 |                                                                                                  |                                                                                                 | NEW TPMH_LP<br><br>➡ A171 |                                                                                                               |                                                                                                              |                                                                                              | NEW LP<br> |
|  | NEW CPMH_LM<br><br>➡ A150 |                                                                                                  |                                                                                                 | NEW TPMH_LM<br><br>➡ A172 |                                                                                                               |                                                                                                              |                                                                                              | NEW LM<br> |
|  |                                                                                                              |                                                                                                  |                                                                                                 | NEW TPMH_LK<br><br>➡ A172 |                                                                                                               |                                                                                                              |                                                                                              | NEW LK<br> |

A

TURNING INSERTS

# CLASSIFICATION

## 11° POSITIVE INSERTS WITH HOLE

| Application | Tolerance      | Chipbreaker Name and Picture | Features                                                                                                                                                                                                                                                                                                                                | Cross Section Geometry         |                   |
|-------------|----------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------|
|             |                |                              |                                                                                                                                                                                                                                                                                                                                         |                                |                   |
| A           | Light Cutting  | M                            |                                                                                                                                                                                                                                                                                                                                         |                                |                   |
|             |                |                              | <b>NEW LS</b><br><b>First recommendation for light cutting of difficult-to-cut materials</b><br>Ideal for heat resistant alloys, titanium alloys, and cobalt chromium alloys. Designed with parallel cutting edges. Achieves stable chip control over a wide range from low to medium depths of cut.                                    | Difficult-to-Cut Materials<br> | <br>CPMH090308-LS |
|             |                |                              | <b>NEW SW</b><br><b>Wiper insert for light cutting of carbon, alloy, mild and stainless steels</b><br>The wiper allows up to double the feed rate. Positive land improves sharpness.                                                                                                                                                    | Carbon Steel • Alloy Steel<br> | <br>DCMX11T304-SW |
|             |                |                              | <b>SV</b><br><b>Alternative chipbreaker for light cutting of carbon, alloy, mild and stainless steels, and cast iron</b><br>Large rake angle provides sharp cutting action. A peninsular dot ensures chip control at depths of cut under 1mm.                                                                                           | Carbon Steel • Alloy Steel<br> | <br>CPMH090304-SV |
|             |                |                              | <b>NEW MP</b><br><b>First recommendation for medium cutting of carbon, alloy and mild steels</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut. | Carbon Steel • Alloy Steel<br> | <br>CPMH090308-MP |
|             |                |                              | <b>NEW MM</b><br><b>First recommendation for medium cutting of stainless steel</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.               | Stainless Steel<br>            | <br>CPMH090308-MM |
|             | Medium Cutting | M                            | <b>NEW MK</b><br><b>First recommendation for medium cutting of cast iron</b><br>Optimum balance between sharpness and high edge strength for general use.                                                                                                                                                                               | Cast Iron<br>                  | <br>CPMH090308-MK |
|             |                |                              | <b>NEW MS</b><br><b>First recommendation for medium cutting of difficult-to-cut materials</b><br>Ideal for heat-resistant alloy and titanium alloy and cobalt chrome alloy. A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.                        | Difficult-to-Cut Materials<br> | <br>CPMH090308-MS |
|             |                |                              | <b>Standard</b><br><b>Alternative chipbreaker for medium cutting of carbon, alloy and stainless steels</b><br>Standard, general purpose chipbreaker.                                                                                                                                                                                    | Carbon Steel • Alloy Steel<br> | <br>CPMX090304    |
|             |                |                              | <b>MV</b><br><b>Alternative chipbreaker for medium cutting of carbon, alloy, mild and stainless steels, and cast iron</b><br>A positive insert and large rake angle achieves sharp cutting edge performance. Double chipbreakers in the rake face achieve a wide range of chip discharge.                                               | Carbon Steel • Alloy Steel<br> | <br>CPMH090304-MV |

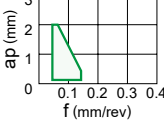
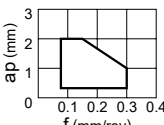
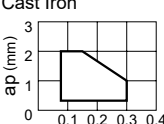
|  | Rhombic 80°<br>                               | Rhombic 55°<br>                             | Square 90°<br>       | Triangular 60°<br>                          | Rhombic 35°<br> | Trigon 80°<br>          | Round<br> | Chipbreaker Name and Cross Section                                                                             |
|--|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|  | CPMH_LS<br><small>NEW</small><br><br>➡ A150   |                                                                                                                              |                                                                                                       | TPMH_LS<br><small>NEW</small><br><br>➡ A172 |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> LS<br>   |
|  |                                                                                                                                | DCMX_SW<br><small>NEW</small><br><br>➡ A154 |                                                                                                       | TPMX_SW<br><small>NEW</small><br><br>➡ A173 |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> SW<br>   |
|  | CPMH_SV<br><br>➡ A150                         |                                                                                                                              |                                                                                                       | TPMH_SV<br><br>➡ A172                       |                                                                                                  |                                                                                                            |                                                                                              | SV<br>                      |
|  | CPMH_MP<br><small>NEW</small><br><br>➡ A150 |                                                                                                                              |                                                                                                       |                                                                                                                              |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> MP<br> |
|  | CPMH_MM<br><small>NEW</small><br><br>➡ A151 |                                                                                                                              |                                                                                                       |                                                                                                                              |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> MM<br> |
|  | CPMH_MK<br><small>NEW</small><br><br>➡ A151 |                                                                                                                              |                                                                                                       |                                                                                                                              |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> MK<br> |
|  | CPMH_MS<br><small>NEW</small><br><br>➡ A151 |                                                                                                                              |                                                                                                       |                                                                                                                              |                                                                                                  |                                                                                                            |                                                                                              | <small>NEW</small> MS<br> |
|  | CPMX, CPMH<br><br>➡ A151                    |                                                                                                                              | SPMT<br><br>➡ A163 | TPMX<br><br>➡ A173                        |                                                                                                  |                                                                                                            |                                                                                              | Standard<br>              |
|  | CPMH_MV<br><br>➡ A151                       |                                                                                                                              |                                                                                                       | TPMH_MV<br><br>➡ A173                     |                                                                                                  | WPMT_MV<br><br>➡ A185 |                                                                                              | MV<br>                    |

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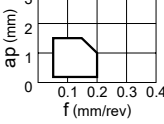
TURNING INSERTS

# CLASSIFICATION

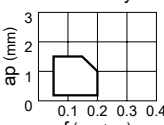
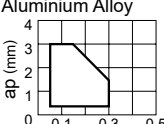
## 11° POSITIVE INSERTS WITH HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                           | Cross Section Geometry                                                                                                                                                       |            |
|----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Medium Cutting | G         | <b>SMG</b><br>      | <b>Medium cutting on automatic lathes</b><br>3D moulded chipbreaker provides good chip control.<br>G class insert gives sharp cutting action, allowing high precision machining.<br>Chipbreaker geometry appropriate for copying and back turning. | Carbon Steel • Alloy Steel<br><br>11° <b>Corner</b><br>11° <b>Flank</b><br>VPGT110301M-SMG |            |
|                |           | <b>Flat Top</b><br> | <b>Rough cutting of cast iron</b><br>Most effective for unstable machining due to its high edge strength.                                                                                                                                          | Cast Iron<br><br>0°                                                                        | SPMW120308 |
|                |           | <b>Flat Top</b><br> | <b>Chipbreaker for heavy cutting of cast iron</b><br>Most effective for unstable machining due to its high edge strength.<br>Can be used on workpiece requiring close tolerances due to G class insert tolerance.                                  | Cast Iron<br><br>0°                                                                        | SPGX120308 |

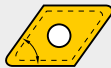
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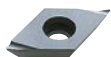
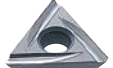
| Application         | Tolerance | Chipbreaker Name and Picture                                                                      | Features                                                                                                   | Cross Section Geometry                                                                                                                     |  |
|---------------------|-----------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--|
| For Aluminium Alloy | G         | <b>R/L</b><br> | <b>For aluminium alloy cutting</b><br>Lead chipbreaker.<br>Sharp cutting edge gives a good surface finish. | Aluminium Alloy<br><br>25° <b>Flank</b><br>VDGX160302R |  |

## 20° POSITIVE INSERTS WITH HOLE

| Application         | Tolerance | Chipbreaker Name and Picture                                                                        | Features                                                                                                                                                     | Cross Section Geometry                                                                                                                       |  |
|---------------------|-----------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--|
| For Aluminium Alloy | G         | <b>R/L-F</b><br> | <b>For aluminium alloy cutting</b><br>Lead chipbreaker.<br>Sharp cutting edge gives a good surface finish.                                                   | Aluminium Alloy<br><br>20° <b>Flank</b><br>DEGX150402L-F |  |
|                     |           | <b>R/L</b><br>   | <b>For aluminium alloy cutting</b><br>A parallel chipbreaker.<br>Sharp cutting edge gives a good surface finish.<br>Good chip control for medium feed rates. | Aluminium Alloy<br><br>25° <b>Flank</b><br>DEGX150402R   |  |

|  | Rhombic 80°<br>           | Rhombic 55°<br> | Square 90°<br>     | Triangular 60°<br> | Rhombic 35°<br>        | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                                 |
|--|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  |                                                                                                            |                                                                                                  |                                                                                                     |                                                                                                     | VPGT_SMG<br><br>➡ A182 |                                                                                                   |                                                                                              | SMG<br>         |
|  | CPMB<br>NEW<br><br>➡ A151 |                                                                                                  | SPMW<br><br>➡ A163 |                                                                                                     |                                                                                                         |                                                                                                   |                                                                                              | Flat Top(M)<br> |
|  |                                                                                                            |                                                                                                  | SPGX<br><br>➡ A163 | TPGX<br><br>➡ A173 |                                                                                                         |                                                                                                   |                                                                                              | Flat Top(G)<br> |

|  | Rhombic 80°<br> | Rhombic 55°<br> | Square 90°<br> | Triangular 60°<br> | Rhombic 35°<br>        | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                           |
|--|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  |                                                                                                    |                                                                                                    |                                                                                                   |                                                                                                       | VDGX_R/L<br><br>➡ A181 |                                                                                                     |                                                                                                | R/L<br> |

|  | Rhombic 80°<br> | Rhombic 55°<br>          | Square 90°<br> | Triangular 60°<br>     | Rhombic 35°<br> | Trigon 80°<br> | Round<br> | Chipbreaker Name and Cross Section                                                             |
|--|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  |                                                                                                    | DEGX_R/L-F<br><br>➡ A159 |                                                                                                   |                                                                                                           |                                                                                                    |                                                                                                     |                                                                                                | R/L-F<br> |
|  |                                                                                                    | DEGX_R/L<br><br>➡ A159   |                                                                                                   | TEGX_R/L<br><br>➡ A169 |                                                                                                    |                                                                                                     |                                                                                                | R/L<br>   |

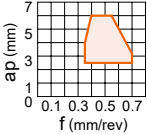
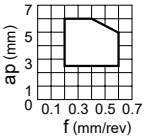
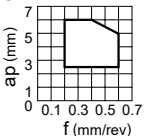
A

TURNING INSERTS

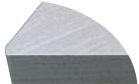
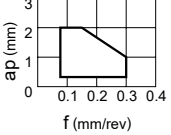


# CLASSIFICATION

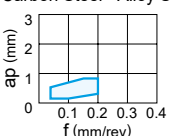
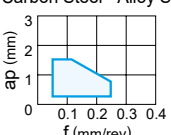
## NEGATIVE INSERTS WITHOUT HOLE

| Application   | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                              | Cross Section Geometry                                                                                                                                    |  |
|---------------|-----------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Rough Cutting | M         | <b>R/L-M1</b><br>   | <b>Rough cutting of carbon and alloy steels</b><br>Single sided chipbreaker.<br>Can be used for copying.<br>An angled chipbreaker for controlling chip flow.                                                                                          | Carbon Steel • Alloy Steel<br><br>Flank<br>12°<br>0.2<br>KNUX160405R-M1 |  |
|               |           | <b>Flat Top</b><br> | <b>Rough cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to high edge strength and stable insert clamping.                                                                                                         | Cast Iron<br><br>0°<br>SNMN120408                                       |  |
|               |           | <b>Flat Top</b><br> | <b>Chipbreaker for heavy cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to high edge strength and stable insert clamping.<br>Can be used on workpiece requiring close tolerances due to G class insert tolerance. | Cast Iron<br><br>0°<br>SNGN120408                                       |  |

## 7° POSITIVE INSERTS WITHOUT HOLE

| Application   | Tolerance | Chipbreaker Name and Picture                                                                           | Features                                                                                                                                                                                                             | Cross Section Geometry                                                                                                |  |
|---------------|-----------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--|
| For Cast Iron | G         | <b>Flat Top</b><br> | <b>Chipbreaker for heavy cutting of cast iron</b><br>Flat top.<br>Most effective for unstable machining due to high edge strength and stable insert clamping.<br>Use on workpiece requiring close tolerance inserts. | Cast Iron<br><br>0°<br>TCGN090204 |  |

## 11° POSITIVE INSERTS WITHOUT HOLE

| Application    | Tolerance | Chipbreaker Name and Picture                                                                         | Features                                                                                                                                                                                                                                    | Cross Section Geometry                                                                                                                                              |  |
|----------------|-----------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Finish Cutting | M         | <b>NEW FV</b><br> | <b>Alternative chipbreaker for finish cutting of carbon, alloy, mild and stainless steels</b><br>Suitable for low depths of cut and low feed rates.<br>Sharp cutting edge and low resistance design achieves excellent cutting performance. | Carbon Steel • Alloy Steel<br><br>18°<br>8°<br>Corner<br>Flank<br>TPMR160304-FV |  |
|                | G         | <b>R/L</b><br>    | <b>Finishing</b><br>A parallel chipbreaker.<br>Good chip control for low to medium feed rates.                                                                                                                                              | Carbon Steel • Alloy Steel<br><br>15°<br>Flank<br>SPGR090304R                   |  |

|  | Rhombic 80°<br>    | Square 90°<br>     | Triangular 60°<br> | Parallelogram 55°<br>     | Chipbreaker Name and Cross Section                                                               |
|--|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|  |                                                                                                     |                                                                                                     |                                                                                                     | KNUX_R/L-M1<br><br>➔ A136 | R/L-M1<br>      |
|  | CNMN<br><br>➔ A137 | SNMN<br><br>➔ A138 | TNMN<br><br>➔ A139 |                                                                                                            | Flat Top(M)<br> |
|  |                                                                                                     | SNGN<br><br>➔ A138 | TNGN<br><br>➔ A139 |                                                                                                            | Flat Top(G)<br> |

|  | Triangular 60°<br> | Chipbreaker Name and Cross Section                                                              |
|--|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|  | TCGN<br><br>➔ A189 | Flat Top<br> |

|  | Square 90°<br>       | Triangular 60°<br>           | Round<br> | Chipbreaker Name and Cross Section                                                            |
|--|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|  |                                                                                                         | TPMR_FV<br>NEW<br><br>➔ A190 |                                                                                              | NEW FV<br> |
|  | SPGR_R<br><br>➔ A188 | TPGR_R/L<br><br>➔ A190       |                                                                                              | R/L<br>    |

## SPECIAL PURPOSE INSERTS

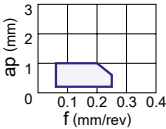
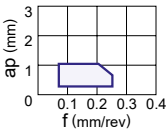
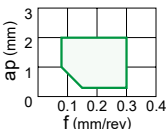
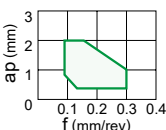
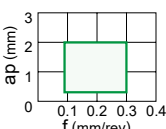
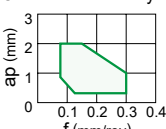
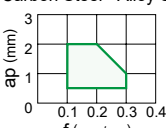
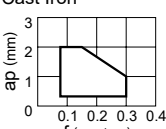
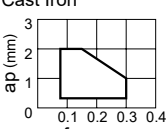
| Application | Tolerance | Tool Holder Type | Inserts                                                                                                |
|-------------|-----------|------------------|--------------------------------------------------------------------------------------------------------|
| Special     | G         | TL Type          | RTG<br><br>➔ A187 |

# CLASSIFICATION

## 11° POSITIVE INSERTS WITHOUT HOLE

TURNING INSERTS

A

| Application             | Tolerance | Chipbreaker Name and Picture                                                                           | Features                                                                                                                                                                                                                                                                                                                  |                                                                                                                    | Cross Section Geometry                                               |  |
|-------------------------|-----------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--|
| Light to Medium Cutting | M         | <b>NEW LP</b><br>     | <b>First recommendation for light cutting of carbon, alloy and mild steels</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control.      | Carbon Steel • Alloy Steel<br>   | 18° <b>Corner</b><br>8° <b>Flank</b><br>TPMR160308-LP                |  |
|                         |           | <b>NEW LM</b><br>     | <b>First recommendation for light cutting of stainless steel</b><br>Sharp cutting edge due to a large rake angle.<br>Prevents welding of the insert and helps to prevent cloudy surface finishes.<br>Chipbreaker protrusion suitable for this depth of cut area achieves a wide range of chip control.                    | Stainless Steel<br>              | 18° <b>Corner</b><br>8° <b>Flank</b><br>TPMR160308-LM                |  |
|                         |           | <b>NEW MP</b><br>     | <b>First recommendation for medium cutting of carbon, alloy and mild steels</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut. | Carbon Steel • Alloy Steel<br>   | 18° 0.1 mm <b>Corner</b><br>18° 0.1 mm <b>Flank</b><br>TPMR160308-MP |  |
|                         |           | <b>NEW MM</b><br>   | <b>First recommendation for medium cutting of stainless steel</b><br>Good balance of wear resistance and fracture resistance because of the flat land cutting edge.<br>A wide chip pocket controls increasing of the cutting resistance and reduces vibration and chip jamming even at large depths of cut.               | Stainless Steel<br>            | 18° 0.1 mm <b>Corner</b><br>18° 0.1 mm <b>Flank</b><br>TPMR160308-MM |  |
|                         |           | <b>NEW MK</b><br>   | <b>First recommendation for medium cutting of cast iron</b><br>Optimum balance between sharpness and high edge strength for general use.                                                                                                                                                                                  | Cast Iron<br>                  | 18° <b>Flank</b><br>0.1 mm<br>TPMR160308-MK                          |  |
|                         |           | <b>Standard</b><br> | <b>Light to medium cutting of carbon, alloy and stainless steels</b><br>Standard, general purpose chipbreaker.                                                                                                                                                                                                            | Carbon Steel • Alloy Steel<br> | 0° <b>Corner</b><br>0° <b>Flank</b><br>SPMR090308                    |  |
|                         |           | <b>80</b><br>       | <b>Light to medium cutting of carbon steel, alloy steel and stainless steel</b><br>Large chip pocket for excellent chip evacuation.<br>Double chipbreakers in the rake face achieves a wide range of chip breaking.                                                                                                       | Carbon Steel • Alloy Steel<br> | 7° <b>Corner</b><br>7° <b>Flank</b><br>TPMR110304-80                 |  |
| For Cast Iron           | M         | <b>Flat Top</b><br> | <b>Rough cutting of cast iron</b><br>Most effective for unstable machining due to high edge strength and stable insert clamping.                                                                                                                                                                                          | Cast Iron<br>                  | 0°<br>SPMN090308                                                     |  |
|                         | G         | <b>Flat Top</b><br> | <b>Chipbreaker for heavy cutting of cast iron</b><br>Most effective for unstable machining due to high edge strength and stable insert clamping.<br>Can be used on workpiece requiring close tolerances due to G class insert tolerance.                                                                                  | Cast Iron<br>                  | 0°<br>SPGN090308                                                     |  |

|  | Square 90°<br>            | Triangular 60°<br>                                                                                                         | Round<br> | Chipbreaker<br>Name and<br>Cross Section                                                                  |
|--|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|  |                                                                                                            | <b>TPMR_LP</b><br>NEW<br><br><br>A190     |                                                                                            | NEW<br><b>LP</b><br>     |
|  |                                                                                                            | <b>TPMR_LM</b><br>NEW<br><br><br>A190     |                                                                                            | NEW<br><b>LM</b><br>     |
|  |                                                                                                            | <b>TPMR_MP</b><br>NEW<br><br><br>A190     |                                                                                            | NEW<br><b>MP</b><br>     |
|  |                                                                                                            | <b>TPMR_MM</b><br>NEW<br><br><br>A191 |                                                                                            | NEW<br><b>MM</b><br>   |
|  |                                                                                                            | <b>TPMR_MK</b><br>NEW<br><br><br>A191 |                                                                                            | NEW<br><b>MK</b><br>   |
|  | <b>SPMR</b><br><br>A188 | <b>TPMR</b><br><br>A191                                                                                                  |                                                                                            | <b>Standard</b><br>    |
|  |                                                                                                            | <b>TPMR-80</b><br><br><br>A190        |                                                                                            | <b>80</b><br>          |
|  | <b>SPMN</b><br><br>A188 | <b>TPMN</b><br><br>A191                                                                                                  |                                                                                            | <b>Flat Top(M)</b><br> |
|  | <b>SPGN</b><br><br>A188 | <b>TPGN</b><br><br>A191                                                                                                  |                                                                                            | <b>Flat Top(G)</b><br> |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### ■ NEGATIVE INSERTS

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                          | Hardness  | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---------------------------------------------------|-----------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| A<br>TURNING INSERTS<br>Mild Steel (St37-2, Ck10) | ≤180HB    | ●            | F        | 1           | FY    | VP25N                 | 285—450       | 0.09—0.23         |
|                                                   |           | ●            | F        | 2           | FY    | NX2525                | 270—385       | 0.09—0.23         |
|                                                   |           | ●            | F        | 3           | FS    | NX2525                | 270—385       | 0.09—0.23         |
|                                                   |           | ●            | L        | 1           | SY    | VP25N                 | 260—410       | 0.16—0.33         |
|                                                   |           | ●            | L        | 2           | SY    | NX2525                | 245—350       | 0.16—0.33         |
|                                                   |           | ●            | F        | 1           | FY    | MP3025                | 275—425       | 0.09—0.23         |
|                                                   |           | ●            | F        | 2           | FY    | NX3035                | 260—370       | 0.09—0.23         |
|                                                   |           | ●            | F        | 3           | FS    | NX2525                | 270—385       | 0.09—0.23         |
|                                                   |           | ●            | L        | 1           | SY    | MP3025                | 255—385       | 0.16—0.33         |
|                                                   |           | ●            | L        | 2           | SY    | NX3035                | 240—340       | 0.16—0.33         |
|                                                   |           | ✱            | F        | 1           | FY    | MC6125                | 385—605       | 0.09—0.23         |
|                                                   |           | ✱            | F        | 2           | FY    | MC6135                | 315—480       | 0.09—0.23         |
|                                                   |           | ✱            | F        | 3           | FS    | MC6125                | 385—605       | 0.09—0.23         |
|                                                   |           | ✱            | L        | 1           | SY    | MC6125                | 350—550       | 0.16—0.33         |
|                                                   |           | ✱            | L        | 2           | SY    | MC6135                | 290—435       | 0.16—0.33         |
| P<br>Carbon Steel • Alloy Steel (Ck45, 42CrMo4)   | 180—280HB | ●            | F        | 1           | FP    | NX2525                | 210—300       | 0.08—0.25         |
|                                                   |           | ●            | F        | 2           | FH    | AP25N                 | 220—345       | 0.08—0.20         |
|                                                   |           | ●            | F        | 3           | FH    | NX2525                | 210—300       | 0.08—0.20         |
|                                                   |           | ●            | F        | 4           | R/L-F | MP3025                | 215—330       | 0.05—0.15         |
|                                                   |           | ●            | L        | 1           | LP    | MC6115                | 250—480       | 0.10—0.40         |
|                                                   |           | ●            | L        | 2           | LP    | MC6125                | 275—425       | 0.10—0.40         |
|                                                   |           | ●            | M        | 1           | MP    | MC6115                | 230—440       | 0.16—0.50         |
|                                                   |           | ●            | M        | 2           | MP    | MC6125                | 250—390       | 0.16—0.50         |
|                                                   |           | ●            | R        | 1           | RP    | MC6115                | 215—415       | 0.25—0.60         |
|                                                   |           | ●            | R        | 2           | RP    | MC6125                | 235—370       | 0.25—0.60         |
|                                                   |           | ●            | H        | 1           | HX    | MC6125                | 210—330       | 0.50—1.26         |
|                                                   |           | ●            | H        | 2           | HX    | MC6135                | 170—260       | 0.50—1.26         |
|                                                   |           | ●            | F        | 1           | FP    | MP3025                | 215—330       | 0.08—0.25         |
|                                                   |           | ●            | F        | 2           | FH    | MP3025                | 215—330       | 0.08—0.20         |
|                                                   |           | ●            | F        | 3           | FH    | NX3035                | 200—285       | 0.08—0.20         |
|                                                   |           | ●            | L        | 1           | LP    | MC6115                | 250—480       | 0.10—0.40         |
|                                                   |           | ●            | L        | 2           | LP    | MC6125                | 275—425       | 0.10—0.40         |
|                                                   |           | ●            | L        | 3           | SH    | MC6115                | 250—480       | 0.10—0.40         |
|                                                   |           | ●            | M        | 1           | MP    | MC6125                | 250—390       | 0.16—0.50         |
|                                                   |           | ●            | M        | 2           | MP    | MC6115                | 230—440       | 0.16—0.50         |
|                                                   |           | ●            | M        | 3           | MA    | MC6125                | 250—390       | 0.20—0.50         |
|                                                   |           | ●            | R        | 1           | RP    | MC6125                | 235—370       | 0.25—0.60         |
|                                                   |           | ●            | R        | 2           | RP    | MC6135                | 190—290       | 0.25—0.60         |
|                                                   |           | ●            | H        | 1           | HX    | MC6135                | 170—260       | 0.50—1.26         |
|                                                   |           | ●            | H        | 2           | HX    | MC6125                | 210—330       | 0.50—1.26         |
|                                                   |           | ✱            | F        | 1           | FP    | MC6135                | 245—370       | 0.08—0.25         |
|                                                   |           | ✱            | F        | 2           | FP    | MC6125                | 300—465       | 0.08—0.25         |
|                                                   |           | ✱            | F        | 3           | FP    | MC6115                | 275—525       | 0.08—0.25         |
|                                                   |           | ✱            | L        | 1           | LP    | MC6135                | 225—340       | 0.10—0.40         |
|                                                   |           | ✱            | L        | 2           | LP    | MC6125                | 275—425       | 0.10—0.40         |
|                                                   |           | ✱            | L        | 3           | LP    | MC6135                | 225—340       | 0.10—0.40         |
|                                                   |           | ✱            | M        | 1           | MP    | MC6135                | 205—310       | 0.16—0.50         |
|                                                   |           | ✱            | M        | 2           | MP    | MC6125                | 250—390       | 0.16—0.50         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material |                                                         | Hardness    | Cutting Mode |   | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|---------------------------------------------------------|-------------|--------------|---|----------|-------------|--------|-----------------------|---------------|-------------------|
| P        | Carbon Steel • Alloy Steel (Ck45, 42CrMo4)              | 180 – 280HB | ✚            | M | 3        | MP          | MC6135 | 205—310               | 0.16—0.50     | 0.30—4.00         |
|          |                                                         |             | ✚            | R | 1        | RP          | MC6135 | 190—290               | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ✚            | R | 2        | RP          | MC6125 | 235—370               | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ✚            | R | 3        | RP          | MC6035 | 160—225               | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ✚            | H | 1        | HX          | MC6135 | 170—260               | 0.50—1.26     | 3.00—11.00        |
|          |                                                         |             | ✚            | H | 2        | HX          | MC6125 | 210—330               | 0.50—1.26     | 3.00—11.00        |
|          |                                                         |             | ✚            | H | 3        | HX          | MC6035 | 140—200               | 0.50—1.26     | 3.00—11.00        |
|          |                                                         |             | ✚            | H | 4        | HX          | UH6400 | 140—195               | 0.50—1.26     | 3.00—11.00        |
| M        | Austenitic Stainless Steel (X5CrNi189, X5CrNiMo1810)    | ≤200HB      | ●            | L | 1        | LM          | MC7015 | 180—285               | 0.10—0.35     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 2        | SH          | US735  | 95—185                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 3        | SH          | NX2525 | 65—135                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 4        | SW          | US7020 | 110—275               | 0.10—0.50     | 0.30—2.50         |
|          |                                                         |             | ●            | M | 1        | MM          | MC7015 | 165—260               | 0.15—0.45     | 0.70—5.00         |
|          |                                                         |             | ●            | M | 2        | GM          | MC7015 | 165—260               | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ●            | M | 3        | MS          | US7020 | 100—250               | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ●            | M | 4        | MA          | US7020 | 100—250               | 0.20—0.50     | 0.30—4.00         |
|          |                                                         |             | ●            | R | 1        | RM          | MC7015 | 155—245               | 0.25—0.55     | 1.50—6.00         |
|          |                                                         |             | ●            | R | 2        | GH          | US7020 | 95—235                | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ●            | H | 1        | HL          | US735  | 75—140                | 0.30—0.70     | 3.00—7.50         |
|          |                                                         |             | ●            | H | 2        | HL          | US735  | 75—140                | 0.30—0.70     | 3.00—7.50         |
|          |                                                         |             | ●            | H | 3        | GH          | US7020 | 95—235                | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ●            | L | 1        | LM          | MC7025 | 165—220               | 0.10—0.35     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 2        | SH          | US735  | 95—185                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ●            | M | 1        | MM          | MC7025 | 150—200               | 0.15—0.45     | 0.70—5.00         |
|          |                                                         |             | ●            | M | 2        | GM          | MC7025 | 150—200               | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ●            | M | 3        | MA          | MC7025 | 150—200               | 0.20—0.50     | 0.30—4.00         |
|          |                                                         |             | ●            | M | 4        | MS          | US735  | 90—170                | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ●            | R | 1        | RM          | MC7025 | 140—190               | 0.25—0.55     | 1.50—6.00         |
|          |                                                         |             | ●            | R | 2        | GH          | US735  | 85—160                | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ●            | H | 1        | HL          | US735  | 75—140                | 0.30—0.70     | 3.00—7.50         |
|          |                                                         |             | ●            | H | 2        | HM          | US735  | 75—140                | 0.50—1.10     | 2.00—10.00        |
|          |                                                         |             | ✚            | L | 1        | LM          | MP7035 | 95—155                | 0.10—0.35     | 0.30—2.00         |
|          |                                                         |             | ✚            | L | 2        | SH          | US735  | 95—185                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ✚            | M | 1        | MM          | MP7035 | 90—145                | 0.15—0.45     | 0.70—5.00         |
|          |                                                         |             | ✚            | M | 2        | GM          | MP7035 | 90—145                | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ✚            | M | 3        | MA          | MP7035 | 90—145                | 0.20—0.50     | 0.30—4.00         |
|          |                                                         |             | ✚            | M | 4        | MS          | US735  | 90—170                | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ✚            | R | 1        | RM          | MP7035 | 85—135                | 0.25—0.55     | 1.50—6.00         |
|          |                                                         |             | ✚            | R | 2        | GH          | US735  | 85—160                | 0.25—0.60     | 1.50—6.00         |
|          |                                                         |             | ✚            | H | 1        | HL          | US735  | 75—140                | 0.30—0.70     | 3.00—7.50         |
|          |                                                         |             | ✚            | H | 2        | HM          | US735  | 75—140                | 0.50—1.10     | 2.00—10.00        |
|          | Austenitic Stainless Steel (X2CrNiN1810, X2CrNiMoN1813) | >200HB      | ●            | L | 1        | LM          | MC7015 | 150—240               | 0.10—0.35     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 2        | SH          | US735  | 80—155                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 3        | SH          | NX2525 | 55—115                | 0.10—0.40     | 0.30—2.00         |
|          |                                                         |             | ●            | L | 4        | SW          | US7020 | 90—230                | 0.10—0.50     | 0.30—2.50         |
|          |                                                         |             | ●            | M | 1        | MM          | MC7015 | 135—215               | 0.15—0.45     | 0.70—5.00         |
|          |                                                         |             | ●            | M | 2        | GM          | MC7015 | 135—215               | 0.16—0.50     | 0.50—4.00         |
|          |                                                         |             | ●            | M | 3        | MS          | US7020 | 80—210                | 0.16—0.50     | 0.50—4.00         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### NEGATIVE INSERTS

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                                | Hardness | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---------------------------------------------------------|----------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| Austenitic Stainless Steel (X2CrNiN1810, X2CrNiMoN1813) | >200HB   | ●            | M        | 4           | MA    | US7020                | 80—210        | 0.20—0.50         |
|                                                         |          | ●            | R        | 1           | RM    | MC7015                | 130—205       | 0.25—0.55         |
|                                                         |          | ●            | R        | 2           | GH    | US7020                | 75—195        | 0.25—0.60         |
|                                                         |          | ●            | H        | 1           | HL    | US735                 | 60—120        | 0.30—0.70         |
|                                                         |          | ●            | H        | 2           | HM    | US735                 | 60—120        | 0.50—1.10         |
|                                                         |          | ●            | L        | 1           | LM    | MC7025                | 135—180       | 0.10—0.35         |
|                                                         |          | ●            | L        | 2           | SH    | US735                 | 80—155        | 0.10—0.40         |
|                                                         |          | ●            | M        | 1           | MM    | MC7025                | 125—165       | 0.15—0.45         |
|                                                         |          | ●            | M        | 2           | GM    | MC7025                | 125—165       | 0.16—0.50         |
|                                                         |          | ●            | M        | 3           | MA    | MC7025                | 125—165       | 0.20—0.50         |
|                                                         |          | ●            | M        | 4           | MS    | US735                 | 75—140        | 0.16—0.50         |
|                                                         |          | ●            | R        | 1           | RM    | MC7025                | 115—155       | 0.25—0.55         |
|                                                         |          | ●            | R        | 2           | GH    | US735                 | 70—135        | 0.25—0.60         |
|                                                         |          | ●            | H        | 1           | HL    | US735                 | 60—120        | 0.30—0.70         |
|                                                         |          | ●            | H        | 2           | HM    | US735                 | 60—120        | 0.50—1.10         |
|                                                         |          | ✱            | L        | 1           | LM    | MP7035                | 80—130        | 0.10—0.35         |
|                                                         |          | ✱            | L        | 2           | SH    | US735                 | 80—155        | 0.10—0.40         |
|                                                         |          | ✱            | M        | 1           | MM    | MP7035                | 75—120        | 0.15—0.45         |
|                                                         |          | ✱            | M        | 2           | GM    | MP7035                | 75—120        | 0.16—0.50         |
|                                                         |          | ✱            | M        | 3           | MA    | MP7035                | 75—120        | 0.20—0.50         |
|                                                         |          | ✱            | M        | 4           | MS    | US735                 | 75—140        | 0.16—0.50         |
|                                                         |          | ✱            | R        | 1           | RM    | MP7035                | 70—115        | 0.25—0.55         |
|                                                         |          | ✱            | R        | 2           | GH    | US735                 | 70—135        | 0.25—0.60         |
|                                                         |          | ✱            | H        | 1           | HL    | US735                 | 60—120        | 0.30—0.70         |
|                                                         |          | ✱            | H        | 2           | HM    | US735                 | 60—120        | 0.50—1.10         |
| Two-phase Stainless Steel (X3CrNiCu1894)                | ≤280HB   | ●            | L        | 1           | LM    | MC7015                | 120—190       | 0.10—0.35         |
|                                                         |          | ●            | L        | 2           | SH    | US735                 | 65—125        | 0.10—0.40         |
|                                                         |          | ●            | L        | 3           | SH    | NX2525                | 40—90         | 0.10—0.40         |
|                                                         |          | ●            | L        | 4           | SW    | US7020                | 70—185        | 0.10—0.50         |
|                                                         |          | ●            | M        | 1           | MM    | MC7015                | 110—175       | 0.15—0.45         |
|                                                         |          | ●            | M        | 2           | GM    | MC7015                | 110—175       | 0.16—0.50         |
|                                                         |          | ●            | M        | 3           | MS    | US7020                | 65—170        | 0.16—0.50         |
|                                                         |          | ●            | M        | 4           | MA    | US7020                | 65—170        | 0.20—0.50         |
|                                                         |          | ●            | R        | 1           | RM    | MC7015                | 105—165       | 0.25—0.55         |
|                                                         |          | ●            | R        | 2           | GH    | US7020                | 60—160        | 0.25—0.60         |
|                                                         |          | ●            | H        | 1           | HL    | US735                 | 50—95         | 0.30—0.70         |
|                                                         |          | ●            | H        | 2           | HM    | US735                 | 50—95         | 0.50—1.10         |
|                                                         |          | ●            | L        | 1           | LM    | MC7025                | 110—145       | 0.10—0.35         |
|                                                         |          | ●            | L        | 2           | SH    | US735                 | 65—125        | 0.10—0.40         |
|                                                         |          | ●            | M        | 1           | MM    | MC7025                | 100—135       | 0.15—0.45         |
|                                                         |          | ●            | M        | 2           | GM    | MC7025                | 100—135       | 0.16—0.50         |
|                                                         |          | ●            | M        | 3           | MA    | MC7025                | 100—135       | 0.20—0.50         |
|                                                         |          | ●            | M        | 4           | MS    | US735                 | 60—115        | 0.16—0.50         |
|                                                         |          | ●            | R        | 1           | RM    | MC7025                | 95—125        | 0.25—0.55         |
|                                                         |          | ●            | R        | 2           | GH    | US735                 | 55—105        | 0.25—0.60         |
|                                                         |          | ●            | H        | 1           | HL    | US735                 | 50—95         | 0.30—0.70         |
|                                                         |          | ●            | H        | 2           | HM    | US735                 | 50—95         | 0.50—1.10         |
|                                                         |          | ✱            | L        | 1           | LM    | MP7035                | 65—105        | 0.10—0.35         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting



| Material                                                       |        | Hardness | Cutting Mode |   | Priority | Chipbreaker | Grade   | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------------------------------------------------------------|--------|----------|--------------|---|----------|-------------|---------|-----------------------|---------------|-------------------|
| Two-phase Stainless Steel (X3CrNiCu1894)                       | ≤280HB | ✚        | L            | 2 | SH       | US735       | 65—125  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ✚        | M            | 1 | MM       | MP7035      | 60—95   | 0.15—0.45             | 0.70—5.00     |                   |
|                                                                |        | ✚        | M            | 2 | GM       | MP7035      | 60—95   | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ✚        | M            | 3 | MA       | MP7035      | 60—95   | 0.20—0.50             | 0.30—4.00     |                   |
|                                                                |        | ✚        | M            | 4 | MS       | US735       | 60—115  | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ✚        | R            | 1 | RM       | MP7035      | 55—90   | 0.25—0.55             | 1.50—6.00     |                   |
|                                                                |        | ✚        | R            | 2 | GH       | US735       | 55—105  | 0.25—0.60             | 1.50—6.00     |                   |
|                                                                |        | ✚        | H            | 1 | HL       | US735       | 50—95   | 0.30—0.70             | 3.00—7.50     |                   |
|                                                                |        | ✚        | H            | 2 | HM       | US735       | 50—95   | 0.50—1.10             | 2.00—10.00    |                   |
| Ferritic and Martensitic Stainless Steel (X10Cr13, X8Cr17)     | ≤200HB | ●        | L            | 1 | LM       | MC7015      | 180—285 | 0.10—0.35             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 2 | SH       | US735       | 95—185  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 3 | SH       | NX2525      | 65—135  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 4 | SW       | US7020      | 110—275 | 0.10—0.50             | 0.30—2.50     |                   |
|                                                                |        | ●        | M            | 1 | MM       | MC7015      | 165—260 | 0.15—0.45             | 0.70—5.00     |                   |
|                                                                |        | ●        | M            | 2 | GM       | MC7015      | 165—260 | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ●        | M            | 3 | MS       | US7020      | 100—250 | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ●        | M            | 4 | MA       | US7020      | 100—250 | 0.20—0.50             | 0.30—4.00     |                   |
|                                                                |        | ●        | R            | 1 | RM       | MC7015      | 155—245 | 0.25—0.55             | 1.50—6.00     |                   |
|                                                                |        | ●        | R            | 2 | GH       | US7020      | 95—235  | 0.25—0.60             | 1.50—6.00     |                   |
|                                                                |        | ●        | H            | 1 | HL       | US735       | 75—140  | 0.30—0.70             | 3.00—7.50     |                   |
|                                                                |        | ●        | H            | 2 | HM       | US735       | 75—140  | 0.50—1.10             | 2.00—10.00    |                   |
|                                                                |        | ●        | L            | 1 | LM       | MC7025      | 165—220 | 0.10—0.35             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 2 | SH       | US735       | 95—185  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ●        | M            | 1 | MM       | MC7025      | 150—200 | 0.15—0.45             | 0.70—5.00     |                   |
|                                                                |        | ●        | M            | 2 | GM       | MC7025      | 150—200 | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ●        | M            | 3 | MA       | MC7025      | 150—200 | 0.20—0.50             | 0.30—4.00     |                   |
|                                                                |        | ●        | M            | 4 | MA       | US735       | 90—170  | 0.20—0.50             | 0.30—4.00     |                   |
|                                                                |        | ●        | R            | 1 | RM       | MC7025      | 140—190 | 0.25—0.55             | 1.50—6.00     |                   |
|                                                                |        | ●        | R            | 2 | GH       | US735       | 85—160  | 0.25—0.60             | 1.50—6.00     |                   |
|                                                                |        | ●        | H            | 1 | HL       | US735       | 75—140  | 0.30—0.70             | 3.00—7.50     |                   |
|                                                                |        | ●        | H            | 2 | HM       | US735       | 75—140  | 0.50—1.10             | 2.00—10.00    |                   |
|                                                                |        | ✚        | L            | 1 | LM       | MP7035      | 95—155  | 0.10—0.35             | 0.30—2.00     |                   |
|                                                                |        | ✚        | L            | 2 | SH       | US735       | 95—185  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ✚        | M            | 1 | MM       | MP7035      | 90—145  | 0.15—0.45             | 0.70—5.00     |                   |
|                                                                |        | ✚        | M            | 2 | GM       | MP7035      | 90—145  | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ✚        | M            | 3 | MA       | MP7035      | 90—145  | 0.20—0.50             | 0.30—4.00     |                   |
|                                                                |        | ✚        | M            | 4 | MS       | US735       | 90—170  | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ✚        | R            | 1 | RM       | MP7035      | 85—135  | 0.25—0.55             | 1.50—6.00     |                   |
|                                                                |        | ✚        | R            | 2 | GH       | US735       | 85—160  | 0.25—0.60             | 1.50—6.00     |                   |
|                                                                |        | ✚        | H            | 1 | HL       | US735       | 75—140  | 0.30—0.70             | 3.00—7.50     |                   |
|                                                                |        | ✚        | H            | 2 | HM       | US735       | 75—140  | 0.50—1.10             | 2.00—10.00    |                   |
| Ferritic and Martensitic Stainless Steel (X17CrNi162, X30Cr13) | >200HB | ●        | L            | 1 | LM       | MC7015      | 150—240 | 0.10—0.35             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 2 | SH       | US735       | 80—155  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 3 | SH       | NX2525      | 55—115  | 0.10—0.40             | 0.30—2.00     |                   |
|                                                                |        | ●        | L            | 4 | SW       | US7020      | 90—230  | 0.10—0.50             | 0.30—2.50     |                   |
|                                                                |        | ●        | M            | 1 | MM       | MC7015      | 135—215 | 0.15—0.45             | 0.70—5.00     |                   |
|                                                                |        | ●        | M            | 2 | GM       | MC7015      | 135—215 | 0.16—0.50             | 0.50—4.00     |                   |
|                                                                |        | ●        | M            | 3 | MS       | US7020      | 80—210  | 0.16—0.50             | 0.50—4.00     |                   |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### ■ NEGATIVE INSERTS

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                                       | Hardness | Cutting Mode | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------------------------------------------------------------|----------|--------------|----------|-------------|--------|-----------------------|---------------|-------------------|
| Ferritic and Martensitic Stainless Steel (X17CrNi162, X30Cr13) | >200HB   | ● M          | 4        | MA          | US7020 | 80—210                | 0.20—0.50     | 0.30—4.00         |
|                                                                |          | ● R          | 1        | RM          | MC7015 | 130—205               | 0.25—0.55     | 1.50—6.00         |
|                                                                |          | ● R          | 2        | GH          | US7020 | 75—195                | 0.25—0.60     | 1.50—6.00         |
|                                                                |          | ● H          | 1        | HL          | US735  | 60—120                | 0.30—0.70     | 3.00—7.50         |
|                                                                |          | ● H          | 2        | HM          | US735  | 60—120                | 0.50—1.10     | 2.00—10.00        |
|                                                                |          | ● L          | 1        | LM          | MC7025 | 135—180               | 0.10—0.35     | 0.30—2.00         |
|                                                                |          | ● L          | 2        | SH          | US735  | 80—155                | 0.10—0.40     | 0.30—2.00         |
|                                                                |          | ● M          | 1        | MM          | MC7025 | 125—165               | 0.15—0.45     | 0.70—5.00         |
|                                                                |          | ● M          | 2        | MA          | MC7025 | 125—165               | 0.20—0.50     | 0.30—4.00         |
|                                                                |          | ● M          | 3        | MA          | US735  | 75—140                | 0.20—0.50     | 0.30—4.00         |
|                                                                |          | ● M          | 4        | MS          | US735  | 75—140                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ● R          | 1        | RM          | MC7025 | 115—155               | 0.25—0.55     | 1.50—6.00         |
|                                                                |          | ● R          | 2        | GH          | US735  | 70—135                | 0.25—0.60     | 1.50—6.00         |
|                                                                |          | ● H          | 1        | HL          | US735  | 60—120                | 0.30—0.70     | 3.00—7.50         |
|                                                                |          | ● H          | 2        | HM          | US735  | 60—120                | 0.50—1.10     | 2.00—10.00        |
|                                                                |          | ✱ L          | 1        | LM          | MP7035 | 80—130                | 0.10—0.35     | 0.30—2.00         |
|                                                                |          | ✱ L          | 2        | SH          | US735  | 80—155                | 0.10—0.40     | 0.30—2.00         |
|                                                                |          | ✱ M          | 1        | MM          | MP7035 | 75—120                | 0.15—0.45     | 0.70—5.00         |
|                                                                |          | ✱ M          | 2        | GM          | MP7035 | 75—120                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ✱ M          | 3        | MA          | MP7035 | 75—120                | 0.20—0.50     | 0.30—4.00         |
|                                                                |          | ✱ M          | 4        | MS          | US735  | 75—140                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ✱ R          | 1        | RM          | MP7035 | 70—115                | 0.25—0.55     | 1.50—6.00         |
|                                                                |          | ✱ R          | 2        | GH          | US735  | 70—135                | 0.25—0.60     | 1.50—6.00         |
|                                                                |          | ✱ H          | 1        | HL          | US735  | 60—120                | 0.30—0.70     | 3.00—7.50         |
|                                                                |          | ✱ H          | 2        | HM          | US735  | 60—120                | 0.50—1.10     | 2.00—10.00        |
| Hardened Stainless Steel (X5CrNiCuNb16-4, X7CrNiAl17-7)        | <450HB   | ● L          | 1        | LM          | MC7015 | 95—130                | 0.10—0.35     | 0.30—2.00         |
|                                                                |          | ● L          | 2        | LS(M)       | MP9005 | 125—175               | 0.10—0.25     | 0.20—0.80         |
|                                                                |          | ● L          | 3        | SH          | US735  | 55—100                | 0.10—0.40     | 0.30—2.00         |
|                                                                |          | ● L          | 4        | SH          | NX2525 | 35—75                 | 0.10—0.40     | 0.30—2.00         |
|                                                                |          | ● M          | 1        | MM          | MC7015 | 90—120                | 0.15—0.45     | 0.70—5.00         |
|                                                                |          | ● M          | 2        | GM          | MC7015 | 90—120                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ● M          | 3        | MS          | US7020 | 55—140                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ● M          | 4        | MA          | US7020 | 55—140                | 0.10—0.30     | 0.50—3.00         |
|                                                                |          | ● R          | 1        | RM          | MC7015 | 85—110                | 0.25—0.55     | 1.50—6.00         |
|                                                                |          | ● R          | 2        | GH          | US7020 | 50—130                | 0.25—0.60     | 1.50—6.00         |
|                                                                |          | ● H          | 1        | HL          | US735  | 40—80                 | 0.40—1.00     | 1.50—8.00         |
|                                                                |          | ● H          | 2        | HM          | US735  | 40—80                 | 0.50—1.10     | 2.00—10.00        |
|                                                                |          | ● L          | 1        | LM          | MC7025 | 85—110                | 0.10—0.35     | 0.30—2.00         |
|                                                                |          | ● L          | 2        | SH          | US735  | 55—100                | 0.10—0.40     | 0.30—2.00         |
|                                                                |          | ● L          | 3        | LS(M)       | MP9015 | 120—165               | 0.10—0.25     | 0.20—0.80         |
|                                                                |          | ● M          | 1        | MM          | MC7025 | 80—100                | 0.15—0.45     | 0.70—5.00         |
|                                                                |          | ● M          | 2        | GM          | MC7025 | 80—100                | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ● M          | 3        | MA          | MC7025 | 80—100                | 0.10—0.30     | 0.50—3.00         |
|                                                                |          | ● M          | 4        | MS          | US735  | 50—95                 | 0.16—0.50     | 0.50—4.00         |
|                                                                |          | ● R          | 1        | RM          | MC7025 | 75—95                 | 0.25—0.55     | 1.50—6.00         |
|                                                                |          | ● R          | 2        | GH          | US735  | 45—90                 | 0.25—0.60     | 1.50—6.00         |
|                                                                |          | ● R          | 3        | RS          | MP9015 | 100—140               | 0.20—0.35     | 1.00—4.00         |
|                                                                |          | ● H          | 1        | HL          | US735  | 40—80                 | 0.40—1.00     | 1.50—8.00         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material |                                                            | Hardness | Cutting Mode                                                                        |   | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|---|----------|-------------|--------|-----------------------|---------------|-------------------|
| M        | Hardened Stainless Steel<br>(X5CrNiCuNb16-4, X7CrNiAl17-7) | <450HB   |    | H | 2        | HM          | US735  | 40—80                 | 0.50—1.10     | 2.00—10.00        |
|          |                                                            |          |    | L | 1        | LM          | MP7035 | 55—85                 | 0.10—0.35     | 0.30—2.00         |
|          |                                                            |          |    | L | 2        | SH          | US735  | 55—100                | 0.10—0.40     | 0.30—2.00         |
|          |                                                            |          |    | L | 3        | LS(M)       | MP9025 | 80—95                 | 0.10—0.25     | 0.20—0.80         |
|          |                                                            |          |    | M | 1        | MM          | MP7035 | 50—80                 | 0.15—0.45     | 0.70—5.00         |
|          |                                                            |          |    | M | 2        | GM          | MP7035 | 50—80                 | 0.16—0.50     | 0.50—4.00         |
|          |                                                            |          |    | M | 3        | MA          | MP7035 | 50—80                 | 0.10—0.30     | 0.50—3.00         |
|          |                                                            |          |    | M | 4        | MS          | US735  | 50—95                 | 0.16—0.50     | 0.50—4.00         |
|          |                                                            |          |    | R | 1        | RM          | MP7035 | 45—75                 | 0.25—0.55     | 1.50—6.00         |
|          |                                                            |          |    | R | 2        | GH          | US735  | 45—90                 | 0.25—0.60     | 1.50—6.00         |
|          |                                                            |          |    | R | 3        | RS          | MP9025 | 70—85                 | 0.20—0.35     | 1.00—4.00         |
|          |                                                            |          |    | H | 1        | HL          | US735  | 40—80                 | 0.40—1.00     | 1.50—8.00         |
|          |                                                            |          |    | H | 2        | HM          | US735  | 40—80                 | 0.50—1.10     | 2.00—10.00        |
| K        | Gray Cast Iron<br>(GG30)                                   | ≤350MPa  |    | L | 1        | LK          | MC5105 | 230—700               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |    | L | 2        | LK          | MC5115 | 205—385               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |    | L | 3        | MA          | MC5105 | 210—640               | 0.20—0.50     | 0.30—4.00         |
|          |                                                            |          |    | M | 1        | MK          | MC5105 | 210—640               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |    | M | 2        | MK          | MC5115 | 190—350               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |   | M | 3        | GK          | MC5105 | 210—640               | 0.20—0.60     | 1.50—5.00         |
|          |                                                            |          |  | R | 1        | RK          | MC5105 | 195—605               | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 2        | RK          | MC5115 | 180—330               | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 3        | Flat        | MC5105 | 195—605               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 1        | Flat        | MC5105 | 195—605               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 2        | Flat        | MC5115 | 180—330               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | L | 1        | LK          | MC5105 | 230—700               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |  | L | 2        | LK          | MC5115 | 205—385               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |  | L | 3        | MA          | MC5105 | 210—640               | 0.20—0.50     | 0.30—4.00         |
|          |                                                            |          |  | M | 1        | MK          | MC5105 | 210—640               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |  | M | 2        | MK          | MC5115 | 190—350               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |  | M | 3        | GK          | MC5105 | 210—640               | 0.20—0.60     | 1.50—5.00         |
|          |                                                            |          |  | R | 1        | RK          | MC5105 | 195—605               | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 2        | RK          | MC5115 | 180—330               | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 3        | Flat        | MC5105 | 195—605               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 1        | Flat        | MC5105 | 195—605               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 2        | Flat        | MC5115 | 180—330               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | L | 1        | LK          | MC5115 | 205—385               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |  | L | 2        | LK          | MC5125 | 110—220               | 0.10—0.50     | 0.50—2.50         |
|          |                                                            |          |  | L | 3        | MA          | MC5115 | 190—350               | 0.20—0.50     | 0.30—4.00         |
|          |                                                            |          |  | M | 1        | MK          | MC5115 | 190—350               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |  | M | 2        | MK          | MC5125 | 100—200               | 0.20—0.55     | 0.50—4.00         |
|          |                                                            |          |  | M | 3        | GK          | MC5115 | 190—350               | 0.20—0.60     | 1.50—5.00         |
|          |                                                            |          |  | R | 1        | RK          | MC5115 | 180—330               | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 2        | RK          | MC5125 | 95—190                | 0.20—0.60     | 1.50—6.00         |
|          |                                                            |          |  | R | 3        | Flat        | MC5115 | 180—330               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 1        | Flat        | MC5115 | 180—330               | 0.20—0.60     | 2.50—6.00         |
|          |                                                            |          |  | H | 2        | Flat        | MC5125 | 95—190                | 0.20—0.60     | 2.50—6.00         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### NEGATIVE INSERTS

Chipbreaker : Std : Standard Flat : Flat Top

| Material                  | Tensile Strength | Cutting Mode | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---------------------------|------------------|--------------|----------|-------------|--------|-----------------------|---------------|-------------------|
| Ductile Cast Iron (GGG40) | ≤450MPa          | ● L          | 1        | LK          | MC5115 | 195—365               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 2        | LK          | MC5105 | 215—665               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 3        | MA          | MC5115 | 180—330               | 0.20—0.50     | 0.30—4.00         |
|                           |                  | ● M          | 1        | MK          | MC5115 | 180—330               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 2        | MK          | MC5105 | 195—605               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 3        | GK          | MC5115 | 180—330               | 0.20—0.60     | 1.50—5.00         |
|                           |                  | ● M          | 4        | GK          | MC5105 | 195—605               | 0.20—0.60     | 1.50—5.00         |
|                           |                  | ● R          | 1        | RK          | MC5115 | 170—315               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ● R          | 2        | RK          | MC5105 | 185—575               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ● R          | 3        | Flat        | MC5115 | 170—315               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 1        | Flat        | MC5115 | 170—315               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 2        | Flat        | MC5105 | 185—575               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 3        | Flat        | MC5125 | 90—180                | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● L          | 1        | LK          | MC5115 | 195—365               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 3        | MA          | MC5115 | 180—330               | 0.20—0.50     | 0.30—4.00         |
|                           |                  | ● M          | 1        | MK          | MC5115 | 180—330               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 2        | GK          | MC5115 | 180—330               | 0.20—0.60     | 1.50—5.00         |
|                           |                  | ● R          | 1        | RK          | MC5115 | 170—315               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ● R          | 2        | Flat        | MC5115 | 170—315               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 1        | Flat        | MC5115 | 170—315               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ✱ L          | 1        | LK          | MC5125 | 100—205               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ✱ L          | 2        | LK          | MC5115 | 195—365               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ✱ L          | 3        | MA          | MC5125 | 95—190                | 0.20—0.50     | 0.30—4.00         |
|                           |                  | ✱ M          | 1        | MK          | MC5125 | 95—190                | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ✱ M          | 2        | MK          | MC5115 | 180—330               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ✱ M          | 3        | GK          | MC5125 | 95—190                | 0.20—0.60     | 1.50—5.00         |
|                           |                  | ✱ R          | 1        | RK          | MC5125 | 90—180                | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ✱ R          | 2        | RK          | MC5115 | 170—315               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ✱ R          | 3        | Flat        | MC5125 | 90—180                | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ✱ H          | 1        | Flat        | MC5125 | 90—180                | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ✱ H          | 2        | Flat        | MC5115 | 170—315               | 0.20—0.60     | 2.50—6.00         |
| Ductile Cast Iron (GGG70) | ≤800MPa          | ● L          | 1        | LK          | MC5115 | 175—325               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 2        | LK          | MC5105 | 195—595               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 3        | MA          | MC5115 | 160—295               | 0.20—0.50     | 0.30—4.00         |
|                           |                  | ● M          | 1        | MK          | MC5115 | 160—295               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 2        | MK          | MC5105 | 175—540               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 3        | GK          | MC5115 | 160—295               | 0.20—0.60     | 1.50—5.00         |
|                           |                  | ● R          | 1        | RK          | MC5115 | 150—280               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ● R          | 2        | RK          | MC5105 | 165—515               | 0.20—0.60     | 1.50—6.00         |
|                           |                  | ● R          | 3        | Flat        | MC5115 | 150—280               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 1        | Flat        | MC5115 | 150—280               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● H          | 2        | Flat        | MC5105 | 165—515               | 0.20—0.60     | 2.50—6.00         |
|                           |                  | ● L          | 1        | LK          | MC5115 | 175—325               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 2        | LK          | MC5105 | 195—595               | 0.10—0.50     | 0.50—2.50         |
|                           |                  | ● L          | 3        | MA          | MC5115 | 160—295               | 0.20—0.50     | 0.30—4.00         |
|                           |                  | ● M          | 1        | MK          | MC5115 | 160—295               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 2        | MK          | MC5105 | 175—540               | 0.20—0.55     | 0.50—4.00         |
|                           |                  | ● M          | 3        | GK          | MC5115 | 160—295               | 0.20—0.60     | 1.50—5.00         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material |                            | Tensile Strength | Cutting Mode |   | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|----------------------------|------------------|--------------|---|----------|-------------|--------|-----------------------|---------------|-------------------|
| K        | Ductile Cast Iron (GGG70)  | ≤800MPa          | 🌀            | R | 1        | RK          | MC5115 | 150—280               | 0.20—0.60     | 1.50—6.00         |
|          |                            |                  | 🌀            | R | 2        | RK          | MC5105 | 165—515               | 0.20—0.60     | 1.50—6.00         |
|          |                            |                  | 🌀            | R | 3        | Flat        | MC5115 | 150—280               | 0.20—0.60     | 2.50—6.00         |
|          |                            |                  | 🌀            | H | 1        | Flat        | MC5115 | 150—280               | 0.20—0.60     | 2.50—6.00         |
|          |                            |                  | 🌀            | H | 2        | Flat        | MC5105 | 165—515               | 0.20—0.60     | 2.50—6.00         |
|          |                            |                  | ⚙️           | L | 1        | LK          | MC5125 | 90—185                | 0.10—0.50     | 0.50—2.50         |
|          |                            |                  | ⚙️           | L | 2        | LK          | MC5115 | 175—325               | 0.10—0.50     | 0.50—2.50         |
|          |                            |                  | ⚙️           | L | 3        | MA          | MC5125 | 85—170                | 0.20—0.50     | 0.30—4.00         |
|          |                            |                  | ⚙️           | M | 1        | MK          | MC5125 | 85—170                | 0.20—0.55     | 0.50—4.00         |
|          |                            |                  | ⚙️           | M | 2        | MK          | MC5115 | 160—295               | 0.20—0.55     | 0.50—4.00         |
|          |                            |                  | ⚙️           | M | 3        | GK          | MC5125 | 85—170                | 0.20—0.60     | 1.50—5.00         |
|          |                            |                  | ⚙️           | R | 1        | RK          | MC5125 | 80—160                | 0.20—0.60     | 1.50—6.00         |
|          |                            |                  | ⚙️           | R | 2        | RK          | MC5115 | 150—280               | 0.20—0.60     | 1.50—6.00         |
|          |                            |                  | ⚙️           | R | 3        | Flat        | MC5125 | 80—160                | 0.20—0.60     | 2.50—6.00         |
|          |                            |                  | ⚙️           | H | 1        | Flat        | MC5125 | 80—160                | 0.20—0.60     | 2.50—6.00         |
|          |                            |                  | ⚙️           | H | 2        | Flat        | MC5115 | 150—280               | 0.20—0.60     | 2.50—6.00         |
| S        | Titanium Alloy (Ti-6Al-4V) | —                | 🔴            | F | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | 🔴            | F | 2        | FJ          | RT9010 | 45—95                 | 0.07—0.20     | 0.10—1.00         |
|          |                            |                  | 🔴            | L | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | 🔴            | L | 2        | MJ(M)       | RT9010 | 40—85                 | 0.07—0.25     | 0.40—1.50         |
|          |                            |                  | 🔴            | M | 1        | MS          | MT9015 | 40—80                 | 0.15—0.30     | 0.50—3.00         |
|          |                            |                  | 🔴            | M | 2        | MS          | RT9010 | 40—80                 | 0.16—0.50     | 0.50—4.00         |
|          |                            |                  | 🔴            | R | 1        | RS          | MT9015 | 35—75                 | 0.20—0.35     | 1.00—4.00         |
|          |                            |                  | 🔴            | R | 2        | GJ          | RT9010 | 35—75                 | 0.16—0.35     | 1.00—3.00         |
|          |                            |                  | 🌀            | F | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | 🌀            | F | 2        | FJ          | RT9010 | 45—95                 | 0.07—0.20     | 0.10—1.00         |
|          |                            |                  | 🌀            | L | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | 🌀            | L | 2        | MJ(M)       | RT9010 | 40—85                 | 0.07—0.25     | 0.40—1.50         |
|          |                            |                  | 🌀            | L | 3        | MJ(G)       | RT9010 | 40—85                 | 0.07—0.25     | 0.40—1.50         |
|          |                            |                  | 🌀            | M | 1        | MS          | MT9015 | 40—80                 | 0.15—0.30     | 0.50—3.00         |
|          |                            |                  | 🌀            | M | 2        | MS          | RT9010 | 40—80                 | 0.16—0.50     | 0.50—4.00         |
|          |                            |                  | 🌀            | R | 1        | RS          | MT9015 | 35—75                 | 0.20—0.35     | 1.00—4.00         |
|          |                            |                  | 🌀            | R | 2        | GJ          | RT9010 | 35—75                 | 0.16—0.35     | 1.00—3.00         |
|          |                            |                  | ⚙️           | F | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | ⚙️           | F | 2        | FJ          | RT9010 | 45—95                 | 0.07—0.20     | 0.10—1.00         |
|          |                            |                  | ⚙️           | L | 1        | LS(M)       | MT9015 | 40—85                 | 0.10—0.25     | 0.20—0.80         |
|          |                            |                  | ⚙️           | L | 2        | MJ(M)       | RT9010 | 40—85                 | 0.07—0.25     | 0.40—1.50         |
|          |                            |                  | ⚙️           | L | 3        | MJ(G)       | RT9010 | 40—85                 | 0.07—0.25     | 0.40—1.50         |
|          |                            |                  | ⚙️           | M | 1        | MS          | MT9015 | 40—80                 | 0.15—0.30     | 0.50—3.00         |
|          |                            |                  | ⚙️           | R | 1        | RS          | MT9015 | 35—75                 | 0.20—0.35     | 1.00—4.00         |
|          |                            |                  | ⚙️           | R | 2        | GJ          | RT9010 | 35—75                 | 0.16—0.35     | 1.00—3.00         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### ■ NEGATIVE INSERTS

Chipbreaker : Std : Standard Flat : Flat Top

| Material | Hardness                           | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|------------------------------------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| S        | Heat Resistant Alloy (Inconel®718) | ●            | F        | 1           | LS(M) | MV9005                | 75—140        | 0.10—0.25         |
|          |                                    | ●            | F        | 2           | LS(M) | MP9005                | 55—110        | 0.10—0.25         |
|          |                                    | ●            | F        | 3           | FJ    | VP10RT                | 30—60         | 0.07—0.20         |
|          |                                    | ●            | L        | 1           | LS(M) | MV9005                | 75—140        | 0.10—0.25         |
|          |                                    | ●            | L        | 2           | LS(M) | MP9005                | 55—110        | 0.10—0.25         |
|          |                                    | ●            | L        | 3           | MJ(M) | MP9005                | 55—110        | 0.07—0.25         |
|          |                                    | ●            | L        | 4           | MJ(M) | VP05RT                | 30—65         | 0.07—0.25         |
|          |                                    | ●            | M        | 1           | MS    | MV9005                | 70—130        | 0.15—0.30         |
|          |                                    | ●            | M        | 2           | MS    | MP9005                | 50—100        | 0.15—0.30         |
|          |                                    | ●            | M        | 3           | MS    | VP05RT                | 30—60         | 0.16—0.50         |
|          |                                    | ●            | M        | 4           | MS    | US905                 | 50—90         | 0.16—0.50         |
|          |                                    | ●            | R        | 1           | RS    | MP9015                | 35—75         | 0.20—0.35         |
|          |                                    | ●            | R        | 2           | GJ    | VP10RT                | 20—45         | 0.16—0.35         |
|          |                                    | ●            | R        | 3           | GJ    | US905                 | 45—85         | 0.16—0.35         |
|          |                                    | ●            | F        | 1           | LS(M) | MP9015                | 40—85         | 0.10—0.25         |
|          |                                    | ●            | F        | 2           | FJ    | VP10RT                | 30—60         | 0.07—0.20         |
|          |                                    | ●            | L        | 1           | LS(M) | MP9015                | 40—85         | 0.10—0.25         |
|          |                                    | ●            | L        | 2           | MJ(M) | MP9015                | 40—80         | 0.07—0.25         |
|          |                                    | ●            | L        | 3           | MJ(M) | VP10RT                | 25—55         | 0.07—0.25         |
|          |                                    | ●            | M        | 1           | MS    | MP9015                | 40—80         | 0.15—0.30         |
|          |                                    | ●            | M        | 2           | MA    | MP9015                | 40—80         | 0.10—0.30         |
|          |                                    | ●            | M        | 3           | MS    | VP10RT                | 25—50         | 0.16—0.50         |
|          |                                    | ●            | R        | 1           | RS    | MP9015                | 35—75         | 0.20—0.35         |
|          |                                    | ●            | R        | 2           | GJ    | VP10RT                | 20—45         | 0.16—0.35         |
|          |                                    | ✚            | F        | 1           | LS(M) | MP9025                | 30—45         | 0.10—0.25         |
|          |                                    | ✚            | F        | 2           | FJ    | VP15TF                | 20—40         | 0.07—0.20         |
|          |                                    | ✚            | L        | 1           | LS(M) | MP9025                | 30—45         | 0.10—0.25         |
|          |                                    | ✚            | L        | 2           | MJ(G) | VP15TF                | 20—35         | 0.07—0.25         |
|          |                                    | ✚            | M        | 1           | MS    | MP9025                | 30—45         | 0.15—0.30         |
|          |                                    | ✚            | M        | 2           | MA    | MP9025                | 30—45         | 0.10—0.30         |
|          |                                    | ✚            | M        | 3           | MS    | VP15TF                | 20—35         | 0.16—0.50         |
|          |                                    | ✚            | R        | 1           | RS    | MP9025                | 25—40         | 0.20—0.35         |
|          |                                    | ✚            | R        | 2           | GJ    | VP15TF                | 15—30         | 0.16—0.35         |

A

TURNING INSERTS

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✚ : Unstable Cutting

A084 CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

■ 7° POSITIVE INSERT TYPE

| Material                                  |                                               | Hardness          | Cutting Mode |   | Priority | Chipbreaker | Grade   | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|-------------------------------------------|-----------------------------------------------|-------------------|--------------|---|----------|-------------|---------|-----------------------|---------------|-------------------|
| P                                         | Mild Steel<br>(St37-2, Ck10)                  | ≤180HB            | ●            | F | 1        | FP          | NX2525  | 225—320               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 2        | FV          | NX2525  | 225—320               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 3        | R/L-F       | MP3025  | 230—355               | 0.05—0.12     | 0.10—0.50         |
|                                           |                                               |                   | ●            | L | 1        | LP          | NX2525  | 225—320               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 2        | LP          | MC6115  | 295—570               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 3        | MV          | MP3025  | 190—295               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | M | 1        | MP          | NX2525  | 185—270               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | F | 1        | FP          | MC6115  | 295—570               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 2        | FP          | MP3025  | 230—355               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | L | 1        | LP          | MC6115  | 295—570               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 2        | LP          | MP3025  | 230—355               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | M | 1        | MP          | MC6115  | 245—475               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | M | 2        | MP          | MP3025  | 190—295               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | F | 1        | FP          | MC6125  | 320—505               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | F | 2        | FP          | MC6135  | 265—400               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | F | 3        | FM          | VP30RT  | 155—190               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | L | 1        | LP          | MC6125  | 320—505               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | L | 2        | LP          | MC6135  | 265—400               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | L | 3        | LM          | VP30RT  | 155—190               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | M | 1        | MP          | MC6125  | 270—420               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | M | 2        | MP          | MC6135  | 220—330               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | M | 3        | MM          | VP30RT  | 125—160               | 0.08—0.30     | 0.30—2.00         |
|                                           | Carbon Steel • Alloy Steel<br>(Ck45, 42CrMo4) | 180<br>—<br>280HB | ●            | F | 1        | FP          | NX2525  | 165—240               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 2        | FV          | NX2525  | 165—240               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 3        | R/L-F       | MP3025  | 170—260               | 0.05—0.12     | 0.10—0.50         |
|                                           |                                               |                   | ●            | L | 1        | LP          | NX2525  | 165—240               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 2        | LP          | MC6115  | 220—420               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 3        | MV          | MP3025  | 140—220               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | M | 1        | MP          | NX2525  | 140—200               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | M | 2        | MW          | MP3025  | 140—220               | 0.10—0.35     | 0.80—2.50         |
|                                           |                                               |                   | ●            | F | 1        | FP          | MC6115  | 220—420               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | F | 2        | FP          | MC6125  | 240—370               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ●            | L | 1        | LP          | MC6115  | 220—420               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | L | 2        | LP          | MC6125  | 240—370               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ●            | M | 1        | MP          | MC6125  | 200—310               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ●            | M | 2        | MP          | MC6115  | 180—350               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | F | 1        | FP          | MC6125  | 240—370               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | F | 2        | FP          | MC6135  | 195—295               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | F | 3        | FM          | VP30RT  | 115—140               | 0.04—0.20     | 0.20—0.90         |
|                                           |                                               |                   | ✚            | L | 1        | LP          | MC6125  | 240—370               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | L | 2        | LP          | MC6135  | 195—295               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | L | 3        | LM          | VP30RT  | 115—140               | 0.06—0.25     | 0.20—1.00         |
|                                           |                                               |                   | ✚            | M | 1        | MP          | MC6125  | 200—310               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | M | 2        | MP          | MC6135  | 160—245               | 0.08—0.30     | 0.30—2.00         |
|                                           |                                               |                   | ✚            | M | 3        | MM          | VP30RT  | 95—120                | 0.08—0.30     | 0.30—2.00         |
| Carbon Steel • Alloy Steel<br>(40CrNiMoA) | 280<br>—<br>350HB                             | ●                 | F            | 1 | FP       | NX2525      | 115—170 | 0.04—0.20             | 0.20—0.90     |                   |
|                                           |                                               | ●                 | L            | 1 | LP       | NX2525      | 115—170 | 0.06—0.25             | 0.20—1.00     |                   |
|                                           |                                               | ●                 | M            | 1 | MP       | NX2525      | 95—140  | 0.08—0.30             | 0.30—2.00     |                   |

A

TURNING INSERTS



# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### 7° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                              | Hardness  | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|-------------------------------------------------------|-----------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| Carbon Steel • Alloy Steel (40CrNiMoA)                | 280—350HB | ●            | F        | 1           | FP    | MC6115                | 155—295       | 0.04—0.20         |
|                                                       |           | ●            | F        | 2           | FV    | MC6115                | 155—295       | 0.04—0.20         |
|                                                       |           | ●            | L        | 1           | LP    | MC6115                | 155—295       | 0.06—0.25         |
|                                                       |           | ●            | M        | 1           | MP    | MC6115                | 130—245       | 0.08—0.30         |
|                                                       |           | ●            | M        | 2           | MP    | MP3025                | 100—155       | 0.08—0.30         |
|                                                       |           | ✱            | F        | 1           | FP    | MC6125                | 170—265       | 0.04—0.20         |
|                                                       |           | ✱            | F        | 2           | FP    | MC6135                | 135—210       | 0.04—0.20         |
|                                                       |           | ✱            | F        | 3           | FM    | VP30RT                | 80—100        | 0.04—0.20         |
|                                                       |           | ✱            | F        | 4           | FV    | MC6125                | 170—265       | 0.04—0.20         |
|                                                       |           | ✱            | L        | 1           | LP    | MC6125                | 170—265       | 0.06—0.25         |
|                                                       |           | ✱            | L        | 2           | LP    | MC6135                | 135—210       | 0.06—0.25         |
|                                                       |           | ✱            | L        | 3           | LM    | VP30RT                | 80—100        | 0.06—0.25         |
|                                                       |           | ✱            | L        | 4           | LS(G) | VP30RT                | 80—100        | 0.04—0.15         |
|                                                       |           | ✱            | M        | 1           | MP    | MC6125                | 140—220       | 0.08—0.30         |
|                                                       |           | ✱            | M        | 2           | MP    | MC6135                | 115—175       | 0.08—0.30         |
|                                                       |           | ✱            | M        | 3           | MM    | VP30RT                | 65—85         | 0.08—0.30         |
| Austenitic Stainless Steel (X5CrNi189, X5CrNiMo1810)  | ≤200HB    | ●            | F        | 1           | FM    | VP15TF                | 75—125        | 0.04—0.20         |
|                                                       |           | ●            | F        | 2           | Std   | US735                 | 70—135        | 0.08—0.30         |
|                                                       |           | ●            | L        | 1           | LM    | MC7025                | 140—190       | 0.06—0.25         |
|                                                       |           | ●            | L        | 2           | LM    | MC7015                | 155—245       | 0.06—0.25         |
|                                                       |           | ●            | L        | 3           | Std   | US735                 | 70—135        | 0.08—0.30         |
|                                                       |           | ●            | M        | 1           | MM    | MC7025                | 120—160       | 0.08—0.30         |
|                                                       |           | ●            | M        | 2           | MM    | MC7015                | 130—205       | 0.08—0.30         |
|                                                       |           | ●            | F        | 1           | FM    | VP15TF                | 75—125        | 0.04—0.20         |
|                                                       |           | ●            | F        | 2           | Std   | US735                 | 70—135        | 0.08—0.30         |
|                                                       |           | ●            | L        | 1           | LM    | MC7025                | 140—190       | 0.06—0.25         |
|                                                       |           | ●            | L        | 2           | Std   | US735                 | 70—135        | 0.08—0.30         |
|                                                       |           | ●            | M        | 1           | MM    | MC7025                | 120—160       | 0.08—0.30         |
|                                                       |           | ✱            | F        | 1           | FM    | VP30RT                | 50—90         | 0.04—0.20         |
|                                                       |           | ✱            | F        | 2           | FM    | VP15TF                | 75—125        | 0.04—0.20         |
|                                                       |           | ✱            | F        | 3           | FS-P  | VP30RT                | 50—90         | 0.04—0.12         |
|                                                       |           | ✱            | F        | 4           | FS(G) | VP30RT                | 50—90         | 0.04—0.12         |
|                                                       |           | ✱            | L        | 1           | LM    | MP7035                | 85—135        | 0.06—0.25         |
|                                                       |           | ✱            | L        | 2           | LM    | VP30RT                | 50—90         | 0.06—0.25         |
|                                                       |           | ✱            | L        | 3           | LM    | VP15TF                | 75—125        | 0.06—0.25         |
|                                                       |           | ✱            | L        | 4           | LS(G) | VP30RT                | 50—90         | 0.04—0.15         |
|                                                       |           | ✱            | M        | 1           | MM    | MP7035                | 70—115        | 0.08—0.30         |
|                                                       |           | ✱            | M        | 2           | MM    | VP30RT                | 40—75         | 0.08—0.30         |
|                                                       |           | ✱            | M        | 3           | MM    | VP15TF                | 60—105        | 0.08—0.30         |
| Austenitic Stainless Steel (X2CrNi1810, X2CrNiMo1813) | >200HB    | ●            | F        | 1           | FM    | VP15TF                | 60—105        | 0.04—0.20         |
|                                                       |           | ●            | F        | 2           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                       |           | ●            | L        | 1           | LM    | MC7025                | 120—160       | 0.06—0.25         |
|                                                       |           | ●            | L        | 2           | LM    | MC7015                | 130—205       | 0.06—0.25         |
|                                                       |           | ●            | L        | 3           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                       |           | ●            | M        | 1           | MM    | MC7025                | 100—130       | 0.08—0.30         |
|                                                       |           | ●            | M        | 2           | MM    | MC7015                | 110—170       | 0.08—0.30         |
|                                                       |           | ●            | F        | 1           | FM    | VP15TF                | 60—105        | 0.04—0.20         |
|                                                       |           | ●            | F        | 2           | Std   | US735                 | 60—110        | 0.08—0.30         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material                                                      |                                                            | Hardness | Cutting Mode |   | Priority | Chipbreaker | Grade   | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---------------------------------------------------------------|------------------------------------------------------------|----------|--------------|---|----------|-------------|---------|-----------------------|---------------|-------------------|
| M                                                             | Austenitic Stainless Steel<br>(X2CrNiN1810, X2CrNiMoN1813) | >200HB   | ☐            | L | 1        | LM          | MC7025  | 120—160               | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ☐            | L | 2        | Std         | US735   | 60—110                | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ☐            | M | 1        | MM          | MC7025  | 100—130               | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ✚            | F | 1        | FM          | VP30RT  | 40—75                 | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ✚            | F | 2        | FM          | VP15TF  | 60—105                | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ✚            | F | 3        | FS-P        | VP30RT  | 40—75                 | 0.04—0.12     | 0.20—1.40         |
|                                                               |                                                            |          | ✚            | F | 4        | FS(G)       | VP30RT  | 40—75                 | 0.04—0.12     | 0.20—1.40         |
|                                                               |                                                            |          | ✚            | L | 1        | LM          | MP7035  | 70—115                | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ✚            | L | 2        | LM          | VP30RT  | 40—75                 | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ✚            | L | 3        | LM          | VP15TF  | 60—105                | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ✚            | L | 4        | LS(G)       | VP30RT  | 40—75                 | 0.04—0.15     | 0.3—3.0           |
|                                                               |                                                            |          | ✚            | M | 1        | MM          | MP7035  | 60—95                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ✚            | M | 2        | MM          | VP30RT  | 35—60                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ✚            | M | 3        | MM          | VP15TF  | 50—90                 | 0.08—0.30     | 0.30—2.00         |
|                                                               | Two-phase Stainless Steel<br>(X3CrNiCu1894)                | ≤280HB   | ●            | F | 1        | FM          | VP15TF  | 50—85                 | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ●            | F | 2        | Std         | US735   | 45—90                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ●            | L | 1        | LM          | MC7025  | 95—130                | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ●            | L | 2        | LM          | MC7015  | 105—165               | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ●            | L | 3        | Std         | US735   | 45—90                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ●            | M | 1        | MM          | MC7025  | 80—105                | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ●            | M | 2        | MM          | MC7015  | 85—140                | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ☐            | F | 1        | FM          | VP15TF  | 50—85                 | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ☐            | F | 2        | Std         | US735   | 45—90                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ☐            | L | 1        | LM          | MC7025  | 95—130                | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ☐            | L | 2        | Std         | US735   | 45—90                 | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ☐            | M | 1        | MM          | MC7025  | 80—105                | 0.08—0.30     | 0.30—2.00         |
|                                                               |                                                            |          | ✚            | F | 1        | FM          | VP30RT  | 35—60                 | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ✚            | F | 2        | FM          | VP15TF  | 50—85                 | 0.04—0.20     | 0.20—0.90         |
|                                                               |                                                            |          | ✚            | F | 3        | FS-P        | VP30RT  | 35—60                 | 0.04—0.12     | 0.20—1.40         |
|                                                               |                                                            |          | ✚            | F | 4        | FS(G)       | VP30RT  | 35—60                 | 0.04—0.12     | 0.20—1.40         |
|                                                               |                                                            |          | ✚            | L | 1        | LM          | MP7035  | 55—90                 | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ✚            | L | 2        | LM          | VP30RT  | 35—60                 | 0.06—0.25     | 0.20—1.00         |
|                                                               |                                                            |          | ✚            | L | 3        | LM          | VP15TF  | 50—85                 | 0.06—0.25     | 0.20—1.00         |
| ✚                                                             |                                                            |          | L            | 4 | LS(G)    | VP30RT      | 35—60   | 0.04—0.15             | 0.3—3.0       |                   |
| ✚                                                             |                                                            |          | M            | 1 | MM       | MP7035      | 45—75   | 0.08—0.30             | 0.30—2.00     |                   |
| ✚                                                             |                                                            |          | M            | 2 | MM       | VP30RT      | 25—50   | 0.08—0.30             | 0.30—2.00     |                   |
| ✚                                                             |                                                            |          | M            | 3 | MM       | VP15TF      | 40—70   | 0.08—0.30             | 0.30—2.00     |                   |
| Ferritic and Martensitic Stainless Steel<br>(X10Cr13, X8Cr17) | ≤200HB                                                     | ●        | F            | 1 | FM       | VP15TF      | 75—125  | 0.04—0.20             | 0.20—0.90     |                   |
|                                                               |                                                            | ●        | F            | 2 | Std      | US735       | 70—135  | 0.08—0.30             | 0.30—2.00     |                   |
|                                                               |                                                            | ●        | L            | 1 | LM       | MC7025      | 140—190 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                               |                                                            | ●        | L            | 2 | LM       | MC7015      | 155—245 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                               |                                                            | ●        | L            | 3 | Std      | US735       | 70—135  | 0.08—0.30             | 0.30—2.00     |                   |
|                                                               |                                                            | ●        | M            | 1 | MM       | MC7025      | 120—160 | 0.08—0.30             | 0.30—2.00     |                   |
|                                                               |                                                            | ●        | M            | 2 | MM       | MC7015      | 130—205 | 0.08—0.30             | 0.30—2.00     |                   |
|                                                               |                                                            | ☐        | F            | 1 | FM       | VP15TF      | 75—125  | 0.04—0.20             | 0.20—0.90     |                   |
|                                                               |                                                            | ☐        | F            | 2 | Std      | US735       | 70—135  | 0.08—0.30             | 0.30—2.00     |                   |
|                                                               |                                                            | ☐        | L            | 1 | LM       | MC7025      | 140—190 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                               |                                                            | ☐        | L            | 2 | Std      | US735       | 70—135  | 0.08—0.30             | 0.30—2.00     |                   |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### 7° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                                       | Hardness | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------------------------------------------------------------|----------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| Ferritic and Martensitic Stainless Steel (X10Cr13, X8Cr17)     | ≤200HB   | ●            | M        | 1           | MM    | MC7025                | 120—160       | 0.08—0.30         |
|                                                                |          | ✱            | F        | 1           | FM    | VP30RT                | 50—90         | 0.04—0.20         |
|                                                                |          | ✱            | F        | 2           | FM    | VP15TF                | 75—125        | 0.04—0.20         |
|                                                                |          | ✱            | F        | 3           | FS-P  | VP30RT                | 50—90         | 0.04—0.12         |
|                                                                |          | ✱            | F        | 4           | FS(G) | VP30RT                | 50—90         | 0.04—0.12         |
|                                                                |          | ✱            | L        | 1           | LM    | MP7035                | 85—135        | 0.06—0.25         |
|                                                                |          | ✱            | L        | 2           | LM    | VP30RT                | 50—90         | 0.06—0.25         |
|                                                                |          | ✱            | L        | 3           | LM    | VP15TF                | 75—125        | 0.06—0.25         |
|                                                                |          | ✱            | L        | 4           | LS(G) | VP30RT                | 50—90         | 0.04—0.15         |
|                                                                |          | ✱            | M        | 1           | MM    | MP7035                | 70—115        | 0.08—0.30         |
|                                                                |          | ✱            | M        | 2           | MM    | VP30RT                | 40—75         | 0.08—0.30         |
|                                                                |          | ✱            | M        | 3           | MM    | VP15TF                | 60—105        | 0.08—0.30         |
| Ferritic and Martensitic Stainless Steel (X17CrNi162, X30Cr13) | >200HB   | ●            | F        | 1           | FM    | VP15TF                | 60—105        | 0.04—0.20         |
|                                                                |          | ●            | F        | 2           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                                |          | ●            | L        | 1           | LM    | MC7025                | 120—160       | 0.06—0.25         |
|                                                                |          | ●            | L        | 2           | LM    | MC7015                | 130—205       | 0.06—0.25         |
|                                                                |          | ●            | L        | 3           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                                |          | ●            | M        | 1           | MM    | MC7025                | 100—130       | 0.08—0.30         |
|                                                                |          | ●            | M        | 2           | MM    | MC7015                | 110—170       | 0.08—0.30         |
|                                                                |          | ●            | F        | 1           | FM    | VP15TF                | 60—105        | 0.04—0.20         |
|                                                                |          | ●            | F        | 2           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                                |          | ●            | L        | 1           | LM    | MC7025                | 120—160       | 0.06—0.25         |
|                                                                |          | ●            | L        | 2           | Std   | US735                 | 60—110        | 0.08—0.30         |
|                                                                |          | ●            | M        | 1           | MM    | MC7025                | 100—130       | 0.08—0.30         |
|                                                                |          | ✱            | F        | 1           | FM    | VP30RT                | 40—75         | 0.04—0.20         |
|                                                                |          | ✱            | F        | 2           | FM    | VP15TF                | 60—105        | 0.04—0.20         |
|                                                                |          | ✱            | F        | 3           | FS-P  | VP30RT                | 40—75         | 0.04—0.12         |
|                                                                |          | ✱            | F        | 4           | FS(G) | VP30RT                | 40—75         | 0.04—0.12         |
|                                                                |          | ✱            | L        | 1           | LM    | MP7035                | 70—115        | 0.06—0.25         |
|                                                                |          | ✱            | L        | 2           | LM    | VP30RT                | 40—75         | 0.06—0.25         |
|                                                                |          | ✱            | L        | 3           | LM    | VP15TF                | 60—105        | 0.06—0.25         |
|                                                                |          | ✱            | L        | 4           | LS(G) | VP30RT                | 40—75         | 0.04—0.15         |
|                                                                |          | ✱            | M        | 1           | MM    | MP7035                | 60—95         | 0.08—0.30         |
|                                                                |          | ✱            | M        | 2           | MM    | VP30RT                | 35—60         | 0.08—0.30         |
|                                                                |          | ✱            | M        | 3           | MM    | VP15TF                | 50—90         | 0.08—0.30         |
| Hardened Stainless Steel (X5CrNiCuNb16-4, X7CrNiAl17-7)        | <450HB   | ●            | F        | 1           | FM    | VP15TF                | 40—70         | 0.04—0.20         |
|                                                                |          | ●            | F        | 2           | FS(G) | MP9005                | 110—150       | 0.04—0.12         |
|                                                                |          | ●            | F        | 3           | Std   | US735                 | 40—75         | 0.08—0.25         |
|                                                                |          | ●            | L        | 1           | LM    | MC7025                | 75—95         | 0.06—0.20         |
|                                                                |          | ●            | L        | 2           | LM    | MC7015                | 85—115        | 0.06—0.20         |
|                                                                |          | ●            | L        | 3           | LS(G) | MP9015                | 105—140       | 0.04—0.15         |
|                                                                |          | ●            | L        | 4           | LS(M) | MP9015                | 105—140       | 0.06—0.20         |
|                                                                |          | ●            | M        | 1           | MM    | MC7025                | 60—80         | 0.08—0.25         |
|                                                                |          | ●            | M        | 2           | MM    | MC7015                | 70—95         | 0.08—0.25         |
|                                                                |          | ●            | M        | 3           | MS    | MP9015                | 85—120        | 0.08—0.25         |
|                                                                |          | ●            | M        | 4           | RCMT  | MP9015                | 85—120        | 0.25—0.45         |
|                                                                |          | ●            | F        | 1           | FM    | VP15TF                | 40—70         | 0.04—0.20         |
|                                                                |          | ●            | F        | 2           | FS(G) | MP9015                | 105—140       | 0.04—0.12         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material |                                                         | Hardness | Cutting Mode                                                                        |   | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|---------------------------------------------------------|----------|-------------------------------------------------------------------------------------|---|----------|-------------|--------|-----------------------|---------------|-------------------|
| M        | Hardened Stainless Steel (X5CrNiCuNb16-4, X7CrNiAl17-7) | <450HB   |    | F | 3        | Std         | US735  | 40—75                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |    | L | 1        | LM          | MC7025 | 75—95                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                         |          |    | L | 2        | LS(G)       | MP9015 | 105—140               | 0.04—0.15     | 0.3—3.0           |
|          |                                                         |          |    | L | 3        | LS(M)       | MP9015 | 105—140               | 0.06—0.20     | 0.20—1.00         |
|          |                                                         |          |    | L | 4        | Std         | US735  | 40—75                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |    | M | 1        | MM          | MC7025 | 60—80                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |    | M | 2        | MS          | MP9015 | 85—120                | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |    | M | 3        | RCMT        | MP9015 | 85—120                | 0.25—0.45     | 1.5—3.0           |
|          |                                                         |          |    | F | 1        | FM          | VP15TF | 40—70                 | 0.04—0.20     | 0.20—0.90         |
|          |                                                         |          |    | F | 2        | FS(M)       | MP9025 | 70—85                 | 0.04—0.20     | 0.20—0.90         |
|          |                                                         |          |    | F | 3        | FS(G)       | MP9025 | 70—85                 | 0.04—0.12     | 0.20—1.40         |
|          |                                                         |          |    | F | 4        | FV          | MP9025 | 70—85                 | 0.04—0.20     | 0.20—0.90         |
|          |                                                         |          |    | L | 1        | LM          | MP7035 | 45—75                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                         |          |    | L | 2        | LS(M)       | MP9025 | 70—85                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                         |          |    | L | 3        | LM          | VP15TF | 40—70                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                         |          |    | L | 4        | LS(G)       | MP9025 | 70—85                 | 0.04—0.15     | 0.3—3.0           |
|          |                                                         |          |    | M | 1        | MM          | MP7035 | 40—60                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |    | M | 2        | MS          | MP9025 | 60—70                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |   | M | 3        | MM          | VP15TF | 35—60                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                         |          |  | M | 4        | RCMT        | MP9025 | 60—70                 | 0.25—0.45     | 1.5—3.0           |
| K        | Gray Cast Iron (GG30)                                   | ≤350MPa  |  | F | 1        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | F | 2        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | F | 3        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | L | 1        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 2        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 3        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 1        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 2        | MK          | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | F | 1        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | F | 2        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | F | 3        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | L | 1        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 2        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 3        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 1        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 2        | MK          | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 3        | Flat        | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | F | 1        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | F | 2        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 1        | LK          | MC5115 | 180—335               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | L | 2        | LK          | MC5105 | 200—610               | 0.06—0.25     | 0.20—1.00         |
|          |                                                         |          |  | M | 1        | MK          | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 2        | MK          | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 3        | Flat        | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                         |          |  | M | 4        | Flat        | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### 7° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                  | Tensile Strength | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---------------------------|------------------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| Ductile Cast Iron (GGG40) | ≤450MPa          | ●            | F        | 1           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ●            | F        | 2           | LK    | MC5105                | 190—580       | 0.06—0.25         |
|                           |                  | ●            | F        | 3           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | L        | 1           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ●            | L        | 2           | LK    | MC5105                | 190—580       | 0.06—0.25         |
|                           |                  | ●            | L        | 3           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | M        | 1           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | M        | 2           | MK    | MC5105                | 155—485       | 0.08—0.30         |
|                           |                  | ●            | M        | 3           | Flat  | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | F        | 1           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ●            | F        | 2           | LK    | MC5125                | 90—180        | 0.06—0.25         |
|                           |                  | ●            | F        | 3           | LK    | MC5105                | 190—580       | 0.06—0.25         |
|                           |                  | ●            | F        | 4           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | L        | 1           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ●            | L        | 2           | LK    | MC5125                | 90—180        | 0.06—0.25         |
|                           |                  | ●            | L        | 3           | LK    | MC5105                | 190—580       | 0.06—0.25         |
|                           |                  | ●            | L        | 4           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | M        | 1           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | M        | 2           | MK    | MC5125                | 75—150        | 0.08—0.30         |
|                           |                  | ●            | M        | 3           | Flat  | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ●            | M        | 4           | Flat  | MC5125                | 75—150        | 0.08—0.30         |
|                           |                  | ✱            | F        | 1           | LK    | MC5125                | 90—180        | 0.06—0.25         |
|                           |                  | ✱            | F        | 2           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ✱            | L        | 1           | LK    | MC5125                | 90—180        | 0.06—0.25         |
|                           |                  | ✱            | L        | 2           | LK    | MC5115                | 170—315       | 0.06—0.25         |
|                           |                  | ✱            | M        | 1           | MK    | MC5125                | 75—150        | 0.08—0.30         |
|                           |                  | ✱            | M        | 2           | MK    | MC5115                | 140—265       | 0.08—0.30         |
|                           |                  | ✱            | M        | 3           | Flat  | MC5125                | 75—150        | 0.08—0.30         |
| Ductile Cast Iron (GGG70) | ≤800MPa          | ●            | F        | 1           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|                           |                  | ●            | F        | 2           | LK    | MC5105                | 170—520       | 0.06—0.25         |
|                           |                  | ●            | F        | 3           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | L        | 1           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|                           |                  | ●            | L        | 2           | LK    | MC5105                | 170—520       | 0.06—0.25         |
|                           |                  | ●            | L        | 3           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | M        | 1           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | M        | 2           | MK    | MC5105                | 140—435       | 0.08—0.30         |
|                           |                  | ●            | M        | 3           | Flat  | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | F        | 1           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|                           |                  | ●            | F        | 2           | LK    | MC5125                | 80—160        | 0.06—0.25         |
|                           |                  | ●            | F        | 3           | LK    | MC5105                | 170—520       | 0.06—0.25         |
|                           |                  | ●            | F        | 4           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | L        | 1           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|                           |                  | ●            | L        | 2           | LK    | MC5125                | 80—160        | 0.06—0.25         |
|                           |                  | ●            | L        | 3           | LK    | MC5105                | 170—520       | 0.06—0.25         |
|                           |                  | ●            | L        | 4           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | M        | 1           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|                           |                  | ●            | M        | 2           | MK    | MC5125                | 65—135        | 0.08—0.30         |
|                           |                  | ●            | M        | 3           | MK    | MC5105                | 140—435       | 0.08—0.30         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

|   | Material                       | Tensile Strength | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|---|--------------------------------|------------------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| K | Ductile Cast Iron (GGG70)      | ≤800MPa          | ●            | M        | 4           | Flat  | MC5115                | 125—235       | 0.30—2.00         |
|   |                                |                  | ✚            | F        | 1           | LK    | MC5125                | 80—160        | 0.06—0.25         |
|   |                                |                  | ✚            | F        | 2           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|   |                                |                  | ✚            | F        | 3           | MK    | MC5125                | 65—135        | 0.08—0.30         |
|   |                                |                  | ✚            | L        | 1           | LK    | MC5125                | 80—160        | 0.06—0.25         |
|   |                                |                  | ✚            | L        | 2           | LK    | MC5115                | 155—285       | 0.06—0.25         |
|   |                                |                  | ✚            | L        | 3           | MK    | MC5125                | 65—135        | 0.08—0.30         |
|   |                                |                  | ✚            | M        | 1           | MK    | MC5125                | 65—135        | 0.08—0.30         |
|   |                                |                  | ✚            | M        | 2           | MK    | MC5115                | 125—235       | 0.08—0.30         |
|   |                                |                  | ✚            | M        | 3           | Flat  | MC5125                | 65—135        | 0.08—0.30         |
| N | Aluminium Alloy (A6061, A7075) | Si<5%            | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ✚            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   | Aluminium Alloy (AC4B)         | 5%≤Si≤10%        | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ✚            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   | Aluminium Alloy (ADC12, A390)  | Si>10%           | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ●            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
|   |                                |                  | ✚            | F        | 1           | AZ    | HTi10                 | 300—700       | 0.10—0.40         |
| S | Titanium Alloy (Ti-6Al-4V)     | —                | ●            | F        | 1           | FS-P  | MT9005                | 40—80         | 0.04—0.12         |
|   |                                |                  | ●            | F        | 2           | FJ    | RT9010                | 35—75         | 0.04—0.12         |
|   |                                |                  | ●            | L        | 1           | LS-P  | MT9005                | 40—80         | 0.04—0.15         |
|   |                                |                  | ●            | L        | 2           | LS(M) | MT9005                | 40—80         | 0.06—0.20         |
|   |                                |                  | ●            | M        | 1           | MS    | MT9005                | 35—65         | 0.08—0.25         |
|   |                                |                  | ●            | M        | 2           | RCMT  | MT9005                | 35—65         | 0.25—0.45         |
|   |                                |                  | ●            | F        | 1           | FS-P  | MT9005                | 40—80         | 0.04—0.12         |
|   |                                |                  | ●            | F        | 2           | FJ    | RT9010                | 35—75         | 0.04—0.12         |
|   |                                |                  | ●            | L        | 1           | LS-P  | MT9005                | 40—80         | 0.04—0.15         |
|   |                                |                  | ●            | L        | 2           | LS(M) | MT9005                | 40—80         | 0.06—0.20         |
|   |                                |                  | ●            | M        | 1           | MS    | MT9005                | 35—65         | 0.08—0.25         |
|   |                                |                  | ●            | M        | 2           | RCMT  | MT9005                | 35—65         | 0.25—0.45         |
|   |                                |                  | ✚            | F        | 1           | FS-P  | MT9005                | 40—80         | 0.04—0.12         |
|   |                                |                  | ✚            | F        | 2           | FJ    | RT9010                | 35—75         | 0.04—0.12         |
|   |                                |                  | ✚            | L        | 1           | LS-P  | MT9005                | 40—80         | 0.04—0.15         |
|   |                                |                  | ✚            | L        | 2           | LS(M) | MT9005                | 40—80         | 0.06—0.20         |
|   |                                |                  | ✚            | M        | 1           | MS    | MT9005                | 35—65         | 0.08—0.25         |
|   |                                |                  | ✚            | M        | 2           | RCMT  | MT9015                | 30—60         | 0.25—0.45         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### 7° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                           | Hardness | Cutting Mode | Priority | Chipbreaker | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|------------------------------------|----------|--------------|----------|-------------|-------|-----------------------|---------------|-------------------|
| Heat Resistant Alloy (Inconel®718) | —        | ●            | F        | 1           | FS(G) | MP9005                | 45—95         | 0.04—0.12         |
|                                    |          | ●            | F        | 2           | FJ    | VP10RT                | 20—45         | 0.04—0.12         |
|                                    |          | ●            | L        | 1           | LS(G) | MP9005                | 45—95         | 0.04—0.15         |
|                                    |          | ●            | L        | 2           | LS(M) | MP9005                | 45—95         | 0.06—0.20         |
|                                    |          | ●            | M        | 1           | MS    | MP9005                | 40—80         | 0.08—0.25         |
|                                    |          | ●            | M        | 2           | RCMT  | MP9005                | 40—80         | 0.25—0.45         |
|                                    |          | ●            | F        | 1           | FS(G) | MP9015                | 35—75         | 0.04—0.12         |
|                                    |          | ●            | F        | 2           | FJ    | VP10RT                | 20—45         | 0.04—0.12         |
|                                    |          | ●            | L        | 1           | LS(G) | MP9015                | 35—75         | 0.04—0.15         |
|                                    |          | ●            | L        | 2           | LS(M) | MP9015                | 35—75         | 0.06—0.20         |
|                                    |          | ●            | M        | 1           | MS    | MP9015                | 30—60         | 0.08—0.25         |
|                                    |          | ●            | M        | 2           | RCMT  | MP9015                | 30—60         | 0.25—0.45         |
|                                    |          | ✱            | F        | 1           | FS(G) | MP9025                | 25—40         | 0.04—0.12         |
|                                    |          | ✱            | F        | 2           | FJ    | VP10RT                | 20—45         | 0.04—0.12         |
|                                    |          | ✱            | F        | 3           | FS(M) | MP9025                | 25—40         | 0.04—0.20         |
|                                    |          | ✱            | F        | 4           | FV    | MP9025                | 25—40         | 0.04—0.20         |
|                                    |          | ✱            | L        | 1           | LS(M) | MP9025                | 25—40         | 0.06—0.20         |
|                                    |          | ✱            | L        | 2           | LS(G) | MP9025                | 25—40         | 0.04—0.15         |
|                                    |          | ✱            | L        | 3           | SW    | MP9025                | 25—40         | 0.06—0.24         |
|                                    |          | ✱            | M        | 1           | MS    | MP9025                | 20—35         | 0.08—0.25         |
|                                    |          | ✱            | M        | 2           | RCMT  | MP9025                | 20—35         | 0.25—0.45         |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

# 11° POSITIVE INSERT TYPE

| Material |                                                  | Hardness          | Cutting Mode |        | Priority | Chipbreaker | Grade     | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|--------------------------------------------------|-------------------|--------------|--------|----------|-------------|-----------|-----------------------|---------------|-------------------|
| P        | Mild Steel<br>(St37-2, Ck10)                     | ≤180HB            | ●            | F      | 1        | R-R/L       | NX2525    | 225—320               | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ●            | L      | 1        | R-Std       | NX2525    | 185—270               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 1        | R-Std       | NX2525    | 185—270               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | F      | 1        | FP          | MC6125    | 320—505               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ●            | F      | 2        | FV          | MC6125    | 320—505               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ●            | F      | 3        | R-R/L       | NX2525    | 225—320               | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ●            | L      | 1        | LP          | MC6125    | 320—505               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ●            | L      | 2        | R-Std       | MC6115    | 245—475               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | L      | 3        | R-Std       | MP3025    | 190—295               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 1        | MP          | MC6125    | 270—420               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 2        | MP          | MC6115    | 245—475               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 3        | MV          | MC6125    | 270—420               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 4        | MV          | MC6115    | 245—475               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | F      | 1        | FM          | VP30RT    | 155—190               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ✚            | F      | 2        | FV          | VP30RT    | 155—190               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ✚            | F      | 3        | R-R/L       | UTi20T    | 115—165               | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ✚            | L      | 1        | LP          | MC6125    | 320—505               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 2        | LP          | MC6135    | 265—400               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 3        | LM          | VP30RT    | 155—190               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 4        | R-Std       | MC6125    | 270—420               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 1        | MM          | VP30RT    | 125—160               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 2        | MP          | MC6125    | 270—420               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 3        | MP          | MC6135    | 220—330               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 4        | MV          | MC6125    | 270—420               | 0.08—0.30     | 0.30—2.00         |
| P        | Carbon Steel •<br>Alloy Steel<br>(Ck45, 42CrMo4) | 180<br>—<br>280HB | ●            | F      | 1        | R-R/L       | NX2525    | 165—240               | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ●            | L      | 1        | R-Std       | NX2525    | 140—200               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 1        | R-Std       | NX2525    | 140—200               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | F      | 1        | FP          | MC6125    | 240—370               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ●            | F      | 2        | FV          | MC6125    | 240—370               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ●            | F      | 3        | R-R/L       | NX2525    | 165—240               | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ●            | L      | 1        | LP          | MC6125    | 240—370               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ●            | L      | 2        | LP          | MC6115    | 220—420               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ●            | L      | 3        | R-Std       | MC6115    | 180—350               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | L      | 4        | R-Std       | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 1        | MP          | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 2        | MV          | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 3        | R-Std       | MC6115    | 180—350               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ●            | M      | 4        | R-Std       | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | F      | 1        | FM          | VP30RT    | 115—140               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ✚            | F      | 2        | FV          | VP30RT    | 115—140               | 0.04—0.20     | 0.20—0.90         |
|          |                                                  |                   | ✚            | F      | 3        | R-R/L       | UTi20T    | 85—120                | 0.06—0.25     | 0.30—1.50         |
|          |                                                  |                   | ✚            | L      | 1        | LP          | MC6125    | 240—370               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 2        | LP          | MC6135    | 195—295               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 3        | LM          | VP30RT    | 115—140               | 0.06—0.25     | 0.20—1.00         |
|          |                                                  |                   | ✚            | L      | 4        | R-Std       | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 1        | MM          | VP30RT    | 95—120                | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 2        | MP          | MC6125    | 200—310               | 0.08—0.30     | 0.30—2.00         |
|          |                                                  |                   | ✚            | M      | 3        | MP          | MC6135    | 160—245               | 0.08—0.30     | 0.30—2.00         |
| ✚        | M                                                | 4                 | MV           | MC6125 | 200—310  | 0.08—0.30   | 0.30—2.00 |                       |               |                   |

A

TURNING INSERTS



# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### 11° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                                                          |                                                               | Hardness | Cutting Mode |   | Priority | Chipbreaker | Grade   | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|-------------------------------------------------------------------|---------------------------------------------------------------|----------|--------------|---|----------|-------------|---------|-----------------------|---------------|-------------------|
| M                                                                 | Austenitic Stainless Steel<br>(X5CrNi189, X5CrNiMo1810)       | ≤200HB   | ●            | L | 1        | LM          | MC7025  | 140—190               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | L | 2        | LM          | MC7015  | 155—245               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 120—160               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | M | 2        | MM          | MC7015  | 130—205               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | L | 1        | LM          | MC7025  | 140—190               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 120—160               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ✚            | F | 1        | FM          | VP30RT  | 50—90                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | F | 2        | FV          | VP30RT  | 50—90                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | L | 1        | LM          | VP30RT  | 50—90                 | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ✚            | M | 1        | MM          | VP30RT  | 40—75                 | 0.08—0.30     | 0.30—2.00         |
|                                                                   | Austenitic Stainless Steel<br>(X2CrNiN1810, X2CrNiMoN1813)    | >200HB   | ●            | L | 1        | LM          | MC7025  | 120—160               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | L | 2        | LM          | MC7015  | 130—205               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 100—130               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | M | 2        | MM          | MC7015  | 110—170               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | L | 1        | LM          | MC7025  | 120—160               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 100—130               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ✚            | F | 1        | FM          | VP30RT  | 40—75                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | F | 2        | FV          | VP30RT  | 40—75                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | L | 1        | LM          | VP30RT  | 40—75                 | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ✚            | M | 1        | MM          | VP30RT  | 35—60                 | 0.08—0.30     | 0.30—2.00         |
|                                                                   | Two-phase Stainless Steel<br>(X3CrNiCu1894)                   | ≤280HB   | ●            | L | 1        | LM          | MC7025  | 95—130                | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | L | 2        | LM          | MC7015  | 105—165               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 80—105                | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | M | 2        | MM          | MC7015  | 85—140                | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | L | 1        | LM          | MC7025  | 95—130                | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 80—105                | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ✚            | F | 1        | FM          | VP30RT  | 35—60                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | F | 2        | FV          | VP30RT  | 35—60                 | 0.04—0.20     | 0.20—0.90         |
|                                                                   |                                                               |          | ✚            | L | 1        | LM          | VP30RT  | 35—60                 | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ✚            | M | 1        | MM          | VP30RT  | 25—50                 | 0.08—0.30     | 0.30—2.00         |
|                                                                   | Ferritic and Martensitic Stainless Steel<br>(X10Cr13, X8Cr17) | ≤200HB   | ●            | L | 1        | LM          | MC7025  | 140—190               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | L | 2        | LM          | MC7015  | 155—245               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 120—160               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | M | 2        | MM          | MC7015  | 130—205               | 0.08—0.30     | 0.30—2.00         |
|                                                                   |                                                               |          | ●            | L | 1        | LM          | MC7025  | 140—190               | 0.06—0.25     | 0.20—1.00         |
|                                                                   |                                                               |          | ●            | M | 1        | MM          | MC7025  | 120—160               | 0.08—0.30     | 0.30—2.00         |
| ✚                                                                 |                                                               |          | F            | 1 | FM       | VP30RT      | 50—90   | 0.04—0.20             | 0.20—0.90     |                   |
| ✚                                                                 |                                                               |          | F            | 2 | FV       | VP30RT      | 50—90   | 0.04—0.20             | 0.20—0.90     |                   |
| ✚                                                                 |                                                               |          | L            | 1 | LM       | VP30RT      | 50—90   | 0.06—0.25             | 0.20—1.00     |                   |
| ✚                                                                 |                                                               |          | M            | 1 | MM       | VP30RT      | 40—75   | 0.08—0.30             | 0.30—2.00     |                   |
| Ferritic and Martensitic Stainless Steel<br>(X17CrNi162, X30Cr13) | >200HB                                                        | ●        | L            | 1 | LM       | MC7025      | 120—160 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                                   |                                                               | ●        | L            | 2 | LM       | MC7015      | 130—205 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                                   |                                                               | ●        | M            | 1 | MM       | MC7025      | 100—130 | 0.08—0.30             | 0.30—2.00     |                   |
|                                                                   |                                                               | ●        | M            | 2 | MM       | MC7015      | 110—170 | 0.08—0.30             | 0.30—2.00     |                   |
|                                                                   |                                                               | ●        | L            | 1 | LM       | MC7025      | 120—160 | 0.06—0.25             | 0.20—1.00     |                   |
|                                                                   |                                                               | ●        | M            | 1 | MM       | MC7025      | 100—130 | 0.08—0.30             | 0.30—2.00     |                   |
|                                                                   |                                                               | ✚        | F            | 1 | FM       | VP30RT      | 40—75   | 0.04—0.20             | 0.20—0.90     |                   |
|                                                                   |                                                               | ✚        | F            | 2 | FV       | VP30RT      | 40—75   | 0.04—0.20             | 0.20—0.90     |                   |

CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

| Material |                                                                | Hardness | Cutting Mode |   | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|----------------------------------------------------------------|----------|--------------|---|----------|-------------|--------|-----------------------|---------------|-------------------|
| M        | Ferritic and Martensitic Stainless Steel (X17CrNi162, X30Cr13) | >200HB   | ✚            | L | 1        | LM          | VP30RT | 40—75                 | 0.06—0.25     | 0.20—1.00         |
|          |                                                                |          | ✚            | M | 1        | MM          | VP30RT | 35—60                 | 0.08—0.30     | 0.30—2.00         |
|          | Hardened Stainless Steel (X5CrNiCuNb16-4, X7CrNiAl17-7)        | <450HB   | ●            | L | 1        | LM          | MC7025 | 75—95                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                                |          | ●            | L | 2        | LM          | MC7015 | 85—115                | 0.06—0.20     | 0.20—1.00         |
|          |                                                                |          | ●            | M | 1        | MM          | MC7025 | 60—80                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 2        | MM          | MC7015 | 70—95                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 1        | LM          | MC7025 | 75—95                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                                |          | ●            | M | 1        | MM          | MC7025 | 60—80                 | 0.08—0.25     | 0.30—2.00         |
|          |                                                                |          | ✚            | F | 1        | FS(M)       | MP9025 | 70—85                 | 0.04—0.20     | 0.20—0.90         |
|          |                                                                |          | ✚            | F | 2        | FV          | MP9025 | 70—85                 | 0.04—0.20     | 0.20—0.90         |
|          |                                                                |          | ✚            | L | 1        | LS(M)       | MP9025 | 70—85                 | 0.06—0.20     | 0.20—1.00         |
|          |                                                                |          | ✚            | L | 2        | SW          | MP9025 | 70—85                 | 0.06—0.24     | 0.20—1.50         |
|          |                                                                |          | ✚            | M | 1        | MS          | MP9025 | 60—70                 | 0.08—0.25     | 0.30—2.00         |
| K        | Gray Cast Iron (GG30)                                          | ≤350MPa  | ●            | F | 1        | R-R/L       | NX2525 | 145—200               | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | L | 1        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 2        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 1        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 2        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | F | 1        | R-R/L       | NX2525 | 145—200               | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | F | 2        | R-R/L       | HTi10  | 90—125                | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | L | 1        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 2        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 1        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 2        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | F | 1        | R-R/L       | UTi20T | 70—105                | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ✚            | L | 1        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | L | 2        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | L | 3        | N-Flat      | VP15TF | 115—160               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | M | 1        | N-Flat      | MC5115 | 150—280               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | M | 2        | N-Flat      | MC5105 | 165—510               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | M | 3        | N-Flat      | VP15TF | 115—160               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | M | 4        | Flat        | HTi10  | 75—105                | 0.08—0.30     | 0.30—2.00         |
|          | Ductile Cast Iron (GGG40)                                      | ≤450MPa  | ●            | F | 1        | R-R/L       | NX2525 | 140—190               | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | L | 1        | N-Flat      | MC5115 | 140—265               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 2        | N-Flat      | MC5105 | 155—485               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 1        | N-Flat      | MC5115 | 140—265               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 2        | N-Flat      | MC5105 | 155—485               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | F | 1        | R-R/L       | NX2525 | 140—190               | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | F | 2        | R-R/L       | HTi10  | 85—120                | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ●            | L | 1        | N-Flat      | MC5115 | 140—265               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 2        | N-Flat      | MC5125 | 75—150                | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | L | 3        | N-Flat      | MC5105 | 155—485               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 1        | N-Flat      | MC5115 | 140—265               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 2        | N-Flat      | MC5125 | 75—150                | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ●            | M | 3        | N-Flat      | MC5105 | 155—485               | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | F | 1        | R-R/L       | UTi20T | 65—100                | 0.06—0.25     | 0.30—1.50         |
|          |                                                                |          | ✚            | L | 1        | N-Flat      | MC5125 | 75—150                | 0.08—0.30     | 0.30—2.00         |
|          |                                                                |          | ✚            | L | 2        | N-Flat      | MC5115 | 140—265               | 0.08—0.30     | 0.30—2.00         |

A

TURNING INSERTS

# TURNING INSERTS

## RECOMMENDED CUTTING CONDITIONS

### ■ 11° POSITIVE INSERT TYPE

Chipbreaker : Std : Standard Flat : Flat Top

| Material                           | Tensile Strength | Cutting Mode | Priority | Chipbreaker | Grade  | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|------------------------------------|------------------|--------------|----------|-------------|--------|-----------------------|---------------|-------------------|
| Ductile Cast Iron (GGG40)          | ≤450MPa          | ✚            | L        | 3           | N-Flat | VP15TF                | 110—150       | 0.08—0.30         |
|                                    |                  | ✚            | M        | 1           | N-Flat | MC5125                | 75—150        | 0.08—0.30         |
|                                    |                  | ✚            | M        | 2           | N-Flat | MC5115                | 140—265       | 0.08—0.30         |
|                                    |                  | ✚            | M        | 3           | N-Flat | VP15TF                | 110—150       | 0.08—0.30         |
|                                    |                  | ✚            | M        | 4           | Flat   | HTi10                 | 70—100        | 0.08—0.30         |
| Ductile Cast Iron (GGG70)          | ≤800MPa          | ●            | F        | 1           | R-R/L  | NX2525                | 125—170       | 0.06—0.25         |
|                                    |                  | ●            | L        | 1           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ●            | L        | 2           | N-Flat | MC5105                | 140—435       | 0.08—0.30         |
|                                    |                  | ●            | M        | 1           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ●            | M        | 2           | N-Flat | MC5105                | 140—435       | 0.08—0.30         |
|                                    |                  | ●            | F        | 1           | R-R/L  | NX2525                | 125—170       | 0.06—0.25         |
|                                    |                  | ●            | F        | 2           | R-R/L  | HTi10                 | 75—110        | 0.06—0.25         |
|                                    |                  | ●            | L        | 1           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ●            | L        | 2           | N-Flat | MC5125                | 65—135        | 0.08—0.30         |
|                                    |                  | ●            | L        | 3           | N-Flat | MC5105                | 140—435       | 0.08—0.30         |
|                                    |                  | ●            | M        | 1           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ●            | M        | 2           | N-Flat | MC5125                | 65—135        | 0.08—0.30         |
|                                    |                  | ●            | M        | 3           | N-Flat | MC5105                | 140—435       | 0.08—0.30         |
|                                    |                  | ✚            | F        | 1           | R-R/L  | UTi20T                | 60—85         | 0.06—0.25         |
|                                    |                  | ✚            | L        | 1           | N-Flat | MC5125                | 65—135        | 0.08—0.30         |
|                                    |                  | ✚            | L        | 2           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ✚            | L        | 3           | N-Flat | VP15TF                | 95—135        | 0.08—0.30         |
|                                    |                  | ✚            | M        | 1           | N-Flat | MC5125                | 65—135        | 0.08—0.30         |
|                                    |                  | ✚            | M        | 2           | N-Flat | MC5115                | 125—235       | 0.08—0.30         |
|                                    |                  | ✚            | M        | 3           | N-Flat | VP15TF                | 95—135        | 0.08—0.30         |
|                                    |                  | ✚            | M        | 4           | Flat   | HTi10                 | 60—90         | 0.08—0.30         |
| Heat Resistant Alloy (Inconel®718) | —                | ✚            | F        | 1           | FS(M)  | MP9025                | 25—40         | 0.04—0.20         |
|                                    |                  | ✚            | F        | 2           | FV     | MP9025                | 25—40         | 0.04—0.20         |
|                                    |                  | ✚            | L        | 1           | LS(M)  | MP9025                | 25—40         | 0.06—0.20         |
|                                    |                  | ✚            | L        | 2           | SW     | MP9025                | 25—40         | 0.06—0.24         |
|                                    |                  | ✚            | M        | 1           | MS     | MP9025                | 20—35         | 0.08—0.25         |

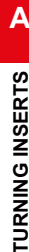
CUTTING CONDITIONS : ● : Stable Cutting ● : General Cutting ✚ : Unstable Cutting

CUTTING AREA : F : Finish Cutting L : Light Cutting M : Medium Cutting R : Rough Cutting H : Heavy Cutting

This image shows a blank sheet of white paper designed as a memo template. At the top left, the word "Memo" is printed in a bold, black, sans-serif font. A thick horizontal line runs across the page just below the title. The rest of the page is filled with horizontal dashed lines, providing space for writing. The paper has a clean, minimalist aesthetic.

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....

[illegible]

● = NEW

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



# TURNING INSERTS [NEGATIVE]

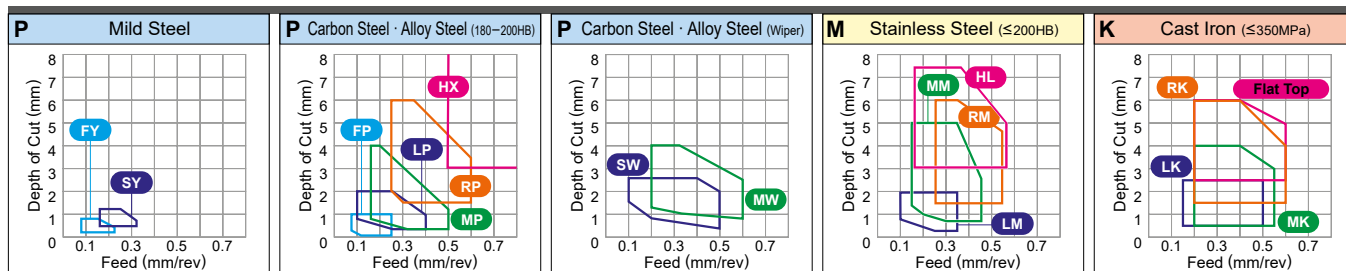


**CNGG 12 04 04- MJ**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                              | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|-------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|-------|---------------|------------------|--------|---------|---------------------------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
|                                                                                                       | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| Shape                                                                                                 | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |               | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005           | MP9015 | MP9025  |                           | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |
| <br>Light Cutting   | CNGG120404-MJ | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C008  |
|                                                                                                       | CNGG120408-MJ | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C009  |
|                                                                                                       |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | E015  |
| <br>Medium Cutting | CNMG120404-MP | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C008  |
|                                                                                                       | CNMG120408-MP | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C009  |
|                                                                                                       | CNMG120412-MP | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E015   |       |
|                                                                                                       | CNMG120416-MP | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E039   |       |
|                                                                                                       | CNMG160608-MP | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | H006   |       |
|                                                                                                       | CNMG160612-MP | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | —008   |       |
|                                                                                                       | CNMG160616-MP | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| <br>Medium Cutting | CNMG120408-MM | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C008  |
|                                                                                                       | CNMG120412-MM | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C009  |
|                                                                                                       | CNMG120416-MM | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E015   |       |
|                                                                                                       | CNMG160608-MM | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E039   |       |
|                                                                                                       | CNMG160612-MM | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | H006   |       |
|                                                                                                       | CNMG160616-MM | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | —008   |       |
|                                                                                                       | CNMG190608-MM | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       | CNMG190612-MM | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| CNMG190616-MM                                                                                         | 1.6           |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| <br>Medium Cutting | CNMG120404-MK | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C008  |
|                                                                                                       | CNMG120408-MK | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        | C009  |
|                                                                                                       | CNMG120412-MK | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E015   |       |
|                                                                                                       | CNMG120416-MK | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | E039   |       |
|                                                                                                       | CNMG160608-MK | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | H006   |       |
|                                                                                                       | CNMG160612-MK | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | —008   |       |
|                                                                                                       | CNMG160616-MK | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                       | CNMG190612-MK | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| CNMG190616-MK                                                                                         | 1.6           |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



\*Newly designed breakers : MP9005, MP9015, MP9025, MT9015, MV9005  = **NEW**

**A101**



# TURNING INSERTS [NEGATIVE]

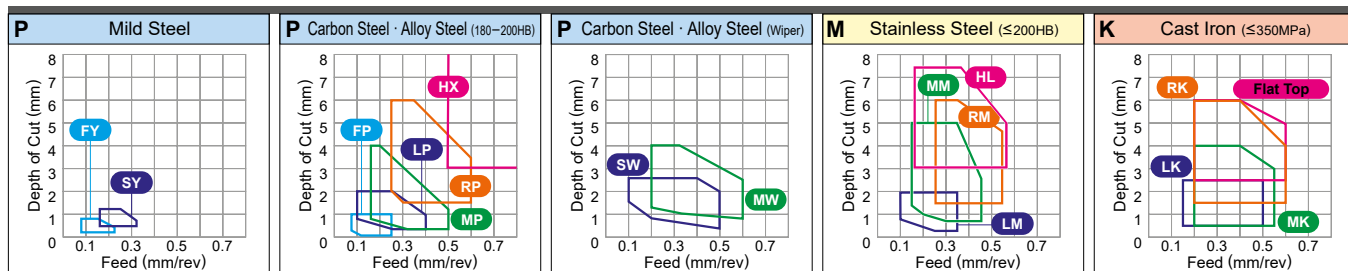


**CNMG 12 04 04- MH**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                              | P                   | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                       | M                   | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | K                   | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | N                   | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | S                   | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                 | Order Number        | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |        | Coated<br>Cermet | Cermet | Carbide |       |        |        | Applicable<br>Holder Page |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                     |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | MV9005 | MP9005           | MP9015 | MP9025  | US905 | MS9025 | VP05RT |                           | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | MH<br>CNMG120404-MH | 0.4                                  | ★      | ●      | ★             |        |        |        |        |        |       |        |               |        |               |       |        |                  |        |         |       |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\* Please refer to page A028 before using the MW chipbreaker (wiper insert).

● = NEW

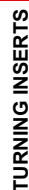
● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....

NEG

**WITH  
HOLE**

**C**

D

## R

## S

T

V

W

A104

● = NEW

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ☼ : Unstable Cutting

[illegible]

● = NEW

# A

## TURNING INSERTS

NEG

## WITH HOLE

C

D

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V

W

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A042 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

## A105

# TURNING INSERTS [NEGATIVE]

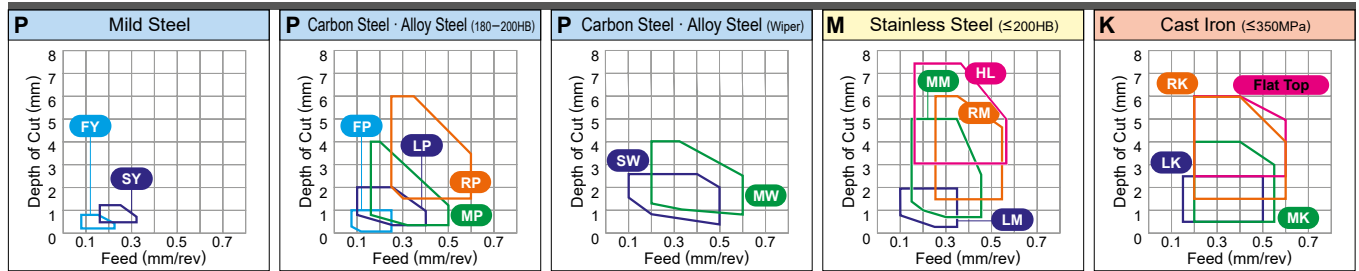


**DNMG 15 04 02- FP**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                             | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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|                                                                                                      | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                      | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                      | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| Shape                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        | Coated<br>Cermet | Cermet       | Carbide | Applicable<br>Holder Page |        |        |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                      |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125    | NEW<br>MH515 | MV9005  |                           | MP9005 | MP9015 | MP9025 | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| <br>Finish Cutting | DNMG150402-FP | 0.2                                  | ★      | ★      | ★             |        |        |        |        |        |       |        |               |        |                  |              |         |                           |        |        |        |       |        |        |        | ●      |        |        | ★     |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                            | P            | Steel                                |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|-------------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|---------------|---------------|-------|------------------|--------|---------|---------------------------|--------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|------|------|------|------|------|
|                                                                                     | M            | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|                                                                                     | K            | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|                                                                                     | N            | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|                                                                                     | S            | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
| Shape                                                                               | Order Number | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |               |               |       | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|                                                                                     |              |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | NEW<br>MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005    | MP9005 | MP9015  |                           | MP9025 | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |      |      |      |      |      |
|    | LP           | DNMG110404-LP                        | 0.4    | ●      | ●             | ●      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |  | C010 |      |      |      |      |
|                                                                                     |              | DNMG110408-LP                        | 0.8    | ●      | ●             | ●      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |  |      | C011 |      |      |      |
|                                                                                     |              | DNMG150404-LP                        | 0.4    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |  |      | E015 |      |      |      |
|                                                                                     |              | DNMG150408-LP                        | 0.8    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        |       |       |       |        |        |        |       |        |        |        |       |  | E039 |      |      |      |      |
|                                                                                     |              | DNMG150412-LP                        | 1.2    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        |       |       |       |        |        |        |       |        |        |        |       |  | —041 |      |      |      |      |
|                                                                                     |              | DNMG150604-LP                        | 0.4    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |  | H009 |      |      |      |      |
|                                                                                     |              | DNMG150608-LP                        | 0.8    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |  | —011 |      |      |      |      |
|                                                                                     |              | DNMG150612-LP                        | 1.2    | ●      | ●             | ★      | ●      |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|    | LM           | DNMG110404-LM                        | 0.4    |        |               |        |        | ●      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | C010 |      |      |      |
|                                                                                     |              | DNMG110408-LM                        | 0.8    |        |               |        |        | ●      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C011 |      |      |
|                                                                                     |              | DNMG150404-LM                        | 0.4    |        |               |        |        | ●      | ●      | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |      |
|                                                                                     |              | DNMG150408-LM                        | 0.8    |        |               |        |        | ●      | ●      | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |      |
|                                                                                     |              | DNMG150412-LM                        | 1.2    |        |               |        |        | ★      | ★      | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | —041 |      |      |      |
|                                                                                     |              | DNMG150604-LM                        | 0.4    |        |               |        |        | ●      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | H009 |      |      |      |
|                                                                                     |              | DNMG150608-LM                        | 0.8    |        |               |        |        | ●      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | —011 |      |      |      |
|                                                                                     |              | DNMG150612-LM                        | 1.2    |        |               |        |        | ★      | ★      | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|  | LK           | DNMG110408-LK                        | 0.8    |        |               |        |        |        |        |        |       | ●      | ●             | ★             |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C010 |      |      |
|                                                                                     |              | DNMG150404-LK                        | 0.4    |        |               |        |        |        |        |        |       |        | ●             | ●             | ★             | ★     |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C011 |      |      |
|                                                                                     |              | DNMG150408-LK                        | 0.8    |        |               |        |        |        |        |        |       |        | ★             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |      |
|                                                                                     |              | DNMG150412-LK                        | 1.2    |        |               |        |        |        |        |        |       |        | ★             | ★             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |      |
|                                                                                     |              | DNMG150604-LK                        | 0.4    |        |               |        |        |        |        |        |       |        | ●             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | —041 |      |      |      |
|                                                                                     |              | DNMG150608-LK                        | 0.8    |        |               |        |        |        |        |        |       |        | ●             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | H009 |      |      |      |
|                                                                                     |              | DNMG150612-LK                        | 1.2    |        |               |        |        |        |        |        |       |        | ●             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      | —011 |      |      |      |
|                                                                                     |              |                                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |
|  | LS           | DNMG150402-LS                        | 0.2    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C010 |      |      |
|                                                                                     |              | DNMG150404-LS                        | 0.4    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C011 |      |      |
|                                                                                     |              | DNMG150408-LS                        | 0.8    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |      |
|                                                                                     |              | DNMG150604-LS                        | 0.4    |        |               |        |        |        |        |        |       |        |               |               |               |       | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |      |
|                                                                                     |              | DNMG150608-LS                        | 0.8    |        |               |        |        |        |        |        |       |        |               |               |               |       | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | —041 |      |      |
|                                                                                     |              |                                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | H009 |      |      |
|  | LS           | DNGG150402-LS                        | 0.2    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C010 |      |      |
|                                                                                     |              | DNGG150404-LS                        | 0.4    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C011 |      |      |
|                                                                                     |              | DNGG150408-LS                        | 0.8    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |      |
|                                                                                     |              | DNGG150604-LS                        | 0.4    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |      |
|                                                                                     |              | DNGG150608-LS                        | 0.8    |        |               |        |        |        |        |        |       |        |               |               |               | ●     | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | —041 |      |      |
|                                                                                     |              |                                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | H009 |      |      |
|  | SH           | DNMG110404-SH                        | 0.4    | ●      | ★             |        |        |        |        | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      | C010 |      |
|                                                                                     |              | DNMG110408-SH                        | 0.8    | ●      | ●             |        |        |        |        | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      | C011 |
|                                                                                     |              | DNMG150404-SH                        | 0.4    | ★      | ★             | ★      |        |        |        | ●      |       | ★      |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        | ●     | ★     |       |        |        |        |       |        |        |        |       |  |      |      |      |      | E015 |
|                                                                                     |              | DNMG150408-SH                        | 0.8    | ★      | ★             | ★      |        |        |        | ●      |       | ★      |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        | ●     | ★     |       |        |        |        |       |        |        |        |       |  |      |      |      |      | E039 |
|                                                                                     |              | DNMG150412-SH                        | 1.2    | ★      | ★             | ★      |        |        |        | ★      |       | ★      |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        | ★     |       |       |        |        |        |       |        |        |        |       |  |      |      |      | —041 |      |
|                                                                                     |              | DNMG150604-SH                        | 0.4    | ●      | ●             |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | H009 |      |      |
|                                                                                     |              | DNMG150608-SH                        | 0.8    | ●      | ●             |        |        |        |        |        |       |        | ●             |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | —011 |      |      |
|                                                                                     |              | DNMG150612-SH                        | 1.2    | ●      | ★             |        |        |        |        |        |       |        | ●             |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |      |

● = NEW

CHIPBREAKERS > A042  
GRADES > A030  
IDENTIFICATION > A002



# TURNING INSERTS [NEGATIVE]

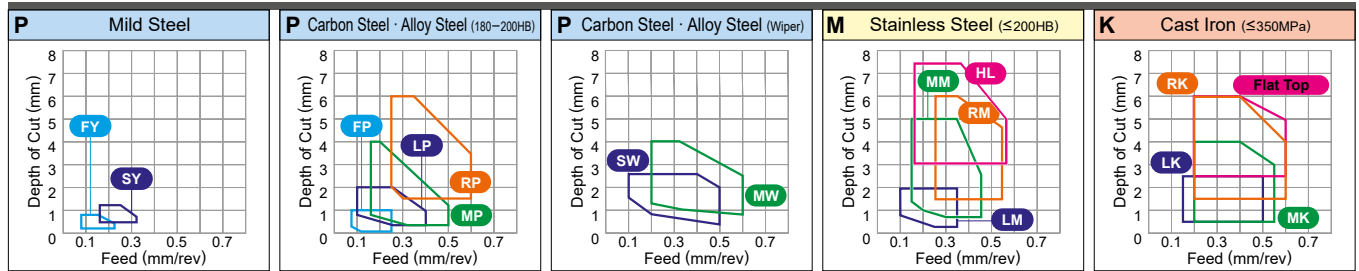


**DNMG 15 04 04- SA**

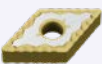
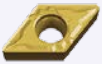
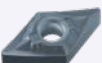
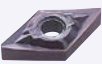
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                                        | P             | Steel                                |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|---------------------------------------------|--------|--------|--------|--------|-------|--------|-----------------------------------|------------------------|--------|--------|--------|-------|--------|--------|------------------|--------|---------|---------------------------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|------|------|------|------|
|                                                                                                                 | M             | Stainless Steel                      |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
|                                                                                                                 | K             | Cast Iron                            |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
|                                                                                                                 | N             | Non-ferrous Metal                    |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
|                                                                                                                 | S             | Heat-resistant Alloy, Titanium Alloy |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
| Shape                                                                                                           | Order Number  | RE<br>(mm)                           | Coated                                      |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
|                                                                                                                 |               |                                      | MC6115<br>NEW<br>MC6125<br>MC6135<br>MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105<br>NEW<br>MC5115<br>MC5125 | MH515<br>NEW<br>MV9005 | MP9005 | MP9015 | MP9025 | US905 | MS9025 | VP05RT | VP10RT           | VP15TF | VP30RT  |                           | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |      |      |      |      |
| <br>Light Cutting             | DNMG150404-SA | 0.4                                  | ★●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       | ★●    |        |        |        |       |        |        |        |       |  | C010 |      |      |      |
|                                                                                                                 | DNMG150408-SA | 0.8                                  | ★●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       | ★★    |        |        |        |       |        |        |        |       |  | C011 |      |      |      |
|                                                                                                                 | DNMG150412-SA | 1.2                                  | ★★★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       | ★     |        |        |        |       |        |        |        |       |  | E015 |      |      |      |
|                                                                                                                 | DNMG150604-SA | 0.4                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       | ●     |        |        |        |       |        |        |        |       |  | E039 |      |      |      |
|                                                                                                                 | DNMG150608-SA | 0.8                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       | ●     |        |        |        |       |        |        |        |       |  | —041 |      |      |      |
|                                                                                                                 | DNMG150612-SA | 1.2                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       | ★      |        |        |       |        |        |        |       |  |      | H009 |      |      |
| <br>Light Cutting<br>(Wiper) | DNMX110404-SW | 0.4                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | C010 |      |
|                                                                                                                 | DNMX110408-SW | 0.8                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |
|                                                                                                                 | DNMX150404-SW | 0.4                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     |       | ●★     |        |        |       |        |        |        |       |  |      | E039 |      |      |
|                                                                                                                 | DNMX150408-SW | 0.8                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     |       | ★★     |        |        |       |        |        |        |       |  |      | E041 |      |      |
|                                                                                                                 | DNMX150412-SW | 1.2                                  | ●★                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       | ★★     |        |        |       |        |        |        |       |  |      | H009 |      |      |
|                                                                                                                 | DNMX150604-SW | 0.4                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ●     |       | ●★     |        |        |       |        |        |        |       |  |      | H011 |      |      |
|                                                                                                                 | DNMX150608-SW | 0.8                                  | ●●                                          |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ●     |       | ●★     |        |        |       |        |        |        |       |  |      |      |      |      |
| <br>Light Cutting            | DNMG150404-SY | 0.4                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     |       | ★★     |        |        |       |        |        |        |       |  |      |      | C010 |      |
|                                                                                                                 | DNMG150408-SY | 0.8                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     | ★     | ★      |        |        |       |        |        |        |       |  |      |      | C011 |      |
|                                                                                                                 | DNMG150604-SY | 0.4                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |
|                                                                                                                 | DNMG150608-SY | 0.8                                  | ●●★                                         |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       | ★     |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |
|                                                                                                                 |               |                                      |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      | —041 |
| <br>Light Cutting            | DNMG150404-MJ | 0.4                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ●                | ●●     |         |                           |        |       |       |       |        |        |        |       |        |        |        | ●     |  |      |      | C010 |      |
|                                                                                                                 | DNMG150408-MJ | 0.8                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ★                | ●●     |         |                           |        |       |       |       |        |        |        |       |        |        | ●      |       |  |      |      | C011 |      |
|                                                                                                                 | DNMG150412-MJ | 1.2                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ●                | ★★     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E015 |      |
|                                                                                                                 | DNMG150416-MJ | 1.6                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ★                | ★★     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | E039 |      |
|                                                                                                                 | DNMG150604-MJ | 0.4                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ●                | ★●     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | —041 |      |
|                                                                                                                 | DNMG150608-MJ | 0.8                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ●                | ★●     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | H009 |      |
|                                                                                                                 | DNMG150612-MJ | 1.2                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ●                | ★★     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      | —011 |      |
|                                                                                                                 | DNMG150616-MJ | 1.6                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        | ●●     | ★                | ★●     |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      |      |
| <br>Light Cutting            | DNGM150404-MJ | 0.4                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        | ★★    |       |       |        |        |        |       |        | ★★     |        |       |  |      |      |      | C010 |
|                                                                                                                 | DNGM150408-MJ | 0.8                                  |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        | ★●    |       |       |        |        |        |       |        | ★★     |        |       |  |      |      |      | C011 |
|                                                                                                                 |               |                                      |                                             |        |        |        |        |       |        |                                   |                        |        |        |        |       |        |        |                  |        |         |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |      |      |      | E039 |

\* Please refer to page A028 before using the SW chipbreaker (wiper insert).

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135





# TURNING INSERTS [NEGATIVE]

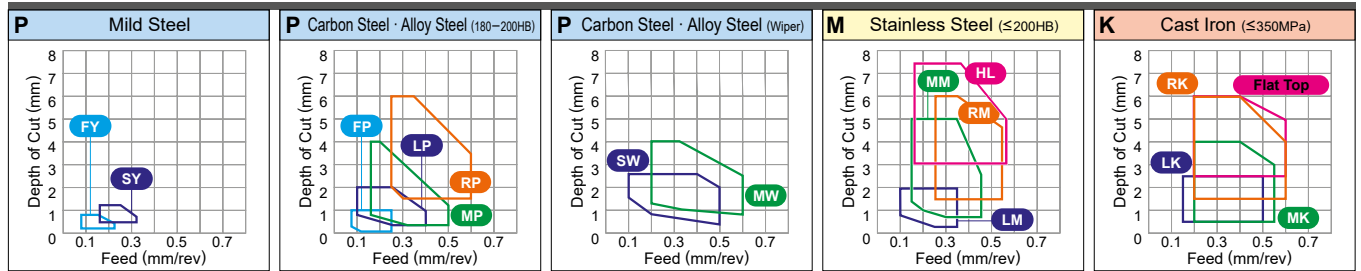


**DNMG 15 04 04- GM**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P | Steel |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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● : Inventory maintained. ★ : Inventory maintained in Japan.

□ : Non stock, produced to order only.

★ MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

\* Please refer to page A028 before using the MW chipbreaker (wiper insert).  = **NEW**

# TURNING INSERTS [NEGATIVE]

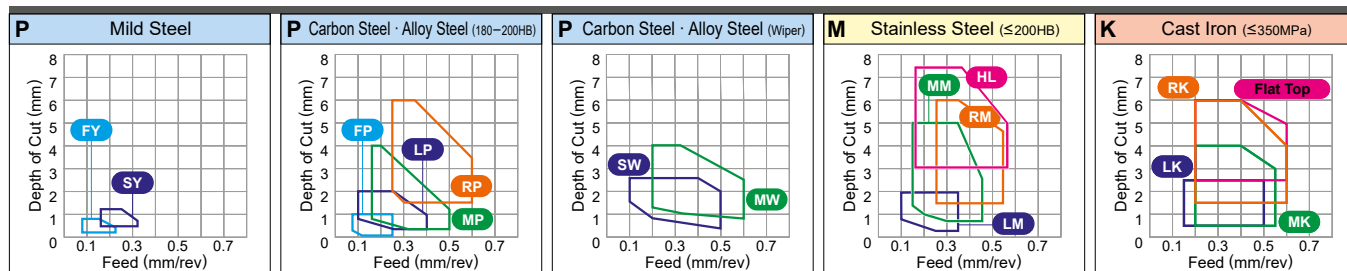


**DNMG 15 04 08- GJ**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                             | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
|------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|-------|---------------|--------|------------------|--------|---------|--------|--------|--------|---------------------------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|------|------|
|                                                                                                      | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
|                                                                                                      | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
|                                                                                                      | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
|                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
| Shape                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        | Coated<br>Cermet | Cermet | Carbide |        |        |        | Applicable<br>Holder Page |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |      |
|                                                                                                      |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015           | MP9025 | US905   | MS9025 | VP05RT | VP10RT |                           | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |      |      |
| <br>Rough Cutting  | DNMG150408-GJ | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C010 |      |
|                                                                                                      | DNMG150412-GJ | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C011 |      |
|                                                                                                      | DNMG150416-GJ | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E015 |      |
|                                                                                                      | DNMG150608-GJ | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E039 |      |
|                                                                                                      | DNMG150612-GJ | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | —041 |      |
|                                                                                                      | DNMG150616-GJ | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | H009 |      |
| <br>Heavy Cutting | DNMM150408-HL | 0.8                                  |        |        | ★ ★ ★         |        |        |        |        | ★      |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C010 |      |
|                                                                                                      | DNMM150412-HL | 1.2                                  |        |        | ★ ★ ★         |        |        |        |        | ★      |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C011 |      |
|                                                                                                      | DNMM150608-HL | 0.8                                  |        |        | ● ● ●         |        |        |        |        | ●      |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E015 |      |
|                                                                                                      | DNMM150612-HL | 1.2                                  |        |        | ● ★ ●         |        |        |        |        | ●      |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E039 |      |
|                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      | H009 |
| <br>Heavy Cutting | DNMM150408-HZ | 0.8                                  |        |        | ★ ★ ★ ★       |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C010 |      |
|                                                                                                      | DNMM150412-HZ | 1.2                                  |        |        | ★ ★ ★ ★       |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C011 |      |
|                                                                                                      | DNMM150608-HZ | 0.8                                  |        |        | ★ ● ★ ★       |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E015 |      |
|                                                                                                      | DNMM150612-HZ | 1.2                                  |        |        | ★ ★ ★ ★       |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E039 |      |
|                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      | —041 |
| <br>Flat Top      | DNMA150404    | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      | C010 |
|                                                                                                      | DNMA150408    | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      | C011 |
|                                                                                                      | DNMA150412    | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E015 |      |
|                                                                                                      | DNMA150604    | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E039 |      |
|                                                                                                      | DNMA150608    | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | —041 |      |
|                                                                                                      | DNMA150612    | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | H009 |      |
| <br>Flat Top      | DNGA150404    | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | —011 |      |
|                                                                                                      | DNGA150408    | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C010 |      |
|                                                                                                      | DNGA150604    | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | C011 |      |
|                                                                                                      | DNGA150608    | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E015 |      |
|                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E039 |      |

● = NEW

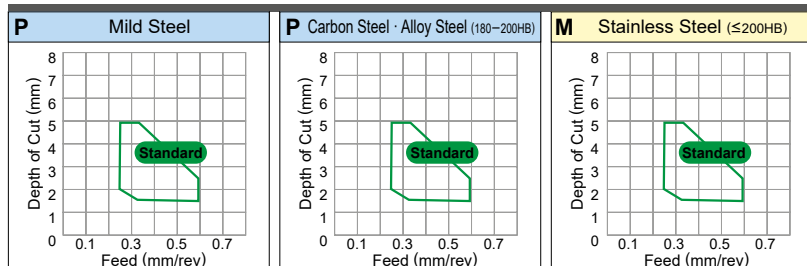
● : Inventory maintained. ★ : Inventory maintained in Japan.

□ : Non stock, produced to order only.

★ MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

## CHIP CONTROL RANGE FOR MATERIAL

Medium Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

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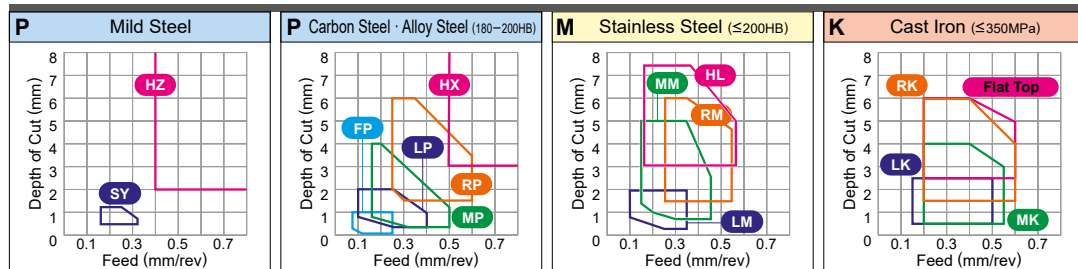
**90° SN** TYPE INSERTS  
WITH HOLE

**SNMG 12 04 04- FP**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                             | P             | Steel                                |        |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                      | M             | Stainless Steel                      |        |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                      | K             | Cast Iron                            |        |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                      | N             | Non-ferrous Metal                    |        |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |        |        |        |        |        |        |       |        |        |        |        |       |        |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                      |               |                                      | MC6115 | MC6125 | MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | MC5115 | MC5125 | MH515 | MV9005 | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Finish Cutting | SNMG120404-FP | 0.4                                  | ★      | ★      | ★      |        |        |        |        |        |       |        |        |        |        |       |        |        |                  |        |         |                           |        |        |        |        | ★      |        |       |       | ★     |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

## A115



# TURNING INSERTS [NEGATIVE]

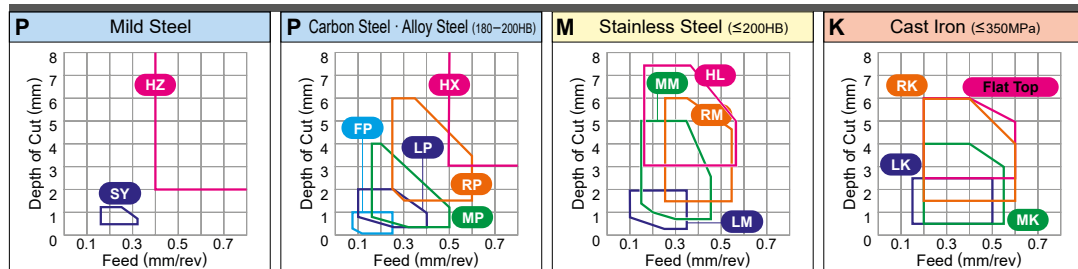


**SNMG 09 03 04- MS**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

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● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



## A117

# TURNING INSERTS [NEGATIVE]

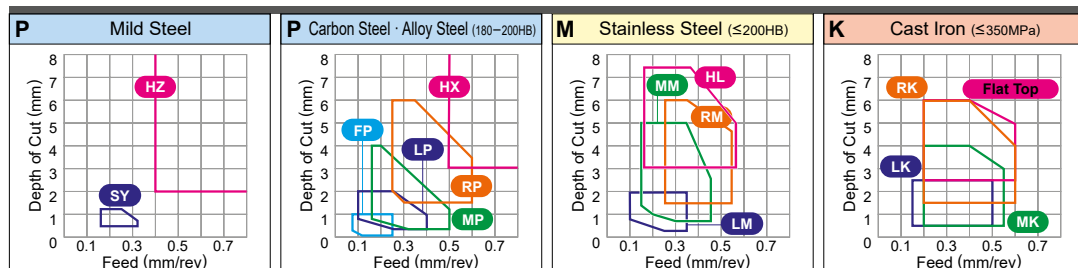


**SNMG 12 04 08- RS**

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                             | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|--------------|---------------|--------|------------------|--------|---------|---------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|------------------------------|------------------------------|
|                                                                                                      | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
| Shape                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | NEW<br>MH515 | NEW<br>MV9005 | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005                       | MT9015                       |
| <br>Rough Cutting  | SNMG120408-RS | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               | ●            |               | ●      | ●                |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      | C012<br>—015<br>E016<br>E038 |                              |
|                                                                                                      | SNMG120412-RS | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               | ●            |               | ●      | ●                |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |                              |                              |
|                                                                                                      | SNMG120416-RS | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               | ●            |               | ★      | ●                |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ★      |                              |                              |
|                                                                                                      | SNMG150616-RS | 1.6                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               | ●      | ●                |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ★      |                              |                              |
|                                                                                                      | SNMG190612-RS | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               | ●      | ●                |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              | ★                            |
| <br>Rough Cutting | SNMG120408-GH | 0.8                                  | ★      | ●      | ★             |        |        |        |        | ●      |       | ●      | ●             | ★      |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              | C012<br>—015<br>E016<br>E038 |
|                                                                                                      | SNMG120412-GH | 1.2                                  | ★      | ●      | ★             |        |        |        |        | ★      |       | ●      | ●             | ★      |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMG120416-GH | 1.6                                  | ★      | ★      |               |        |        |        |        | ●      |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMG150612-GH | 1.2                                  | ★      | ●      |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMG150616-GH | 1.6                                  | ●      | ●      |               |        |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
| <br>Heavy Cutting | SNMM120408-HX | 0.8                                  |        | ★      | ★             | ★      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              | C012<br>—015<br>E016<br>E038 |
|                                                                                                      | SNMM120412-HX | 1.2                                  |        | ★      | ★             | ★      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM150612-HX | 1.2                                  |        | ★      | ★             | ★      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM190612-HX | 1.2                                  | ★      | ●      | ★             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM190616-HX | 1.6                                  | ★      | ●      | ★             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
| <br>Heavy Cutting | SNMM120408-HL | 0.8                                  |        | ●      | ★             | ●      |        |        |        |        | ●     |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              | C012<br>—015<br>E016<br>E038 |
|                                                                                                      | SNMM120412-HL | 1.2                                  |        | ●      | ★             | ●      |        |        |        |        | ●     |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM150612-HL | 1.2                                  |        | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM190612-HL | 1.2                                  |        | ●      | ★             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM190616-HL | 1.6                                  |        | ●      | ★             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
| <br>Heavy Cutting | SNMM190624-HL | 2.4                                  |        | ★      | ★             | ●      |        |        |        |        | ★     |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |
|                                                                                                      | SNMM250724-HR | 2.4                                  | ●      | ★      | ●             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              | —                            |
|                                                                                                      | SNMM250924-HR | 2.4                                  | ●      | ★      | ●             | ●      |        |        |        |        |       |        |               |        |               |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |                              |                              |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

□ : Non stock, produced to order only.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

# A119

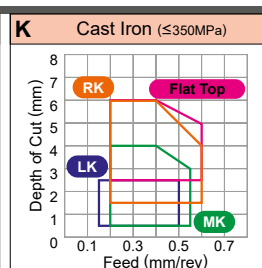
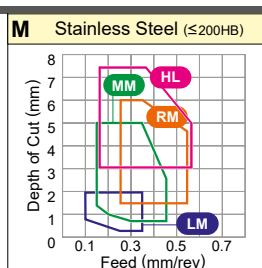
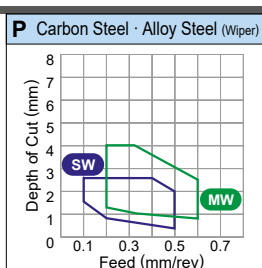
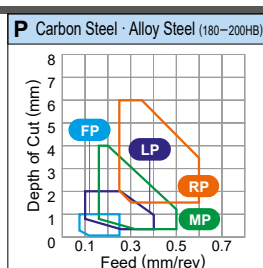
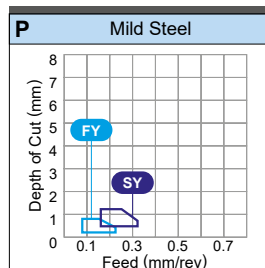


**60°**

## TN TYPE INSERTS WITH HOLE

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting    ◐ : General Cutting    ✖ : Unstable Cutting

| Material                            | P             | Steel                                |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|-------------------------------------|---------------|--------------------------------------|--------|--------|------------|--------|--------|--------|--------|--------|-------|--------|------------|------------|------------|-------|------------|----------------|---------|---------|------------------------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|---|--|
|                                     | M             | Stainless Steel                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | K             | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | N             | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | S             | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| Shape                               | Order Number  | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |            |            |            |       |            | Coated Cermert | Cermert | Carbide | Applicable Holder Page |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW MC5105 | NEW MC5115 | NEW MC5125 | MH515 | NEW MV9005 | MP9005         | MP9015  | MP9025  |                        | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |   |  |
| <b>FP</b><br><br>Finish Cutting     | TNMG160402-FP | 0.2                                  | ★ ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        | ★      |        | ★     |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160404-FP | 0.4                                  | ● ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ●      |       | ★     |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160408-FP | 0.8                                  | ★ ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ●      |       | ★     |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160412-FP | 1.2                                  | ★ ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ●      |       | ●     |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| <b>FH</b><br><br>Finish Cutting     | TNMG110304-FH | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       | ★     |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160402-FH | 0.2                                  | ★ ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ●      |       | ★ ★   |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160404-FH | 0.4                                  | ● ★    |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ● ★    |       | ● ★   |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160408-FH | 0.8                                  | ● ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        | ★ ★    |       | ★ ●   |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| <b>FS</b><br><br>Finish Cutting     | TNMG160404-FS | 0.4                                  | ★ ★    |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       | ●     |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160408-FS | 0.8                                  | ★ ★    |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       | ●     |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| <b>FS</b><br><br>Finish Cutting     | TNMG160402-FS | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            | ● ● ●          |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  | ★ |  |
|                                     | TNMG160404-FS | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            | ● ● ●          |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  | ★ |  |
|                                     | TNMG160408-FS | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            | ● ● ●          |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  | ★ |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| <b>FY</b><br><br>Finish Cutting     | TNMG160404-FY | 0.4                                  | ● ● ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        | ● ●    |        | ★ ●   |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160408-FY | 0.8                                  | ● ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        | ★ ●    |        | ★     |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
| <b>R/L-FS</b><br><br>Finish Cutting | TNMG160402-FY | 0.4                                  | ● ● ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        | ● ●    |        | ★ ●   |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     | TNMG160408-FY | 0.8                                  | ● ★ ★  |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        | ★ ●    |        | ★     |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |
|                                     |               |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |            |                |         |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |   |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                                     | P             | Steel                                |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|--------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|---------------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|---------------|---------------|-------|------------------|--------|---------|---------------------------|--------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|------------------------------|------------------------------|------------------------------|------------------------------|
|                                                                                                              | M             | Stainless Steel                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | K             | Cast Iron                            |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | N             | Non-ferrous Metal                    |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | S             | Heat-resistant Alloy, Titanium Alloy |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| Shape                                                                                                        | Order Number  | RE<br>(mm)                           | Coated |               |               |        |        |        |        |        |       |        |               |               |               |       | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      | MC6115 | NEW<br>MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | NEW<br>MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005    | MP9005 | MP9015  |                           | MP9025 | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |                              |                              |                              |                              |
| <br>Finish Cutting          | TNGG160402R-F | 0.2                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ●      | ★      |        |       |       | ★     | ●      |        |        |       |        |        |        |       |                              |                              |                              | C016<br>—018<br>E016<br>E038 |
|                                                                                                              | TNGG160402L-F | 0.2                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ★      | ★      |        |       |       | ★     | ★      |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNGG160404R-F | 0.4                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ●      | ★      |        |       |       | ★     | ●      |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNGG160404L-F | 0.4                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ●      | ★      |        |       |       | ★     | ●      |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNGG160408R-F | 0.8                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ★      | ★      |        |       |       | ★     | ★      |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNGG160408L-F | 0.8                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        | ★      | ★      |        |       |       | ★     | ★      |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting           | TNMG160404-LP | 0.4                                  | ●      | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        | ●      |       |       |       |        |        |        |       |        |        |        |       |                              |                              | C016<br>—018<br>E016<br>E038 |                              |
|                                                                                                              | TNMG160408-LP | 0.8                                  | ●      | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG160412-LP | 1.2                                  | ●      | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG220408-LP | 0.8                                  | ●      | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG220412-LP | 1.2                                  | ●      | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting          | TNMG160404-LM | 0.4                                  |        |               |               |        |        | ●      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              | C016<br>—018<br>E016<br>E038 |                              |                              |
|                                                                                                              | TNMG160408-LM | 0.8                                  |        |               |               |        |        | ★      | ●      | ●      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG160412-LM | 1.2                                  |        |               |               |        |        | ★      | ★      | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting         | TNMG160404-LK | 0.4                                  |        |               |               |        |        |        |        |        |       |        | ●             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              | C016<br>—018<br>E016<br>E038 |                              |                              |
|                                                                                                              | TNMG160408-LK | 0.8                                  |        |               |               |        |        |        |        |        |       |        | ●             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG160412-LK | 1.2                                  |        |               |               |        |        |        |        |        |       |        | ★             | ●             | ★             |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting         | TNMG160402-LS | 0.2                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | ●      |       |                              | C016<br>—018<br>E016<br>E038 |                              |                              |
|                                                                                                              | TNMG160404-LS | 0.4                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        | ●      |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG160408-LS | 0.8                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       | ●                | ●      | ●       |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        | ●      |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting         | TNGG160402-LS | 0.2                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  | ●      | ●       | ●                         |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        | ★      |       |                              | C016<br>—018<br>E016<br>E038 |                              |                              |
|                                                                                                              | TNGG160404-LS | 0.4                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  | ●      | ●       | ●                         |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        | ★      |        |       |                              |                              |                              |                              |
|                                                                                                              | TNGG160408-LS | 0.8                                  |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  | ●      | ●       | ●                         |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        | ★      |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting         | TNMG160404-SH | 0.4                                  | ★      | ★             | ★             |        |        |        |        | ●      |       | ★      |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        | ★      |       |       |       |        | ●      | ●      |       |        |        |        |       |                              | C016<br>—018<br>E016<br>E038 |                              |                              |
|                                                                                                              | TNMG160408-SH | 0.8                                  | ★      | ★             | ★             |        |        |        |        | ●      |       | ★      |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        | ★      |       |       |       |        | ●      | ●      |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG220408-SH | 0.8                                  | ★      | ★             |               |        |        |        |        | ★      |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting         | TNMG160404-SA | 0.4                                  | ★      | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       | ★      | ●      |        |       |        |        |        |       | C016<br>—018<br>E016<br>E038 |                              |                              |                              |
|                                                                                                              | TNMG160408-SA | 0.8                                  | ★      | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       | ★      | ●      |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG160412-SA | 1.2                                  | ★      | ●             | ★             |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        | ★      |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG220408-SA | 0.8                                  | ●      | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              | TNMG220412-SA | 1.2                                  | ★      | ★             |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |
| <br>Light Cutting (Wiper) | TNMX160404-SW | 0.4                                  | ●      | ●             |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ●      |        |       |       |       | ●      | ★      |        |       |        |        |        |       | C017<br>—018                 |                              |                              |                              |
|                                                                                                              | TNMX160408-SW | 0.8                                  | ●      | ●             |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        | ★      |        |       |       |       | ●      | ★      |        |       |        |        |        |       |                              |                              |                              |                              |
|                                                                                                              |               |                                      |        |               |               |        |        |        |        |        |       |        |               |               |               |       |                  |        |         |                           |        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |                              |                              |                              |                              |

\* Please refer to page A028 before using the SW chipbreaker (wiper insert).

● = NEW

# TURNING INSERTS [NEGATIVE]



60°

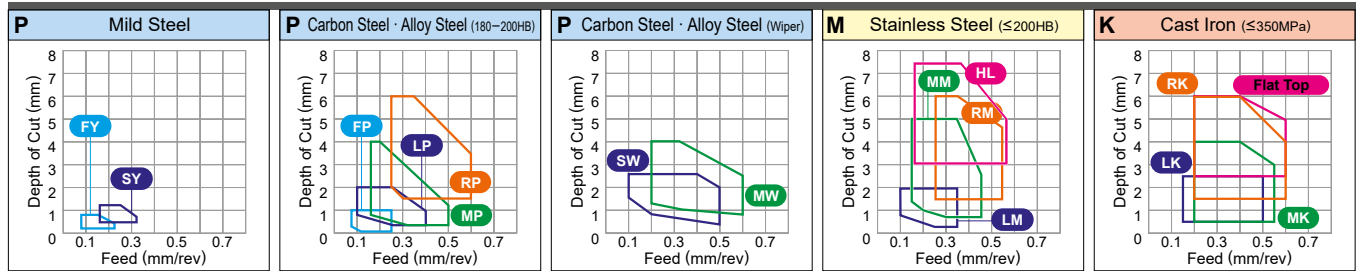
**TN** TYPE INSERTS  
WITH HOLE

**TNMG 16 04 04- SY**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                                         | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                                  | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                  | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                  | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                  | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                            | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |              |               | Coated Cermet |        |        | Cermet | Carbide |        |        | Applicable<br>Holder Page |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                  |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | NEW<br>MH515 | NEW<br>MV9005 | MP9005        | MP9015 | MP9025 | US905  | MS9025  | VP05RT | VP10RT |                           | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>SY</b><br><br>Light Cutting | TNMG160404-SY | 0.4                                  | ●      | ★      | ★             |        |        |        |        |        |       |        |               |        |               |              |               |               |        |        |        |         |        |        |                           | ●      | ●      |        |       | ★     | ★     |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135







# TURNING INSERTS [NEGATIVE]



60°

**TN** TYPE INSERTS  
WITH HOLE

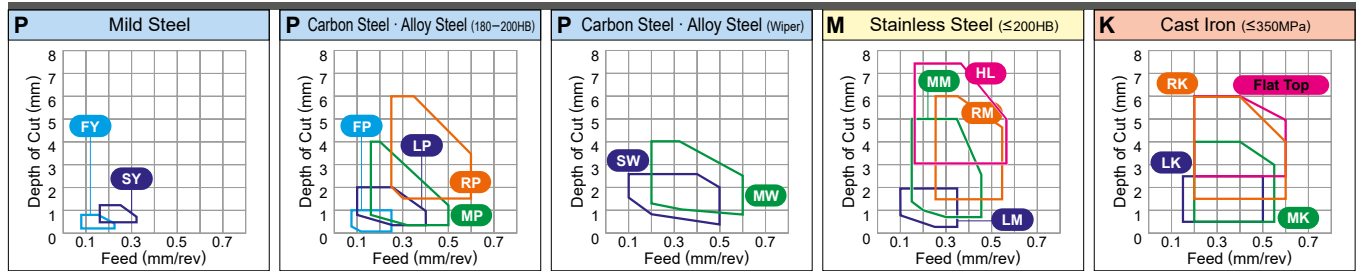
**TNMG 11 03 04**

Size Thickness Corner Radius

\* Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                                         | P              | Steel                                |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|---------------|---------------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|---------------|---------------|-------|---------------|-------------------|---------|---------|---------------------------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|--|
|                                                                                                                  | M              | Stainless Steel                      |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | K              | Cast Iron                            |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | N              | Non-ferrous Metal                    |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | S              | Heat-resistant Alloy, Titanium Alloy |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| Shape                                                                                                            | Order Number   | RE<br>(mm)                           | Coated        |               |               |        |        |        |        |        |       |        |               |               |               |       |               | Coated<br>Cermets | Cermets | Carbide | Applicable<br>Holder Page |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  |                |                                      | MC6115<br>NEW | MC6125<br>NEW | MC6135<br>NEW | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105<br>NEW | MC5115<br>NEW | MC5125<br>NEW | MH515 | MV9005<br>NEW | MP9005            | MP9015  | MP9025  |                           | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |
|                               | TNMG110304     | 0.4                                  | ★             | ●             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        | ★      | ★     |        |        |        |       |  |  |
|                                                                                                                  | TNMG110308     | 0.8                                  | ★             | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160304     | 0.4                                  | ★             | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        | ★     |        |        |        |       |  |  |
|                                                                                                                  | TNMG160308     | 0.8                                  | ★             | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        | ★      |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160404     | 0.4                                  | ●             | ●             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        | ★      |        |        | ★      |        |       |       |       | ●      | ★      | ●      | ★     |        |        |        |       |  |  |
|                                                                                                                  | TNMG160408     | 0.8                                  | ●             | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        | ★      |        |        | ★      |        |       |       |       | ●      | ★      | ●      | ★     |        |        |        |       |  |  |
|                                                                                                                  | TNMG160412     | 1.2                                  | ●             | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        | ●      |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160416     | 1.6                                  | ★             | ★             | ★             | ★      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        | ★      |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG220404     | 0.4                                  | ●             | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        | ★      | ●     |        |        |        |       |  |  |
|                                                                                                                  | TNMG220408     | 0.8                                  | ●             | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        | ★      | ★     | ●      |        |        |       |  |  |
|                                                                                                                  | TNMG220412     | 1.2                                  | ●             | ●             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG220416     | 1.6                                  | ★             | ★             | ★             | ●      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG270608     | 0.8                                  | ★             | ★             | ★             | ★      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG270612     | 1.2                                  | ★             | ★             | ★             | ★      |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |       |  |  |
|                                                                                                                  | TNMG270616     | 1.6                                  | ★             | ★             | ★             |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| Medium Cutting                                                                                                   | TNMG330924     | 2.4                                  |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        | ★     |        |        |        |       |  |  |
| * MW                                                                                                             | TNMX160408-MW  | 0.8                                  | ●             | ●             |               |        |        |        |        |        |       | ●      | ●             | ★             |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| <br>Medium Cutting<br>(Wiper) | TNMX160412-MW  | 1.2                                  | ●             | ●             |               |        |        |        |        |        |       | ●      | ●             | ★             |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  |                |                                      |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| <br>Medium Cutting            | TNMG160404R-ES | 0.4                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160404L-ES | 0.4                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160408R-ES | 0.8                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160408L-ES | 0.8                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG220408R-ES | 0.8                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG220408L-ES | 0.8                                  | ★             | ★             |               |        |        |        |        | ●      |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| <br>Medium Cutting            | TNMG160404R-2G | 0.4                                  |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160404L-2G | 0.4                                  |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160408R-2G | 0.8                                  |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  | TNMG160408L-2G | 0.8                                  |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                                  |                |                                      |               |               |               |        |        |        |        |        |       |        |               |               |               |       |               |                   |         |         |                           |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |

\* Please refer to page A028 before using the MW chipbreaker (wiper insert).

● = NEW

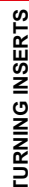
● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....

[illegible]

● = NEW

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

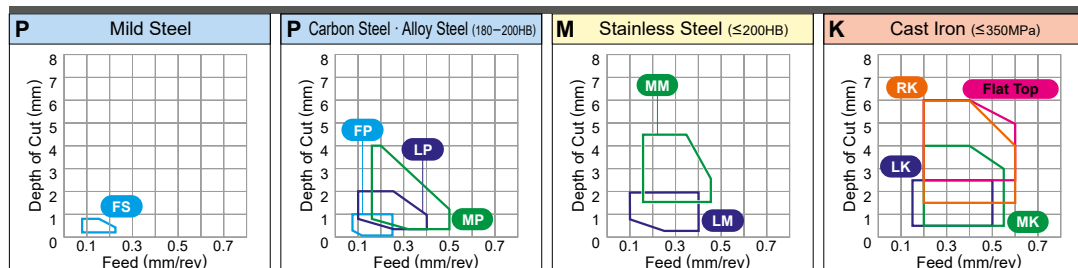


# 35° VN TYPE INSERTS WITH HOLE

**VNMG 16 04 02- FP**Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                              | P             | Steel                                |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|-------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|---------------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|---------------|--------|------------------|--------|---------|---------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|----------------------|----------------------|----------------------|----------------------|
|                                                                                                       | M             | Stainless Steel                      |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | K             | Cast Iron                            |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | N             | Non-ferrous Metal                    |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | S             | Heat-resistant Alloy, Titanium Alloy |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
| Shape                                                                                                 | Order Number  | RE<br>(mm)                           | Coated        |               |        |        |        |        |        |       |        |               |        |               |               |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       |               |                                      | MC6115<br>NEW | MC6125<br>NEW | MC6135 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105<br>NEW | MC5115 | MC5125<br>NEW | MH5115<br>NEW | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010               | MT9005               | MT9015               | UP20M                |
| <br>Finish Cutting   | VNMG160402-FP | 0.2                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ★      |        | ★     |       |       |        |        |        |       |                      |                      |                      | C019<br>—021<br>E017 |
|                                                                                                       | VNMG160404-FP | 0.4                                  | ● ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ●      |        | ★     |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160408-FP | 0.8                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ●      |        | ★     |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160412-FP | 1.2                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ●      |        | ●     |       |       |        |        |        |       |                      |                      |                      |                      |
| <br>Finish Cutting | VNMG160402-FH | 0.2                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ●      |        | ★ ★   |       |       |        |        |        |       |                      |                      | C019<br>—021<br>E017 |                      |
|                                                                                                       | VNMG160404-FH | 0.4                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ● ★    |        | ●     |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160408-FH | 0.8                                  | ★ ★ ★         |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ★ ★    |        | ★ ★   |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       |               |                                      |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
| <br>Finish Cutting | VNMG160404-FS | 0.4                                  | ★ ★           |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       | ●     |       |        |        |        |       |                      |                      | C019<br>—021<br>E017 |                      |
|                                                                                                       | VNMG160408-FS | 0.8                                  | ★ ★           |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       | ●     |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       |               |                                      |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
| <br>Finish Cutting | VNMG1604V5-FS | 0.05                                 |               |               |        |        |        |        |        |       |        |               |        | ● ●           |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ★                    | C019<br>—021<br>E017 |                      |                      |
|                                                                                                       | VNMG160401-FS | 0.1                                  |               |               |        |        |        |        |        |       |        |               |        | ● ● ●         |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        | ★     |                      |                      |                      |                      |
|                                                                                                       | VNMG160402-FS | 0.2                                  |               |               |        |        |        |        |        |       |        |               |        | ● ● ● ●       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        | ★      |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160404-FS | 0.4                                  |               |               |        |        |        |        |        |       |        |               |        | ● ● ● ● ●     |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        | ★      |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160408-FS | 0.8                                  |               |               |        |        |        |        |        |       |        |               |        | ● ● ● ●       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        | ★      |       |                      |                      |                      |                      |
| <br>Finish Cutting | VNMG1604V5-FJ | 0.05                                 |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         | ●                         |        |        |        |        |        |        |       |       |       |        | ★      |        |       | C019<br>—021<br>E017 |                      |                      |                      |
|                                                                                                       | VNMG160401-FJ | 0.1                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         | ●                         |        |        |        |        |        |        |       |       |       |        | ●      |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160402-FJ | 0.2                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         | ●                         |        |        |        |        |        |        |       |       |       |        | ●      |        |       |                      |                      |                      |                      |
|                                                                                                       |               |                                      |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
| <br>Finish Cutting | VNMG160402L-F | 0.2                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           | ★      |        | ★      |        |        |        | ★ ★   |       |       |        |        |        |       |                      | C019<br>—021<br>E017 |                      |                      |
|                                                                                                       | VNMG160402R-F | 0.2                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           | ★      |        | ★      |        |        |        | ★ ★   |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160404L-F | 0.4                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           | ★      |        | ★      |        |        |        | ★ ★   |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       | VNMG160404R-F | 0.4                                  |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           | ●      |        | ★      |        |        |        | ★ ★   |       |       |        |        |        |       |                      |                      |                      |                      |
| <br>Light Cutting  | VNMG160404-LP | 0.4                                  | ● ● ★ ●       |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ●      |        |       |       |       |        |        |        |       | C019<br>—021<br>E017 |                      |                      |                      |
|                                                                                                       | VNMG160408-LP | 0.8                                  | ● ● ★ ●       |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        | ★      |        |       |       |       |        |        |        |       |                      |                      |                      |                      |
|                                                                                                       |               |                                      |               |               |        |        |        |        |        |       |        |               |        |               |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |                      |                      |                      |                      |

● = NEW

# TURNING INSERTS [NEGATIVE]



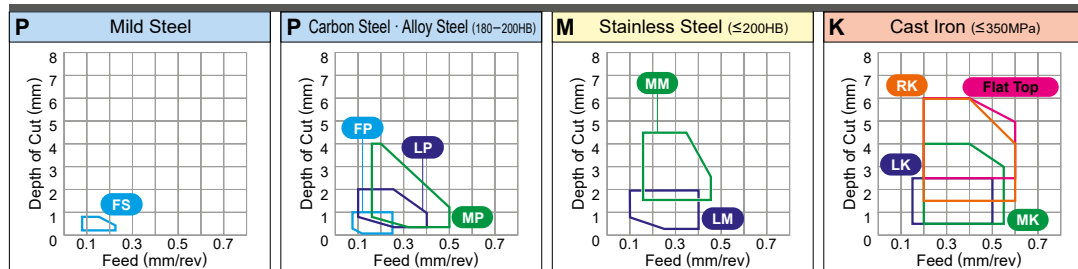
## 35° VN TYPE INSERTS WITH HOLE

### VNMG 16 04 04- LM

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

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● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

★ MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

● = NEW

**A129**









**WNMG 08 04 02- FP**

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



## TURNING INSERTS

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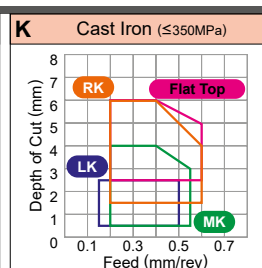
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|----------------|--------|
| CHIPBREAKERS   | ➤ A042 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

# A131

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

\* Please refer to page A028 before using the SW chipbreaker (wiper insert).

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

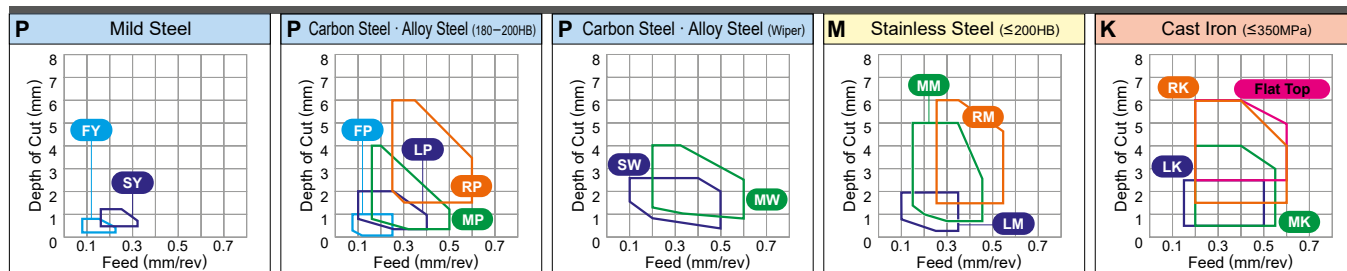
\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

\*Newly designed breakers : MP9005, MP9015, MP9025, MT9015, MV9005

A133

Size Thickness Corner Radius Chipbreaker  
\* Please refer to page A002.

Finish Cutting..... Light Cutting..... Medium Cutting..... Rough Cutting..... Heavy Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

\* Please refer to page A028 before using the MW chipbreaker (wiper insert).

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

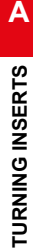




# KN

**KNUX 16 04 05 R-M1**

Rough Cutting.....

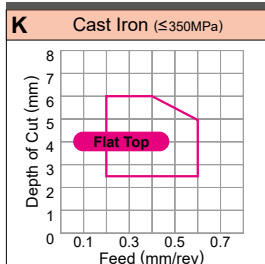


● = NEW

# A136

## CHIP CONTROL RANGE FOR MATERIAL

Heavy Cutting.....

[illegible]

 = **NEW**



# TURNING INSERTS [NEGATIVE]

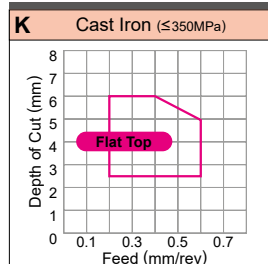
**90° SN** TYPE INSERTS  
WITHOUT HOLE

**SNMN 12 04 08**

Size Thickness Corner Radius  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                                | P              | Steel                                |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|---------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|---------------|---------------|-------|---------------|--------|--------|------------------|-------|--------|---------|--------|--------|--------|---------------------------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|--|
|                                                                                                         | M              | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         | K              | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         | N              | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         | S              | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
| Shape                                                                                                   | Order Number   | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        | Coated<br>Cermet |       | Cermet | Carbide |        |        |        | Applicable<br>Holder Page |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         |                |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | NEW<br>MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015 | MP9025           | US905 | MS9025 | VP05RT  | VP10RT | VP15TF | VP30RT |                           | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |
| <div>Flat Top</div>   | SNMN120408     | 0.8                                  |        |        |               |        |        |        |        |        | ★     | ●      | ★             |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       | ★     | ●     | ★      |        |        |       |        |        |        |       |  |  |
|                                                                                                         | SNMN120412     | 1.2                                  |        |        |               |        |        |        |        |        |       | ★      | ●             | ●             |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       | ★     | ●      |        |        |       |        |        |        |       |  |  |
|                                                                                                         | SNMN120416     | 1.6                                  |        |        |               |        |        |        |        |        |       | ★      | ★             | ★             |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         | NEW SNMN120420 | 2.0                                  |        |        |               |        |        |        |        |        |       | ★      | ●             | ★             |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |
|                                                                                                         | SNMN190412     | 1.2                                  |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        | ●      |       |        |        |        |       |  |  |
| <div>Flat Top</div>  | SNGN090308     | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |  |
|                                                                                                         | SNGN120404     | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        | ★      | ★     |        |        |        |       |  |  |
|                                                                                                         | SNGN120408     | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |  |
|                                                                                                         |                |                                      |        |        |               |        |        |        |        |        |       |        |               |               |               |       |               |        |        |                  |       |        |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |  |

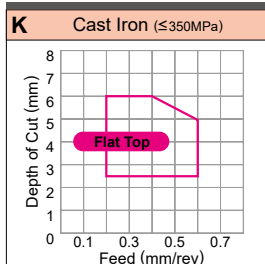
● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**CHIP CONTROL RANGE FOR MATERIAL**

Heavy Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                               | P            | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                        | M            | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                        | K            | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                        | N            | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                        | S            | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                  | Order Number | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                        |              |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015 | MP9025 | US905            | MS9025 | VP05RT  |                           | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>Flat Top</div>  | TNMN160308   | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |        |        |                  |        |         |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

A

TURNING INSERTS

NEG

WITHOUT HOLE

C

D

R

S

T

V

W

# TURNING INSERTS [POSITIVE]



**CCMT 06 02 02- FP**

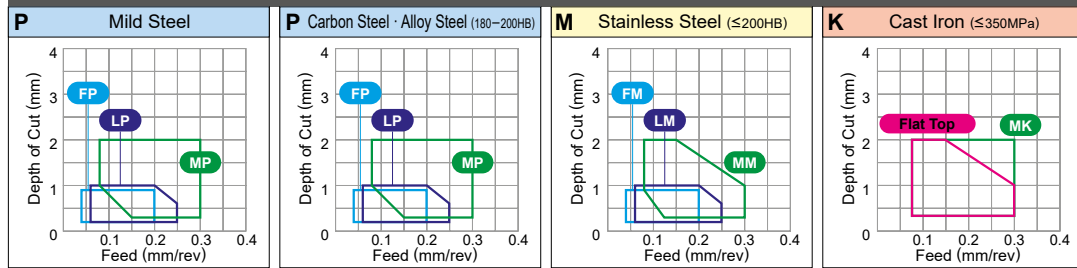
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                              | P                    | Steel                                |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|-------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------|--------|--------|------------|--------|--------|--------|--------|--------|-------|--------|------------|------------|------------|-------|--------|--------|---------------|-------|--------|---------|--------|--------|--------|------------------------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|------|
|                                                                                                       | M                    | Stainless Steel                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                       | K                    | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                       | N                    | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                       | S                    | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        |       |      |
| Shape                                                                                                 | Order Number         | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | Coated Cermet |       | Cermet | Carbide |        |        |        | Applicable Holder Page |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                       |                      |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW MC5105 | NEW MC5115 | NEW MC5125 | MH515 | MP9005 | MP9015 | MP9025        | US905 | MS9025 | VP05RT  | VP10RT | VP15TF | VP30RT |                        | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |      |
| <br>Finish Cutting  | CCMT060202-FP        | 0.2                                  | ●      | ●      | ★          |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      |        |       |       | ●     |        |        |        |       |        |        |        |       | C024 |
|                                                                                                       | CCMT060204-FP        | 0.4                                  | ●      | ●      | ★          |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      |        |       |       | ●     |        |        |        |       |        |        |        |       | D010 |
|                                                                                                       | CCMT09T302-FP        | 0.2                                  | ●      | ●      | ★          |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      |        |       |       | ●     |        |        |        |       |        |        |        |       | E007 |
|                                                                                                       | CCMT09T304-FP        | 0.4                                  | ●      | ●      | ★          |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      |        |       |       | ●     |        |        |        |       |        |        |        |       | E008 |
|                                                                                                       | CCMT09T308-FP        | 0.8                                  | ●      | ●      | ★          |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        | ●      |       |       |       | ★      |        |        |       |        |        |        |       | E033 |
| <br>Finish Cutting | CCMT060202-FM        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E037  |      |
|                                                                                                       | CCMT060204-FM        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E047  |      |
|                                                                                                       | CCMT09T302-FM        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E048  |      |
|                                                                                                       | CCMT09T304-FM        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E008  |      |
|                                                                                                       | CCMT09T308-FM        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E033  |      |
| <br>Finish Cutting | NEW CCMT060202-FS    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        | C024  |      |
|                                                                                                       | NEW CCMT060204-FS    | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        | D010  |      |
|                                                                                                       | NEW CCMT09T302-FS    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        | E007  |      |
|                                                                                                       | NEW CCMT09T304-FS    | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        | E008  |      |
|                                                                                                       | NEW CCMT09T308-FS    | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        |        |                        |        |       |       |       |        |        |        |       |        |        |        | E033  |      |
| <br>Finish Cutting | CCGT060201M-FS       | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       | ●      | ●      | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | C024  |      |
|                                                                                                       | CCGT060202M-FS       | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       | ●      | ●      | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | D010  |      |
|                                                                                                       | NEW CCGT060204M-FS   | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       | ●      | ●      | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | E007  |      |
|                                                                                                       | CCGT09T301M-FS       | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       | ●      | ●      | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | E008  |      |
|                                                                                                       | CCGT09T302M-FS       | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       | ●      | ●      | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | E033  |      |
| <br>Finish Cutting | CCGT09T304M-FS       | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            | ●     | ●      | ●      |               |       |        |         |        | ●      |        |                        |        |       |       |       |        |        |        |       |        |        |        | E037  |      |
|                                                                                                       | CCGT060201M-FS-P     | 0.1*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       | ●      |        |        | C024  |      |
|                                                                                                       | CCGT060202M-FS-P     | 0.2*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       | ●      |        |        | D010  |      |
|                                                                                                       | NEW CCGT060204M-FS-P | 0.4*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        |        |        | E007  |      |
|                                                                                                       | CCGT09T301M-FS-P     | 0.1*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        |        | ●             |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       |        | ●      |        | E008  |      |
| <br>Finish Cutting | CCGT09T302M-FS-P     | 0.2*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        | ●      |               |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       | ●      |        |        | E033  |      |
|                                                                                                       | CCGT09T304M-FS-P     | 0.4*                                 |        |        |            |        |        |        | ●      |        |       |        |            |            |            |       |        | ●      |               |       |        |         |        |        | ●      |                        |        |       |       |       |        |        |        |       | ●      |        |        | E037  |      |
|                                                                                                       | CCMT060202-FV        | 0.2                                  | ●      | ★      |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         | ●      |        |        | ●                      | ●      | ●     | ●     |       |        |        |        |       |        |        |        |       | E047 |
|                                                                                                       | CCMT060204-FV        | 0.4                                  | ●      | ★      |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         | ●      |        |        | ●                      | ●      | ●     | ●     |       |        |        |        |       |        |        |        |       | E048 |
|                                                                                                       | CCMT09T302-FV        | 0.2                                  | ●      | ★      |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        |        | ●     | ●     | ★     |        |        |        |       |        |        |        |       |      |
| <br>Finish Cutting | CCMT09T304-FV        | 0.4                                  | ●      | ★      |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      | ●      | ●     | ●     |       |        |        |        |       |        |        |        |       | E033 |
|                                                                                                       | CCMT09T308-FV        | 0.8                                  | ●      | ★      |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        | ●                      | ●      | ●     | ★     |       |        |        |        |       |        |        |        |       | E037 |
|                                                                                                       |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        | ●      | ●     | ●     | ★     |        |        |        |       |        |        |        |       | E047 |
|                                                                                                       |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        | ●      | ●     | ●     | ★     |        |        |        |       |        |        |        |       | E048 |
|                                                                                                       |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |               |       |        |         |        |        |        |                        | ●      | ●     | ●     | ★     |        |        |        |       |        |        |        |       |      |

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A056 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

# TURNING INSERTS [POSITIVE]



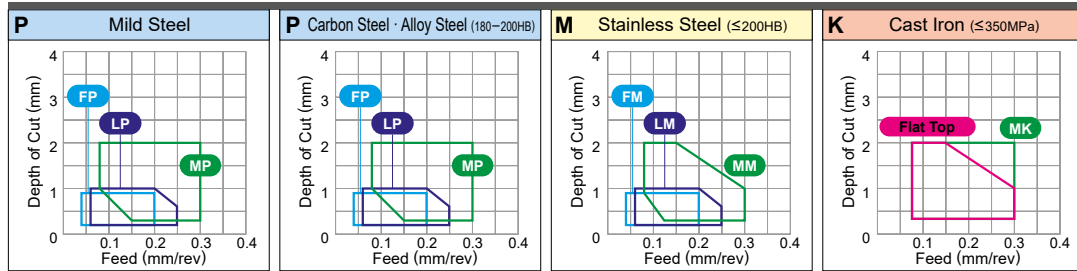
**CCET 06 02 01M R-SRF**  
 Size Thickness Corner Radius R/L Chipbreaker  
 \* Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material | P | Steel | ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●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\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

\*1 Please refer to page A028 before using the SW chipbreaker (wiper insert).

\*2 Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A056 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

# TURNING INSERTS [POSITIVE]



**CCMT 06 02 02- MP**

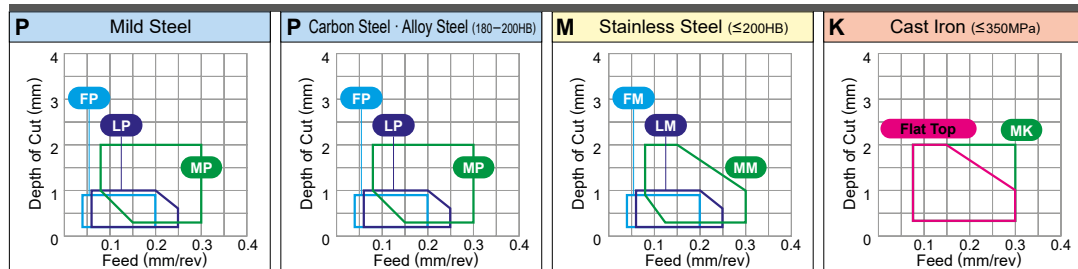
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

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**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                      | P            | Steel                                | Casting Conditions (Cast) |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | Stable Casting |        |       |        |        |         |        |        |        |                        |       |       |       |        |        |        | General Casting |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  | Special Casting |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                               | K            | Cast Iron                            |                           |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               | N            | Non-ferrous Metal                    |                           |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               | S            | Heat-resistant Alloy, Titanium Alloy |                           |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                         | Order Number | RE (mm)                              | Coated                    |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | Coated Cermet  |        |       | Cermet |        | Carbide |        |        |        | Applicable Holder Page |       |       |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              |                                      | MC6115                    | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW MC5105 | MC5115 | NEW MC5125 | MH515 | NEW MV9005 | MP9005 | MP9015         | MP9025 | US905 | MS9025 | VP05RT | VP10RT  | VP15TF | VP30RT | MP3025 |                        | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10           | RT9010 | MT9005                                                       | MT9015                                                       | UP20M                                                        |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting           | MS           | CCMT060202-MS                        | 0.2                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            | ●      | ●              | ●      |       |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              | C024<br>D010<br>E007<br>E008<br>E033<br>E037<br>E047<br>E048 |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT060204-MS                        | 0.4                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT060208-MS                        | 0.8                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T302-MS                        | 0.2                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T304-MS                        | 0.4                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T308-MS                        | 0.8                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120404-MS                        | 0.4                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120408-MS                        | 0.8                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120412-MS                        | 1.2                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        | ●              | ●      | ●     |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        | ●                                                            |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting          | Standard     | CCMT060202                           | 0.2                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        | ●      | ★                      |       |       | ●     | ●      | ●      |        |                 |        |                                                              |                                                              |                                                              | C024<br>D010<br>E007<br>E008<br>E033<br>E037<br>E047<br>E048 |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT060204                           | 0.4                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         | ●      |        |        | ●                      | ★     |       |       | ●      | ●      | ●      |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT060208                           | 0.8                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        | ●      |        |                        |       |       | ★     |        | ●      | ●      |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT080304                           | 0.4                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        | ●                      | ★     |       |       | ●      | ★      | ●      |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT080308                           | 0.8                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        | ●      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T302                           | 0.2                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        | ●                      | ★     |       |       | ●      | ●      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T304                           | 0.4                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         | ●      |        | ●      | ★                      |       |       | ●     | ●      |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T308                           | 0.8                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         | ●      |        | ●      | ★                      |       |       | ●     | ●      | ●      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120404                           | 0.4                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         | ●      |        | ●      | ★                      |       |       | ●     | ●      | ●      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120408                           | 0.8                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         | ●      |        | ●      |                        |       |       | ●     | ●      | ●      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120412                           | 1.2                       |        |            |        |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        | ★      |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting         | MV           | CCMH060202-MV                        | 0.2                       |        | ●          | ★      |        |        |        | ●      |       |        |            |        |            |       |            |        |                |        |       |        |        | ●       |        |        | ●      | ★                      |       | ★     | ★     | ★      |        |        |                 |        |                                                              |                                                              | C024<br>D010<br>E007<br>E008<br>E033<br>E037<br>E047<br>E048 |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMH060204-MV                        | 0.4                       |        | ●          | ★      |        |        |        | ●      |       | ★      |            |        |            |       |            |        |                |        |       |        |        | ●       |        |        | ●      | ★                      |       | ●     | ●     | ●      |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              |                                      |                           |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        |        |                        |       |       |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting (Wiper) | * MW         | CCMT060204-MW                        | 0.4                       | ●      | ●          | ★      |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        | ●      |        | ★                      |       | ●     |       |        |        |        |                 |        |                                                              | C024<br>D010<br>E007<br>E008<br>E033<br>E037<br>E047<br>E048 |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT060208-MW                        | 0.8                       | ●      | ●          | ★      |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        | ★      |                        | ★     |       | ●     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T304-MW                        | 0.4                       | ●      | ●          | ★      |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        | ●      |                        | ★     |       | ●     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT09T308-MW                        | 0.8                       | ●      | ●          | ★      |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        |         |        |        | ●      |                        | ★     |       | ●     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120404-MW                        | 0.4                       | ●      | ●          | ★      |        |        |        |        |       |        |            | ●      |            |       |            |        |                |        |       |        |        |         |        |        |        | ★                      |       | ●     |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCMT120408-MW                        | 0.8                       | ●      | ●          | ★      |        |        |        |        |       |        |            | ●      |            |       |            |        |                |        |       |        |        |         |        |        |        | ★                      |       | ●     |       |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting         | R/L-SR       | CCET0602V3R-SR                       | 0.03                      |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ★       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        | C024<br>D010<br>E007<br>E008<br>E033<br>E037<br>E047<br>E048 |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET0602V3L-SR                       | 0.03                      |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ●       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060201R-SR                       | 0.1                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ★       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060201L-SR                       | 0.1                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ★       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060202R-SR                       | 0.2                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ★       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060202L-SR                       | 0.2                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ●       |        |        |        |                        | ●     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060204R-SR                       | 0.4                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ★       |        |        |        |                        | ★     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                               |              | CCET060204L-SR                       | 0.4                       |        |            |        |        |        |        |        |       |        |            |        |            |       |            |        |                |        |       |        |        | ●       |        |        |        |                        | ●     |       | ★     |        |        |        |                 |        |                                                              |                                                              |                                                              |                                                              |  |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\* Please refer to page A028 before using the MW chipbreaker (wiper insert).

● = NEW

A

## TURNING INSERTS

**POSI**  
**7°**

## WITH HOLE

**C**

D

**P**

S

T

v

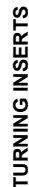
W

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A056 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

## A145

Size Thickness Corner Radius R/L Chipbreaker  
\* Please refer to page A002.

Medium Cutting.....



**POSI  
7°**

**WITH  
HOLE**



\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



# TURNING INSERTS [POSITIVE]



80°

CC

TYPE INSERTS  
WITH HOLE

CCGW 06 02 00

Size Thickness Corner Radius

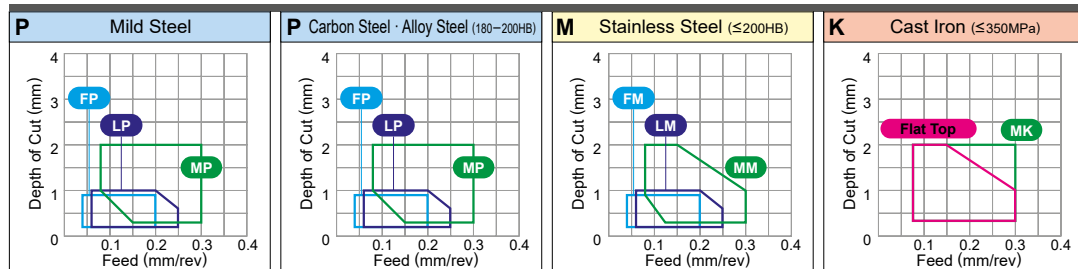
\* Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                            | P            | Steel                                |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |
|-------------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|--------|--------|---------------|-------|---------------|--------|--------|--------|-------------------|---------|---------|--------|--------|--------|---------------------------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|
|                                                                                     | M            | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |
|                                                                                     | K            | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |
|                                                                                     | N            | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |
|                                                                                     | S            | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        |        |       |        |        |        |       |  |
| Shape                                                                               | Order Number | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        | Coated<br>Cermets | Cermets | Carbide |        |        |        | Applicable<br>Holder Page |        |       |       |       |        |        |        |       |        |        |        |       |  |
|                                                                                     |              |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015 | MP9025 | US905             | MS9025  | VP05RT  | VP10RT | VP15TF | VP30RT |                           | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |  |
|  | CCGW060200   | 0                                    |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       | ★     |        |        |        |       |        |        |        |       |  |
|                                                                                     | CCGW0602V5   | 0.05                                 |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       | ●     |        |        |        |       |        |        |        |       |  |
|                                                                                     | CCGW060201   | 0.1                                  |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |
|                                                                                     | CCGW060202   | 0.2                                  |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |
|                                                                                     | CCGW09T300   | 0                                    |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       | ●     |        |        | ★      |       |        |        |        |       |  |
|                                                                                     | CCGW09T3V5   | 0.05                                 |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       | ●     |        |        |        |       |        |        |        |       |  |
|                                                                                     | CCGW09T301   | 0.1                                  |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |
|                                                                                     | CCGW09T302   | 0.2                                  |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |
|                                                                                     | CCGW09T304   | 0.4                                  |        |        |               |        |        |        |        |        |       |        |        |        |               |       |               |        |        |        |                   |         |         |        |        |        |                           |        |       |       |       |        |        | ★      |       |        |        |        |       |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

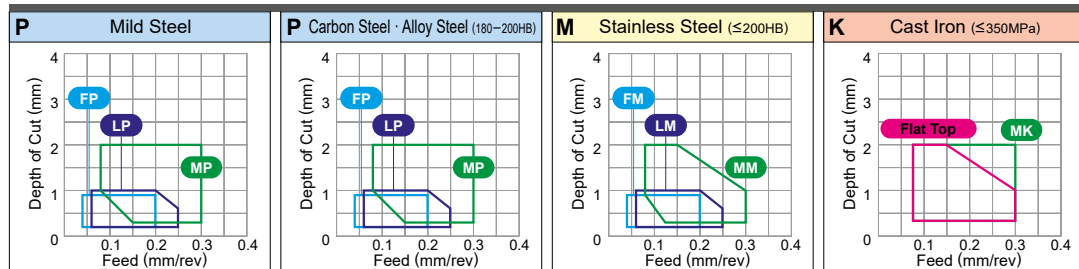
CHIPBREAKERS > A056

**CHIP CONTROL RANGE FOR MATERIAL**

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



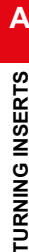
Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material | P | Steel |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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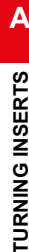


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Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                        | P                    | Steel                                |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
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|                                                                                                                 | K                    | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                                 | N                    | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                                 | S                    | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
| Shape                                                                                                           | Order Number         | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       | Coated Cermet | Cermet | Carbide | Applicable Holder Page |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                                 |                      |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW MC5105 | NEW MC5115 | NEW MC5125 | MH515 | MP9005 | MP9015 | MP9025 | US905 | MS9025        | VP05RT | VP10RT  |                        | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |      |
| <br>Medium —<br>Finish Cutting | DCGT070202-AZ        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | C025  |      |
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|                                                                                                                 | DCGT070202L-F        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D011  |      |
|                                                                                                                 | DCGT070204R-F        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D026  |      |
|                                                                                                                 | DCGT070204L-F        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E010  |      |
|                                                                                                                 | DCGT11T302R-F        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E011  |      |
|                                                                                                                 | DCGT11T302L-F        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E032  |      |
|                                                                                                                 | DCGT11T304R-F        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E034  |      |
|                                                                                                                 | DCGT11T304L-F        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E052  |      |
| <br>Finish Cutting           | DCGT11T301MR-SRF     | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | C025  |      |
|                                                                                                                 | DCGT11T302MR-SRF     | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D011  |      |
|                                                                                                                 | DCGT11T304MR-SRF     | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D026  |      |
|                                                                                                                 |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E010  |      |
| <br>Finish Cutting           | NEW DCET070201MR-SRF | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | C025  |      |
|                                                                                                                 | DCET070201ML-SRF     | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D011  |      |
|                                                                                                                 | DCET070202MR-SRF     | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D026  |      |
|                                                                                                                 | DCET070202ML-SRF     | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E010  |      |
|                                                                                                                 | DCET070204MR-SRF     | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E011  |      |
|                                                                                                                 | DCET070204ML-SRF     | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E032  |      |
|                                                                                                                 | DCET11T301ML-SRF     | 0.1*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E034  |      |
|                                                                                                                 | DCET11T302ML-SRF     | 0.2*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E052  |      |
| <br>Light Cutting            | DCMT11T304ML-SRF     | 0.4*                                 |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E053  |      |
|                                                                                                                 | NEW DCMT070202-LP    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | C025  |      |
|                                                                                                                 | DCMT070204-LP        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D011  |      |
|                                                                                                                 | DCMT070208-LP        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D026  |      |
|                                                                                                                 | NEW DCMT11T302-LP    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E010  |      |
|                                                                                                                 | DCMT11T304-LP        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E011  |      |
| <br>Light Cutting            | DCMT11T308-LP        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E032  |      |
|                                                                                                                 | NEW DCMT070202-LM    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E034  |      |
|                                                                                                                 | DCMT070204-LM        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E052  |      |
|                                                                                                                 | DCMT070208-LM        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E053  |      |
|                                                                                                                 | NEW DCMT11T302-LM    | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                                 | DCMT11T304-LM        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
| <br>Light Cutting            | DCMT11T308-LM        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |      |
|                                                                                                                 | DCMT070202-LS        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | C025  |      |
|                                                                                                                 | DCMT070204-LS        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D011  |      |
|                                                                                                                 | NEW DCMT070208-LS    | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | D026  |      |
|                                                                                                                 | DCMT11T302-LS        | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E010  |      |
|                                                                                                                 | DCMT11T304-LS        | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E032  |      |
| <br>Light Cutting            | DCMT11T308-LS        | 0.8                                  |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E034  |      |
|                                                                                                                 |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        | E052  |      |
|                                                                                                                 |                      |                                      |        |        |            |        |        |        |        |        |       |        |            |            |            |       |        |        |        |       |               |        |         |                        |        |        |        |       |       |       |        |        |        |       |        |        |        |       | E053 |

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

CHIPBREAKERS > A056  
GRADES > A030  
IDENTIFICATION > A002

# TURNING INSERTS [POSITIVE]



DCGT 07 02 01M- LS

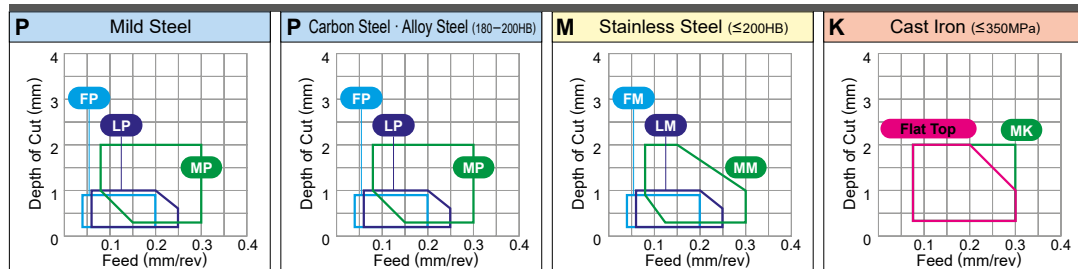
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                        | P                        | Steel                                |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|-----------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|-------|---------------|--------|------------------|--------|---------|---------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|----------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
|                                                                                                                 | M                        | Stainless Steel                      |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | K                        | Cast Iron                            |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | N                        | Non-ferrous Metal                    |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | S                        | Heat-resistant Alloy, Titanium Alloy |        |               |        |        |        |        |        |       |        |               |        |               |       |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
| Shape                                                                                                           | Order Number             | RE<br>(mm)                           | Coated |               |        |        |        |        |        |       |        |               |        |               |       |               |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 |                          |                                      | MC6115 | NEW<br>MC6125 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M                                                                |                                                                      |                                                                      |
| <br>Light Cutting             | LS<br>DCGT070201M-LS     | 0.1*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034<br>E052<br>E053 |                                                                      |                                                                      |
|                                                                                                                 | DCGT070202M-LS           | 0.2*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT070204M-LS           | 0.4*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T301M-LS           | 0.1*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T302M-LS           | 0.2*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T304M-LS           | 0.4*2                                |        |               |        |        |        |        |        |       |        |               |        |               |       | ●             | ●      | ●                |        |         |                           |        |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
| <br>Light Cutting            | LS-P<br>DCGT070201M-LS-P | 0.1*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034<br>E052<br>E053 |                                                                      |
|                                                                                                                 | DCGT070202M-LS-P         | 0.2*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT070204M-LS-P         | 0.4*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T301M-LS-P         | 0.1*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T302M-LS-P         | 0.2*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCGT11T304M-LS-P         | 0.4*2                                |        |               |        | ●      |        |        |        | ●     |        |               |        |               |       |               |        |                  |        | ●       |                           |        |        |        |        |        |        |       |       |       |        |        |        |       | ●      |        |        |                                                                      |                                                                      |                                                                      |
| <br>Light Cutting            | SV<br>DCMT070202-SV      | 0.2                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ★     | ●     | ●     |        |        |        |       |        |        |        |                                                                      |                                                                      | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034<br>E052<br>E053 |
|                                                                                                                 | DCMT070204-SV            | 0.4                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ★     | ●     | ●     | ●      |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMT070208-SV            | 0.8                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ★     | ●     | ●     | ★      |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMT11T302-SV            | 0.2                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ●     | ●     | ●     |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMT11T304-SV            | 0.4                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ●     | ●     | ●     |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMT11T308-SV            | 0.8                                  |        |               |        |        |        |        |        | ●     |        |               |        |               |       |               |        |                  |        |         |                           |        | ●      |        |        |        |        | ●     | ●     | ★     |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
| <br>Light Cutting<br>(Wiper) | *1 NEW<br>DCMX070202-SW  | 0.2                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMX070204-SW            | 0.4                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMX070208-SW            | 0.8                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMX11T302-SW            | 0.2                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMX11T304-SW            | 0.4                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |
|                                                                                                                 | DCMX11T308-SW            | 0.8                                  | ●      | ●             | ●      |        |        |        |        |       |        |               |        |               |       | ●             |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                                                                      |                                                                      |                                                                      |

\*1 Please refer to page A028 before using the SW chipbreaker (wiper insert).

\*2 Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A056 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

## A155

# A

## TURNING INSERTS

**POSI**  
**7°**

## WITH HOLE

6



1

**S**

1

V

W

# TURNING INSERTS [POSITIVE]



**DCMT 07 02 02- MS**

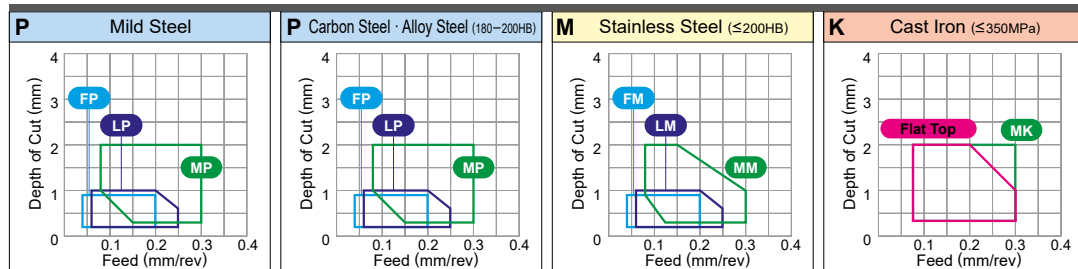
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material |                |         |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|----------|----------------|---------|--------|-----------------|--------|-----------|--------|-------------------|--------|--------------------------------------|-------|--------|--------|--------|--------|-------|---------------|--------|
|          | P              | Steel   | M      | Stainless Steel | K      | Cast Iron | N      | Non-ferrous Metal | S      | Heat-resistant Alloy, Titanium Alloy |       |        |        |        |        |       |               |        |
| Shape    | Order Number   | RE (mm) | Coated |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       | Coated Cermet | Cermet |
|          |                |         | MC6115 | MC6125          | MC6135 | MC6035    | MS6015 | MC7015            | MC7025 | MP7035                               | US735 | MS7025 | MC5105 | MC5115 | MC5125 | MH515 | MV9005        | MP9005 |
|          | DCMT070202-MS  | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070204-MS  | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070208-MS  | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T302-MS  | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T304-MS  | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T308-MS  | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T312-MS  | 1.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070202     | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070204     | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070208     | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T302     | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T304     | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T308     | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT150404     | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070202-MV  | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070204-MV  | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT070208-MV  | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T302-MV  | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T304-MV  | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T308-MV  | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCMT11T308-MV  | 0.8     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET0702V3R-SR | 0.03    |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET0702V3L-SR | 0.03    |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070201R-SR | 0.1     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070201L-SR | 0.1     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070202R-SR | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070202L-SR | 0.2     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070204R-SR | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |
|          | DCET070204L-SR | 0.4     |        |                 |        |           |        |                   |        |                                      |       |        |        |        |        |       |               |        |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

★ MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW



# TURNING INSERTS [POSITIVE]



**DCET 11 T3 01 L-SN**

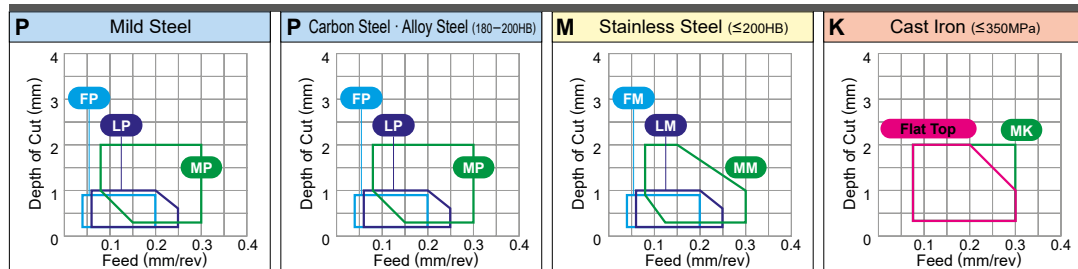
Size Thickness Corner Radius R/L Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P | Steel |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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\*1 Please refer to page A028 before using the R/LW-SN chipbreaker (wiper insert).

\*2 Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

□ : Non stock, produced to order only.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

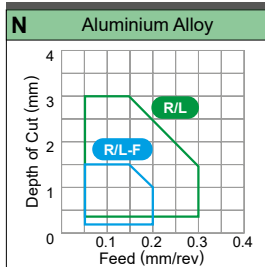
CHIPBREAKERS > A056



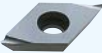
## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                                                                          | P                                                                                                                                                                 | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
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|                                                                                                                                                                   | M                                                                                                                                                                 | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                                   | K                                                                                                                                                                 | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                                   | N                                                                                                                                                                 | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                                   | S                                                                                                                                                                 | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| Shape                                                                                                                                                             | Order Number                                                                                                                                                      | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |               | Coated<br>Cermet |        | Cermet | Carbide |        |        | Applicable<br>Holder Page |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                                   |                                                                                                                                                                   |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005           | MP9015 | MP9025 | US905   | MS9025 | VP05RT |                           | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |
| <div>R/L-F</div> <div></div> <div>Finish Cutting<br/>(For Aluminium Alloy)</div> | DEGX150402L-F                                                                                                                                                     | 0.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ★      |        |       |        |        |        | C034  |
|                                                                                                                                                                   | DEGX150404R-F                                                                                                                                                     | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ★      |        |       |        |        |        |       |
|                                                                                                                                                                   | DEGX150404L-F                                                                                                                                                     | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ★      |        |       |        |        |        |       |
|                                                                                                                                                                   | <div>R/L</div> <div></div> <div>Medium Cutting<br/>(For Aluminium Alloy)</div> | DEGX150402R                          | 0.2    |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        |        | ●      |       |        |        |        |       |
| DEGX150402L                                                                                                                                                       |                                                                                                                                                                   | 0.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ★      |        |       |        |        |        |       |
| DEGX150404R                                                                                                                                                       |                                                                                                                                                                   | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ●      |        |       |        |        |        |       |
| DEGX150404L                                                                                                                                                       |                                                                                                                                                                   | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |                           |        |        |        |        |       |       |       |        | ●      |        |       |        |        |        |       |

● = NEW





# 90° SC TYPE INSERTS WITH HOLE

**SCMT 09 T3 04- FP**

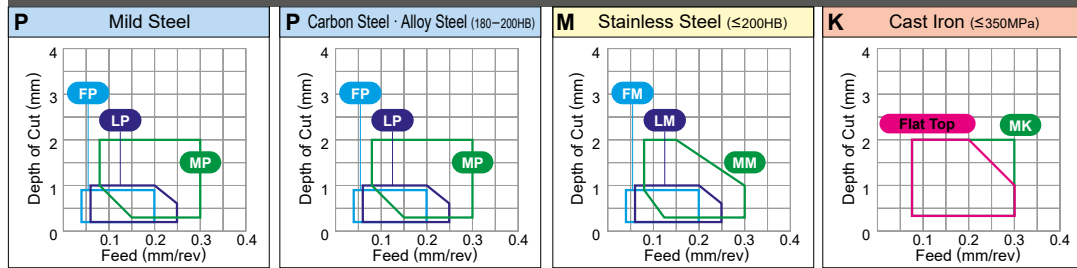
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                              | P                 | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|-------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|--------|--------------|---------------|--------|------------------|--------|---------|---------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------------|--------------|--------------|
|                                                                                                       | M                 | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | K                 | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | N                 | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | S                 | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| Shape                                                                                                 | Order Number      | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | MC5125 | NEW<br>MH515 | NEW<br>MV9005 | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015       | UP20M        |              |
| <br>Finish Cutting  | SCMT09T304-FP     | 0.4                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        | ★      |        | ★      |       |       |       |        |        |        |       |        |        |              | C028<br>E036 |              |
|                                                                                                       | SCMT09T308-FP     | 0.8                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        | ★      |        | ★      |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Finish Cutting | SCMT09T304-FM     | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              | C028<br>E036 |              |
|                                                                                                       | SCMT09T308-FM     | 0.8                                  |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Finish Cutting | SCMT09T304-FV     | 0.4                                  | ●      | ★      |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        | ★      | ★      | ★     | ●     |       |        |        |        |       |        |        |              |              | C028<br>E036 |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Light Cutting  | SCMT09T304-LP     | 0.4                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        | ★      |        | ★      |       |       |       |        |        |        |       |        |        |              | C028<br>E036 |              |
|                                                                                                       | SCMT09T308-LP     | 0.8                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        | ★      |        | ●      |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Light Cutting  | SCMT09T304-LM     | 0.4                                  |        |        |               |        |        |        | ★      | ★      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              | C028<br>E036 |              |
|                                                                                                       | SCMT09T308-LM     | 0.8                                  |        |        |               |        |        |        | ★      | ★      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Medium Cutting | SCMT09T304-MP     | 0.4                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        | ★      |        | ★      |       |       |       |        |        |        |       |        |        |              | C028<br>E036 |              |
|                                                                                                       | SCMT09T308-MP     | 0.8                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        | ●      |        | ★      |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | SCMT120404-MP     | 0.4                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        | ★      |        | ★      |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | SCMT120408-MP     | 0.8                                  | ●      | ●      | ★             |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        | ●      |        | ★      |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | NEW SCMT120412-MP | 1.2                                  | ●      | ★      |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
| <br>Medium Cutting | SCMT09T304-MM     | 0.4                                  |        |        |               |        |        |        | ●      | ★      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        | C028<br>E036 |              |              |
|                                                                                                       | SCMT09T308-MM     | 0.8                                  |        |        |               |        |        |        | ●      | ★      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | SCMT120404-MM     | 0.4                                  |        |        |               |        |        |        | ●      | ★      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       | SCMT120408-MM     | 0.8                                  |        |        |               |        |        |        | ●      | ●      |       |        |               |        |        |              |               |        |                  |        |         |                           | ●      |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |
|                                                                                                       |                   |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |               |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |              |              |              |

● = NEW



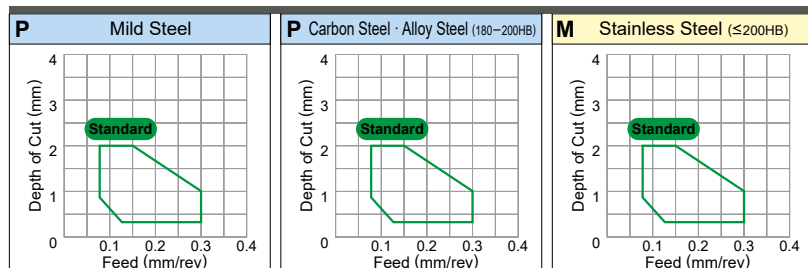


**SPMT 09 03 04**

Size      Thickness      Corner Radius

\* Please refer to page A002.

Medium Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

**POSI**  
**11°**

## WITH HOLE

C

D

R

**S**

**T**

v

3

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A064 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

**A163**

# TURNING INSERTS [POSITIVE]



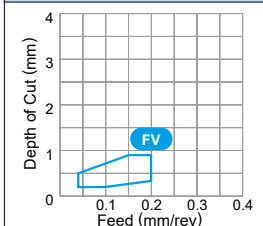
**TBMT 06 01 02- FV**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

P Carbon Steel - Alloy Steel (180-200HB)



A

TURNING INSERTS

POSITIVE

WITH HOLE

C

D

R

S

T

V

W

Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                                                             | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|--------|---------------|--------|--------------|--------|--------|------------------|--------|---------|---------------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
|                                                                                                                                                      | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| Shape                                                                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | NEW<br>MC5115 | MC5125 | NEW<br>MH515 | MV9005 | MP9005 | MP9015           | MP9025 | US905   |                           | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |
| <div>FV</div> <div>NEW</div> <div></div> <div>Finish Cutting</div> | TBMT060102-FV | 0.2                                  | ●      | ●      |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      | TBMT060104-FV | 0.4                                  | ●      | ●      |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |        |               |        |              |        |        |                  |        |         |                           |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

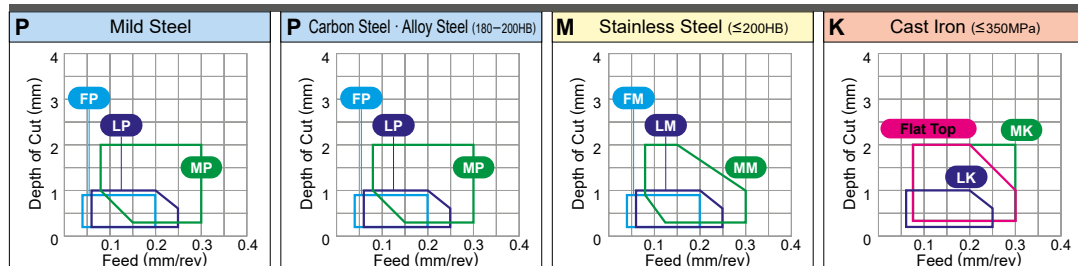
\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

### CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P | Steel | 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\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW



# TURNING INSERTS [POSITIVE]



**TCMT 09 02 04- LP**

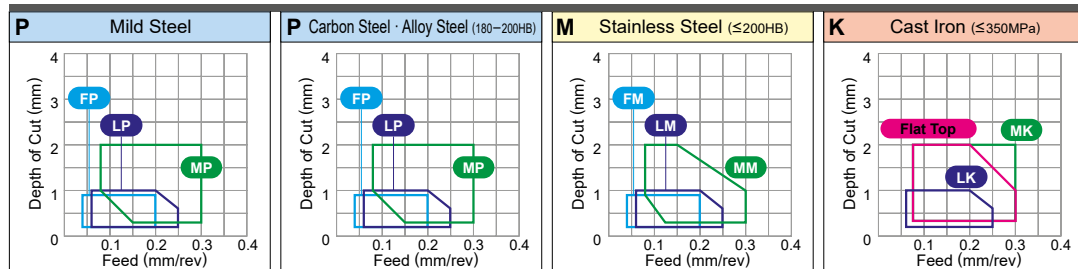
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P | Steel | ●●●●● |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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★ Please refer to page A028 before using the SW chipbreaker (wiper insert).

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



# TURNING INSERTS [POSITIVE]



TCGW 08 02 01

Size Thickness Corner Radius

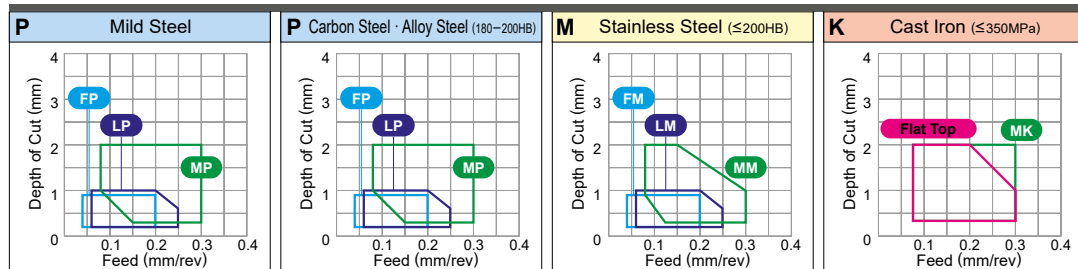
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                               | P            | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|--------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|-------|---------------|------------------|--------|--------|---------|--------|--------|--------|---------------------------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|
|                                                                                                        | M            | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | K            | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | N            | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | S            | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
| Shape                                                                                                  | Order Number | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |       |               | Coated<br>Cermet |        | Cermet | Carbide |        |        |        | Applicable<br>Holder Page |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        |              |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005           | MP9015 | MP9025 | US905   | MS9025 | VP05RT | VP10RT |                           | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 |
| <div>Flat Top</div>  | TCGW080201   | 0.1                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | TCGW080202   | 0.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | TCGW110201   | 0.1                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | TCGW110202   | 0.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |
|                                                                                                        | TCGW110204   | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |       |               |                  |        |        |         |        |        |        |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |

● = NEW

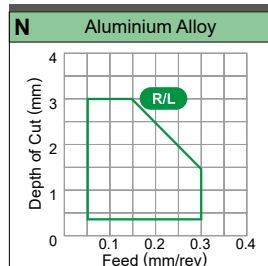
● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

CHIPBREAKERS > A056

## CHIP CONTROL RANGE FOR MATERIAL

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                                      | P            | Steel                                |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|--------|---------------|---------------|-------|---------------|--------|--------|--------|-------|--------|------------------|--------|--------|---------|--------|-------|-------|---------------------------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--|--|--|
|                                                                                                                               | M            | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               | K            | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               | N            | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               | S            | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
| Shape                                                                                                                         | Order Number | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        | Coated<br>Cermet |        | Cermet | Carbide |        |       |       | Applicable<br>Holder Page |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               |              |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | NEW<br>MC5115 | NEW<br>MC5125 | MH515 | NEW<br>MV9005 | MP9005 | MP9015 | MP9025 | US905 | MS9025 | VP05RT           | VP10RT | VP15TF | VP30RT  | MP3025 | AP25N | VP25N |                           | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |
| R/L                                                                                                                           | TEGX160302R  | 0.2                                  |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
| <br>Medium Cutting<br>(For Aluminium Alloy) | TEGX160302L  | 0.2                                  |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               | TEGX160304R  | 0.4                                  |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               | TEGX160304L  | 0.4                                  |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |
|                                                                                                                               |              |                                      |        |        |               |        |        |        |        |        |       |        |        |               |               |       |               |        |        |        |       |        |                  |        |        |         |        |       |       |                           |       |        |        |        |       |        |        |        |       |  |  |  |

● = NEW

A

TURNING INSERTS

POSI  
20°  
WITH  
HOLE

C

D

R

S

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V

W

# TURNING INSERTS [POSITIVE]



60°

TP TYPE INSERTS  
WITH HOLE

TPMH 09 02 02- FP

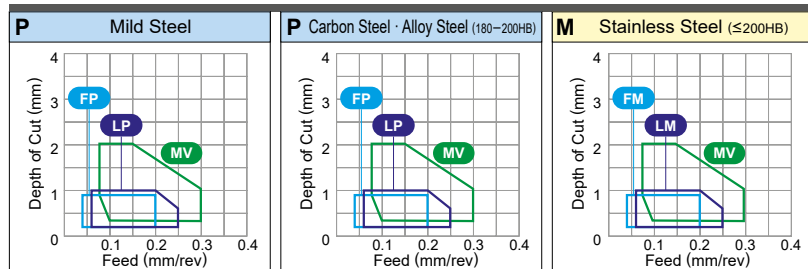
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                                                                            | P             | Steel                                |                              |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                                                                                     | M             | Stainless Steel                      |                              |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                     | K             | Cast Iron                            |                              |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                     | N             | Non-ferrous Metal                    |                              |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                     | S             | Heat-resistant Alloy, Titanium Alloy |                              |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                                                                               | Order Number  | RE<br>(mm)                           | Coated                       |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       | Coated<br>Cermet | Cermet | Carbide | Applicable<br>Holder Page |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                     |               |                                      | MC6115<br><small>NEW</small> | MC6125 | MC6135<br><small>NEW</small> | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105<br><small>NEW</small> | MC5115 | MC5125<br><small>NEW</small> | MV515<br><small>NEW</small> | MP9005 | MP9015 | MP9025 | US905 | MS9025           | VP05RT | VP10RT  |                           | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>FP</div> <div><small>NEW</small></div> <div></div> <div>Finish Cutting</div> | TPMH090202-FP | 0.2                                  | ●●●                          |        |                              |        |        |        |        |        |       |        |                              |        |                              |                             |        |        |        |       |                  |        |         |                           |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

● = NEW

# TURNING INSERTS [POSITIVE]



60°

TP TYPE INSERTS  
WITH HOLE

TPMH 09 02 02- LM

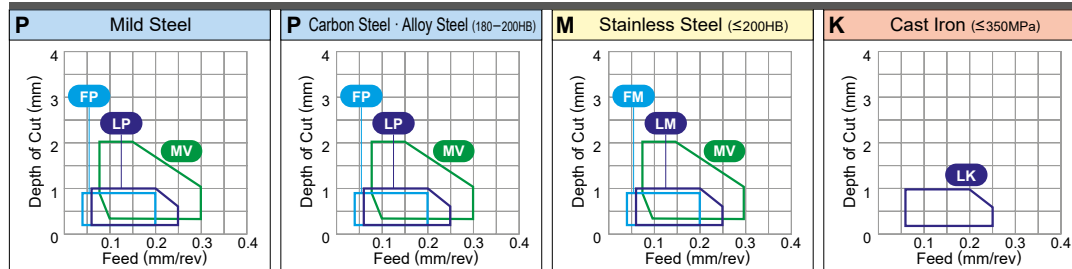
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

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**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

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\* Please refer to page A028 before using the SW chipbreaker (wiper insert).

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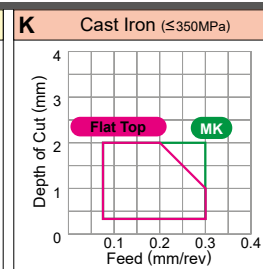
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Size Thickness Corner Radius Chipbreaker  
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Medium Cutting.... ☒

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Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material                                                                                              | P                 | Steel                                |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                                                                                                       | M                 | Stainless Steel                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | K                 | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | N                 | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | S                 | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                 | Order Number      | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        | Coated Cermet | Cermet | Carbide | Applicable Holder Page |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | MC5115 | MC5125 | MH515 | NEW MV9005 | MP9005 | MP9015 | MP9025 | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025        | AP25N  | VP25N   |                        | VP45N | NX2525 | NX3035 | UT120T | HT110 | RT9010 | MT9005 | MT9015 | UP20M |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Light Cutting    | VBMT110304-LP     | 0.4                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        | ●             |        |         | ★                      |       |        |        |        |       |        |        |        |       | D012 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110308-LP     | 0.8                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        | ★             |        |         | ●                      |       |        |        |        |       |        |        |        |       | D013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-LP     | 0.4                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        | ●             |        |         | ●                      |       |        |        |        |       |        |        |        |       | E013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-LP     | 0.8                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        | ●             |        |         | ●                      |       |        |        |        |       |        |        |        |       | E014 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160412-LP     | 1.2                                  | ●●●●   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       | H013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Light Cutting    | VBMT110304-LM     | 0.4                                  |        |        |            |        |        | ●●●    |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        | ●●     |               |        |         |                        |       |        |        |        |       |        |        |        |       | D012 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110308-LM     | 0.8                                  |        |        |            |        |        | ●●★    |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        | ●●     |               |        |         |                        |       |        |        |        |       |        |        |        |       | D013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-LM     | 0.4                                  |        |        |            |        |        | ●●●    |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        |       |        |        |        |       |        |        |        | E013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-LM     | 0.8                                  |        |        |            |        |        | ●●★    |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        |       |        |        |        |       |        |        |        | E014  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | NEW VBMT160412-LM | 1.2                                  |        |        |            |        |        | ●●     |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Light Cutting    | VBMT110302-LS     | 0.2                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | D012  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110304-LS     | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | D013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110308-LS     | 0.8                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | E013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-LS     | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | E014  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-LS     | 0.8                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NEW VBMT160412-LS                                                                                     | 1.2               |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        | ●      |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Light Cutting  | VBMT110304-SV     | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        | ★     |        |        |        |       |        |        |        | D012  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110308-SV     | 0.8                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        | ●     |        |        |        |       |        |        |        | D013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-SV     | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        | ●     |        |        |        |       |        |        | E013   |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-SV     | 0.8                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        | ★     |        |        |        |       |        |        | E014   |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | VBMT160404-MP     | 0.4                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        | ●      |               |        |         | ★                      |       |        |        |        |       |        |        |        |       | E013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-MP     | 0.8                                  | ●●●★   |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        | ★      |               |        | ★       |                        |       |        |        |        |       |        |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | VBMT160404-MM     | 0.4                                  |        |        |            |        |        | ●●     |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        |       |        |        |        |       |        |        |        | E013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-MM     | 0.8                                  |        |        |            |        |        | ●●     |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        | ●      |        |               |        |         |                        |       |        |        |        |       |        |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | VBMT160404-MK     | 0.4                                  |        |        |            |        |        |        |        |        |       | ★●●★   |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        | E013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-MK     | 0.8                                  |        |        |            |        |        |        |        |        |       | ★●●★   |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | VBMT160402-MS     | 0.2                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-MS     | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | E013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-MS     | 0.8                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        | H013  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160412-MS     | 1.2                                  |        |        |            |        |        |        |        |        |       |        |        |        |        |       | ●●●        |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       | ●      |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <br>Medium Cutting | VBMT110304-MV     | 0.4                                  | ●●★    |        |            |        |        | ●      |        |        |       | ●      |        |        |        |       |            |        |        |        |       |        |        |        | ●      | ●●     | ★             | ●●★    |         |                        |       |        |        |        |       |        |        |        |       | D012 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT110308-MV     | 0.8                                  | ●●★    |        |            |        |        | ★      |        |        |       | ●      |        |        |        |       |            |        |        |        |       |        |        |        | ●      | ★      | ●             | ★      | ●●★     |                        |       |        |        |        |       |        |        |        |       | D013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160404-MV     | 0.4                                  | ●●★    |        |            |        |        | ●      |        |        |       | ●      |        |        |        |       |            |        |        |        |       |        |        |        | ●      | ●●     | ●             | ●●●    |         |                        |       |        |        |        |       |        |        |        |       | E013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       | VBMT160408-MV     | 0.8                                  | ★★     |        |            |        |        | ●      |        |        |       | ●      |        |        |        |       |            |        |        |        |       |        |        |        | ●      | ●●     | ★             | ●●★    |         |                        |       |        |        |        |       |        |        |        |       | E014 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                       |                   |                                      |        |        |            |        |        |        |        |        |       |        |        |        |        |       |            |        |        |        |       |        |        |        |        |        |               |        |         |                        |       |        |        |        |       |        |        |        |       | H013 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

# TURNING INSERTS [POSITIVE]



## 35° VB TYPE INSERTS WITH HOLE

### VBET 11 03 V3 R- SR

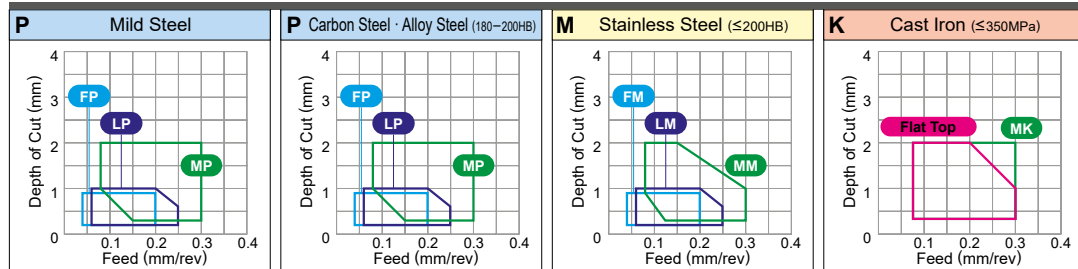
Size Thickness Corner Radius R/L Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                      | P               | Steel                                |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|---------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------|--------|--------|------------|--------|--------|--------|--------|--------|-------|--------|------------|--------|--------|-----------|------------|---------------|--------|---------|------------------------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|------------------------------|------------------------------|
|                                                                                                               | M               | Stainless Steel                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | K               | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | N               | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | S               | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
| Shape                                                                                                         | Order Number    | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |            |        |        |           |            | Coated Cermet | Cermet | Carbide | Applicable Holder Page |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               |                 |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW MC5105 | MC5115 | MC5125 | NEW MH515 | NEW MV9005 | MP9005        | MP9015 | MP9025  |                        | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M                        |                              |
| <br>Medium Cutting         | VBET1103V3R-SR  | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ★      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              | D012<br>D013<br>E013<br>E014 |
|                                                                                                               | VBET1103V3L-SR  | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ★      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110301R-SR  | 0.1                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110301L-SR  | 0.1                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110302R-SR  | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110302L-SR  | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        | ★      |        |        |        |       | ★     |       | ★      |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110304R-SR  | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
| <br>Medium Cutting         | VBET110300R-SN  | 0                                    |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              | D012<br>D013<br>E013<br>E014 |
|                                                                                                               | VBET110300L-SN  | 0                                    |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ★      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET1103V3R-SN  | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET1103V3L-SN  | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110301R-SN  | 0.1                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110301L-SN  | 0.1                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110302R-SN  | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        | ★     |       | ★     |        |        |        |       |        |        |        |                              |                              |
| <br>Medium Cutting (Wiper) | VBET110302L-SN  | 0.2                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       | ●      |        |        |        |        | ★      |       | ★     |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET110304R-SN  | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       | ●      |        |        |        |        | ★      |       | ●     |       |        |        |        |       |        |        |        |                              |                              |
|                            | VBET110304L-SN  | 0.4                                  |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       | ★      |        |        |        |        | ★      |       | ★     |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               | VBET1103V3RW-SN | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        |       |       |       |        |        |        |       |        |        |        | D012<br>D013<br>E013<br>E014 |                              |
|                                                                                                               | VBET1103V3LW-SN | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ★      |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                            | VBET1103V3RW-SN | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ●      |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              | E013<br>H013                 |
|                                                                                                               | VBET1103V3LW-SN | 0.03                                 |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        | ★      |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                            |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                            |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                            |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |
|                                                                                                               |                 |                                      |        |        |            |        |        |        |        |        |       |        |            |        |        |           |            |               |        |         |                        |       |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |                              |                              |



# 35° VC TYPE INSERTS WITH HOLE

**VCMT 08 02 02- FP**

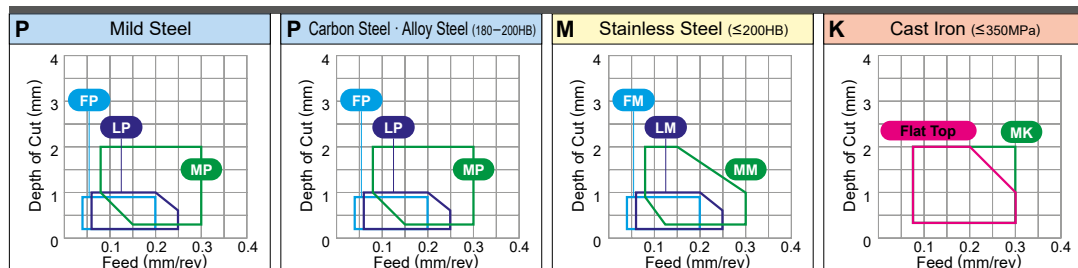
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting

| Material | P | Steel |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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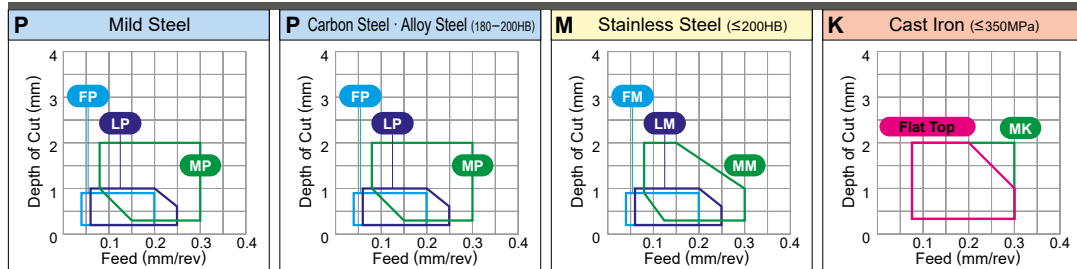
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Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P            | Steel                                |                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|          | M            | Stainless Steel                      |                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|          | K            | Cast Iron                            |                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|          | N            | Non-ferrous Metal                    |                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|          | S            | Heat-resistant Alloy, Titanium Alloy |                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape    | Order Number | RE (mm)                              | Coated                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  |  |  |  |  |  |  | Coated Cermet | Cermet | Carbide | Applicable Holder Page |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|          |              |                                      | MC6115<br>NEW MC6125<br>MC6135<br>MC6035<br>MS6015<br>MC7015<br>MC7025<br>MP7035<br>US735<br>MS7025<br>NEW MC5105<br>NEW MC5115<br>NEW MC5125<br>MH515<br>MV9005<br>MP9005<br>MP9015<br>MP9025<br>US905<br>MS9025<br>VP05RT<br>VP10RT<br>VP15TF<br>VP30RT<br>MP3025<br>AP25N<br>VP25N<br>VP45N<br>NX2525<br>NX3035<br>UT120T<br>HT110<br>RT9010<br>MT9005<br>MT9015<br>UP20M |  |  |  |  |  |  |  |  |  |  |  |               |        |         |                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A056 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |



# TURNING INSERTS [POSITIVE]



## 35° VC TYPE INSERTS WITH HOLE

**VCMT 08 02 02- MV**

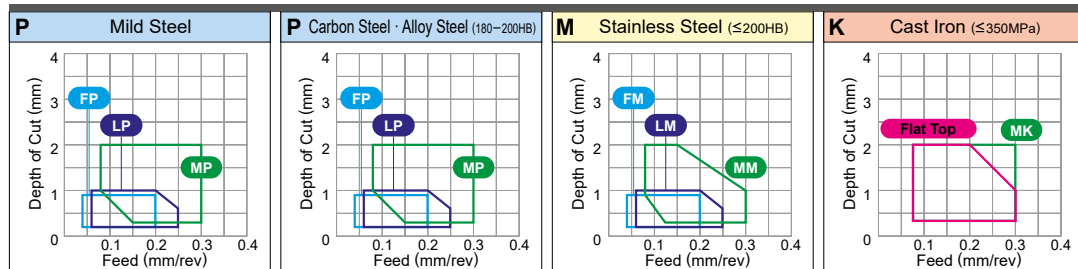
Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

### CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Light Cutting.....

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                                             | P             | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|---------------|--------------|---------------|--------|--------|--------|-------|--------|--------|--------|--------|--------|------------------|-------|--------|-------|---------|--------|--------|-------|---------------------------|--------|--------|--------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                                                                                                                                      | M             | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | K             | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | N             | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | S             | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                                                                                                                                | Order Number  | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        | Coated<br>Cermet |       | Cermet |       | Carbide |        |        |       | Applicable<br>Holder Page |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      |               |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MS6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | NEW<br>MC5125 | NEW<br>MH515 | NEW<br>MV9005 | MP9005 | MP9015 | MP9025 | US905 | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025           | AP25N | VP25N  | VP45N | NX2525  | NX3035 | UTi20T | HTi10 |                           | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>MV</div> <div></div> <div>Medium Cutting</div> | VCMT080202-MV | 0.2                                  | ★      | ★      |               |        |        |        | ●      |        |       |        |               |        |               |              |               |        |        |        |       |        | ●      |        | ★      | ●      |                  | ★     | ●      | ★     |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | VCMT080204-MV | 0.4                                  | ●      | ★      |               |        |        |        | ●      |        |       | ●      |               |        |               |              |               |        |        |        |       |        | ●      |        | ★      | ●      |                  | ★     | ●      | ★     |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div>Flat Top</div> <div></div>                   | VCMW110304    | 0.4                                  |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       | ●                         |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | VCMW160404    | 0.4                                  |        |        |               |        |        |        |        |        |       |        | ●             | ●      | ★             |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       | ●                         |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      | VCMW160408    | 0.8                                  |        |        |               |        |        |        |        |        |       |        | ●             | ●      | ★             | ★            |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        | ●     |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                      |               |                                      |        |        |               |        |        |        |        |        |       |        |               |        |               |              |               |        |        |        |       |        |        |        |        |        |                  |       |        |       |         |        |        |       |                           |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

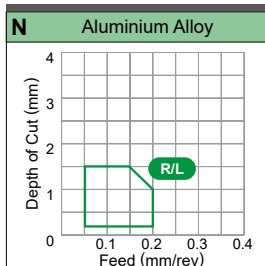
● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

CHIPBREAKERS > A056

## CHIP CONTROL RANGE FOR MATERIAL

Medium Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

**POSI  
15°**

**WITH  
HOLE**

## WITH HOLE

C

D

**P**

**S**

T

V

W

Size Thickness Corner Radius R/L Chipbreaker  
\* Please refer to page A002.

Medium Cutting.....



**POSI  
11°**

**WITH  
HOLE**

\* Indicates the maximum value of the corner R. For more details, see page D003.

● = NEW

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

CHIPBREAKERS ➤ A064

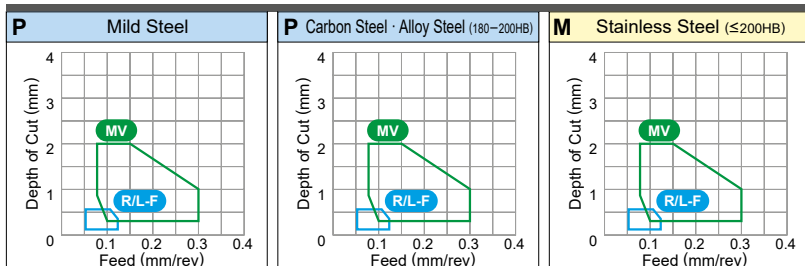


**WBGT 02 01 V3 L- F**

Size Thickness Corner Radius R/L Chipbreaker  
\* Please refer to page A002.

Finish Cutting.....

Medium Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

**POSI  
5°**

## WITH HOLE

6

D

## R

**S**

T

v

W

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A052 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

# TURNING INSERTS [POSITIVE]

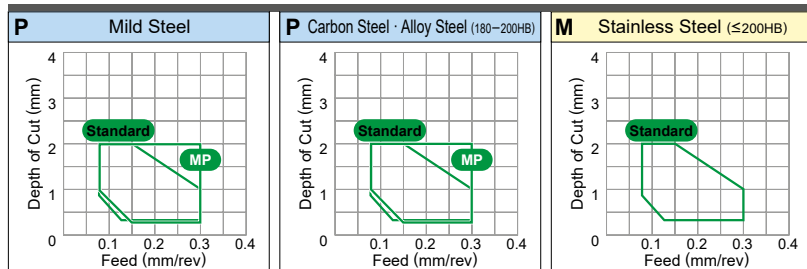


WCGT 02 01 02 R

Size Thickness Corner Radius R/L  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Medium Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material               | P | Steel                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------|---|--------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|                        | M | Stainless Steel                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Shape                  | K | Cast Iron                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        | N | Non-ferrous Metal                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| S                      | S | Heat-resistant Alloy, Titanium Alloy |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Coated                 |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Coated Cermet          |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cermet                 |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Carbide                |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Applicable Holder Page |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R/L                    |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Finish Cutting         |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FV                     |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Finish Cutting         |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MP                     |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Medium Cutting         |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Standard               |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Medium Cutting         |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                        |   |                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

CHIPBREAKERS > A056

80°

# WP TYPE INSERTS WITH HOLE

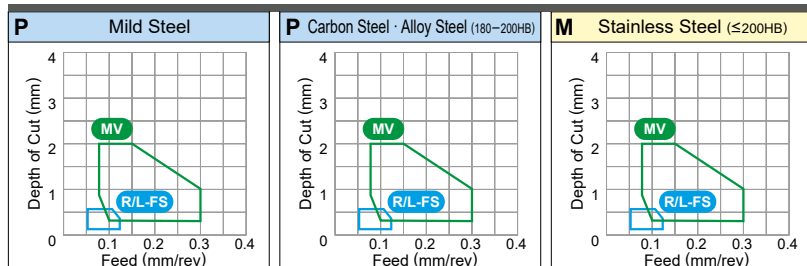
**WPGT 04 02 04 R- FS**

Size Thickness Corner Radius R/LChipbreaker  
\* Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....

Medium Cutting.....



**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

**POS**  
**11°**

## WITH HOLE

C

D

**P**

**S**

T

V

W

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A064 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

**A185**

# TURNING INSERTS [POSITIVE]



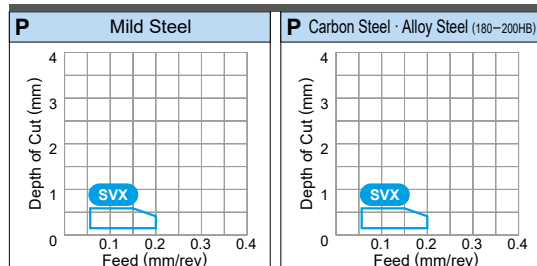
## 25° XC TYPE INSERTS WITH HOLE

**XCMT 15 03 02- SVX**

Size Thickness Corner Radius Chipbreaker  
★ Please refer to page A002.

### CHIP CONTROL RANGE FOR MATERIAL

Finish Cutting.....



Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material                                                                                                    | P              | Steel                                |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|-------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------|--------|--------|---------------|--------|--------|--------|--------|--------|-------|--------|---------------|--------|--------|--------------|--------|------------------|--------|---------|-------|--------|---------------------------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
|                                                                                                             | M              | Stainless Steel                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | K              | Cast Iron                            |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | N              | Non-ferrous Metal                    |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | S              | Heat-resistant Alloy, Titanium Alloy |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
| Shape                                                                                                       | Order Number   | RE<br>(mm)                           | Coated |        |               |        |        |        |        |        |       |        |               |        |        |              |        | Coated<br>Cermet | Cermet | Carbide |       |        | Applicable<br>Holder Page |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             |                |                                      | MC6115 | MC6125 | NEW<br>MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | NEW<br>MC5105 | MC5115 | MC5125 | NEW<br>MH515 | MV9005 | MP9005           | MP9015 | MP9025  | US905 | MS9025 |                           | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |
| <div>SVX</div> <div></div> | XCMT150302-SVX | 0.2                                  |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | XCMT150304-SVX | 0.4                                  |        |        | ● ★           |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        | ●      |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | XCMT150308-SVX | 0.8                                  |        |        | ● ★           |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           | ●      |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |
|                                                                                                             | Light Cutting  |                                      |        |        |               |        |        |        |        |        |       |        |               |        |        |              |        |                  |        |         |       |        |                           |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

CHIPBREAKERS ➤ A056



# RTG TYPE INSERTS WITHOUT HOLE

**Cutting Conditions (Guide) :** ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

[illegible]

● = NEW

A

## TURNING INSERTS

**POSI  
6°**

**WITHOUT HOLE**

C

D

**P**

**S**

**T**

V

W

|                |        |
|----------------|--------|
| CHIPBREAKERS   | ➤ A073 |
| GRADES         | ➤ A030 |
| IDENTIFICATION | ➤ A002 |

**A187**

# TURNING INSERTS [POSITIVE]



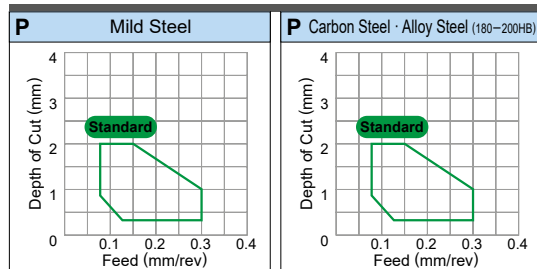
**90° SP** TYPE INSERTS  
WITHOUT HOLE

**SPGR 09 03 04 R**

Size Thickness Corner Radius R/L  
★ Please refer to page A002.

## CHIP CONTROL RANGE FOR MATERIAL

Medium Cutting.....



TURNING INSERTS

A

Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P            | Steel                                |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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|          | M            | Stainless Steel                      |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|          | K            | Cast Iron                            |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|          | N            | Non-ferrous Metal                    |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|          | S            | Heat-resistant Alloy, Titanium Alloy |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| Shape    | Order Number | RE (mm)                              | Coated |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        | Coated Cermet | Cermet | Carbide | Applicable Holder Page |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|          |              |                                      | MC6115 | MC6125 | NEW MC6135 | MC6035 | MS6015 | MC7015 | MC7025 | MP7035 | US735 | MS7025 | MC5105 | MC5115 | NEW MC5125 | NEW MH515 | NEW MV9005 | MP9005 | MP9015        | MP9025 | US905   |                        | MS9025 | VP05RT | VP10RT | VP15TF | VP30RT | MP3025 | AP25N | VP25N | VP45N | NX2525 | NX3035 | UTi20T | HTi10 | RT9010 | MT9005 | MT9015 | UP20M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
| R        | SPGR090304R  | 0.4                                  |        |        |            |        |        |        |        |        |       |        |        |        |            |           |            |        |               |        |         |                        |        |        |        |        |        |        |       |       |       |        |        |        |       |        |        |        |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

\* MC6035/MC7015/MC7025/MP7035 will be replaced by MC6135/MC7115/MC7125/MP7135

Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

| Material | P | Steel | ● ✖ ✖ ✖ ✖ ● |  |  |  |  |  |  |  |  |  |  |  | ● ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ ✖ 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TURNING INSERTS

POSI 7°

WITHOUT HOLE

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● = NEW

# A191



## TURNING TOOLS

# PCBN & PCD INSERT STANDARDS

# PCBN & PCD INSERT GRADES

|                                           |      |
|-------------------------------------------|------|
| IDENTIFICATION .....                      | B002 |
| CLASSIFICATION OF PCBN & PCD GRADES ..    | B004 |
| CBN (CUBIC BORON NITRIDE) .....           | B006 |
| PCD (SINTERED DIAMOND) .....              | B015 |
| CLASSIFICATION OF PCBN & PCD INSERTS .... | B016 |

### STANDARD OF PCBN TURNING INSERTS

#### NEGATIVE INSERTS WITH HOLE

|         |                |      |
|---------|----------------|------|
| CN TYPE | RHOMBIC 80°    | B022 |
| DN TYPE | RHOMBIC 55°    | B025 |
| SN TYPE | SQUARE 90°     | B029 |
| TN TYPE | TRIANGULAR 60° | B030 |
| VN TYPE | RHOMBIC 35°    | B032 |
| WN TYPE | TRIGON 80°     | B034 |

#### NEGATIVE INSERTS WITHOUT HOLE

|         |                |      |
|---------|----------------|------|
| CN TYPE | RHOMBIC 80°    | B035 |
| DN TYPE | RHOMBIC 55°    | B035 |
| RN TYPE | ROUND          | B035 |
| SN TYPE | SQUARE 90°     | B036 |
| TN TYPE | TRIANGULAR 60° | B036 |

#### POSITIVE INSERTS WITH HOLE

|         |                |      |
|---------|----------------|------|
| CC TYPE | RHOMBIC 80°    | B037 |
| CP TYPE | RHOMBIC 80°    | B039 |
| DC TYPE | RHOMBIC 55°    | B040 |
| TC TYPE | TRIANGULAR 60° | B042 |
| TP TYPE | TRIANGULAR 60° | B043 |
| VB TYPE | RHOMBIC 35°    | B045 |
| VC TYPE | RHOMBIC 35°    | B046 |

#### POSITIVE INSERTS WITHOUT HOLE

|         |            |      |
|---------|------------|------|
| SP TYPE | SQUARE 90° | B047 |
| GY TYPE |            | B048 |

### STANDARD OF PCD TURNING INSERTS

#### NEGATIVE INSERTS WITH HOLE

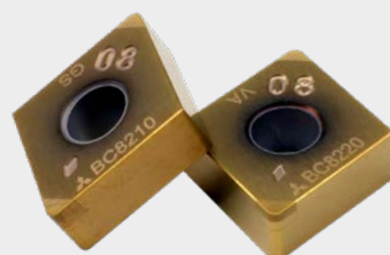
|         |                |      |
|---------|----------------|------|
| CN TYPE | RHOMBIC 80°    | B049 |
| DN TYPE | RHOMBIC 55°    | B050 |
| SN TYPE | SQUARE 90°     | B050 |
| TN TYPE | TRIANGULAR 60° | B051 |
| VN TYPE | RHOMBIC 35°    | B052 |

#### POSITIVE INSERTS WITH HOLE

|         |                |      |
|---------|----------------|------|
| CC TYPE | RHOMBIC 80°    | B053 |
| CP TYPE | RHOMBIC 80°    | B053 |
| DC TYPE | RHOMBIC 55°    | B054 |
| SP TYPE | SQUARE 90°     | B054 |
| TC TYPE | TRIANGULAR 60° | B055 |
| TP TYPE | TRIANGULAR 60° | B056 |
| VB TYPE | RHOMBIC 35°    | B057 |
| VC TYPE | RHOMBIC 35°    | B057 |
| WC TYPE | TRIGON 80°     | B058 |
| WP TYPE | TRIGON 80°     | B058 |
| DE TYPE | RHOMBIC 55°    | B059 |
| TE TYPE | TRIANGULAR 60° | B059 |
| VD TYPE | RHOMBIC 35°    | B060 |

#### POSITIVE INSERTS WITHOUT HOLE

|         |                |      |
|---------|----------------|------|
| SP TYPE | SQUARE 90°     | B061 |
| TP TYPE | TRIANGULAR 60° | B061 |

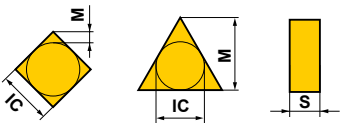




# IDENTIFICATION

B

|                   |                        |
|-------------------|------------------------|
| BR                | For Large Depth of Cut |
| BM                | With Chipbreaker       |
| BF                | With Chipbreaker       |
| NP                | New Petit Cut          |
| No mark           | Standard Type          |
| ① Insert Geometry |                        |

|                                                                                     |                                              |                                                    |                                            |                |                |       |
|-------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------|--------------------------------------------|----------------|----------------|-------|
|  |                                              |                                                    |                                            |                |                |       |
| Symbol                                                                              | Tolerance of<br>Nose Height<br><b>M</b> (mm) | Tolerance of<br>Inscribed Circle<br><b>IC</b> (mm) | Tolerance of<br>Thickness<br><b>S</b> (mm) |                |                |       |
| <b>G</b>                                                                            | ±0.025                                       | ±0.025                                             | ±0.13                                      |                |                |       |
| <b>M *</b>                                                                          | ±0.08—±0.18                                  | ±0.05—±0.15                                        | ±0.13                                      |                |                |       |
| Inserts marked with * are sintered.                                                 |                                              |                                                    |                                            |                |                |       |
| Detail of M Class Insert Tolerance                                                  |                                              |                                                    |                                            |                |                |       |
| ● Tolerance of Nose Height <b>M</b> (mm)                                            |                                              |                                                    |                                            |                |                |       |
| D.I.C.                                                                              | Triangular                                   | Square                                             | Rhombic<br>80°                             | Rhombic<br>55° | Rhombic<br>35° | Round |
| <b>6.35</b>                                                                         | ±0.08                                        | ±0.08                                              | ±0.08                                      | ±0.11          | ±0.16          | —     |
| <b>9.525</b>                                                                        | ±0.08                                        | ±0.08                                              | ±0.08                                      | ±0.11          | ±0.16          | —     |
| <b>12.70</b>                                                                        | ±0.13                                        | ±0.13                                              | ±0.13                                      | ±0.15          | —              | —     |
| ● Tolerance of Inscribed Circle <b>IC</b> (mm)                                      |                                              |                                                    |                                            |                |                |       |
| D.I.C.                                                                              | Triangular                                   | Square                                             | Rhombic<br>80°                             | Rhombic<br>55° | Rhombic<br>35° | Round |
| <b>6.35</b>                                                                         | ±0.05                                        | ±0.05                                              | ±0.05                                      | ±0.05          | ±0.05          | —     |
| <b>9.525</b>                                                                        | ±0.05                                        | ±0.05                                              | ±0.05                                      | ±0.05          | ±0.05          | ±0.05 |
| <b>12.70</b>                                                                        | ±0.08                                        | ±0.08                                              | ±0.08                                      | ±0.08          | —              | ±0.08 |
| <b>④ Tolerance Class</b>                                                            |                                              |                                                    |                                            |                |                |       |

① NP - ② D ③ N ④ G ⑤ A

|                |              |                                                                                     |
|----------------|--------------|-------------------------------------------------------------------------------------|
| ② Insert Shape |              |                                                                                     |
| Symbol         | Insert Shape |                                                                                     |
| C              | Rhombic 80°  |  |
| D              | Rhombic 55°  |  |
| R              | Round        |  |
| S              | Square       |  |
| T              | Triangular   |  |
| V              | Rhombic 35°  |  |
| W              | Trigon       |  |

|                    |                  |                                                                                     |
|--------------------|------------------|-------------------------------------------------------------------------------------|
| ③ Normal Clearance |                  |                                                                                     |
| Symbol             | Normal Clearance |                                                                                     |
| B                  | 5°               |  |
| C                  | 7°               |  |
| D                  | 15°              |  |
| E                  | 20°              |  |
| N                  | 0°               |  |
| P                  | 11°              |  |

|                                 |              |                          |             |                                                                                       |
|---------------------------------|--------------|--------------------------|-------------|---------------------------------------------------------------------------------------|
| ⑤ Fixing and/or for Chipbreaker |              |                          |             |                                                                                       |
| Metric                          |              |                          |             |                                                                                       |
| Symbol                          | Hole         | Hole Configuration       | Chipbreaker | Figure                                                                                |
| W                               | With Hole    | Cylindrical Hole +       | No          |  |
| T/V                             | With Hole    | One Countersink (40—60°) | One Sided   |  |
| B                               | With Hole    | Cylindrical Hole +       | No          |  |
| H                               | With Hole    | One Countersink (70—90°) | One Sided   |  |
| A                               | With Hole    | Cylindrical Hole         | No          |  |
| M                               | With Hole    | Cylindrical Hole         | One Sided   |  |
| N                               | Without Hole | —                        | No          |  |
| X                               | —            | —                        | —           | Special Design                                                                        |

| Diameter of Inscribed Circle (mm) | Symbol    |           |           |           |           |           |           |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                   |           |           |           |           |           |           |           |
| 3.97                              |           | <b>02</b> |           | <b>04</b> | <b>03</b> | <b>03</b> | <b>06</b> |
| 4.76                              |           | <b>L3</b> | <b>08</b> | <b>05</b> | <b>04</b> | <b>04</b> | <b>08</b> |
| 5.56                              |           | <b>03</b> | <b>09</b> | <b>06</b> | <b>05</b> | <b>05</b> | <b>09</b> |
| 6.35                              |           | <b>04</b> | <b>11</b> | <b>07</b> | <b>06</b> | <b>06</b> | <b>11</b> |
| 7.94                              |           | <b>05</b> | <b>13</b> | <b>09</b> | <b>08</b> | <b>07</b> | <b>13</b> |
| 9.525                             | <b>09</b> | <b>06</b> | <b>16</b> | <b>11</b> | <b>09</b> | <b>09</b> | <b>16</b> |
| 12.70                             | <b>12</b> | <b>08</b> | <b>22</b> | <b>15</b> | <b>12</b> | <b>12</b> | <b>22</b> |
| <b>⑥ Insert Size</b>              |           |           |           |           |           |           |           |

| *Thickness is from the bottom of the insert to the top of the cutting edge. |                |
|-----------------------------------------------------------------------------|----------------|
| Symbol                                                                      | Thickness (mm) |
| <b>S1</b>                                                                   | 1.39           |
| <b>01</b>                                                                   | 1.59           |
| <b>T0</b>                                                                   | 1.79           |
| <b>02</b>                                                                   | 2.38           |
| <b>T2</b>                                                                   | 2.78           |
| <b>03</b>                                                                   | 3.18           |
| <b>T3</b>                                                                   | 3.97           |
| <b>04</b>                                                                   | 4.76           |
| <b>⑦ Insert Thickness</b>                                                   |                |

| Symbol                               | Corner Radius (mm) |
|--------------------------------------|--------------------|
| <b>02</b>                            | 0.2                |
| <b>04</b>                            | 0.4                |
| <b>08</b>                            | 0.8                |
| <b>12</b>                            | 1.2                |
| <b>16</b>                            | 1.6                |
| <b>⑧ Insert Corner Configuration</b> |                    |

⑥ **15**    ⑦ **04**    ⑧ **04**    ⑨ **GA**    ⑩ **W**    ⑪ **2**    ⑫ **J**    ⑬ **R**

| ⑨ Application (Honing)                           |                                   |
|--------------------------------------------------|-----------------------------------|
| Symbol                                           | Honing                            |
| <b>GS</b><br><b>GA</b><br><b>GB</b><br><b>GH</b> | General Cutting                   |
| <b>VA</b>                                        | For High Speed, High Feed Cutting |
| <b>FS</b><br><b>FA</b><br><b>FB</b>              | Continuous Cutting                |
| <b>TS</b><br><b>TA</b><br><b>TH</b>              | Interrupted Cutting               |
| <b>SF</b><br><b>SE</b>                           | Sintered Alloys Cutting           |

| ⑩ Wiper        |                                         |
|----------------|-----------------------------------------|
| <b>WS</b>      | For High Rigidity Material              |
| <b>WL</b>      | For Deflection and Vibration Prevention |
| <b>No mark</b> | Without Wiper                           |

| ⑪ Number of Teeth |   |
|-------------------|---|
| <b>2</b>          | 2 |
| <b>3</b>          | 3 |
| <b>4</b>          | 4 |
| <b>6</b>          | 6 |
| <b>No mark</b>    | 1 |

| ⑫ Cutting Edge Angle                                   |                 |
|--------------------------------------------------------|-----------------|
| <b>F</b>                                               | 91°             |
| <b>J</b>                                               | 93°             |
| <b>No mark</b>                                         | Non Restriction |
| Please pay special attention when using wiper inserts. |                 |

| ⑬ Cutting Direction |         |          |
|---------------------|---------|----------|
| Figure              | Hand    | Symbol   |
|                     | Right   | <b>R</b> |
|                     | Left    | <b>L</b> |
|                     | Neutral | <b>N</b> |

Please refer to page B009 for further information.

# CLASSIFICATION OF PCBN & PCD GRADES

## FEATURES

### NON-COATED PCBN MATERIALS

PCBN sintered material base cutting tools are produced by binding CBN (cubic Boron Nitride) and ceramic having hardness next to diamond and sintering them under ultra-high pressure and at high temperature.

PCBN has lower affinity to iron than diamond. The low affinity and high hardness properties means that sintered PCBN delivers a superior cutting performance especially during high speed machining of materials such hardened steel, cast iron and sintered alloys.

B

### COATED PCBN MATERIALS

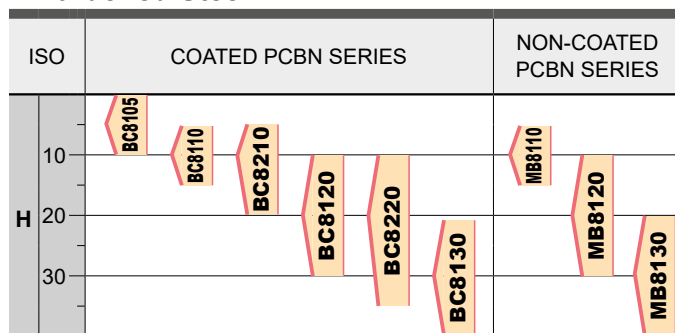
To achieve longer tool life, MITSUBISHI MATERIALS uses a unique "Particle-activated Sintering Method", combined with increased cutting edge strength. With high crater wear resistance PCBN grades, plus a wear resistant ceramic coating, longer tool life and improved machine efficiency are obtained.

### PCD MATERIALS (Sintered Diamond)

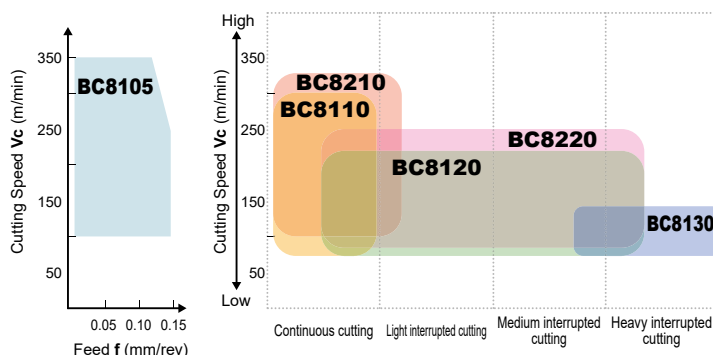
Suitable for cutting materials such as nonferrous metals and fibre reinforced plastics (FRP) including aluminium alloys. It supports ultra high speed finish machining.

## Materials for turning grades/application area

### ● Hardened Steel

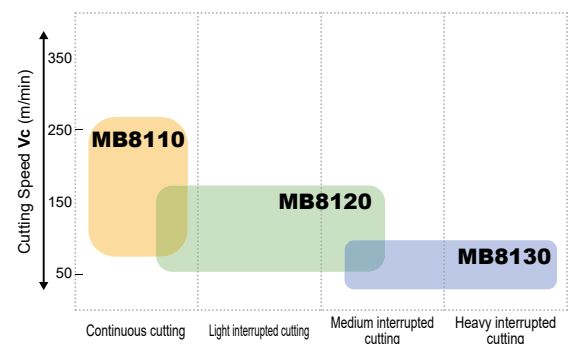


### COATED PCBN MATERIALS



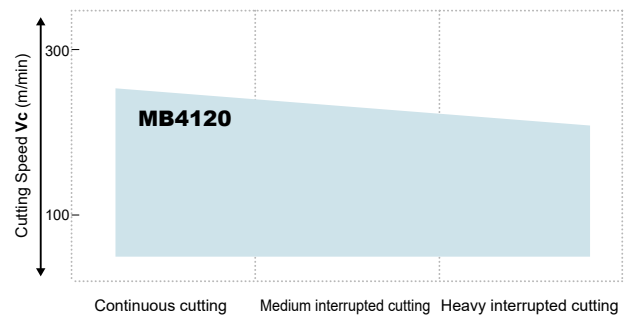
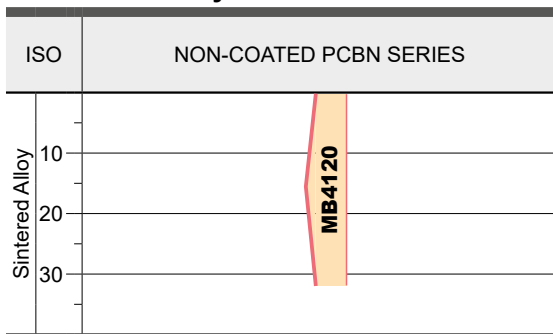
Suitable for finishing with surface roughness  $R_a$  0.6  $\mu\text{m}$  or  $R_z$  2.4  $\mu\text{m}$  or less.

### NON-COATED PCBN MATERIALS



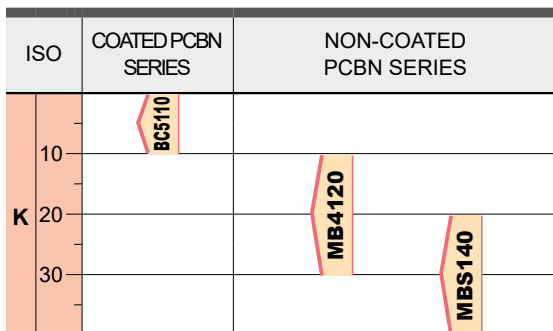
Coated PCBN Grade BC8100/BC8200 and non-coated PCBN Grade MB8100 for high-hardness steel processing are available for a wide range of applications from finishing to continuous cutting of hardened steels and strongly interrupted machining.

## ● Sintered Alloy



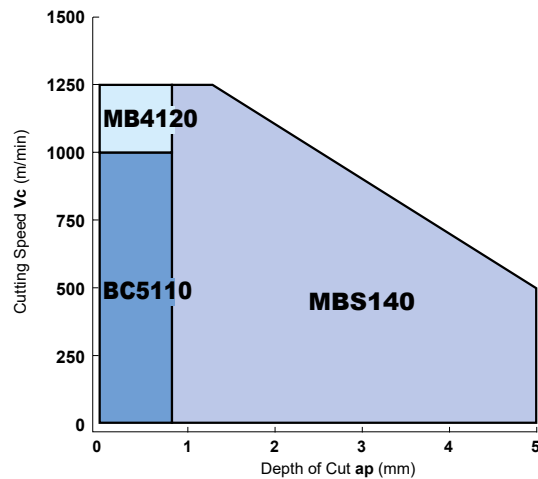
The PCBN grade "MB4120" for cutting sintered alloys and cast iron can be used over a wide range of applications from continuous to interrupted machining of cast iron and sintered alloy components such as oil pumps and valve mechanisms.

## ● Cast Iron



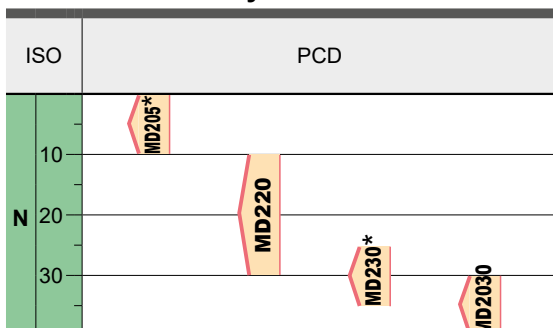
### BC5110

Tough substrate with a high hardness coating provides excellent chipping and wear resistance.

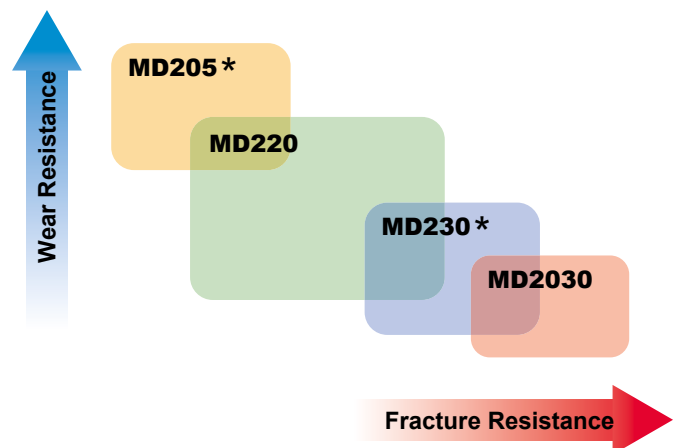


Range of grades available for general to larger depths of cut to enable high efficiency machining.

## ● Aluminium Alloy



\* MD205, MD230 : Non-Standard



Suitable for cutting materials such as nonferrous metals and fiber reinforced plastics (FRP) including aluminium alloys. It supports ultra high speed finish cutting.

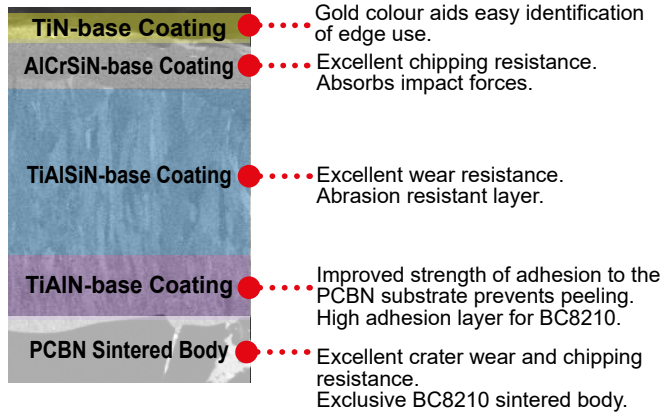
# COATED PCBN SERIES

## BC8200 series for machining of hardened steel

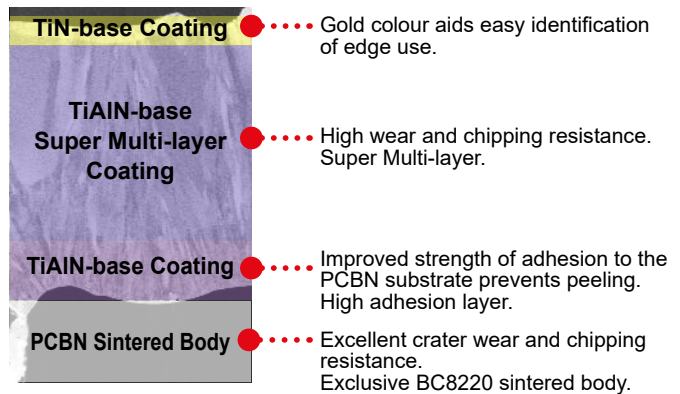
### FEATURES

#### ■ A Newly Developed Special Ceramic PVD Coating

##### BC8210

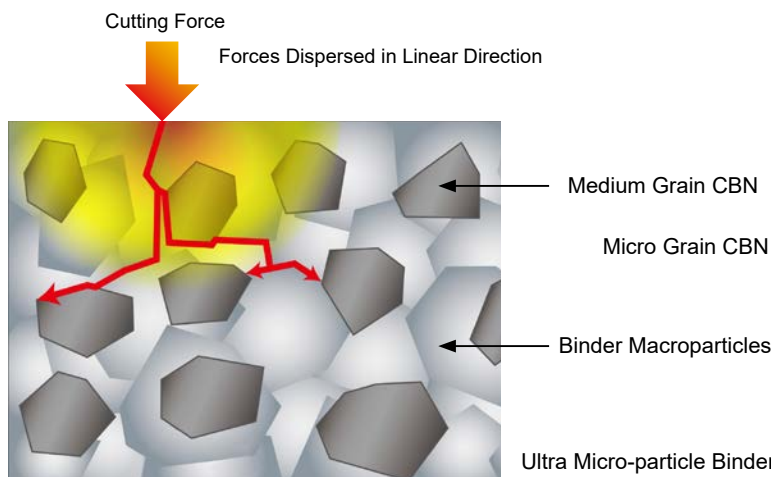


##### BC8220

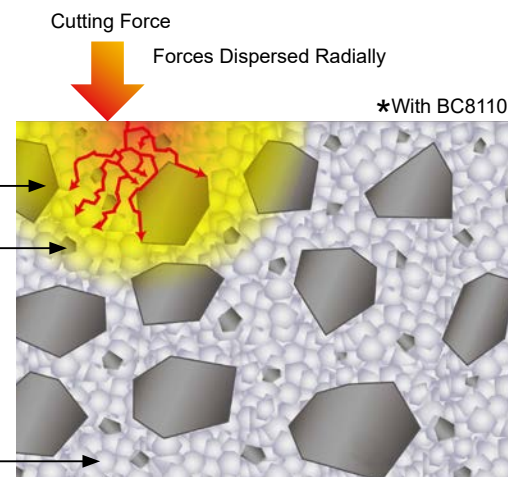


#### ■ Ultra Micro-Particle Binder Prevents Sudden Fractures

##### ● Conventional



##### ● BC8100 Series BC8200 Series

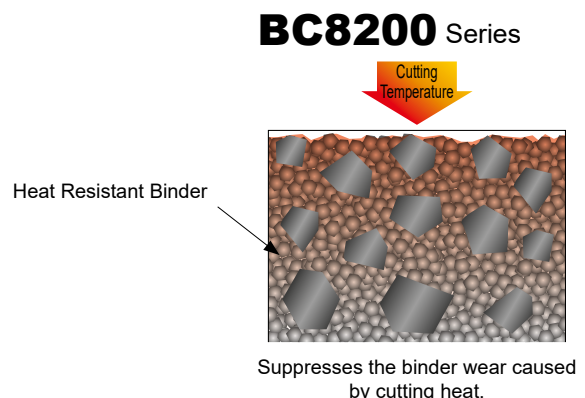
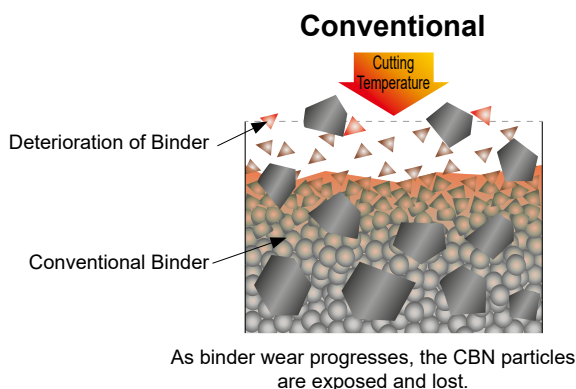


The ultra micro-particle binder prevents linear crack development to avoid sudden fracturing.

#### ■ Ultra Micro-Particle and Heat Resistant Binder Technology

### Positive Effect of the Newly Developed Heat Resistant Binder

The progress of crater wear is greatly reduced due to the use of a heat resistant binder. This suppresses chipping, crater wear and fracturing.



# Cast Iron Machining **BC5110**

## FEATURES

BC5110 uses a tough substrate with a highly hard coating to provide excellent chipping and wear resistance.

### Excellent Chipping Resistance

Compared to conventional grades, the fine grain and high CBN content greatly improves chipping resistance and provides stability and long tool life.

### Excellent Wear Resistance Coating

The hard ceramic coating layer provides excellent surface finishes as well as wear and notch resistance during continuous cutting. Additionally, chipping and peeling of the coating layer is suppressed due to the improved bonding strength to the CBN substrate.

# FOR CYLINDER LINER **MB5015**

\*Produced to order only.

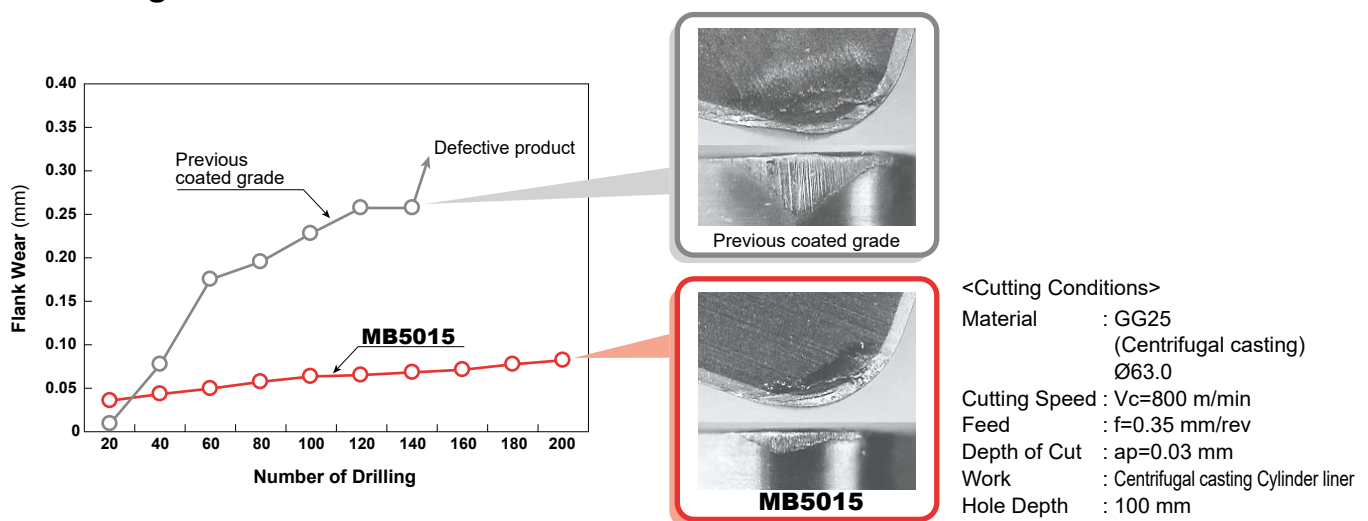
## FEATURES

**MB5015** is an exclusive grade with high wear resistance for boring of centrifugal casting cylinder liners in semi finishing or finishing applications.

### ■ Recommended Cutting Conditions

| Material            | Cutting Mode | Cutting Speed $V_c$ (m/min) |     |      |      | Feed $f$ (mm/rev)                       | Depth of Cut $a_p$ (mm)                  | Cutting Mode |
|---------------------|--------------|-----------------------------|-----|------|------|-----------------------------------------|------------------------------------------|--------------|
|                     |              | 100                         | 500 | 1000 | 1500 |                                         |                                          |              |
| Centrifugal casting | Cast Iron    |                             |     |      |      | —0.3(Finishing)<br>—0.8(Semi-finishing) | —0.05(Finishing)<br>—0.2(Semi-finishing) | Wet Cutting  |

### ■ Cutting Performance



B

# PCBN

- Suitable for high speed finishing of heat treated steel, sintered ferrous alloy and cast iron.
- Low affinity to iron, thus good surface finishes are possible.
- Grinding operations can be replaced by machining.

## ● Heat Treated Steel

| Material                                                      | Type       | Cutting Mode                           | Recommended Grade              | Recommended Cutting Conditions |                 |                      |              |
|---------------------------------------------------------------|------------|----------------------------------------|--------------------------------|--------------------------------|-----------------|----------------------|--------------|
|                                                               |            |                                        |                                | Cutting Speed Vc (m/min)       | Feed f (mm/rev) | Depth of Cut ap (mm) | Cutting Mode |
| Structural Steel<br>Esp. Carburized Steel<br>High Alloy Steel | Coated     | High speed finishing cutting           | <b>BC8105</b>                  | 250 (100—350)                  | ≤0.15           | ≤0.2                 | Dry,Wet      |
|                                                               |            | Continuous cutting for general purpose | <b>BC8210</b><br><b>BC8110</b> | 200 (100—300)                  | ≤0.2            | ≤0.35                | Dry,Wet      |
|                                                               |            |                                        | <b>BC8220</b><br><b>BC8120</b> | 200 (100—230)                  | ≤0.3            | ≤0.8                 | Dry,Wet      |
|                                                               |            | Medium interrupted cutting             | <b>BC8220</b><br><b>BC8120</b> | 150 (60—200)                   | ≤0.2            | ≤0.3                 | Dry,Wet      |
|                                                               |            | Interrupted cutting                    | <b>BC8130</b>                  | 120 (60—150)                   | ≤0.2            | ≤0.3                 | Dry,Wet      |
|                                                               | Non-coated | Continuous cutting for general purpose | <b>MB8110</b>                  | 200 (100—250)                  | ≤0.2            | ≤0.3                 | Dry,Wet      |
|                                                               |            |                                        | <b>MB8120</b>                  | 150 (80—220)                   | ≤0.2            | ≤0.5                 | Dry,Wet      |
|                                                               |            | Medium interrupted cutting             | <b>MB8120</b>                  | 130 (85—180)                   | ≤0.2            | ≤0.3                 | Dry,Wet      |
|                                                               |            | Interrupted cutting                    | <b>MB8130</b>                  | 100 (60—150)                   | ≤0.2            | ≤0.3                 | Dry,Wet      |

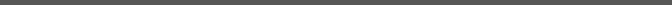
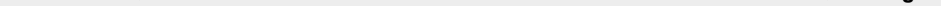
## ● Cast Iron

| Material        |      | Material Structure   | Cutting Speed Vc (m/min) |     |     |      |      | Feed<br>f (mm/rev) | Depth of Cut<br>ap (mm)       | Cutting<br>Mode |
|-----------------|------|----------------------|--------------------------|-----|-----|------|------|--------------------|-------------------------------|-----------------|
|                 |      |                      | 250                      | 500 | 750 | 1000 | 1250 |                    |                               |                 |
| Gray Cast Iron  | GG25 | Ferritic + Pearlitic | MBS140                   |     |     |      |      | —0.5               | —1.0<br>MBS140/BC5110<br>—5.0 | Dry,Wet         |
|                 | GG30 | Pearlitic            | BC5110 MB4120            |     |     |      |      |                    |                               |                 |
| Alloy Cast Iron |      | Pearlitic            | BC5110 MB4120            |     |     |      |      | —0.4               | —0.5                          | Dry,Wet         |

## ● Sintered Alloy

| Material                    | Recommended Grade | Recommended Cutting Conditions |                 |                      |
|-----------------------------|-------------------|--------------------------------|-----------------|----------------------|
|                             |                   | Cutting Speed Vc (m/min)       | Feed f (mm/rev) | Depth of Cut ap (mm) |
| General Sintered Alloy      | <b>MB4120</b>     | 180 (80—300)                   | —0.2            | —0.3                 |
| High Density Sintered Alloy | <b>MB4120</b>     | 150 (80—230)                   | —0.2            | —0.3                 |
| Sintered Alloy              | <b>MB4120</b>     | 130 (80—180)                   | —0.2            | —0.3                 |

## ● Valve Seat

|                           |                                                                                      |                                                                                      |     |     |       |
|---------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----|-----|-------|
| Amount of Hard Particles  | None or Small                                                                        |  |     |     | Large |
| Hardness of Material (HV) | 150                                                                                  | 250                                                                                  | 300 | 350 |       |
| Plunge Cut                |  |                                                                                      |     |     |       |
| Traverse Cut              |  |                                                                                      |     |     |       |

## ● Roll

| Material         | Grade                 | Recommended Cutting Conditions |                 |                      |
|------------------|-----------------------|--------------------------------|-----------------|----------------------|
|                  |                       | Cutting Speed Vc (m/min)       | Feed f (mm/rev) | Depth of Cut ap (mm) |
| Cemented Carbide | <b>MB4120, MBS140</b> | 20 (10—30)                     | —0.2            | —0.2                 |
|                  | <b>MD220 (PCD)</b>    | 20 (10—30)                     | —0.2            | —0.2                 |

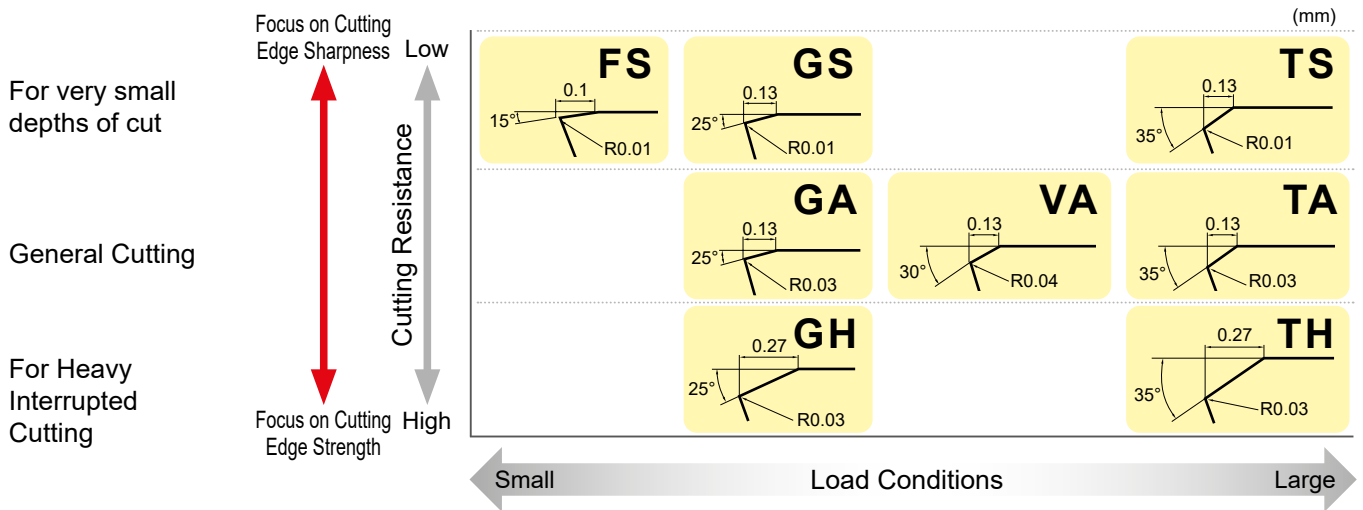
## ● Heat Resistant Alloy

| Material                                     | Grade         | Recommended Cutting Conditions |                 |                      |
|----------------------------------------------|---------------|--------------------------------|-----------------|----------------------|
|                                              |               | Cutting Speed Vc (m/min)       | Feed f (mm/rev) | Depth of Cut ap (mm) |
| Ni Base Heat Resistant Alloy (e.g. Inconel)  | <b>MB4120</b> | 120 (100—150)                  | —0.2            | —0.5                 |
| Co Base Heat Resistant Alloy (e.g. Stellite) | <b>MB4120</b> | 70 (50—100)                    | —0.2            | —0.5                 |

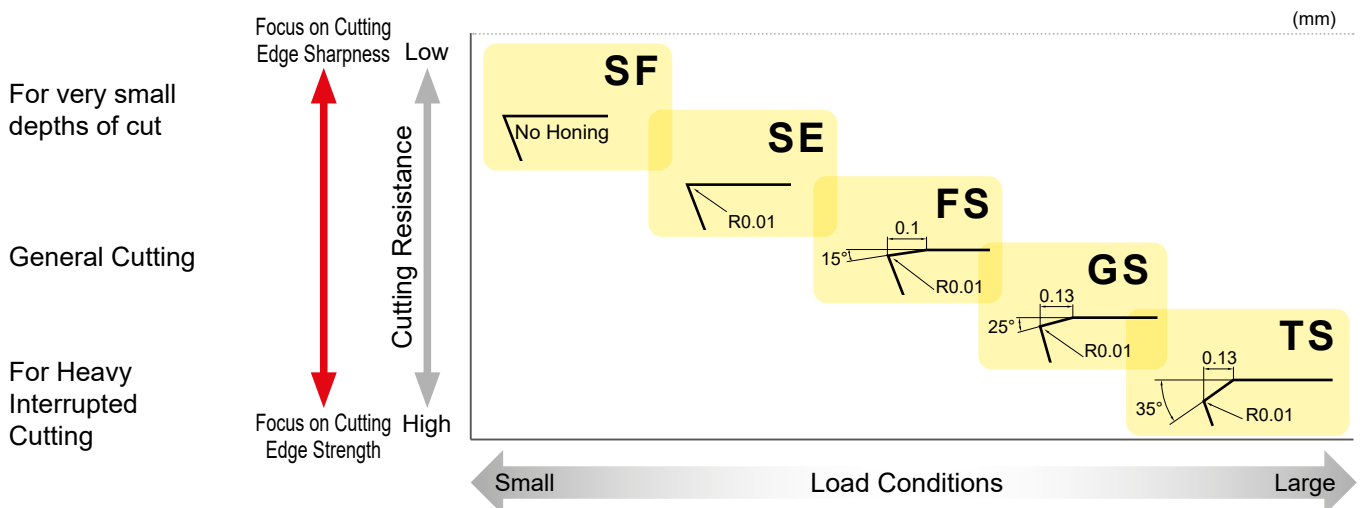


# HONING

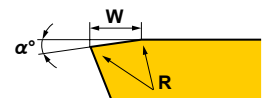
## ■ Honing for machining hardened steel



## ■ Honing for machining sintered alloys



NP-CNGA120408- **G** **A** 2



Main Application

Edge Honing Type

(mm)

|                                            | A       |      |      | S                          |      |      | H               |      |      | F             |   |   | E                |   |      |
|--------------------------------------------|---------|------|------|----------------------------|------|------|-----------------|------|------|---------------|---|---|------------------|---|------|
|                                            | General |      |      | Vibration and burr control |      |      | High efficiency |      |      | High accuracy |   |   | Chipping control |   |      |
|                                            | α       | W    | R    | α                          | W    | R    | α               | W    | R    | α             | W | R | α                | W | R    |
| <b>F</b> Continuous cutting                | 15°     | 0.1  | 0    | 15°                        | 0.1  | 0.01 | —               | —    | —    | —             | — | — | —                | — | —    |
| <b>G</b> General cutting                   | 25°     | 0.13 | 0.03 | 25°                        | 0.13 | 0.01 | 25°             | 0.27 | 0.03 | —             | — | — | —                | — | —    |
| <b>V</b> For High Speed, High Feed Cutting | 30°     | 0.13 | 0.04 | —                          | —    | —    | —               | —    | —    | —             | — | — | —                | — | —    |
| <b>T</b> Interrupted cutting               | 35°     | 0.13 | 0.03 | 35°                        | 0.13 | 0.01 | 35°             | 0.27 | 0.03 | —             | — | — | —                | — | —    |
| <b>S</b> High precision cutting            | —       | —    | —    | —                          | —    | —    | —               | —    | —    | 0°            | 0 | 0 | 0°               | 0 | 0.01 |

Conventional honing shapes

F honing : 0.1mm×15°+R0 G honing : 0.13mm×25°+R0.03 T honing : 0.13mm×35°+R0.03

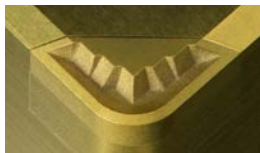
## PETIT CUT INSERT SERIES

The surface area of the CBN sintered body has been optimised to allow for a lower price. In addition, tool management is easier because repolishing is not required.

# PCBN CHIPBREAKER INSERT

## ■ Application Area

A BR Chipbreaker has been added to achieve better chip control at higher depths of cut.  
A versatile range of chipbreakers is available for a wide range of applications.



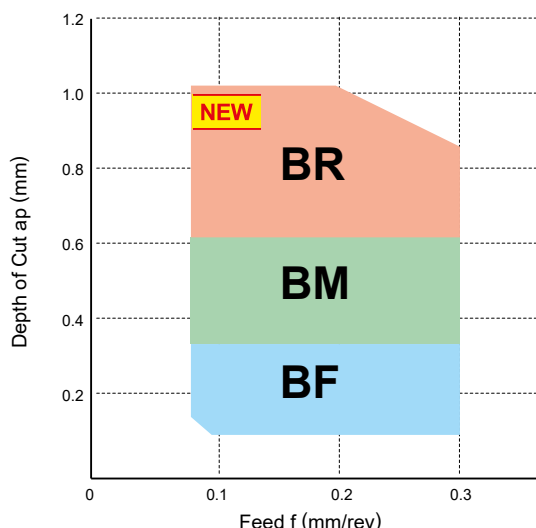
**BR Chipbreaker**



**BM Chipbreaker**



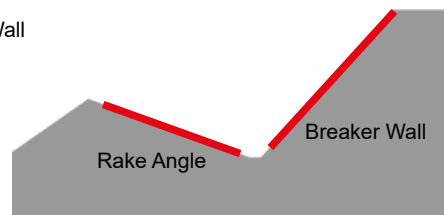
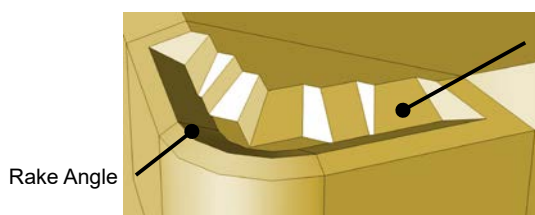
**BF Chipbreaker**



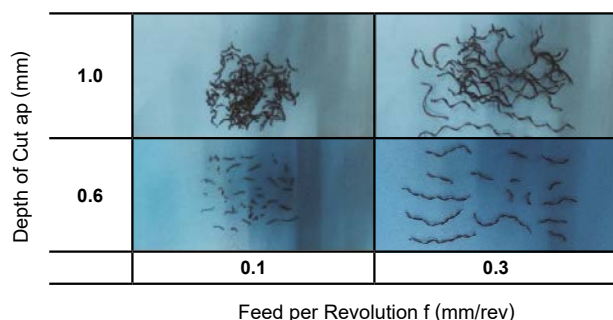
## **NEW** BR Chipbreaker (BC8220)

The number of passes needed is reduced and chip control during high depths of cut is also improved.  
Chips are formed with the effect from the rake angle, and the multi stage breaker wall supports a wide range of cuts.

Recommended Cutting Conditions :  $V_c=80-200$  m/min,  $f \leq 0.3$  mm/rev,  $a_p=0.6-1.0$  mm



**Achieves ideal chip control even at high depths of cut.**



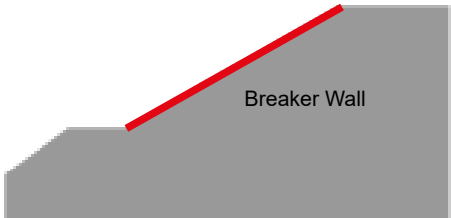
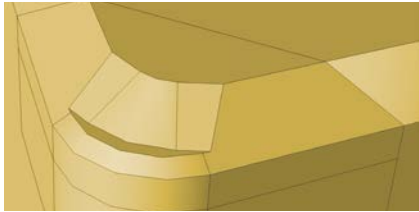
### <Cutting Conditions>

Material : JIS SCr420 (60 HRC)  
 Inserts : BR-CNGM120408TA2  
 Cutting Speed :  $V_c=200$  m/min  
 Feed per Rev. :  $f=0.1$  mm/rev  
                     0.3 mm/rev  
 Depth of Cut :  $a_p=0.6$  mm  
                     1.0 mm  
 Cutting Mode : Wet Cutting

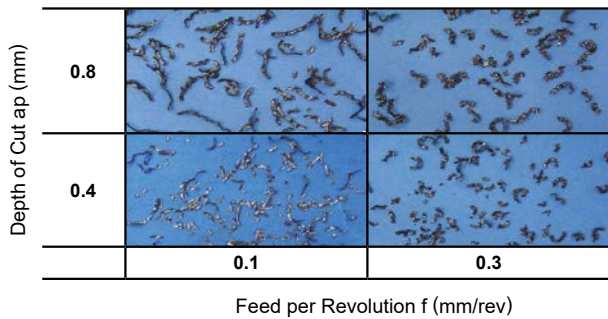
# BM Chipbreaker (BC8220)

Great chip control when machining at medium depths of cut. (0.3—0.8 mm)

Recommended Cutting Conditions :  $V_c=80-200$  m/min,  $f \leq 0.3$  mm/rev,  $a_p=0.3-0.8$  mm



B

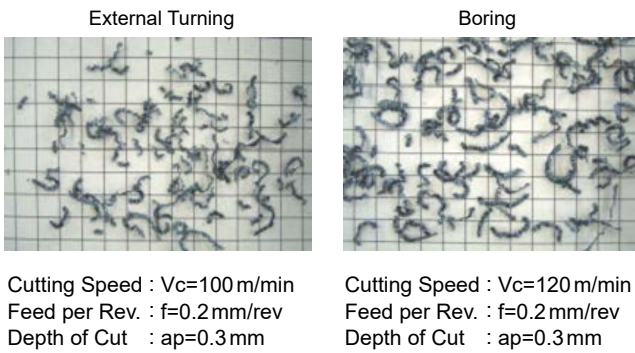
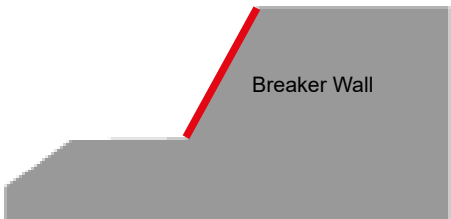
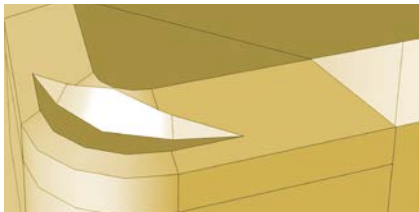


<Cutting Conditions>  
Material : JIS SCM415 (60 HRC)  
Inserts : BM-CNGM120408TA2  
Cutting Speed :  $V_c=160$  m/min  
Feed per Rev. :  $f=0.1$  mm/rev  
                  0.3 mm/rev  
Depth of Cut :  $a_p=0.4$  mm  
                  0.8 mm  
Cutting Mode : Wet Cutting

# BF Chipbreaker (BC8210, BC8220)

Achieves excellent chip control while finish cutting at depths of 0.3 mm or less.

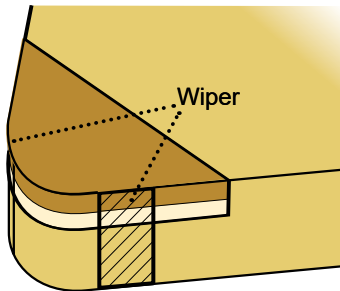
Recommended Cutting Conditions :  $V_c=80-200$  m/min,  $f \leq 0.3$  mm/rev,  $a_p=0.1-0.3$  mm



<Cutting Conditions>  
Material : JIS SCM415 (60 HRC)  
Inserts : BF-CNGM120408TS2  
Cutting Mode : Wet Cutting

# WIPER INSERT

## FEATURES



### Improving Surface Finish

Under the same machining conditions as conventional chipbreakers, but with the feed rate increased, the surface finish of the material can be improved.

### Improving Efficiency

High feed rates not only shorten machining times but also make it possible to combine roughing and finishing operations.

### Increased Tool Life

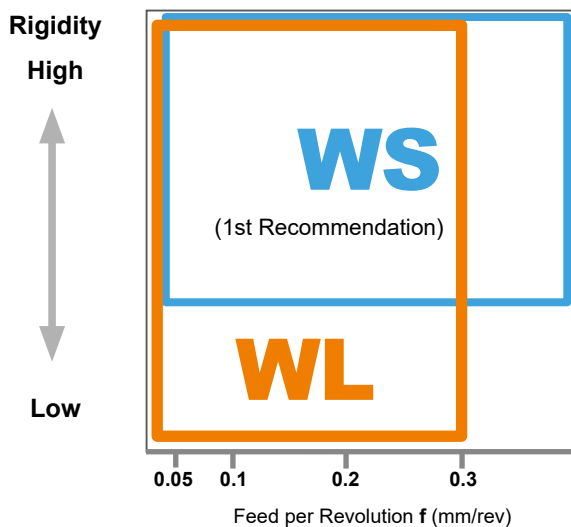
When using high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing, therefore, delaying the progression of wear and increasing tool life of the insert.

### Improving Chip Control

Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.

## Application of Wiper Inserts

The most recommended wiper shape is the WS Wiper. If deflection or chatter occur, use the WL Wiper.

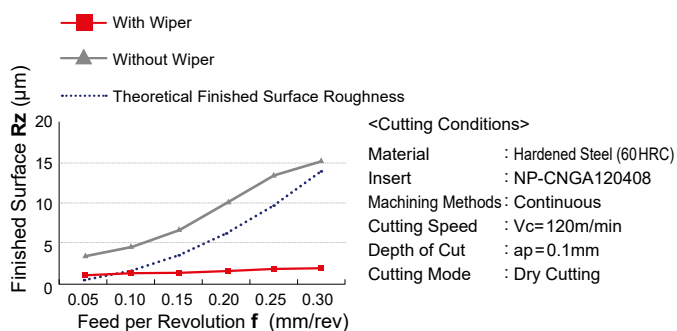


### Examples of Low Rigidity:

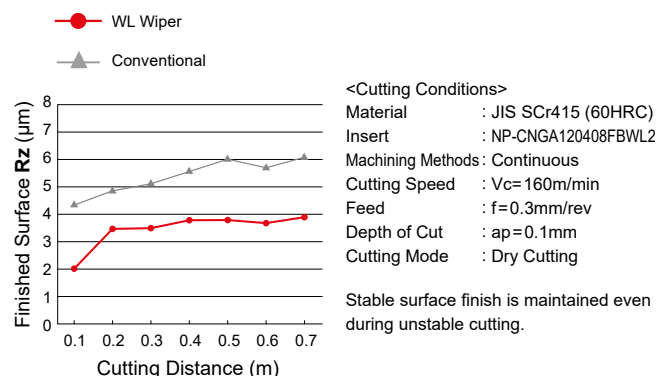
- When overhang length is long due to boring
- When the material has a small diameter

## Cutting Performance

### WL Wiper (External Turning)



### WL Wiper (Boring)

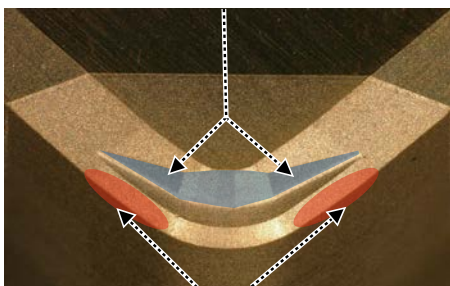


## Combination of BF Chipbreaker and WS Wiper Insert

CNGM and DNGM types are now available with new inserts that combine a BF Chipbreaker with a WS wiper Insert. (BC8210 : BF-○NGM○○○○○○○TSWS2, BC8220 : BF-○NGM○○○○○○○TAWS2)

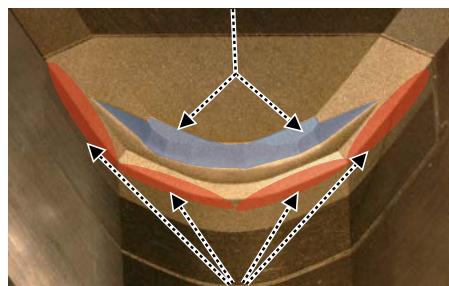
It is effective for chip control and improvement of finished surface roughness without worrying about the hand of the tool even when continuous external or internal turning and facing.

**BF Chipbreaker**



**WL Wiper (No hand)**  
BF-CNGM120408TSWS2

**BF Chipbreaker**



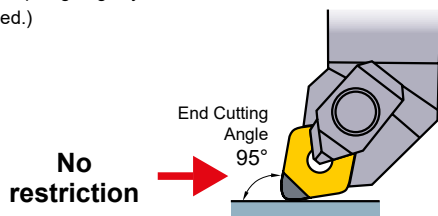
**WL Wiper (No hand)**  
BF-DNGM150412TAWS2

## ■ Notes for Use

### When using CNGM type

#### No Restriction for Holders

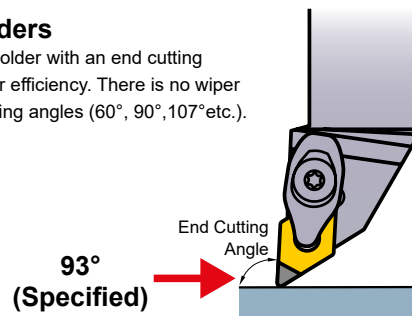
A standard holder can be used.  
(A double clamp, high rigidity tool is recommended.)



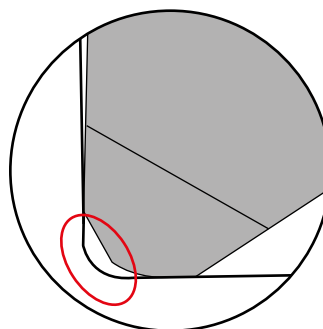
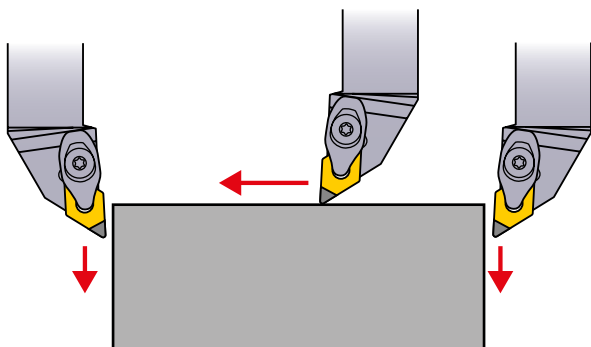
### When using DNGM type

#### Restriction for Holders

Use PDJN holder or DDJN holder with an end cutting angle 93° for improving wiper efficiency. There is no wiper efficiency with other end cutting angles (60°, 90°, 107°etc.).



Displays great wiper efficiency when machining the end face and outer diameter in both right-hand and left-hand machining.



The DNGM type is not suitable for machining the R that connects the end face and the outer diameter because it will leave uncut parts.

# PCBN GROOVING SERIES (GY)

**BC8110 coated materials for continuous machining of hardened steel have been added to GY inserts.**

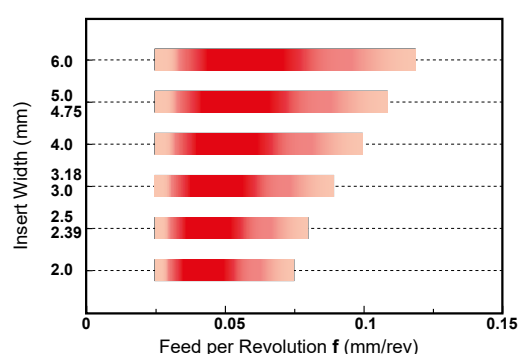
GY is a grooving tool series that achieves high rigidity with the "Tri-Lock System".  
(See page F004 for more details.)

BC8110 materials with excellent wear resistance have been added. Compared to conventional materials, they display excellent wear resistance to achieve long tool life. A blade width of 6 mm has also been added to the lineup of BC8110.



B

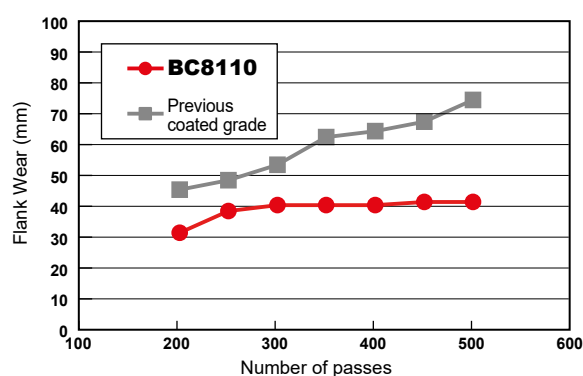
## Recommended Cutting Conditions



| Material                | Hardness | Grade         | Cutting Speed Vc (m/min) | Cutting Mode |
|-------------------------|----------|---------------|--------------------------|--------------|
| <b>H</b> Hardened Steel | 35—65HRC | <b>BC8110</b> | 100<br>(60—120)          | Dry, Wet     |

## Cutting Performance

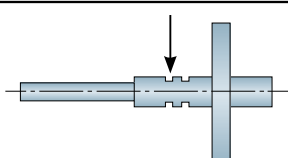
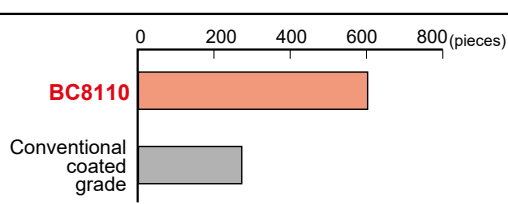
Tool life evaluation for the GY holder



<Cutting Conditions>

Insert : GY1G0200D020N-GFGS  
Material : JIS SG420 (60HRC)  
Cutting Speed : Vc=120 m/min  
Feed : f=0.1 mm/rev  
Depth of Cut : ap=0.3 mm  
Cutting Mode : Dry Cutting

## Application Example

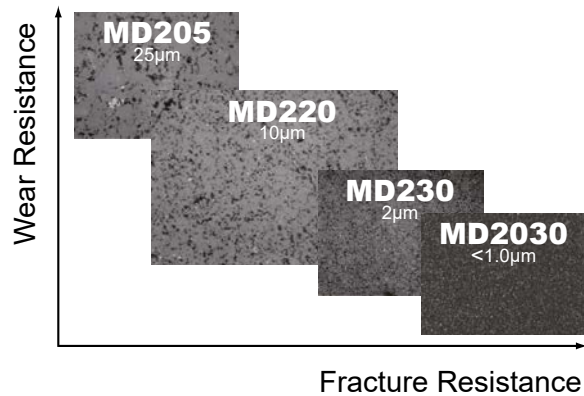
|                    |                                                                                                                                              |     |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Insert             | GY1G0300F020N-GFGS (Grade : BC8110)                                                                                                          |     |
| Material           | <br>Alloy steel (58—62HRC)                                |     |
| Component          | Input shaft                                                                                                                                  |     |
| Cutting Conditions | Cutting Speed Vc (m/min)                                                                                                                     | 130 |
|                    | Feed f (mm/rev)                                                                                                                              | 0.1 |
| Result             | <br>Tool life over twice as long as conventional products |     |

# PCD (SINTERED DIAMOND)

- Suitable for materials such as aluminium alloy, non-ferrous metals and fibre strengthened plastic.
- Suitable for extremely high speed finishing.



## FEATURES



| Grade         | Features                                                                                                                                                                                                                                           |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MD205*</b> | <b>For Continuous Cutting</b><br>Coarse grain diamond particles are sintered and wear resistance is excellent. Use when wear resistance with MD220 is insufficient.                                                                                |
| <b>MD220</b>  | <b>Materials for general machining</b><br>Sintered medium grain diamond particles. Wear resistance and fracture resistance are superbly balanced. Applicable to general finishing of non-ferrous metals, non-metal cutting, and similar machining. |
| <b>MD230*</b> | <b>For Interrupted Cutting</b><br>Fine grain diamond particles are used. Fracture resistance and cutting edge sharpness are excellent. Use when fracture resistance and a high quality finished surface is demanded with MD220.                    |
| <b>MD2030</b> | <b>For Heavy Interrupted Cutting</b><br>Strong sintering of ultra micro-grain PCD particles provides exceptional fracture resistance. Chipping during high-speed finish milling can be controlled.                                                 |

\* MD205, MD230 : Non-Standard

## SELECTION STANDARD TURNING

| Material                       | Recommended Grade |       | Recommended Cutting Conditions |                 |                      |
|--------------------------------|-------------------|-------|--------------------------------|-----------------|----------------------|
|                                | MD205             | MD220 | Cutting Speed Vc (m/min)       | Feed f (mm/rev) | Depth of Cut ap (mm) |
| Aluminium Alloy (Si ≤ 12%)     |                   | ◎     | 800 (200—1200)                 | —0.2            | —1.0                 |
| Aluminium Alloy (Si > 13%)     | ◎                 | ○     | 600 (200—1000)                 | —0.2            | —1.0                 |
| Copper Alloy                   |                   | ◎     | 700 (200—1200)                 | —0.2            | —1.0                 |
| Strengthened Plastic           |                   | ◎     | 600 (100—1000)                 | —0.4            | —1.0                 |
| Glass Fibre Reinforced Plastic |                   | ◎     | 500 (100—800)                  | —0.25           | —1.0                 |
| Carbon                         | ○                 | ◎     | 400 (100—600)                  | —0.3            | —1.0                 |
| Ceramics                       |                   | ○     | 50 (30—80)                     | —0.1            | —1.0                 |
| Hard Rubber                    |                   | ◎     | 600 (300—800)                  | —0.15           | —1.0                 |
| Wood Inorganic Board           |                   | ◎     | 1300 (300—4000)                | —0.4            | —                    |
| Cemented Carbide               | ◎                 | ○     | 15 (5—20)                      | —0.2            | —0.5                 |

Note 1) ◎ : 1st recommendation. ○ : 2nd recommendation  
Note 2) Not suitable for steel.

## PETIT CUT INSERT SERIES

- **Economical** The small PCD tip delivers long tool life.  
Eliminates the need for regrinding, making tool management easier and economical.
- **With Chipbreaker** Chipbreaker formed directly on the PCD portion delivers superior chip control.
- Corner R0.05 mm inserts are available, making it suitable for the machining of small work corner radii.



# CLASSIFICATION

## NEGATIVE INSERTS WITH HOLE

| Product Name  | Type                                                       | Tolerance | Chipbreaker Name and Cross Section | Rhombic 80°                                                                                                   | Rhombic 55°                                                                                                      | Square 90°                                                                                                   | Triangular 60°                                                                                                 | Rhombic 35°                                                                                                    | Trigon 80°                                                                                                    |
|---------------|------------------------------------------------------------|-----------|------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| NEW PETIT CUT | Multi-corner Type Double Sided                             | G         | Flat Top                           | NP-CNGA_04<br><br>↻ B022     | NP-DNGA_04<br><br>↻ B025        |                                                                                                              | NP-TNGA_06<br><br>↻ B030    | NP-VNGA_04<br><br>↻ B032    | NP-WNGA_06<br><br>↻ B034   |
|               | Multi-corner Type Double Sided With Wiper                  |           | Flat Top                           | NP-CNGA_0W04<br><br>↻ B022   |                                                                                                                  |                                                                                                              |                                                                                                                |                                                                                                                |                                                                                                               |
|               | Multi-corner Type Single Sided                             |           | Flat Top                           | NP-CNGA_02<br><br>↻ B023     | NP-DNGA_02<br><br>↻ B026        | NP-SNGA_02<br><br>↻ B029    | NP-TNGA_03<br><br>↻ B030    | NP-VNGA_02<br><br>↻ B032    | NP-WNGA_03<br><br>↻ B034   |
|               | Multi-corner Type Single Sided With Wiper                  |           | Flat Top                           | NP-CNGA_0W02<br><br>↻ B023   | NP-DNGA_0WS2J_R/L<br><br>↻ B028 |                                                                                                              |                                                                                                                |                                                                                                                | NP-WNGA_0WS3<br><br>↻ B034 |
|               | Multi-corner Type Single Sided With Chipbreaker            |           | BF                                 | BF-CNGM_02<br><br>↻ B024   | BF-DNGM_02<br><br>↻ B028      |                                                                                                              |                                                                                                                |                                                                                                                |                                                                                                               |
|               | Multi-corner Type Single Sided With Chipbreaker With Wiper |           | BF                                 | BF-CNGM_0WS2<br><br>↻ B024 | BF-DNGM_0WS2<br><br>↻ B028    |                                                                                                              |                                                                                                                |                                                                                                                |                                                                                                               |
|               | Multi-corner Type Single Sided With Chipbreaker            |           | BM                                 | BM-CNGM_02<br><br>↻ B024   | BM-DNGM_02<br><br>↻ B028      |                                                                                                              | BM-TNGM_03<br><br>↻ B031  |                                                                                                                |                                                                                                               |
|               | Multi-corner Type Single Sided With Chipbreaker            |           | BR                                 | BR-CNGM_02<br><br>↻ B024   | BR-DNGM_02<br><br>↻ B028      |                                                                                                              |                                                                                                                |                                                                                                                |                                                                                                               |
|               | One-corner Type Single Sided With Chipbreaker              | M         | R-F                                | NP-CNMM_R-F<br><br>↻ B049  | NP-DNMM_R-F<br><br>↻ B050     | NP-SNMM_R-F<br><br>↻ B050 | NP-TNMM_R-F<br><br>↻ B051 | NP-VNMM_R-F<br><br>↻ B052 |                                                                                                               |

## NEGATIVE INSERTS WITH HOLE

| Product Name | Type                                        | Tolerance | Chipbreaker Name and Cross Section                                                            | Rhombic 80°                                                                                         | Rhombic 55°                                                                                         | Square 90°                                                                                          | Triangular 60°                                                                                        | Rhombic 35°                                                                                           | Trigon 80° |
|--------------|---------------------------------------------|-----------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------|
| STANDARD     | Multi-corner Type Double Sided (Solid PCBN) | G         | Flat Top<br> | CNGA<br><br>➔ B024 |                                                                                                     | SNGA<br><br>➔ B029 | TNGA<br><br>➔ B031 |                                                                                                       |            |
|              | One-corner Type Single Sided                | M         | Flat Top<br> | CNMA<br><br>➔ B049 |                                                                                                     |                                                                                                     |                                                                                                       |                                                                                                       |            |
|              | One-corner Type Single Sided                | G         | Flat Top<br> |                                                                                                     | DNGA<br><br>➔ B050 |                                                                                                     | TNGA<br><br>➔ B051 | VNGA<br><br>➔ B052 |            |

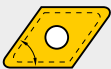
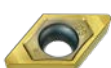
B

## 5° POSITIVE INSERTS WITH HOLE

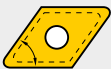
| Product Name  | Type                             | Tolerance | Chipbreaker Name and Cross Section                                                              | Rhombic 80° | Rhombic 55° | Square 90° | Triangular 60° | Rhombic 35°                                                                                                    | Trigon 80° |
|---------------|----------------------------------|-----------|-------------------------------------------------------------------------------------------------|-------------|-------------|------------|----------------|----------------------------------------------------------------------------------------------------------------|------------|
| NEW PETIT CUT | Multi-corner Type                | G         | Flat Top<br> |             |             |            |                | NP-VBGW_02<br><br>➔ B045  |            |
|               | One-corner Type With Chipbreaker |           | R-F<br>      |             |             |            |                | NP-VBGT_R-F<br><br>➔ B057 |            |

# CLASSIFICATION

## 7° POSITIVE INSERTS WITH HOLE

| Product Name  | Type                               | Tolerance | Chipbreaker Name and Cross Section                                                              | Rhombic 80°<br>            | Rhombic 55°<br>               | Square 90°<br> | Triangular 60°<br>        | Rhombic 35°<br>             | Trigon 80°<br>       |
|---------------|------------------------------------|-----------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| NEW PETIT CUT | Multi-corner Type                  | G         | Flat Top<br>   | NP-CCGW/B_02<br><br>↻ B037 | NP-DCGW_02<br><br>↻ B040      |                                                                                                 | NP-TCGW_03<br><br>↻ B042  | NP-VCGW_02<br><br>↻ B046    |                                                                                                         |
|               | Multi-corner Type With Wiper       |           | Flat Top<br>   | NP-CCGW_0W02<br><br>↻ B038 |                                                                                                                |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | Multi-corner Type With Chipbreaker |           | BF<br>         | BF-CCGT_02<br><br>↻ B038   | BF-DCGT_02<br><br>↻ B041      |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | Multi-corner Type With Chipbreaker |           | BM<br>         | BM-CCGT_02<br><br>↻ B038   | BM-DCGT_02<br><br>↻ B041      |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | One-corner Type With Chipbreaker   | M         | Breaker<br>  | NP-CCMH<br><br>↻ B053    |                                                                                                                |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | One-corner Type                    | G         | Flat Top<br> | NP-CCGW_0<br><br>↻ B038  |                                                                                                                |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | One-corner Type                    | M         | Flat Top<br> | NP-CCMW<br><br>↻ B053    |                                                                                                                |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | One-corner Type With Chipbreaker   |           | R/L-F<br>    |                                                                                                             | NP-DCMT_R/L-F<br><br>↻ B054 |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |
|               | One-corner Type With Chipbreaker   | G         | R-F<br>      |                                                                                                             |                                                                                                                |                                                                                                 |                                                                                                              | NP-VCMT_R-F<br><br>↻ B057 |                                                                                                         |
| STANDARD      | One-corner Type                    | M         | Flat Top<br> | CCMW<br><br>↻ B053       | DCMW<br><br>↻ B054          |                                                                                                 | TCMW TCGW<br><br>↻ B055 | VCGW<br><br>↻ B057        | WCMW<br><br>↻ B058 |
|               |                                    | G         |                                                                                                 |                                                                                                             |                                                                                                                |                                                                                                 |                                                                                                              |                                                                                                                |                                                                                                         |

## 11° POSITIVE INSERTS WITH HOLE

| Product Name  | Type                             | Tolerance | Chipbreaker Name and Cross Section                                                              | Rhombic 80°<br>          | Rhombic 55°<br> | Square 90°<br>       | Triangular 60°<br>          | Rhombic 35°<br> | Trigon 80°<br>       |
|---------------|----------------------------------|-----------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| NEW PETIT CUT | Multi-corner Type                | G         | Flat Top<br>   | NP-CPGB_02<br><br>➔ B039 |                                                                                                  |                                                                                                       | NP-TPGB_03<br><br>➔ B043    |                                                                                                    |                                                                                                         |
|               | One-corner Type With Chipbreaker |           | Breaker<br>    | NP-CPMH<br><br>➔ B053    |                                                                                                  |                                                                                                       |                                                                                                                |                                                                                                    |                                                                                                         |
|               | One-corner Type With Chipbreaker | M         | R/L-F<br>      |                                                                                                           |                                                                                                  |                                                                                                       | NP-TPMX_R/L-F<br><br>➔ B056 |                                                                                                    |                                                                                                         |
|               | One-corner Type With Chipbreaker |           | R/L-F<br>      |                                                                                                           |                                                                                                  |                                                                                                       | NP-TPMH_R/L-F<br><br>➔ B056 |                                                                                                    |                                                                                                         |
| STANDARD      | One-corner Type With Chipbreaker | G         | Breaker<br>  | CPGT<br><br>➔ B053     |                                                                                                  |                                                                                                       |                                                                                                                |                                                                                                    | WPGT<br><br>➔ B058 |
|               | One-corner Type                  |           | Flat Top<br> |                                                                                                           |                                                                                                  | SPGX<br><br>➔ B054 | TPGX<br><br>➔ B056        |                                                                                                    |                                                                                                         |

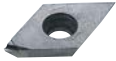
B

# CLASSIFICATION

## 15° POSITIVE INSERTS WITH HOLE

| Type                                                | Tolerance | Chipbreaker Name and Cross Section                                                       | Rhombic 35°                                                                                             |  |
|-----------------------------------------------------|-----------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--|
| One-corner Type<br>(For Aluminium With Chipbreaker) | G         | R-F<br> | VDGX_R-F<br><br>➔ B060 |  |

## 20° POSITIVE INSERTS WITH HOLE

| Type                                                | Tolerance | Chipbreaker Name and Cross Section                                                              | Rhombic 55°                                                                                                 | Triangular 60°                                                                                          |
|-----------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| One-corner Type<br>(For Aluminium With Chipbreaker) | G         | R/L<br>        |                                                                                                             | TEGX_R/L<br><br>➔ B059 |
| One-corner Type<br>(For Aluminium With Chipbreaker) |           | R/L-F<br>    | DEGX_R/L-F<br><br>➔ B059 |                                                                                                         |
| One-corner Type<br>(For Aluminium)                  |           | Flat Top<br> |                                                                                                             | TEGX<br><br>➔ B059   |

### NEGATIVE INSERTS WITHOUT HOLE

| Type                                              | Tolerance | Chipbreaker Name and Cross Section                                                                   | Rhombic 80°<br>           | Rhombic 55°<br>           | Square 90°<br>            | Triangular 60°<br>        | Round<br>                 |
|---------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Multi-corner Type<br>Double Sided<br>(Solid PCBN) | G         | <b>Flat Top</b><br> | <b>CNGN</b><br><br>➔ B035 | <b>DNGN</b><br><br>➔ B035 | <b>SNGN</b><br><br>➔ B036 | <b>TNGN</b><br><br>➔ B036 | <b>RNGN</b><br><br>➔ B035 |

### SPECIAL PURPOSE INSERTS

| Tool Holder Type | Tolerance | Inserts                                                                                                       |
|------------------|-----------|---------------------------------------------------------------------------------------------------------------|
| <b>GY Type</b>   | G         | <b>GY_GFGS</b><br><br>➔ B048 |

### 11° POSITIVE INSERTS WITHOUT HOLE

| Type              | Tolerance | Chipbreaker Name and Cross Section                                                                     | Square 90°<br>                  | Triangular 60°<br>        |
|-------------------|-----------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Multi-corner Type | G         | <b>Flat Top</b><br> | <b>NP-SPGN_02</b><br><br>➔ B047 |                                                                                                              |
| One-corner Type   | G         | <b>Flat Top</b><br> | <b>SPGN</b><br><br>➔ B061       | <b>TPGN</b><br><br>➔ B061 |

B

# PCBN TURNING INSERTS [NEGATIVE]

## 80° CN TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

NEG

WITH HOLE

C

D

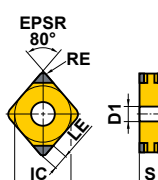
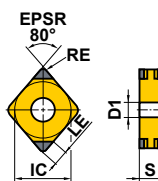
R

S

T

V

W

| Material                       | H                  | Hardened Materials                   |        |        |        |        |        |        |        |            |                 |        |        |      |      |          |                        |      |                                                                                       |                                              | <b>Cutting Conditions (Guide) :</b><br>● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting<br><b>Honing (Last letter of order number) :</b><br>Please refer to page B009 |  |  |  |  |  |  |
|--------------------------------|--------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------|------|------|----------|------------------------|------|---------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
|                                | K                  | Cast Iron                            |        |        |        |        |        |        |        |            |                 |        |        |      |      |          |                        |      |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | S                  | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |            |                 |        |        |      |      |          |                        |      |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                |                    | Sintered Alloy                       |        |        |        |        |        |        |        |            |                 |        |        |      |      |          |                        |      |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
| Shape                          | Order Number       | Coated PCBN                          |        |        |        |        | PCBN   |        |        | Solid PCBN | Dimensions (mm) |        |        |      |      | Geometry | Applicable Holder Page |      |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                |                    | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120     | MB8130          | MB4120 | MBS140 | IC   | S    |          |                        | RE   | LE                                                                                    | D1                                           |                                                                                                                                                                                  |  |  |  |  |  |  |
| NEW PETIT CUT                  | NP-CNGA120404GS4   | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |   | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408GS4   | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412GS4   | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404GA4   |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408GA4   |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412GA4   |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404GH4   | ★                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408GH4   | ★                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412GH4   | ●                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404VA4   |                                      | ●      |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408VA4   |                                      | ●      |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412VA4   |                                      | ●      |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404FS4   | ★                                    |        | ●      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408FS4   | ★                                    |        | ●      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412FS4   | ★                                    |        | ●      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404TS4   | ★                                    |        |        | ★      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408TS4   | ★                                    |        |        | ★      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412TS4   | ★                                    |        |        | ★      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404TA4   |                                      | ★      |        |        | ★      | ●      |        | ★      | ★          |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408TA4   |                                      | ●      |        |        | ●      | ●      |        | ★      | ★          |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412TA4   |                                      | ★      |        |        | ★      | ●      |        | ★      | ★          |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404TH4   |                                      |        |        |        | ★      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408TH4   |                                      | ★      |        |        | ★      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412TH4   |                                      | ★      |        |        | ★      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
| NEW PETIT CUT<br>(With Wiper★) | NP-CNGA120404GSWS4 | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |  | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408GSWS4 | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412GSWS4 | ●                                    |        | ●      | ●      |        |        |        |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404GAWS4 |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408GAWS4 |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412GAWS4 |                                      | ●      |        |        | ●      | ●      |        | ★      |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120404FSWS4 | ●                                    |        | ★      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 0.4      | 1.8                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120408FSWS4 | ●                                    |        | ★      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 0.8      | 2.0                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |
|                                | NP-CNGA120412FSWS4 | ●                                    |        | ★      | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76 | 1.2      | 2.2                    | 5.16 |                                                                                       |                                              |                                                                                                                                                                                  |  |  |  |  |  |  |

\* Please refer to B012 before using wiper inserts.

● : Inventory maintained. ★ : Inventory maintained in Japan.





# PCBN TURNING INSERTS [NEGATIVE]

## 80° CN TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

NEG

WITH HOLE

C

D

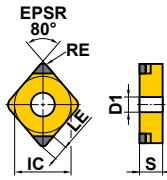
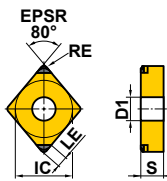
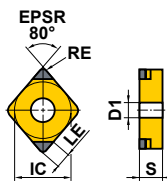
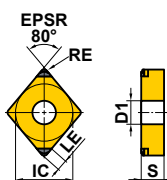
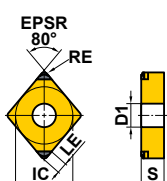
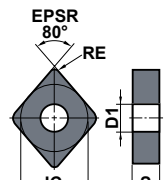
R

S

T

V

W

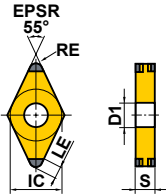
| Material                                                                                                  | H                  | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●      | ●          | ✱               | Cutting Conditions (Guide) :<br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |        |      |     |          |                        |                                                                                       |                                              |
|-----------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-----|----------|------------------------|---------------------------------------------------------------------------------------|----------------------------------------------|
|                                                                                                           | K                  | Cast Iron                            |        |        |        |        |        |        |        |            |                 | ●                                                                                                                                                                      | ✱      |      |     |          |                        |                                                                                       |                                              |
|                                                                                                           | S                  | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        |      |     |          |                        |                                                                                       |                                              |
|                                                                                                           |                    | Sintered Alloy                       |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | ●      |      |     |          |                        |                                                                                       |                                              |
| Shape                                                                                                     | Order Number       | Coated PCBN                          |        |        |        |        | PCBN   |        |        | Solid PCBN | Dimensions (mm) |                                                                                                                                                                        |        |      |     | Geometry | Applicable Holder Page |                                                                                       |                                              |
|                                                                                                           |                    | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120     | MB8130          | MB4120                                                                                                                                                                 | MBS140 | IC   | S   |          |                        | RE                                                                                    | LE                                           |
| <br>(With Wiper★)        | NP-CNGA120404FSWS2 | ●                                    |        | ★      | ★      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.4 | 1.8      | 5.16                   |    | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | NP-CNGA120408FSWS2 | ●                                    |        | ●      | ●      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | NP-CNGA120412FSWS2 | ●                                    |        | ★      | ★      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | NP-CNGA120404FBWL2 |                                      |        | ★      | ★      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.4 | 1.8      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | NP-CNGA120408FBWL2 |                                      |        | ●      | ★      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | NP-CNGA120412FBWL2 |                                      |        | ★      | ★      | ★      |        | ★      |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
| <br>(With Chipbreaker)   | BF-CNGM120404TS2   | ●                                    |        | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.4 | 1.8      | 5.16                   |    | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | BF-CNGM120408TS2   | ●                                    |        | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | BF-CNGM120412TS2   | ●                                    |        | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
| <br>(With Wiper★)      | BF-CNGM120408TSWS2 | ●                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |   | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | BF-CNGM120412TSWS2 | ●                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | BF-CNGM120408TAWS2 |                                      |        | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | BF-CNGM120412TAWS2 |                                      |        | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
| <br>(With Chipbreaker) | BM-CNGM120404TA2   |                                      | ●      |        | ●      |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.4 | 1.8      | 5.16                   |  | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | BM-CNGM120408TA2   |                                      | ●      |        | ●      |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | BM-CNGM120412TA2   |                                      | ●      |        | ●      |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
| <br>(With Chipbreaker) | BR-CNGM120404TA2   |                                      | ●      |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.4 | 1.8      | 5.16                   |  | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | BR-CNGM120408TA2   |                                      | ●      |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 0.8 | 2.0      | 5.16                   |                                                                                       |                                              |
|                                                                                                           | BR-CNGM120412TA2   |                                      | ●      |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 12.7   | 4.76 | 1.2 | 2.2      | 5.16                   |                                                                                       |                                              |
|                        | CNGA120408         |                                      |        |        |        |        |        |        |        |            |                 | ★                                                                                                                                                                      | 12.7   | 4.76 | 0.8 | —        | 5.16                   |  | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                           | CNGA120412         |                                      |        |        |        |        |        |        |        |            |                 | ★                                                                                                                                                                      | 12.7   | 4.76 | 1.2 | —        | 5.16                   |                                                                                       |                                              |
|                                                                                                           |                    |                                      |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        |      |     |          |                        |                                                                                       |                                              |

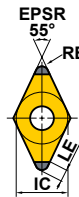
\* Please refer to B012 before using wiper inserts.

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.

# 55° DN TYPE INSERTS WITH HOLE

| Material      | H                | Hardened Materials                   |        |        |        |        |        |        |        |            |                 |        |        |      | Cutting Conditions (Guide) :                                |          |                        |      |                                                                                       |                                                      |
|---------------|------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------|------|-------------------------------------------------------------|----------|------------------------|------|---------------------------------------------------------------------------------------|------------------------------------------------------|
|               | K                | Cast Iron                            |        |        |        |        |        |        |        |            |                 |        |        |      | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |          |                        |      |                                                                                       |                                                      |
|               | S                | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |            |                 |        |        |      | Honing (Last letter of order number) :                      |          |                        |      |                                                                                       |                                                      |
|               |                  | Sintered Alloy                       |        |        |        |        |        |        |        |            |                 |        |        |      | Please refer to page B009                                   |          |                        |      |                                                                                       |                                                      |
| Shape         | Order Number     | Coated PCBN                          |        |        |        |        | PCBN   |        |        | Solid PCBN | Dimensions (mm) |        |        |      |                                                             | Geometry | Applicable Holder Page |      |                                                                                       |                                                      |
|               |                  | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120     | MB8130          | MB4120 | MBS140 | IC   | S                                                           |          |                        | RE   | LE                                                                                    | D1                                                   |
| NEW PETIT CUT | NP-DNGA150404GS4 | ★                                    | ★      | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |  | C010<br>C011<br>E015<br>E039<br>—041<br>H009<br>—011 |
|               | NP-DNGA150408GS4 | ★                                    | ★      | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412GS4 | ★                                    | ★      | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604GS4 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608GS4 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612GS4 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150404GA4 | ★                                    |        |        | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150408GA4 | ★                                    |        |        | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412GA4 | ★                                    |        |        | ★      | ★      |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150404GH4 | ★                                    | ★      |        | ★      | ★      | ★      |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150408GH4 | ★                                    | ★      |        | ★      | ★      | ★      |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412GH4 | ★                                    | ★      |        | ★      | ★      | ★      |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604GH4 | ★                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608GH4 | ★                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612GH4 | ★                                    | ★      |        | ★      | ★      | ●      |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150404VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150408VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612VA4 | ★                                    |        |        |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150404FS4 | ★                                    | ★      | ★      | ★      |        |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150408FS4 | ★                                    | ★      | ★      | ★      |        |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412FS4 | ★                                    | ★      | ★      | ★      |        |        | ★      |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604FS4 | ★                                    | ●      | ★      |        |        |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608FS4 | ★                                    | ●      | ★      |        |        |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612FS4 | ★                                    | ●      | ★      |        |        |        | ★      |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150404TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150408TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150412TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 4.76                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150604TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.4      | 2.1                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150608TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 0.8      | 2.0                    | 5.16 |                                                                                       |                                                      |
|               | NP-DNGA150612TS4 | ★                                    |        | ★      |        |        |        |        |        |            |                 |        |        | 12.7 | 6.35                                                        | 1.2      | 1.8                    | 5.16 |                                                                                       |                                                      |



C010  
C011  
E015  
E039  
-041  
H009  
-011

PCBN

B

PCBN TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

GRADES > B004  
IDENTIFICATION > B002

B025

# PCBN TURNING INSERTS [NEGATIVE]

## 55° DN TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

NEG

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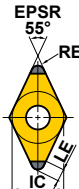
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| Material | H | Hardened Materials | 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● : Inventory maintained. ★ : Inventory maintained in Japan.

| Material      | H                | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●          | ●               | ✱      | Cutting Conditions (Guide) :<br>● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |        |      |          |                        |     |      |                                                                                       |                                                                                       |                                              |
|---------------|------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----------|------------------------|-----|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------|
|               | K                | Cast Iron                            |        |        |        |        |        |        |            |                 | ●      |                                                                                                                                                                    | ✱      |      |          |                        |     |      |                                                                                       |                                                                                       |                                              |
|               | S                | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    | ●      |      |          |                        |     |      |                                                                                       |                                                                                       |                                              |
|               |                  | Sintered Alloy                       |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    | ●      |      |          |                        |     |      |                                                                                       |                                                                                       |                                              |
| Shape         | Order Number     | Coated PCBN                          |        |        |        |        | PCBN   |        | Solid PCBN | Dimensions (mm) |        |                                                                                                                                                                    |        |      | Geometry | Applicable Holder Page |     |      |                                                                                       |                                                                                       |                                              |
|               |                  | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110     | MB8120          | MB8130 | MB4120                                                                                                                                                             | MBS140 | IC   |          |                        | S   | RE   | LE                                                                                    | D1                                                                                    |                                              |
| NEW PETIT CUT | NP-DNGA150404VA2 | ★                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |  |  | C010<br>C011<br>E039<br>-041<br>H009<br>-011 |
|               | NP-DNGA150408VA2 | ★                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412VA2 | ★                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604VA2 | ●                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608VA2 | ●                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612VA2 | ●                                    |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150402FS2 | ★                                    |        | ★      |        |        |        | ★      |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.2                    | 2.2 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404FS2 | ★                                    | ★      | ★      | ★      |        | ★      | ★      |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408FS2 | ★                                    | ★      | ★      | ★      |        | ★      | ★      |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412FS2 | ★                                    | ★      | ★      | ★      |        | ★      |        | ★          |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604FS2 | ●                                    | ●      | ●      | ●      |        | ★      | ★      |            | ●               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608FS2 | ●                                    | ●      | ●      | ●      |        | ★      | ★      |            | ●               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612FS2 | ●                                    | ●      | ●      | ●      |        |        | ●      |            | ●               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404TS2 | ★                                    |        | ★      |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408TS2 | ★                                    |        | ★      |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412TS2 | ★                                    |        | ★      |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604TS2 | ●                                    | ●      |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608TS2 | ●                                    | ●      |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612TS2 | ●                                    | ●      |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404TA2 | ★                                    |        | ★      | ★      |        |        | ★      | ●          |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408TA2 | ★                                    |        | ★      | ★      |        |        | ★      | ●          |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412TA2 | ★                                    |        | ★      | ★      |        |        | ★      | ★          |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604TA2 | ●                                    | ●      | ●      | ●      |        | ★      |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608TA2 | ●                                    | ●      | ●      | ●      |        | ●      |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612TA2 | ●                                    | ●      | ●      | ●      |        | ★      |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404TH2 |                                      |        | ★      | ★      |        |        | ★      |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408TH2 | ★                                    |        | ★      | ★      |        |        | ★      |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412TH2 | ★                                    |        | ★      | ★      |        |        | ★      |            |                 |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604TH2 |                                      |        | ★      | ★      |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608TH2 | ★                                    |        | ★      | ★      |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612TH2 | ★                                    |        | ★      | ★      |        |        |        |            |                 |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612SF2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150404SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150408SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150412SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 4.76     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150604SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.4                    | 2.1 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150608SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 0.8                    | 2.0 | 5.16 |                                                                                       |                                                                                       |                                              |
|               | NP-DNGA150612SE2 |                                      |        |        |        |        |        |        |            | ★               |        |                                                                                                                                                                    |        | 12.7 | 6.35     | 1.2                    | 1.8 | 5.16 |                                                                                       |                                                                                       |                                              |

|                |        |
|----------------|--------|
| GRADES         | ➤ B004 |
| IDENTIFICATION | ➤ B002 |

**B027**



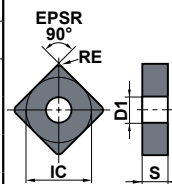
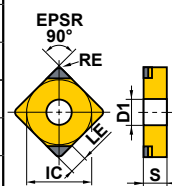


**55° DN TYPE INSERTS WITH HOLE**

\* Please refer to B012 before using wiper inserts.

● = NEW

**B028**



W

**B029**



# PCBN TURNING INSERTS [NEGATIVE]

## 60° TN TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

NEG

WITH HOLE

C

D

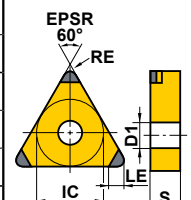
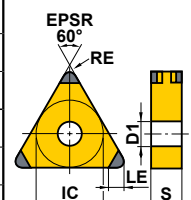
R

S

T

V

W



C016  
—018  
E016  
E038

C016  
—018  
E016  
E038

| Material      | H                | Hardened Materials                   |        | ●      | ●      | ●      | ●      | ✱      | ●      | ●          | ✱               | Cutting Conditions (Guide) :<br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |        |       |      |          |                        |      |                              |                              |
|---------------|------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|------|----------|------------------------|------|------------------------------|------------------------------|
|               | K                | Cast Iron                            |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        |       |      |          | ●                      | ✱    |                              |                              |
|               | S                | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        |       |      |          |                        |      |                              |                              |
|               | Sintered Alloy   |                                      |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        |       |      |          |                        |      |                              |                              |
| Shape         | Order Number     | Coated PCBN                          |        |        |        |        | PCBN   |        |        | Solid PCBN | Dimensions (mm) |                                                                                                                                                                        |        |       |      | Geometry | Applicable Holder Page |      |                              |                              |
|               |                  | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120     | MB8130          | MB4120                                                                                                                                                                 | MBS140 | IC    | S    |          |                        | RE   | LE                           | D1                           |
| NEW PETIT CUT | NP-TNGA160404GS6 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              | C016<br>—018<br>E016<br>E038 |
|               | NP-TNGA160408GS6 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412GS6 | ●                                    | ●      | ●      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404GA6 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408GA6 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412GA6 | ●                                    |        |        | ●      | ●      |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404GH6 | ★                                    |        | ★      | ★      | ★      |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408GH6 | ★                                    |        | ★      | ★      | ★      |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412GH6 | ★                                    |        | ★      | ★      | ★      |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404VA6 | ★                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408VA6 | ★                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412VA6 | ★                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404FS6 | ★                                    | ●      | ★      | ★      |        |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408FS6 | ★                                    | ●      | ★      | ★      |        |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412FS6 | ★                                    | ●      | ★      | ★      |        |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404TS6 | ★                                    |        | ★      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408TS6 | ★                                    |        | ★      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412TS6 | ★                                    |        | ★      |        |        |        |        |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404TA6 | ★                                    |        | ★      | ●      |        |        | ★      | ★      |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408TA6 | ★                                    |        | ★      | ●      |        |        | ★      | ★      |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412TA6 | ★                                    |        | ★      | ●      |        |        | ★      | ★      |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
|               | NP-TNGA160404TH6 |                                      |        | ★      | ★      |        |        |        | ★      |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.4      | 1.6                    | 3.81 |                              |                              |
|               | NP-TNGA160408TH6 | ★                                    |        | ★      | ●      |        |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 0.8      | 1.7                    | 3.81 |                              |                              |
|               | NP-TNGA160412TH6 | ★                                    |        | ★      | ●      |        |        | ★      |        |            |                 |                                                                                                                                                                        |        | 9.525 | 4.76 | 1.2      | 1.9                    | 3.81 |                              |                              |
| NEW PETIT CUT | NP-TNGA160402GS3 | ★                                    |        | ★      |        |        |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.2  | 1.5      | 3.81                   |      | C016<br>—018<br>E016<br>E038 |                              |
|               | NP-TNGA160404GS3 | ★                                    | ●      | ★      |        | ★      |        |        |        | ★          |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.4  | 1.6      | 3.81                   |      |                              |                              |
|               | NP-TNGA160408GS3 | ★                                    | ●      | ★      |        | ★      |        |        |        | ●          |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.8  | 1.7      | 3.81                   |      |                              |                              |
|               | NP-TNGA160412GS3 | ★                                    | ●      | ★      |        | ★      |        |        |        | ★          |                 |                                                                                                                                                                        | 9.525  | 4.76  | 1.2  | 1.9      | 3.81                   |      |                              |                              |
|               | NP-TNGA160402GA3 | ★                                    |        | ★      |        |        |        | ★      |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.2  | 1.5      | 3.81                   |      |                              |                              |
|               | NP-TNGA160404GA3 | ●                                    |        | ●      | ●      |        |        | ★      |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.4  | 1.6      | 3.81                   |      |                              |                              |
|               | NP-TNGA160408GA3 | ●                                    |        | ●      | ●      |        |        | ●      |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.8  | 1.7      | 3.81                   |      |                              |                              |
|               | NP-TNGA160412GA3 | ★                                    |        | ★      | ●      |        |        | ★      |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 1.2  | 1.9      | 3.81                   |      |                              |                              |
|               | NP-TNGA160404GH3 | ★                                    |        | ★      | ★      | ●      |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.4  | 1.6      | 3.81                   |      |                              |                              |
|               | NP-TNGA160408GH3 | ★                                    |        | ★      | ★      | ●      |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.8  | 1.7      | 3.81                   |      |                              |                              |
|               | NP-TNGA160412GH3 | ★                                    |        | ★      | ★      | ●      |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 1.2  | 1.9      | 3.81                   |      |                              |                              |
|               | NP-TNGA160404VA3 | ★                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.4  | 1.6      | 3.81                   |      |                              |                              |
|               | NP-TNGA160408VA3 | ●                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.8  | 1.7      | 3.81                   |      |                              |                              |
|               | NP-TNGA160412VA3 | ★                                    |        |        |        |        |        |        |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 1.2  | 1.9      | 3.81                   |      |                              |                              |
|               | NP-TNGA160402FS3 | ★                                    |        | ★      |        |        |        | ★      |        |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.2  | 1.5      | 3.81                   |      |                              |                              |
|               | NP-TNGA160404FS3 | ●                                    | ●      | ●      | ●      | ★      | ★      |        | ●      |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.4  | 1.6      | 3.81                   |      |                              |                              |
|               | NP-TNGA160408FS3 | ●                                    | ●      | ●      | ●      | ★      | ★      |        | ★      |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 0.8  | 1.7      | 3.81                   |      |                              |                              |
|               | NP-TNGA160412FS3 | ●                                    | ●      | ●      | ●      | ★      | ★      |        | ★      |            |                 |                                                                                                                                                                        | 9.525  | 4.76  | 1.2  | 1.9      | 3.81                   |      |                              |                              |

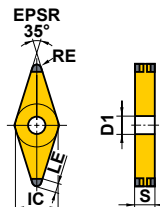
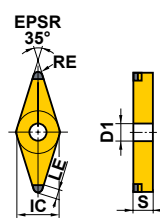
● : Inventory maintained. ★ : Inventory maintained in Japan.



# PCBN TURNING INSERTS [NEGATIVE]



## 35° VN TYPE INSERTS WITH HOLE

| Material      | H                | Hardened Materials                   | ●      | ●      | ●      | ●      | ✱      | ●      | ●      | ✱      | ●          | ●               | ✱      | Cutting Conditions (Guide) :<br>● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |      |     |          |                        |                                                                                       |                      |  |
|---------------|------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|----------|------------------------|---------------------------------------------------------------------------------------|----------------------|--|
|               | K                | Cast Iron                            |        |        |        |        |        |        |        |        |            |                 |        | ●                                                                                                                                                                  | ✱    |     |          |                        |                                                                                       |                      |  |
|               | S                | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |      |     |          |                        |                                                                                       |                      |  |
|               |                  | Sintered Alloy                       |        |        |        |        |        |        |        |        |            |                 |        |                                                                                                                                                                    |      |     |          |                        |                                                                                       |                      |  |
| Shape         | Order Number     | Coated PCBN                          |        |        |        |        | PCBN   |        |        |        | Solid PCBN | Dimensions (mm) |        |                                                                                                                                                                    |      |     | Geometry | Applicable Holder Page |                                                                                       |                      |  |
|               |                  | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120 | MB8130     | MB4120          | MBS140 | IC                                                                                                                                                                 | S    | RE  |          |                        | LE                                                                                    | D1                   |  |
| NEW PETIT CUT | NP-VNGA160404GS4 | ★                                    | ●      | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |   | C019<br>-021<br>E017 |  |
|               | NP-VNGA160408GS4 | ●                                    | ●      | ●      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GS4 | ★                                    |        | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GA4 | ●                                    |        |        | ●      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404GH4 | ★                                    |        | ★      | ★      | ★      |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408GH4 | ★                                    |        | ★      | ★      | ★      |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GH4 |                                      |        |        | ★      | ★      | ★      |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404VA4 | ★                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408VA4 | ★                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412VA4 | ★                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404FS4 | ★                                    | ●      | ★      | ★      |        |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408FS4 | ★                                    | ●      | ★      | ★      |        |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412FS4 |                                      |        |        | ★      |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404TS4 | ★                                    |        | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408TS4 | ★                                    |        | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404TA4 | ★                                    |        |        | ★      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408TA4 | ★                                    |        |        | ★      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412TA4 |                                      |        |        | ★      | ●      |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404TH4 | ★                                    |        | ★      | ★      |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408TH4 | ★                                    |        | ★      | ★      |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412TH4 |                                      |        |        | ★      | ★      |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
| NEW PETIT CUT | NP-VNGA160402GS2 | ★                                    |        | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.2 | 2.5      | 3.81                   |  | C019<br>-021<br>E017 |  |
|               | NP-VNGA160404GS2 | ●                                    | ●      | ●      |        |        | ★      |        |        | ★      |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408GS2 | ●                                    | ●      | ●      |        |        | ★      |        |        | ★      |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GS2 | ★                                    |        | ★      |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160402GA2 | ●                                    |        |        | ●      |        |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.2 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404GA2 | ●                                    |        |        | ●      | ●      |        | ●      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408GA2 | ●                                    |        |        | ●      | ●      |        | ●      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GA2 | ★                                    |        | ★      | ★      |        |        | ★      |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404GH2 | ★                                    |        | ★      | ★      | ★      |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408GH2 | ★                                    |        | ★      | ★      | ★      |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412GH2 |                                      |        |        | ★      | ★      | ★      |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404VA2 | ●                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408VA2 | ●                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412VA2 | ★                                    |        |        |        |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160402FS2 | ★                                    |        | ★      |        |        | ★      |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.2 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160404FS2 | ★                                    | ●      | ★      | ●      |        | ★      | ★      |        | ★      |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.4 | 2.5      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160408FS2 | ★                                    | ●      | ★      | ●      |        | ★      | ★      |        | ●      |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 0.8 | 2.0      | 3.81                   |                                                                                       |                      |  |
|               | NP-VNGA160412FS2 |                                      |        |        | ★      |        |        |        |        |        |            |                 |        | 9.525                                                                                                                                                              | 4.76 | 1.2 | 1.5      | 3.81                   |                                                                                       |                      |  |

● : Inventory maintained. ★ : Inventory maintained in Japan.





# 80° WN TYPE INSERTS WITH HOLE





# PCBN TURNING INSERTS [NEGATIVE]

## 90° **SN** TYPE INSERTS WITHOUT HOLE

PCBN

B

PCBN TURNING INSERTS

NEG

WITHOUT HOLE

C

D

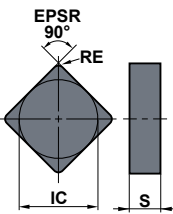
R

S

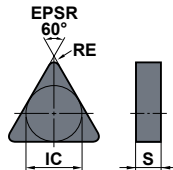
T

V

W

| Material                                                                          | H            | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●          | ●               | ✱      | <b>Cutting Conditions (Guide) :</b><br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting |        |          |                        |     |   |                                                                                     |    |
|-----------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------------------------------------------------------------------------------------------------------|--------|----------|------------------------|-----|---|-------------------------------------------------------------------------------------|----|
|                                                                                   | K            | Cast Iron                            |        |        |        |        |        |        |            |                 |        |                                                                                                        |        |          |                        |     |   |                                                                                     |    |
|                                                                                   | S            | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |            |                 |        |                                                                                                        |        |          |                        |     |   |                                                                                     |    |
|                                                                                   |              | Sintered Alloy                       |        |        |        |        |        |        |            |                 | ●      |                                                                                                        |        |          |                        |     |   |                                                                                     |    |
| Shape                                                                             | Order Number | Coated PCBN                          |        |        |        |        | PCBN   |        | Solid PCBN | Dimensions (mm) |        |                                                                                                        |        | Geometry | Applicable Holder Page |     |   |                                                                                     |    |
|                                                                                   |              | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110     | MB8120          | MB8130 | MB4120                                                                                                 | MBS140 |          |                        | IC  | S | RE                                                                                  | LE |
|  | SNGN090308   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 3.18                   | 0.8 | — |  | —  |
|                                                                                   | SNGN090312   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 3.18                   | 1.2 | — |                                                                                     |    |
|                                                                                   | SNGN090316   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 3.18                   | 1.6 | — |                                                                                     |    |
|                                                                                   | SNGN090408   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ★      | 9.525    | 4.76                   | 0.8 | — |                                                                                     |    |
|                                                                                   | SNGN090412   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ★      | 9.525    | 4.76                   | 1.2 | — |                                                                                     |    |
|                                                                                   | SNGN120408   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 12.7     | 4.76                   | 0.8 | — |                                                                                     |    |
|                                                                                   | SNGN120412   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 12.7     | 4.76                   | 1.2 | — |                                                                                     |    |
|                                                                                   | SNGN120416   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 12.7     | 4.76                   | 1.6 | — |                                                                                     |    |

## 60° **TN** TYPE INSERTS WITHOUT HOLE

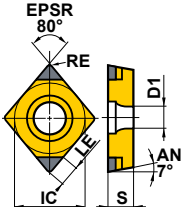
| Material                                                                            | H            | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●          | ●               | ✱      | <b>Cutting Conditions (Guide) :</b><br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting |        |          |                        |     |   |                                                                                       |    |
|-------------------------------------------------------------------------------------|--------------|--------------------------------------|--------|--------|--------|--------|--------|--------|------------|-----------------|--------|--------------------------------------------------------------------------------------------------------|--------|----------|------------------------|-----|---|---------------------------------------------------------------------------------------|----|
|                                                                                     | K            | Cast Iron                            |        |        |        |        |        |        |            | ●               | ✱      |                                                                                                        |        |          |                        |     |   |                                                                                       |    |
|                                                                                     | S            | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |            |                 |        |                                                                                                        |        |          |                        |     |   |                                                                                       |    |
|                                                                                     |              | Sintered Alloy                       |        |        |        |        |        |        |            |                 | ●      |                                                                                                        |        |          |                        |     |   |                                                                                       |    |
| Shape                                                                               | Order Number | Coated PCBN                          |        |        |        |        | PCBN   |        | Solid PCBN | Dimensions (mm) |        |                                                                                                        |        | Geometry | Applicable Holder Page |     |   |                                                                                       |    |
|                                                                                     |              | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110     | MB8120          | MB8130 | MB4120                                                                                                 | MBS140 |          |                        | IC  | S | RE                                                                                    | LE |
|  | TNGN160408   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 4.76                   | 0.8 | — |  | —  |
|                                                                                     | TNGN160412   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 4.76                   | 1.2 | — |                                                                                       |    |
|                                                                                     | TNGN160416   |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        | ●      | 9.525    | 4.76                   | 1.6 | — |                                                                                       |    |
|                                                                                     |              |                                      |        |        |        |        |        |        |            |                 |        |                                                                                                        |        |          |                        |     |   |                                                                                       |    |

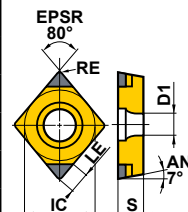
● : Inventory maintained. ★ : Inventory maintained in Japan.



# PCBN TURNING INSERTS [POSITIVE]

## 80° CC TYPE INSERTS WITH HOLE

| Material      | H                | Hardened Materials                   | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | Cutting Conditions (Guide) :                                        |                     |                      |        |     | Geometry | Applicable Holder Page |                                                                                       |                                              |
|---------------|------------------|--------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------|----------------------|--------|-----|----------|------------------------|---------------------------------------------------------------------------------------|----------------------------------------------|
|               | K                | Cast Iron                            |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ● : Stable Cutting                                                  | ● : General Cutting | ✱ : Unstable Cutting |        |     |          |                        |                                                                                       |                                              |
|               | S                | Heat-resistant Alloy, Titanium Alloy |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | Honing (Last letter of order number) :<br>Please refer to page B009 |                     |                      |        |     |          |                        |                                                                                       |                                              |
|               |                  | Sintered Alloy                       |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     |                     |                      |        |     |          |                        |                                                                                       |                                              |
| Shape         | Order Number     | Coated PCBN                          |                                                                               |                                                                               | PCBN                                                                          |                                                                               | Dimensions (mm)                                                               |                                                                     |                     |                      |        | IC  | S        | RE                     | LE                                                                                    | D1                                           |
|               |                  | BC8210                               | BC8220                                                                        | BC8105                                                                        | BC8110                                                                        | BC8120                                                                        | BC8130                                                                        | BC5110                                                              | MB8110              | MB8120               | MB8130 |     |          |                        |                                                                                       |                                              |
| NEW PETIT CUT | NP-CCGW060202GS2 | ★                                    | ★                                                                             | ★                                                                             |                                                                               | ●                                                                             |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.2 | 1.7      | 2.8                    |  | C024<br>D010<br>E007<br>E008<br>E033<br>E037 |
|               | NP-CCGW060204GS2 | ●                                    | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               | ●                                                                   | 6.35                | 2.38                 | 0.4    | 1.8 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW060208GS2 | ●                                    | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               | ★                                                                   | 6.35                | 2.38                 | 0.8    | 2.0 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW09T302GS2 | ★                                    | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               | ★                                                                   | 9.525               | 3.97                 | 0.2    | 1.7 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW09T304GS2 | ●                                    | ●                                                                             | ●                                                                             |                                                                               | ★                                                                             |                                                                               | ★                                                                   | 9.525               | 3.97                 | 0.4    | 1.8 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW09T308GS2 | ●                                    | ●                                                                             | ●                                                                             |                                                                               | ★                                                                             |                                                                               | ★                                                                   | 9.525               | 3.97                 | 0.8    | 2.0 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW060202GA2 |                                      | ●                                                                             |                                                                               |                                                                               | ●                                                                             |                                                                               |                                                                     | 6.35                | 2.38                 | 0.2    | 1.7 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW060204GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               | ●                                                                   | 6.35                | 2.38                 | 0.4    | 1.8 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW060208GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               | ●                                                                   | 6.35                | 2.38                 | 0.8    | 2.0 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW09T302GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             |                                                                               |                                                                               | ●                                                                   | 9.525               | 3.97                 | 0.2    | 1.7 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW09T304GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               | ●                                                                   | 9.525               | 3.97                 | 0.4    | 1.8 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW09T308GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               | ●                                                                   | 9.525               | 3.97                 | 0.8    | 2.0 | 4.4      |                        |                                                                                       |                                              |
|               | NP-CCGW09T304GH2 |                                      |                                                                               |                                                                               | ★                                                                             | ★                                                                             | ●                                                                             |                                                                     |                     | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308GH2 |                                      |                                                                               |                                                                               | ★                                                                             | ★                                                                             | ●                                                                             |                                                                     |                     | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T304VA2 |                                      | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     |                     | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308VA2 |                                      | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     |                     | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW060202FS2 | ●                                    |                                                                               | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             | ●                                                                   | 6.35                | 2.38                 | 0.2    | 1.7 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW060204FS2 | ●                                    |                                                                               | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             | ●                                                                   | 6.35                | 2.38                 | 0.4    | 1.8 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW060208FS2 | ●                                    |                                                                               | ●                                                                             |                                                                               |                                                                               | ●                                                                             | ●                                                                   | 6.35                | 2.38                 | 0.8    | 2.0 | 2.8      |                        |                                                                                       |                                              |
|               | NP-CCGW09T302FS2 | ●                                    | ★                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               | ●                                                                   | ★                   | 9.525                | 3.97   | 0.2 | 1.7      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T304FS2 | ●                                    | ●                                                                             | ●                                                                             | ●                                                                             |                                                                               | ●                                                                             | ●                                                                   | ●                   | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308FS2 | ●                                    | ●                                                                             | ●                                                                             | ●                                                                             |                                                                               | ●                                                                             | ●                                                                   | ●                   | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW060208TS2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.8 | 2.0      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW09T308TS2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW060204TA2 |                                      |                                                                               |                                                                               |                                                                               | ●                                                                             |                                                                               | ★                                                                   |                     | 6.35                 | 2.38   | 0.4 | 1.8      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW060208TA2 |                                      |                                                                               |                                                                               |                                                                               | ●                                                                             |                                                                               | ★                                                                   |                     | 6.35                 | 2.38   | 0.8 | 2.0      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW09T304TA2 | ●                                    |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               | ★                                                                   | ★                   | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308TA2 | ●                                    |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               | ★                                                                   | ★                   | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T304TH2 |                                      |                                                                               |                                                                               | ★                                                                             | ●                                                                             |                                                                               | ★                                                                   |                     | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308TH2 |                                      |                                                                               |                                                                               | ★                                                                             | ●                                                                             |                                                                               | ★                                                                   |                     | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW060202SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.2 | 1.7      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW060204SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ●                   | 6.35                 | 2.38   | 0.4 | 1.8      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW060208SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.8 | 2.0      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW09T302SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 9.525                | 3.97   | 0.2 | 1.7      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T304SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ●                   | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308SF2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ●                   | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW060202SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.2 | 1.7      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW060204SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ●                   | 6.35                 | 2.38   | 0.4 | 1.8      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW060208SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 6.35                 | 2.38   | 0.8 | 2.0      | 2.8                    |                                                                                       |                                              |
|               | NP-CCGW09T302SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 9.525                | 3.97   | 0.2 | 1.7      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T304SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ★                   | 9.525                | 3.97   | 0.4 | 1.8      | 4.4                    |                                                                                       |                                              |
|               | NP-CCGW09T308SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                     | ●                   | 9.525                | 3.97   | 0.8 | 2.0      | 4.4                    |                                                                                       |                                              |



PCBN

B

PCBN TURNING INSERTS

POSI  
7°

WITH  
HOLE

C

D

R

S

T

V

W

GRADES > B004  
IDENTIFICATION > B002

B037

# PCBN TURNING INSERTS [POSITIVE]

## 80° CC TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

POSITIVE  
7°

WITH HOLE

C

D

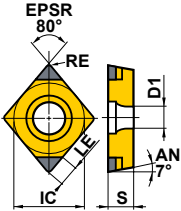
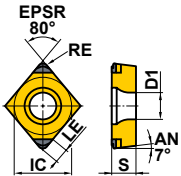
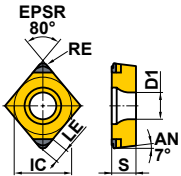
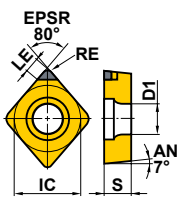
R

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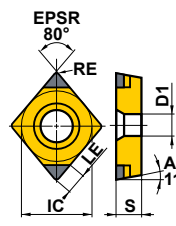
| Material                                                                            | H                            | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●               | ●      | ✱      | Cutting Conditions (Guide) :<br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |       |          |                        |     |     |                                                                                       |                              |
|-------------------------------------------------------------------------------------|------------------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|-----------------|--------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|------------------------|-----|-----|---------------------------------------------------------------------------------------|------------------------------|
|                                                                                     | K                            | Cast Iron                            |        |        |        |        |        |        |                 |        |        |                                                                                                                                                                        |       |          |                        |     |     |                                                                                       |                              |
|                                                                                     | S                            | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |                 |        |        |                                                                                                                                                                        |       |          |                        |     |     |                                                                                       |                              |
|                                                                                     |                              | Sintered Alloy                       |        |        |        |        |        |        |                 |        |        |                                                                                                                                                                        |       |          |                        |     | ●   |                                                                                       |                              |
| Shape                                                                               | Order Number                 | Coated PCBN                          |        |        |        |        | PCBN   |        | Dimensions (mm) |        |        |                                                                                                                                                                        |       | Geometry | Applicable Holder Page |     |     |                                                                                       |                              |
|                                                                                     |                              | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110          | MB8120 | MB8130 | MB4120                                                                                                                                                                 | IC    |          |                        | S   | RE  | LE                                                                                    | D1                           |
|    | NEW PETIT CUT (With Wiper✱1) | NP-CCGW09T304GSWS2                   | ●      |        | ●      | ●      |        |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |    | C024<br>D010<br>E033<br>E037 |
|                                                                                     | NP-CCGW09T308GSWS2           | ●                                    |        | ●      | ●      |        |        |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T304GAWS2           |                                      | ●      |        |        |        | ●      | ●      |                 | ★      |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T308GAWS2           |                                      | ●      |        |        |        | ●      | ●      |                 | ★      |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T304GBWL2           |                                      |        |        | ★      | ★      | ★      |        |                 | ★      |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T308GBWL2           |                                      |        |        | ★      | ★      | ★      |        |                 | ★      |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T304FSWS2           | ●                                    |        | ●      |        | ★      | ★      |        | ★               |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T308FSWS2           | ●                                    |        | ●      |        | ★      | ★      |        | ★               |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T304FBWL2           |                                      |        |        | ★      | ★      | ★      |        | ★               |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |                                                                                       |                              |
|                                                                                     | NP-CCGW09T308FBWL2           |                                      |        |        | ★      | ★      | ★      |        | ★               |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|   | NEW PETIT CUT                | BF-CCGT09T304TS2                     | ●      |        |        | ●      |        |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |   | C024<br>D010<br>E033<br>E037 |
|                                                                                     |                              | BF-CCGT09T308TS2                     | ●      |        |        | ●      |        |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | (With Chipbreaker)           |                                      |        |        |        |        |        |        |                 |        |        |                                                                                                                                                                        |       |          |                        |     |     |                                                                                       |                              |
|  | NEW PETIT CUT                | BM-CCGT09T304TA2                     |        | ●      |        |        | ●      |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.4                    | 1.8 | 4.4 |  | C024<br>D010<br>E033<br>E037 |
|                                                                                     |                              | BM-CCGT09T308TA2                     |        | ●      |        |        | ●      |        |                 |        |        |                                                                                                                                                                        | 9.525 | 3.97     | 0.8                    | 2.0 | 4.4 |                                                                                       |                              |
|                                                                                     | (With Chipbreaker)           |                                      |        |        |        |        |        |        |                 |        |        |                                                                                                                                                                        |       |          |                        |     |     |                                                                                       |                              |
|  | NEW PETIT CUT                | * NP-CCGW03S102GS                    |        |        | ●      |        |        |        |                 |        |        |                                                                                                                                                                        | 3.57  | 1.39     | 0.2                    | 1.1 | 2.0 |  | E018                         |
|                                                                                     |                              | * NP-CCGW03S104GS                    |        |        | ●      |        |        |        |                 |        |        |                                                                                                                                                                        | 3.57  | 1.39     | 0.4                    | 1.0 | 2.0 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW04T002GS                    |        |        | ●      |        |        |        |                 |        |        |                                                                                                                                                                        | 4.37  | 1.79     | 0.2                    | 1.5 | 2.4 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW04T004GS                    |        |        | ●      |        |        |        |                 |        |        |                                                                                                                                                                        | 4.37  | 1.79     | 0.4                    | 1.4 | 2.4 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW03S102FS                    | ●      |        |        | ●      |        |        | ★               |        |        |                                                                                                                                                                        | 3.57  | 1.39     | 0.2                    | 1.1 | 2.0 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW03S104FS                    | ●      |        |        | ●      |        |        | ●               |        |        |                                                                                                                                                                        | 3.57  | 1.39     | 0.4                    | 1.0 | 2.0 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW04T002FS                    | ●      |        |        | ●      |        |        | ●               |        |        |                                                                                                                                                                        | 4.37  | 1.79     | 0.2                    | 1.5 | 2.4 |                                                                                       |                              |
|                                                                                     |                              | * NP-CCGW04T004FS                    | ●      |        |        | ●      |        |        | ●               |        |        |                                                                                                                                                                        | 4.37  | 1.79     | 0.4                    | 1.4 | 2.4 |                                                                                       |                              |

\*1 Please refer to B012 before using wiper inserts.

\* Diameter of inscribed circle is non-ISO standard. (For SCLC type)

● : Inventory maintained. ★ : Inventory maintained in Japan.

# 80° CP TYPE INSERTS WITH HOLE

| Material      | H                | Hardened Materials                   | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | <div><div></div><div></div><div></div><div></div><div></div><div></div></div> | Cutting Conditions (Guide) :<br>● : Stable Cutting ● : General Cutting ✱ : Unstable Cutting<br>Honing (Last letter of order number) :<br>Please refer to page B009 |                 |        |       |      |     |          |                        |                                                                                      |              |
|---------------|------------------|--------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|-------|------|-----|----------|------------------------|--------------------------------------------------------------------------------------|--------------|
|               | K                | Cast Iron                            |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        |       |      |     |          |                        |                                                                                      |              |
|               | S                | Heat-resistant Alloy, Titanium Alloy |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        |       |      |     |          |                        |                                                                                      |              |
|               |                  | Sintered Alloy                       |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        |       |      |     |          |                        |                                                                                      |              |
| Shape         | Order Number     | Coated PCBN                          |                                                                               |                                                                               |                                                                               |                                                                               | PCBN                                                                          |                                                                               |                                                                               |                                                                                                                                                                    | Dimensions (mm) |        |       |      |     | Geometry | Applicable Holder Page |                                                                                      |              |
|               |                  | BC8210                               | BC8220                                                                        | BC8105                                                                        | BC8110                                                                        | BC8120                                                                        | BC8130                                                                        | BC5110                                                                        | MB8110                                                                        | MB8120                                                                                                                                                             | MB8130          | MB4120 | IC    | S    | RE  |          |                        | LE                                                                                   | D1           |
| NEW PETIT CUT | NP-CPGB080204GS2 | ★                                    | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.4 | 1.8      | 3.5                    |  | E007<br>E008 |
|               | NP-CPGB080208GS2 | ★                                    | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.8 | 2.0      | 3.5                    |                                                                                      |              |
|               | NP-CPGB090302GS2 | ★                                    | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.2 | 1.7      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090304GS2 | ★                                    | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308GS2 | ★                                    | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |
|               | NP-CPGB080204GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.4 | 1.8      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080208GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.8 | 2.0      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080212GA2 | ★                                    |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 1.2 | 2.2      | 3.5                    |                                                                                      |              |
|               | NP-CPGB090302GA2 | ★                                    |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.2 | 1.7      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090304GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308GA2 |                                      | ●                                                                             |                                                                               | ●                                                                             | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090312GA2 | ★                                    |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 1.2 | 2.2      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090304VA2 |                                      | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308VA2 |                                      | ●                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090312VA2 | ★                                    |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 1.2 | 2.2      | 4.5                    |                                                                                      |              |
|               | NP-CPGB080202FS2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 7.94  | 2.38 | 0.2 | 1.7      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080204FS2 |                                      |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ●                                                                                                                                                                  |                 |        | 7.94  | 2.38 | 0.4 | 1.8      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080208FS2 |                                      |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.8 | 2.0      | 3.5                    |                                                                                      |              |
|               | NP-CPGB090302FS2 |                                      |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.2 | 1.7      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090304FS2 |                                      |                                                                               | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308FS2 |                                      |                                                                               | ●                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090312FS2 |                                      |                                                                               |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 1.2 | 2.2      | 4.5                    |                                                                                      |              |
|               | NP-CPGB080204TA2 |                                      |                                                                               |                                                                               |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.4 | 1.8      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080208TA2 |                                      |                                                                               |                                                                               |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 0.8 | 2.0      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080212TA2 |                                      |                                                                               |                                                                               |                                                                               | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 7.94  | 2.38 | 1.2 | 2.2      | 3.5                    |                                                                                      |              |
|               | NP-CPGB090304TA2 | ★                                    |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308TA2 | ★                                    |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090312TA2 | ★                                    |                                                                               | ★                                                                             | ★                                                                             |                                                                               |                                                                               |                                                                               |                                                                               |                                                                                                                                                                    |                 |        | 9.525 | 3.18 | 1.2 | 2.2      | 4.5                    |                                                                                      |              |
|               | NP-CPGB080202SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 7.94  | 2.38 | 0.2 | 1.7      | 3.5                    |                                                                                      |              |
|               | NP-CPGB080204SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 7.94  | 2.38 | 0.4 | 1.8      | 3.5                    |                                                                                      |              |
|               | NP-CPGB090302SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.2 | 1.7      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090304SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.4 | 1.8      | 4.5                    |                                                                                      |              |
|               | NP-CPGB090308SE2 |                                      |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               |                                                                               | ★                                                                                                                                                                  |                 |        | 9.525 | 3.18 | 0.8 | 2.0      | 4.5                    |                                                                                      |              |

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PCBN TURNING INSERTS

POSI 11°

WITH HOLE

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# PCBN TURNING INSERTS [POSITIVE]

## 55° DC TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

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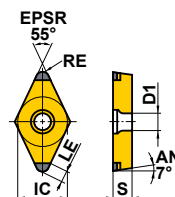
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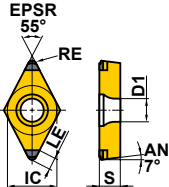
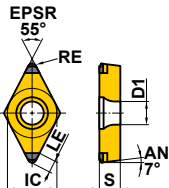
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● : Inventory maintained. ★ : Inventory maintained in Japan.

| Material                                                                                                | H             | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●      | ●      | ✱               | <b>Cutting Conditions (Guide) :</b><br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting<br><b>Honing (Last letter of order number) :</b><br>Please refer to page B009 |       |      |     |          |                        |                                                                                     |                                                      |
|---------------------------------------------------------------------------------------------------------|---------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|----------|------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------|
|                                                                                                         | K             | Cast Iron                            |        |        |        |        |        |        |        |        |                 |                                                                                                                                                                                      |       |      |     |          |                        |                                                                                     |                                                      |
|                                                                                                         | S             | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |        |                 |                                                                                                                                                                                      |       |      |     |          |                        |                                                                                     |                                                      |
|                                                                                                         |               | Sintered Alloy                       |        |        |        |        |        |        |        |        |                 |                                                                                                                                                                                      |       |      |     |          |                        |                                                                                     |                                                      |
| Shape                                                                                                   | Order Number  | Coated PCBN                          |        |        |        |        | PCBN   |        |        |        | Dimensions (mm) |                                                                                                                                                                                      |       |      |     | Geometry | Applicable Holder Page |                                                                                     |                                                      |
|                                                                                                         |               | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120 | MB8130          | MB4120                                                                                                                                                                               | IC    | S    | RE  |          |                        | LE                                                                                  | D1                                                   |
| <br>(With Chipbreaker) | NEW PETIT CUT | BF-DCGT11T304TS2                     | ●      |        |        | ●      |        |        |        |        |                 |                                                                                                                                                                                      | 9.525 | 3.97 | 0.4 | 2.1      | 4.4                    |  | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034 |
|                                                                                                         |               | BF-DCGT11T308TS2                     | ●      |        |        | ●      |        |        |        |        |                 |                                                                                                                                                                                      | 9.525 | 3.97 | 0.8 | 2.0      | 4.4                    |                                                                                     |                                                      |
|                                                                                                         |               |                                      |        |        |        |        |        |        |        |        |                 |                                                                                                                                                                                      |       |      |     |          |                        |                                                                                     |                                                      |
| <br>(With Chipbreaker) | NEW PETIT CUT | BM-DCGT11T304TA2                     |        | ●      |        |        | ●      |        |        |        |                 |                                                                                                                                                                                      | 9.525 | 3.97 | 0.4 | 2.1      | 4.4                    |  | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034 |
|                                                                                                         |               | BM-DCGT11T308TA2                     |        | ●      |        |        | ●      |        |        |        |                 |                                                                                                                                                                                      | 9.525 | 3.97 | 0.8 | 2.0      | 4.4                    |                                                                                     |                                                      |
|                                                                                                         |               |                                      |        |        |        |        |        |        |        |        |                 |                                                                                                                                                                                      |       |      |     |          |                        |                                                                                     |                                                      |

PCBN

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PCBN TURNING INSERTS

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HOLE

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# PCBN TURNING INSERTS [POSITIVE]

## 60° TC TYPE INSERTS WITH HOLE

PCBN

PCBN TURNING INSERTS

POSI  
7°

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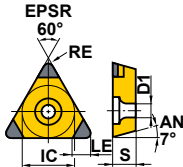
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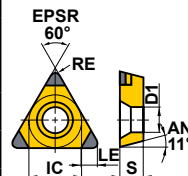
| Material                                                                          | H                | Hardened Materials                   | ●      | ●      | ●      | ●      | ●      | ✱      | ●      | ●               | ✱      | <b>Cutting Conditions (Guide) :</b><br>● : Stable Cutting   ● : General Cutting   ✱ : Unstable Cutting<br><b>Honing (Last letter of order number) :</b><br>Please refer to page B009 |       |      |          |                        |     |                                                                                     |              |
|-----------------------------------------------------------------------------------|------------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|-----------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|----------|------------------------|-----|-------------------------------------------------------------------------------------|--------------|
|                                                                                   | K                | Cast Iron                            |        |        |        |        |        |        |        |                 |        |                                                                                                                                                                                      |       |      |          |                        |     |                                                                                     |              |
|                                                                                   | S                | Heat-resistant Alloy, Titanium Alloy |        |        |        |        |        |        |        |                 |        |                                                                                                                                                                                      |       |      |          |                        |     |                                                                                     |              |
|                                                                                   |                  | Sintered Alloy                       |        |        |        |        |        |        |        |                 | ●      |                                                                                                                                                                                      |       |      |          |                        |     |                                                                                     |              |
| Shape                                                                             | Order Number     | Coated PCBN                          |        |        |        | PCBN   |        |        |        | Dimensions (mm) |        |                                                                                                                                                                                      |       |      | Geometry | Applicable Holder Page |     |                                                                                     |              |
|                                                                                   |                  | BC8210                               | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110 | MB8110 | MB8120          | MB8130 | MB4120                                                                                                                                                                               | IC    | S    |          |                        | RE  | LE                                                                                  | D1           |
|  | NP-TCGW090204GS3 |                                      |        | ★      |        |        | ★      |        |        |                 |        |                                                                                                                                                                                      | 5.56  | 2.38 | 0.4      | 1.6                    | 2.5 |  | C029<br>E031 |
|                                                                                   | NP-TCGW090208GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 5.56  | 2.38 | 0.8      | 1.7                    | 2.5 |                                                                                     |              |
|                                                                                   | NP-TCGW110202GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 6.35  | 2.38 | 0.2      | 1.5                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110204GS3 |                                      |        | ★      |        |        |        |        |        | ★               |        |                                                                                                                                                                                      | 6.35  | 2.38 | 0.4      | 1.6                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110208GS3 |                                      |        | ★      |        |        | ★      |        |        | ★               |        |                                                                                                                                                                                      | 6.35  | 2.38 | 0.8      | 1.7                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW130304GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 7.94  | 3.18 | 0.4      | 1.6                    | 3.4 |                                                                                     |              |
|                                                                                   | NP-TCGW130308GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 7.94  | 3.18 | 0.8      | 1.7                    | 3.4 |                                                                                     |              |
|                                                                                   | NP-TCGW16T304GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 9.525 | 3.97 | 0.4      | 1.6                    | 4.4 |                                                                                     |              |
|                                                                                   | NP-TCGW16T308GS3 |                                      |        | ★      |        |        |        |        |        |                 |        |                                                                                                                                                                                      | 9.525 | 3.97 | 0.8      | 1.7                    | 4.4 |                                                                                     |              |
|                                                                                   | NP-TCGW110204FS3 |                                      |        |        |        |        |        | ★      |        |                 | ●      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.4      | 1.6                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110208FS3 |                                      |        |        |        |        |        | ★      |        |                 | ●      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.8      | 1.7                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110204SF3 |                                      |        |        |        |        |        |        |        |                 | ★      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.4      | 1.6                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110208SF3 |                                      |        |        |        |        |        |        |        |                 | ★      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.8      | 1.7                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110204SE3 |                                      |        |        |        |        |        |        |        |                 | ★      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.4      | 1.6                    | 2.8 |                                                                                     |              |
|                                                                                   | NP-TCGW110208SE3 |                                      |        |        |        |        |        |        |        |                 | ★      |                                                                                                                                                                                      | 6.35  | 2.38 | 0.8      | 1.7                    | 2.8 |                                                                                     |              |

● : Inventory maintained. ★ : Inventory maintained in Japan.

**60°**

# TP TYPE INSERTS WITH HOLE

| Material | H | Hardened Materials | 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E009

**PCBN**

B

## PCBN TURNING INSERTS

**POSI**  
**11°**

## WITH HOLE

C

D

**P**

**S**

**T**

V

W

|                |        |
|----------------|--------|
| GRADES         | ➤ B004 |
| IDENTIFICATION | ➤ B002 |

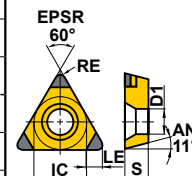
**B043**





**60°**

# TP TYPE INSERTS WITH HOLE



E009

**POSI**  
**11°**

## WITH HOLE

c

D

## R

**S**

**T**

V

W

**B044**

# 35° VB TYPE INSERTS WITH HOLE

| Material | H | Hardened Materials | 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PCBN

B

## PCBN TURNING INSERTS

**POSI**  
**5°**

## WITH HOLE

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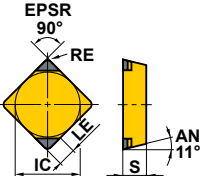
|                |        |
|----------------|--------|
| GRADES         | ➤ B004 |
| IDENTIFICATION | ➤ B002 |

**B045**

# 35° VC TYPE INSERTS WITH HOLE

**B046**

## 90° SP TYPE INSERTS WITHOUT HOLE

| Material                                                                          | H                                    | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting         |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
|-----------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------|--------|--------|--------|--------|--------|-----------------|--------|--------|--------|----------|------------------------|--------|-----|-----|-------------------------------------------------------------------------------------|----|
|                                                                                   | K                                    | Honing (Last letter of order number) :<br>Please refer to page B009 |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   | S                                    |                                                                     |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   |                                      |                                                                     |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   | Hardened Materials                   | ●                                                                   | ●      | ●      | ●      | ●      | ✖      | ●               | ●      | ✖      |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   | Cast Iron                            |                                                                     |        |        |        |        |        | ●               |        |        |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   | Heat-resistant Alloy, Titanium Alloy |                                                                     |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
|                                                                                   | Sintered Alloy                       |                                                                     |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |
| Shape                                                                             | Order Number                         | Coated PCBN                                                         |        |        |        | PCBN   |        | Dimensions (mm) |        |        |        | Geometry | Applicable Holder Page |        |     |     |                                                                                     |    |
|                                                                                   |                                      | BC8210                                                              | BC8220 | BC8105 | BC8110 | BC8120 | BC8130 | BC5110          | MB8110 | MB8120 | MB8130 |          |                        | MB4120 | IC  | S   | RE                                                                                  | LE |
| NEW PETIT CUT                                                                     | NP-SPGN120412GS2                     |                                                                     |        |        |        |        |        | ★               |        |        |        |          | 12.7                   | 4.76   | 1.2 | 2.5 |  | —  |
|  |                                      |                                                                     |        |        |        |        |        |                 |        |        |        |          |                        |        |     |     |                                                                                     |    |

**PCBN**

B

## PCBN TURNING INSERTS

**POSI  
11°**

## WITHOUT HOLE

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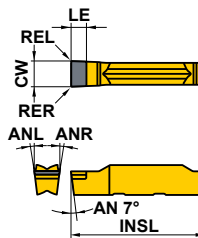
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**GY TYPE INSERTS  
WITHOUT HOLE**



F022  
—097

**POSI**  
**7°**

## WITHOUT HOLE

**C**

D

## R

**S**

**T**

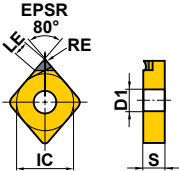
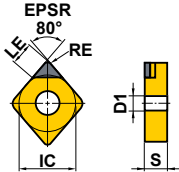
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**B048**

# PCD TURNING INSERTS [NEGATIVE]

## 80° CN TYPE INSERTS WITH HOLE

| Material                                                                                                    | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) : |                     |                      |      | Applicable Holder Page                                                                                          |                                              |
|-------------------------------------------------------------------------------------------------------------|------------------|-------------------|-----------------|------------------------------|---------------------|----------------------|------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|
|                                                                                                             |                  |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✱ : Unstable Cutting |      |                                                                                                                 |                                              |
| Shape                                                                                                       | Order Number     | PCD               | Dimensions (mm) |                              |                     |                      |      | Geometry                                                                                                        |                                              |
|                                                                                                             |                  | MD220             | IC              | S                            | RE                  | LE                   | D1   |                                                                                                                 |                                              |
| <br><br>(With Chipbreaker) | NP-CNMM120402R-F | ★                 | 12.7            | 4.76                         | 0.2                 | 1.7                  | 5.16 | <br>Right hand insert shown. | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                             | NP-CNMM120404R-F | ★                 | 12.7            | 4.76                         | 0.4                 | 1.8                  | 5.16 |                                                                                                                 |                                              |
|                                                                                                             | NP-CNMM120408R-F | ★                 | 12.7            | 4.76                         | 0.8                 | 2.0                  | 5.16 |                                                                                                                 |                                              |
|                                                                                                             |                  |                   |                 |                              |                     |                      |      |                                                                                                                 |                                              |
|                            | CNMA120404       | ★                 | 12.7            | 4.76                         | 0.4                 | 3.6                  | 5.16 |                              | C008<br>C009<br>E015<br>E039<br>H006<br>—008 |
|                                                                                                             | CNMA120408       | ★                 | 12.7            | 4.76                         | 0.8                 | 3.6                  | 5.16 |                                                                                                                 |                                              |
|                                                                                                             |                  |                   |                 |                              |                     |                      |      |                                                                                                                 |                                              |

PCD

B

PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

V

W

GRADES > B015  
IDENTIFICATION > B002

B049

# PCD TURNING INSERTS [NEGATIVE]

## 55° DN TYPE INSERTS WITH HOLE

PCD

B

PCD TURNING INSERTS

NEG

WITH HOLE

C

D

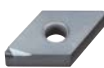
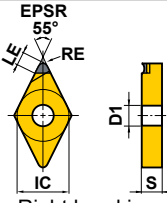
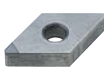
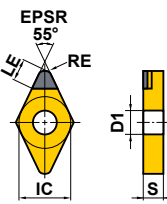
R

S

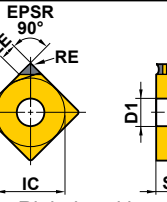
T

V

W

| Material                                                                                                | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) :                                |     |     |      |                                                                                                                 |  |                                                      |
|---------------------------------------------------------------------------------------------------------|------------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|------|-----------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------|
|                                                                                                         |                  |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |      |                                                                                                                 |  |                                                      |
| Shape                                                                                                   | Order Number     | PCD               | Dimensions (mm) |                                                             |     |     |      | Geometry                                                                                                        |  | Applicable Holder Page                               |
|                                                                                                         |                  | MD220             | IC              | S                                                           | RE  | LE  | D1   |                                                                                                                 |  |                                                      |
| <br>(With Chipbreaker) | NEW PETIT CUT    | ★                 | 12.7            | 4.76                                                        | 0.2 | 2.2 | 5.16 | <br>Right hand insert shown. |  | C010<br>C011<br>E015<br>E039<br>—041<br>H009<br>H010 |
|                                                                                                         | NP-DNMM150402R-F | ★                 | 12.7            | 4.76                                                        | 0.4 | 2.1 | 5.16 |                                                                                                                 |  |                                                      |
|                                                                                                         | NP-DNMM150404R-F | ★                 | 12.7            | 4.76                                                        | 0.8 | 2.0 | 5.16 |                                                                                                                 |  |                                                      |
| <br>(With Chipbreaker) | DNGA150404       | ★                 | 12.7            | 4.76                                                        | 0.4 | 2.9 | 5.16 | <br>Right hand insert shown. |  | C010<br>C011<br>E015<br>E039<br>—041<br>H009<br>H010 |
|                                                                                                         | DNGA150408       | ★                 | 12.7            | 4.76                                                        | 0.8 | 2.4 | 5.16 |                                                                                                                 |  |                                                      |
|                                                                                                         |                  |                   |                 |                                                             |     |     |      |                                                                                                                 |  |                                                      |

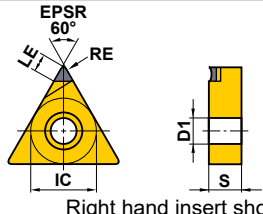
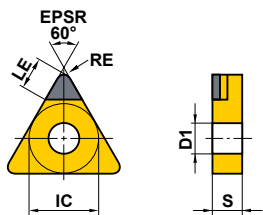
## 90° SN TYPE INSERTS WITH HOLE

| Material                                                                                                  | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) :                                |     |     |      |                                                                                                                   |  |                              |
|-----------------------------------------------------------------------------------------------------------|------------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|------|-------------------------------------------------------------------------------------------------------------------|--|------------------------------|
|                                                                                                           |                  |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |      |                                                                                                                   |  |                              |
| Shape                                                                                                     | Order Number     | PCD               | Dimensions (mm) |                                                             |     |     |      | Geometry                                                                                                          |  | Applicable Holder Page       |
|                                                                                                           |                  | MD220             | IC              | S                                                           | RE  | LE  | D1   |                                                                                                                   |  |                              |
| <br>(With Chipbreaker) | NEW PETIT CUT    | ★                 | 12.7            | 4.76                                                        | 0.4 | 2.0 | 5.16 | <br>Right hand insert shown. |  | C012<br>—015<br>E016<br>E038 |
|                                                                                                           | NP-SNMM120404R-F | ★                 | 12.7            | 4.76                                                        | 0.8 | 2.2 | 5.16 |                                                                                                                   |  |                              |
|                                                                                                           | NP-SNMM120408R-F | ★                 | 12.7            | 4.76                                                        | 0.8 | 2.2 | 5.16 |                                                                                                                   |  |                              |

★ : Inventory maintained in Japan.



# **60° TN** TYPE INSERTS WITH HOLE

| Material                                                                                                | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) : |                     |                      |      |                                                                                                                 | Applicable Holder Page       |
|---------------------------------------------------------------------------------------------------------|------------------|-------------------|-----------------|------------------------------|---------------------|----------------------|------|-----------------------------------------------------------------------------------------------------------------|------------------------------|
|                                                                                                         |                  |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✱ : Unstable Cutting |      |                                                                                                                 |                              |
| Shape                                                                                                   | Order Number     | PCD               | Dimensions (mm) |                              |                     |                      |      | Geometry                                                                                                        |                              |
|                                                                                                         |                  | MD220             | IC              | S                            | RE                  | LE                   | D1   |                                                                                                                 |                              |
| <br>(With Chipbreaker) | NP-TNMM160402R-F | ★                 | 9.525           | 4.76                         | 0.2                 | 1.5                  | 3.81 | <br>Right hand insert shown. | C016<br>—018<br>E016<br>E038 |
|                                                                                                         | NP-TNMM160404R-F | ★                 | 9.525           | 4.76                         | 0.4                 | 1.6                  | 3.81 |                                                                                                                 |                              |
|                                                                                                         | NP-TNMM160408R-F | ★                 | 9.525           | 4.76                         | 0.8                 | 1.7                  | 3.81 |                                                                                                                 |                              |
|                                                                                                         |                  |                   |                 |                              |                     |                      |      |                                                                                                                 |                              |
|                        | TNGA160402       | ★                 | 9.525           | 4.76                         | 0.2                 | 3.1                  | 3.81 |                              | C016<br>—018<br>E016<br>E038 |
|                                                                                                         | TNGA160404       | ★                 | 9.525           | 4.76                         | 0.4                 | 2.9                  | 3.81 |                                                                                                                 |                              |
|                                                                                                         | TNGA160408       | ★                 | 9.525           | 4.76                         | 0.8                 | 2.8                  | 3.81 |                                                                                                                 |                              |
|                                                                                                         |                  |                   |                 |                              |                     |                      |      |                                                                                                                 |                              |

**PCD**
**B**

PCD TURNING INSERTS

**NEG**

 WITH  
HOLE

**C**
**D**
**R**
**S**
**T**
**V**
**W**

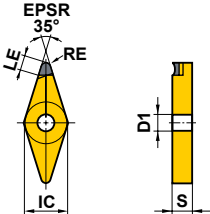
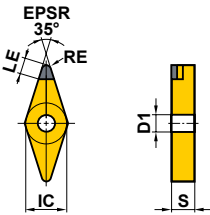
 GRADES > B015  
 IDENTIFICATION > B002

**B051**

# PCD TURNING INSERTS [NEGATIVE]



## 35° VN TYPE INSERTS WITH HOLE

| Material                                                                                                    | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) :                                    |     |     |      |                                                                                     | Geometry               | Applicable Holder Page |
|-------------------------------------------------------------------------------------------------------------|------------------|-------------------|-----------------|-----------------------------------------------------------------|-----|-----|------|-------------------------------------------------------------------------------------|------------------------|------------------------|
|                                                                                                             |                  |                   |                 | ● : Stable Cutting   ● : General Cutting   ✖ : Unstable Cutting |     |     |      |                                                                                     |                        |                        |
| Shape                                                                                                       | Order Number     | PCD               | Dimensions (mm) |                                                                 |     |     |      | Geometry                                                                            | Applicable Holder Page |                        |
|                                                                                                             |                  | MD220             | IC              | S                                                               | RE  | LE  | D1   |                                                                                     |                        |                        |
| <br><br>(With Chipbreaker) | NP-VNMM160402R-F | ★                 | 9.525           | 4.76                                                            | 0.2 | 2.5 | 3.81 |  | C019<br>—021<br>E017   |                        |
|                                                                                                             | NP-VNMM160404R-F | ★                 | 9.525           | 4.76                                                            | 0.4 | 2.5 | 3.81 |                                                                                     |                        |                        |
|                                                                                                             | NP-VNMM160408R-F | ★                 | 9.525           | 4.76                                                            | 0.8 | 2.0 | 3.81 |                                                                                     |                        |                        |
|                                                                                                             |                  |                   |                 |                                                                 |     |     |      |                                                                                     |                        |                        |
|                            | VNGA160404       | ★                 | 9.525           | 4.76                                                            | 0.4 | 2.6 | 3.81 |  | C019<br>—021<br>E017   |                        |
|                                                                                                             | VNGA160408       | ★                 | 9.525           | 4.76                                                            | 0.8 | 1.8 | 3.81 |                                                                                     |                        |                        |
|                                                                                                             |                  |                   |                 |                                                                 |     |     |      |                                                                                     |                        |                        |

PCD

B

PCD TURNING INSERTS

NEG

WITH HOLE

C

D

R

S

T

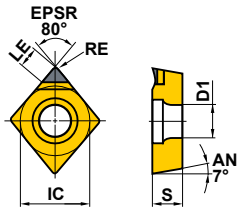
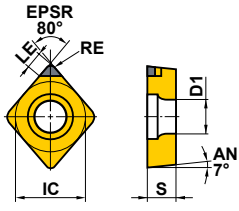
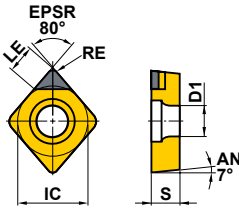
V

W

● : Inventory maintained. ★ : Inventory maintained in Japan.

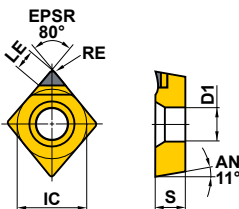
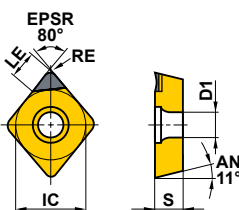
# PCD TURNING INSERTS [POSITIVE]

## 80° CC TYPE INSERTS WITH HOLE

| Material                                                                                                                 | N               | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                |     |     |     |                                                                                      |                                              |
|--------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|-----|--------------------------------------------------------------------------------------|----------------------------------------------|
|                                                                                                                          |                 |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |                                                                                      |                                              |
| Shape                                                                                                                    | Order Number    | PCD               | Dimensions (mm) |                                                             |     |     |     | Geometry                                                                             | Applicable Holder Page                       |
|                                                                                                                          |                 | MD220             | IC              | S                                                           | RE  | LE  | D1  |                                                                                      |                                              |
| NEW PETIT CUT<br><br>(With Chipbreaker) | NP-CCMH060202   | ★                 | 6.35            | 2.38                                                        | 0.2 | 1.7 | 2.8 |   | C024<br>D010<br>E007<br>E008<br>E033<br>E037 |
|                                                                                                                          | NP-CCMH060204   | ★                 | 6.35            | 2.38                                                        | 0.4 | 1.8 | 2.8 |                                                                                      |                                              |
| NEW PETIT CUT<br><br>(With Chipbreaker) | * NP-CCMW03S102 | ●                 | 3.57            | 1.39                                                        | 0.2 | 1.1 | 2.0 |   | E018                                         |
|                                                                                                                          | * NP-CCMW03S104 | ★                 | 3.57            | 1.39                                                        | 0.4 | 1.0 | 2.0 |                                                                                      |                                              |
|                                                                                                                          | * NP-CCMW04T002 | ●                 | 4.37            | 1.79                                                        | 0.2 | 1.5 | 2.4 |                                                                                      |                                              |
|                                                                                                                          | * NP-CCMW04T004 | ★                 | 4.37            | 1.79                                                        | 0.4 | 1.4 | 2.4 |                                                                                      |                                              |
| <br>(With Chipbreaker)                 | CCMW060202      | ★                 | 6.35            | 2.38                                                        | 0.2 | 2.9 | 2.8 |  | C024<br>D010<br>E007<br>E008<br>E033<br>E037 |
|                                                                                                                          | CCMW060204      | ★                 | 6.35            | 2.38                                                        | 0.4 | 2.9 | 2.8 |                                                                                      |                                              |
|                                                                                                                          | CCMW09T302      | ★                 | 9.525           | 3.97                                                        | 0.2 | 3.3 | 4.4 |                                                                                      |                                              |
|                                                                                                                          | CCMW09T304      | ★                 | 9.525           | 3.97                                                        | 0.4 | 3.3 | 4.4 |                                                                                      |                                              |

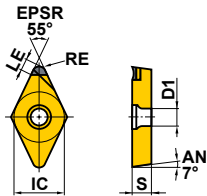
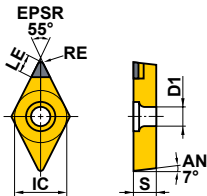
\* Diameter of inscribed circle is special. (For SCLC type)

## 80° CP TYPE INSERTS WITH HOLE

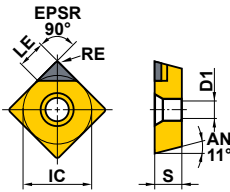
| Material                                                                                                                   | N             | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                |     |     |     |                                                                                       |                        |
|----------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|-----|---------------------------------------------------------------------------------------|------------------------|
|                                                                                                                            |               |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |                                                                                       |                        |
| Shape                                                                                                                      | Order Number  | PCD               | Dimensions (mm) |                                                             |     |     |     | Geometry                                                                              | Applicable Holder Page |
|                                                                                                                            |               | MD220             | IC              | S                                                           | RE  | LE  | D1  |                                                                                       |                        |
| NEW PETIT CUT<br><br>(With Chipbreaker) | NP-CPMH080202 | ★                 | 7.94            | 2.38                                                        | 0.2 | 1.7 | 3.5 |  | E007<br>E008           |
|                                                                                                                            | NP-CPMH080204 | ★                 | 7.94            | 2.38                                                        | 0.4 | 1.8 | 3.5 |                                                                                       |                        |
|                                                                                                                            | NP-CPMH090302 | ★                 | 9.525           | 3.18                                                        | 0.2 | 1.7 | 4.5 |                                                                                       |                        |
|                                                                                                                            | NP-CPMH090304 | ★                 | 9.525           | 3.18                                                        | 0.4 | 1.8 | 4.5 |                                                                                       |                        |
| <br>(With Chipbreaker)                  | CPGT080202    | ★                 | 7.94            | 2.38                                                        | 0.2 | 3.7 | 3.4 |  | -                      |
|                                                                                                                            | CPGT080204    | ★                 | 7.94            | 2.38                                                        | 0.4 | 3.6 | 3.4 |                                                                                       |                        |
|                                                                                                                            | CPGT090302    | ★                 | 9.525           | 3.18                                                        | 0.2 | 3.3 | 4.4 |                                                                                       |                        |
|                                                                                                                            | CPGT090304    | ★                 | 9.525           | 3.18                                                        | 0.4 | 3.3 | 4.4 |                                                                                       |                        |

# PCD TURNING INSERTS [POSITIVE]

## 55° DC TYPE INSERTS WITH HOLE

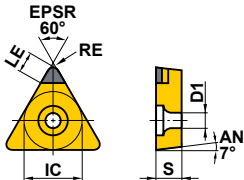
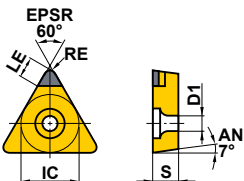
| Material                                                                                                     | N                  | Non-ferrous Metal | ●     | Cutting Conditions (Guide) :                                |     |     |     |    |                                                                                                                |                                                      |
|--------------------------------------------------------------------------------------------------------------|--------------------|-------------------|-------|-------------------------------------------------------------|-----|-----|-----|----|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
|                                                                                                              |                    |                   |       | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |    |                                                                                                                |                                                      |
| Shape                                                                                                        | Order Number       | PCD               | MD220 | IC                                                          | S   | RE  | LE  | D1 | Geometry                                                                                                       | Applicable Holder Page                               |
| <b>PCD</b><br><b>B</b><br>PCD TURNING INSERTS<br>POSI 7° 11°<br>WITH HOLE<br>C<br>D<br>R<br>S<br>T<br>V<br>W | NEW PETIT CUT      | ★                 | 6.35  | 2.38                                                        | 0.2 | 1.4 | 2.8 |    | <br>Left hand insert shown. | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034 |
|                                                                                                              | NP-DCMT070202R-F   | ★                 | 6.35  | 2.38                                                        | 0.2 | 1.4 | 2.8 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT070202L-F   | ★                 | 6.35  | 2.38                                                        | 0.2 | 1.4 | 2.8 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT070204R-F   | ★                 | 6.35  | 2.38                                                        | 0.4 | 1.5 | 2.8 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT070204L-F   | ★                 | 6.35  | 2.38                                                        | 0.4 | 1.5 | 2.8 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT11T302R-F   | ★                 | 9.525 | 3.97                                                        | 0.2 | 1.4 | 4.4 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT11T302L-F   | ★                 | 9.525 | 3.97                                                        | 0.2 | 1.4 | 4.4 |    |                                                                                                                |                                                      |
|                                                                                                              | NP-DCMT11T304R-F   | ★                 | 9.525 | 3.97                                                        | 0.4 | 1.5 | 4.4 |    |                                                                                                                |                                                      |
|                                                                                                              | (With Chipbreaker) | ★                 | 9.525 | 3.97                                                        | 0.4 | 1.5 | 4.4 |    |                                                                                                                |                                                      |
| DCMW070202<br>DCMW070204<br>DCMW11T302<br>DCMW11T304                                                         | DCMW070202         | ★                 | 6.35  | 2.38                                                        | 0.2 | 2.7 | 2.8 |    |                             | C025<br>D011<br>D026<br>E010<br>E011<br>E032<br>E034 |
|                                                                                                              | DCMW070204         | ★                 | 6.35  | 2.38                                                        | 0.4 | 2.5 | 2.8 |    |                                                                                                                |                                                      |
|                                                                                                              | DCMW11T302         | ★                 | 9.525 | 3.97                                                        | 0.2 | 3.0 | 4.4 |    |                                                                                                                |                                                      |
|                                                                                                              | DCMW11T304         | ★                 | 9.525 | 3.97                                                        | 0.4 | 2.9 | 4.4 |    |                                                                                                                |                                                      |
|                                                                                                              |                    |                   |       |                                                             |     |     |     |    |                                                                                                                |                                                      |

## 90° SP TYPE INSERTS WITH HOLE

| Material                                                                              | N            | Non-ferrous Metal | ●     | Cutting Conditions (Guide) :                                |     |     |     |    |          |                        |
|---------------------------------------------------------------------------------------|--------------|-------------------|-------|-------------------------------------------------------------|-----|-----|-----|----|----------|------------------------|
|                                                                                       |              |                   |       | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |    |          |                        |
| Shape                                                                                 | Order Number | PCD               | MD220 | IC                                                          | S   | RE  | LE  | D1 | Geometry | Applicable Holder Page |
|  | SPGX090304   | ★                 | 9.525 | 3.18                                                        | 0.4 | 3.7 | 4.8 |    | I        |                        |
|                                                                                       | SPGX090308   | ★                 | 9.525 | 3.18                                                        | 0.8 | 3.8 | 4.8 |    |          |                        |
|                                                                                       |              |                   |       |                                                             |     |     |     |    |          |                        |

★ : Inventory maintained in Japan.

# **60° TC TYPE INSERTS WITH HOLE**

| Material                                                                          | N            | Non-ferrous Metal |                 | Cutting Conditions (Guide) : |                     |                      |     |                                                                                     | Applicable Holder Page |
|-----------------------------------------------------------------------------------|--------------|-------------------|-----------------|------------------------------|---------------------|----------------------|-----|-------------------------------------------------------------------------------------|------------------------|
|                                                                                   |              |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✖ : Unstable Cutting |     |                                                                                     |                        |
| Shape                                                                             | Order Number | PCD               | Dimensions (mm) |                              |                     |                      |     | Geometry                                                                            |                        |
|                                                                                   |              | MD220             | IC              | S                            | RE                  | LE                   | D1  |                                                                                     |                        |
|  | TCMW110202   | ★                 | 6.35            | 2.38                         | 0.2                 | 2.7                  | 2.8 |  | C029<br>E031           |
|                                                                                   | TCMW110204   | ★                 | 6.35            | 2.38                         | 0.4                 | 2.6                  | 2.8 |                                                                                     |                        |
|                                                                                   |              |                   |                 |                              |                     |                      |     |                                                                                     |                        |
|  | TCGW060102   | ★                 | 3.97            | 1.59                         | 0.2                 | 1.5                  | 2.3 |  | —                      |
|                                                                                   | TCGW060104   | ★                 | 3.97            | 1.59                         | 0.4                 | 1.6                  | 2.3 |                                                                                     |                        |
|                                                                                   | TCGW060108   | ★                 | 3.97            | 1.59                         | 0.8                 | 1.4                  | 2.3 |                                                                                     |                        |

PCD

B

PCD TURNING INSERTS

POSI  
7°

WITH  
HOLE

C

D

R

S

T

V

W

GRADES > B015  
IDENTIFICATION > B002

**B055**

# PCD TURNING INSERTS [POSITIVE]

## 60° TP TYPE INSERTS WITH HOLE

PCD

B

PCD TURNING INSERTS

POSI 11°

WITH HOLE

C

D

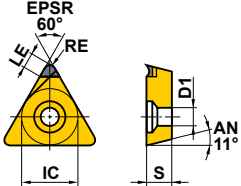
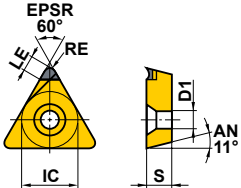
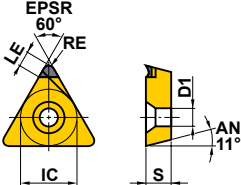
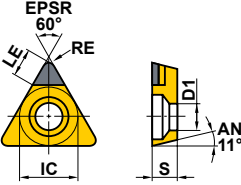
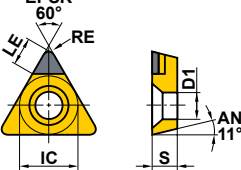
R

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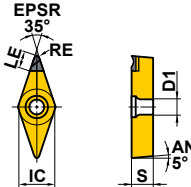
W

| Material                                                                            | N                | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                |     |     |     |                                                                                                                                                                                                                            |                        |  |
|-------------------------------------------------------------------------------------|------------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--|
|                                                                                     |                  |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |                                                                                                                                                                                                                            |                        |  |
| Shape                                                                               | Order Number     | PCD               | Dimensions (mm) |                                                             |     |     |     | Geometry                                                                                                                                                                                                                   | Applicable Holder Page |  |
|                                                                                     |                  | MD220             | IC              | S                                                           | RE  | LE  | D1  |                                                                                                                                                                                                                            |                        |  |
|    | NP-TPMX090202R-F | ★                 | 5.56            | 2.38                                                        | 0.2 | 1.5 | 3.0 | <br>NP-TPMX160302L-F<br><br>Right hand insert shown. | E009<br>E028           |  |
|                                                                                     | NP-TPMX090202L-F | ★                 | 5.56            | 2.38                                                        | 0.2 | 1.5 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX090204L-F | ★                 | 5.56            | 2.38                                                        | 0.4 | 1.6 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX090208L-F | ★                 | 5.56            | 2.38                                                        | 0.8 | 1.7 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX110302L-F | ★                 | 6.35            | 3.18                                                        | 0.2 | 1.5 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX110304L-F | ★                 | 6.35            | 3.18                                                        | 0.4 | 1.6 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX110308L-F | ★                 | 6.35            | 3.18                                                        | 0.8 | 1.7 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX160302L-F | ★                 | 9.525           | 3.18                                                        | 0.2 | 1.5 | 4.8 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX160304L-F | ★                 | 9.525           | 3.18                                                        | 0.4 | 1.6 | 4.8 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMX160308L-F | ★                 | 9.525           | 3.18                                                        | 0.8 | 1.7 | 4.8 |                                                                                                                                                                                                                            |                        |  |
| (With Chipbreaker)                                                                  |                  |                   |                 |                                                             |     |     |     |                                                                                                                                                                                                                            |                        |  |
|  | NP-TPMH080202R-F | ★                 | 4.76            | 2.38                                                        | 0.2 | 1.5 | 2.4 | <br>Left hand insert shown.                                                                                                           | E009                   |  |
|                                                                                     | NP-TPMH080202L-F | ★                 | 4.76            | 2.38                                                        | 0.2 | 1.5 | 2.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH080204R-F | ★                 | 4.76            | 2.38                                                        | 0.4 | 1.6 | 2.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH080204L-F | ★                 | 4.76            | 2.38                                                        | 0.4 | 1.6 | 2.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH090202R-F | ★                 | 5.56            | 2.38                                                        | 0.2 | 1.5 | 2.9 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH090202L-F | ★                 | 5.56            | 2.38                                                        | 0.2 | 1.5 | 2.9 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH090204R-F | ★                 | 5.56            | 2.38                                                        | 0.4 | 1.6 | 2.9 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH090204L-F | ★                 | 5.56            | 2.38                                                        | 0.4 | 1.6 | 2.9 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH110302R-F | ★                 | 6.35            | 3.18                                                        | 0.2 | 1.5 | 3.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH110302L-F | ★                 | 6.35            | 3.18                                                        | 0.2 | 1.5 | 3.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH110304R-F | ★                 | 6.35            | 3.18                                                        | 0.4 | 1.6 | 3.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH110304L-F | ★                 | 6.35            | 3.18                                                        | 0.4 | 1.6 | 3.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH160302R-F | ★                 | 9.525           | 3.18                                                        | 0.2 | 1.5 | 4.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH160302L-F | ★                 | 9.525           | 3.18                                                        | 0.2 | 1.5 | 4.4 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | NP-TPMH160304R-F | ★                 | 9.525           | 3.18                                                        | 0.4 | 1.6 | 4.4 |                                                                                                                                                                                                                            |                        |  |
| (With Chipbreaker)                                                                  | NP-TPMH160304L-F | ★                 | 9.525           | 3.18                                                        | 0.4 | 1.6 | 4.4 |                                                                                                                                                                                                                            |                        |  |
|  | TPGX080202       | ★                 | 4.76            | 2.38                                                        | 0.2 | 1.8 | 2.5 | <br>TPGX160302L-F<br>                            | E009<br>E028           |  |
|                                                                                     | TPGX080204       | ★                 | 4.76            | 2.38                                                        | 0.4 | 1.7 | 2.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX080208       | ★                 | 4.76            | 2.38                                                        | 0.8 | 1.4 | 2.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX090202       | ★                 | 5.56            | 2.38                                                        | 0.2 | 2.7 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX090204       | ★                 | 5.56            | 2.38                                                        | 0.4 | 2.6 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX090208       | ★                 | 5.56            | 2.38                                                        | 0.8 | 2.3 | 3.0 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX110302       | ★                 | 6.35            | 3.18                                                        | 0.2 | 2.7 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX110304       | ★                 | 6.35            | 3.18                                                        | 0.4 | 2.6 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX110308       | ★                 | 6.35            | 3.18                                                        | 0.8 | 2.3 | 3.5 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX160304       | ★                 | 9.525           | 3.18                                                        | 0.4 | 2.9 | 4.8 |                                                                                                                                                                                                                            |                        |  |
|                                                                                     | TPGX160308       | ★                 | 9.525           | 3.18                                                        | 0.8 | 2.6 | 4.8 |                                                                                                                                                                                                                            |                        |  |

★ : Inventory maintained in Japan.



# 35° VB TYPE INSERTS WITH HOLE

| Material                                                                          | N                | Non-ferrous Metal | ●               | Cutting Conditions (Guide) : |                     |                      |      |                                                                                     |                              |  |
|-----------------------------------------------------------------------------------|------------------|-------------------|-----------------|------------------------------|---------------------|----------------------|------|-------------------------------------------------------------------------------------|------------------------------|--|
|                                                                                   |                  |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✖ : Unstable Cutting |      |                                                                                     |                              |  |
| Shape                                                                             | Order Number     | PCD               | Dimensions (mm) |                              |                     |                      |      | Geometry                                                                            | Applicable Holder Page       |  |
|                                                                                   |                  | MD220             | IC              | S                            | RE                  | LE                   | D1   |                                                                                     |                              |  |
|  | NEW PETIT CUT    | ★                 | 6.35            | 3.18                         | 0.1                 | 2.5                  | 2.85 |  | D012<br>D013<br>E013<br>E014 |  |
|                                                                                   | NP-VBGT110301R-F | ★                 | 6.35            | 3.18                         | 0.2                 | 2.5                  | 2.85 |                                                                                     |                              |  |
|                                                                                   | NP-VBGT110302R-F | ★                 | 6.35            | 3.18                         | 0.4                 | 2.5                  | 2.85 |                                                                                     |                              |  |
|                                                                                   | NP-VBGT110304R-F | ★                 | 6.35            | 3.18                         | 0.05                | 2.5                  | 2.85 |                                                                                     |                              |  |
| (With Chipbreaker)                                                                |                  |                   |                 |                              |                     |                      |      |                                                                                     |                              |  |

PCD

B

PCD TURNING INSERTS

POSI  
5°  
7°WITH  
HOLE

C

D

R

S

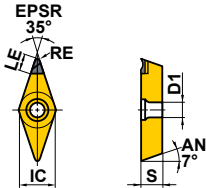
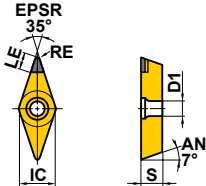
T

V

W



# 35° VC TYPE INSERTS WITH HOLE

| Material                                                                            | N                | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                    |      |     |     |                                                                                       |                                      |
|-------------------------------------------------------------------------------------|------------------|-------------------|-----------------|-----------------------------------------------------------------|------|-----|-----|---------------------------------------------------------------------------------------|--------------------------------------|
|                                                                                     |                  |                   |                 | ● : Stable Cutting   ● : General Cutting   ✖ : Unstable Cutting |      |     |     |                                                                                       |                                      |
| Shape                                                                               | Order Number     | PCD               | Dimensions (mm) |                                                                 |      |     |     | Geometry                                                                              | Applicable Holder Page               |
|                                                                                     |                  | MD220             | IC              | S                                                               | RE   | LE  | D1  |                                                                                       |                                      |
|  | NP-VCGT080201R-F | ★                 | 4.76            | 2.38                                                            | 0.1  | 2.5 | 2.4 |  | C030<br>C031<br>D013<br>E014<br>E035 |
|                                                                                     | NP-VCGT080202R-F | ★                 | 4.76            | 2.38                                                            | 0.2  | 2.5 | 2.4 |                                                                                       |                                      |
|                                                                                     | NP-VCGT080204R-F | ★                 | 4.76            | 2.38                                                            | 0.4  | 2.5 | 2.4 |                                                                                       |                                      |
|                                                                                     | NP-VCGT0802V5R-F | ★                 | 4.76            | 2.38                                                            | 0.05 | 2.5 | 2.4 |                                                                                       |                                      |
|                                                                                     | NP-VCGT110301R-F | ★                 | 6.35            | 3.18                                                            | 0.1  | 2.5 | 2.8 |                                                                                       |                                      |
|                                                                                     | NP-VCGT110302R-F | ★                 | 6.35            | 3.18                                                            | 0.2  | 2.5 | 2.8 |                                                                                       |                                      |
|                                                                                     | NP-VCGT110304R-F | ★                 | 6.35            | 3.18                                                            | 0.4  | 2.5 | 2.8 |                                                                                       |                                      |
| (With Chipbreaker)                                                                  | NP-VCGT1103V5R-F | ★                 | 6.35            | 3.18                                                            | 0.05 | 2.5 | 2.8 |                                                                                       |                                      |
|  | VCGW110301       | ★                 | 6.35            | 3.18                                                            | 0.1  | 3.1 | 2.8 |  | C030<br>D013<br>E035                 |
|                                                                                     | VCGW110302       | ★                 | 6.35            | 3.18                                                            | 0.2  | 3.0 | 2.8 |                                                                                       |                                      |
|                                                                                     | VCGW110304       | ★                 | 6.35            | 3.18                                                            | 0.4  | 2.6 | 2.8 |                                                                                       |                                      |
|                                                                                     |                  |                   |                 |                                                                 |      |     |     |                                                                                       |                                      |

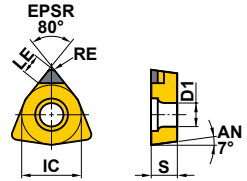
GRADES > B015  
IDENTIFICATION > B002

B057



# PCD TURNING INSERTS [POSITIVE]

## 80° WC TYPE INSERTS WITH HOLE

| Material                                                                          | N            | Non-ferrous Metal |       | Cutting Conditions (Guide) :                                |      |     |     |     |                                                                                     |                        |
|-----------------------------------------------------------------------------------|--------------|-------------------|-------|-------------------------------------------------------------|------|-----|-----|-----|-------------------------------------------------------------------------------------|------------------------|
|                                                                                   |              |                   |       | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |      |     |     |     |                                                                                     |                        |
| Shape                                                                             | Order Number | PCD               | MD220 | IC                                                          | S    | RE  | LE  | D1  | Geometry                                                                            | Applicable Holder Page |
|  | WCMW06T304   | ★                 |       | 9.525                                                       | 3.97 | 0.4 | 3.0 | 4.4 |  | E030                   |

PCD

B

PCD TURNING INSERTS

POSITIVE  
7°  
11°

WITH HOLE

C

D

R

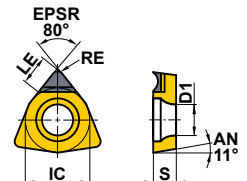
S

T

V

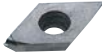
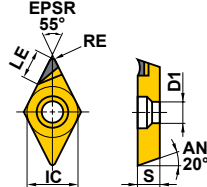
W

## 80° WP TYPE INSERTS WITH HOLE

| Material                                                                            | N            | Non-ferrous Metal |       | Cutting Conditions (Guide) :                                |      |     |     |     |                                                                                       |                        |
|-------------------------------------------------------------------------------------|--------------|-------------------|-------|-------------------------------------------------------------|------|-----|-----|-----|---------------------------------------------------------------------------------------|------------------------|
|                                                                                     |              |                   |       | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |      |     |     |     |                                                                                       |                        |
| Shape                                                                               | Order Number | PCD               | MD220 | IC                                                          | S    | RE  | LE  | D1  | Geometry                                                                              | Applicable Holder Page |
|  | WPGT040202   | ★                 |       | 6.35                                                        | 2.38 | 0.2 | 2.9 | 2.8 |  | E012                   |
|                                                                                     | WPGT040204   | ★                 |       | 6.35                                                        | 2.38 | 0.4 | 2.9 | 2.8 |                                                                                       |                        |
|                                                                                     | WPGT060302   | ★                 |       | 9.525                                                       | 3.18 | 0.2 | 3.3 | 4.4 |                                                                                       |                        |
|                                                                                     | WPGT060304   | ★                 |       | 9.525                                                       | 3.18 | 0.4 | 3.3 | 4.4 |                                                                                       |                        |
| (With Chipbreaker)                                                                  |              |                   |       |                                                             |      |     |     |     |                                                                                       |                        |

★ : Inventory maintained in Japan.

# 55° DE TYPE INSERTS WITH HOLE

| Material                                                                                                    | N             | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                    |     |     |     |                                                                                                                 |                        |
|-------------------------------------------------------------------------------------------------------------|---------------|-------------------|-----------------|-----------------------------------------------------------------|-----|-----|-----|-----------------------------------------------------------------------------------------------------------------|------------------------|
|                                                                                                             |               |                   |                 | ● : Stable Cutting   ● : General Cutting   ✖ : Unstable Cutting |     |     |     |                                                                                                                 |                        |
| Shape                                                                                                       | Order Number  | PCD               | Dimensions (mm) |                                                                 |     |     |     | Geometry                                                                                                        | Applicable Holder Page |
|                                                                                                             |               | MD220             | IC              | S                                                               | RE  | LE  | D1  |                                                                                                                 |                        |
| <br><br>(With Chipbreaker) | DEGX150404R-F | ★                 | 12.7            | 4.76                                                            | 0.4 | 2.9 | 5.1 | <br>Right hand insert shown. | C034                   |
|                                                                                                             | DEGX150404L-F | ★                 | 12.7            | 4.76                                                            | 0.4 | 2.9 | 5.1 |                                                                                                                 |                        |
|                                                                                                             |               |                   |                 |                                                                 |     |     |     |                                                                                                                 |                        |

PCD

B

PCD TURNING INSERTS

POSI 20°

WITH HOLE

C

D

R

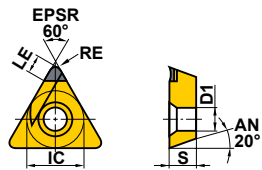
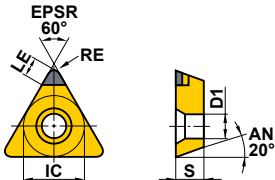
S

T

V

W

# 60° TE TYPE INSERTS WITH HOLE

| Material                                                                                                  | N            | Non-ferrous Metal |                 | Cutting Conditions (Guide) :                                |     |     |     |                                                                                                                   |                        |
|-----------------------------------------------------------------------------------------------------------|--------------|-------------------|-----------------|-------------------------------------------------------------|-----|-----|-----|-------------------------------------------------------------------------------------------------------------------|------------------------|
|                                                                                                           |              |                   |                 | ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting |     |     |     |                                                                                                                   |                        |
| Shape                                                                                                     | Order Number | PCD               | Dimensions (mm) |                                                             |     |     |     | Geometry                                                                                                          | Applicable Holder Page |
|                                                                                                           |              | MD220             | IC              | S                                                           | RE  | LE  | D1  |                                                                                                                   |                        |
| <br>(With Chipbreaker) | TEGX160302R  | ★                 | 9.525           | 3.18                                                        | 0.2 | 3.8 | 4.4 | <br>Right hand insert shown. | C035 E043              |
|                                                                                                           | TEGX160302L  | ★                 | 9.525           | 3.18                                                        | 0.2 | 3.8 | 4.4 |                                                                                                                   |                        |
|                                                                                                           | TEGX160304R  | ★                 | 9.525           | 3.18                                                        | 0.4 | 3.6 | 4.4 |                                                                                                                   |                        |
|                                                                                                           | TEGX160304L  | ★                 | 9.525           | 3.18                                                        | 0.4 | 3.6 | 4.4 |                                                                                                                   |                        |
|                                                                                                           |              |                   |                 |                                                             |     |     |     |                                                                                                                   |                        |
|                        | TEGX160302   | ★                 | 9.525           | 3.18                                                        | 0.2 | 3.1 | 4.4 |                              | C035 E043              |
|                                                                                                           | TEGX160304   | ★                 | 9.525           | 3.18                                                        | 0.4 | 2.9 | 4.4 |                                                                                                                   |                        |
|                                                                                                           |              |                   |                 |                                                             |     |     |     |                                                                                                                   |                        |

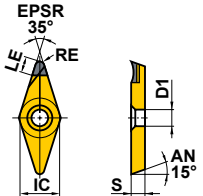
GRADES > B015  
IDENTIFICATION > B002

B059

# PCD TURNING INSERTS [POSITIVE]



## 35° V TYPE INSERTS WITH HOLE

| Material                                                                                                | N             | Non-ferrous Metal |       | Cutting Conditions (Guide) :                                    |      |     |     |     | Geometry                                                                                                        | Applicable Holder Page |
|---------------------------------------------------------------------------------------------------------|---------------|-------------------|-------|-----------------------------------------------------------------|------|-----|-----|-----|-----------------------------------------------------------------------------------------------------------------|------------------------|
|                                                                                                         |               |                   |       | ● : Stable Cutting   ● : General Cutting   ✖ : Unstable Cutting |      |     |     |     |                                                                                                                 |                        |
| Shape                                                                                                   | Order Number  |                   | PCD   | Dimensions (mm)                                                 |      |     |     |     | Geometry                                                                                                        |                        |
|                                                                                                         |               |                   | MD220 | IC                                                              | S    | RE  | LE  | D1  |                                                                                                                 |                        |
| <br>(With Chipbreaker) | VDGX160302R-F |                   | ●     | 9.525                                                           | 3.18 | 0.2 | 3.1 | 4.5 | <br>Right hand insert shown. | C036                   |
|                                                                                                         | VDGX160304R-F |                   | ●     | 9.525                                                           | 3.18 | 0.4 | 2.7 | 4.5 |                                                                                                                 |                        |
|                                                                                                         |               |                   |       |                                                                 |      |     |     |     |                                                                                                                 |                        |

PCD

B

PCD TURNING INSERTS

POSITIVE  
15°

WITH  
HOLE

C

D

R

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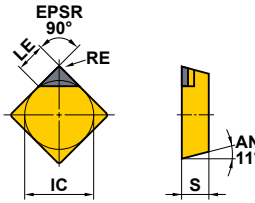
V

W

● : Inventory maintained. ★ : Inventory maintained in Japan.

B060

# 90° SP TYPE INSERTS WITHOUT HOLE

| Material                                                                          | N            | Non-ferrous Metal | ●               | Cutting Conditions (Guide) : |                     |                      |                                                                                     | Applicable Holder Page |
|-----------------------------------------------------------------------------------|--------------|-------------------|-----------------|------------------------------|---------------------|----------------------|-------------------------------------------------------------------------------------|------------------------|
|                                                                                   |              |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✖ : Unstable Cutting |                                                                                     |                        |
| Shape                                                                             | Order Number | PCD               | Dimensions (mm) |                              |                     |                      | Geometry                                                                            |                        |
|                                                                                   |              | MD220             | IC              | S                            | RE                  | LE                   |                                                                                     |                        |
|  | SPGN090302   | ★                 | 9.525           | 3.18                         | 0.2                 | 3.7                  |  | I                      |
|                                                                                   | SPGN090304   | ★                 | 9.525           | 3.18                         | 0.4                 | 3.7                  |                                                                                     |                        |
|                                                                                   | SPGN090308   | ★                 | 9.525           | 3.18                         | 0.8                 | 3.8                  |                                                                                     |                        |
|                                                                                   | SPGN120304   | ★                 | 12.7            | 3.18                         | 0.4                 | 3.7                  |                                                                                     |                        |
|                                                                                   | SPGN120308   | ★                 | 12.7            | 3.18                         | 0.8                 | 3.8                  |                                                                                     |                        |
|                                                                                   | SPGN120312   | ★                 | 12.7            | 3.18                         | 1.2                 | 3.7                  |                                                                                     |                        |

PCD

B

PCD TURNING INSERTS

POSI 11°

WITHOUT HOLE

C

D

R

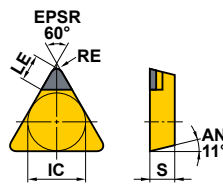
S

T

V

W

# 60° TP TYPE INSERTS WITHOUT HOLE

| Material                                                                            | N            | Non-ferrous Metal | ●               | Cutting Conditions (Guide) : |                     |                      |                                                                                       | Applicable Holder Page |
|-------------------------------------------------------------------------------------|--------------|-------------------|-----------------|------------------------------|---------------------|----------------------|---------------------------------------------------------------------------------------|------------------------|
|                                                                                     |              |                   |                 | ● : Stable Cutting           | ● : General Cutting | ✖ : Unstable Cutting |                                                                                       |                        |
| Shape                                                                               | Order Number | PCD               | Dimensions (mm) |                              |                     |                      | Geometry                                                                              |                        |
|                                                                                     |              | MD220             | IC              | S                            | RE                  | LE                   |                                                                                       |                        |
|  | TPGN110302   | ★                 | 6.35            | 3.18                         | 0.2                 | 2.7                  |  | E029                   |
|                                                                                     | TPGN110304   | ★                 | 6.35            | 3.18                         | 0.4                 | 2.6                  |                                                                                       |                        |
|                                                                                     | TPGN110308   | ★                 | 6.35            | 3.18                         | 0.8                 | 2.3                  |                                                                                       |                        |
|                                                                                     | TPGN160302   | ★                 | 9.525           | 3.18                         | 0.2                 | 3.1                  |                                                                                       |                        |
|                                                                                     | TPGN160304   | ★                 | 9.525           | 3.18                         | 0.4                 | 2.9                  |                                                                                       |                        |
|                                                                                     | TPGN160308   | ★                 | 9.525           | 3.18                         | 0.8                 | 2.6                  |                                                                                       |                        |

# HOW TO READ THE STANDARD OF EXTERNAL TURNING TOOLS

- How this section page is organised
- ①Organised according to turning insert shape.  
(Refer to the index on the next page.)

## TYPE OF TOOL HOLDER

Indicates the first four letters of the order number, as well as cutting applications.

## TITLE OF PRODUCT BY INSERT TYPE

## PRODUCT SECTION

**EXTERNAL TURNING TOOLS**

**VN** **INSERTS**  
**TOOL HOLDERS**

**DVNN** External turning, Copying **DOUBLE CLAMP type**

| Order Number | Stock | Insert Number | Dimensions (mm) |    |     |    | Shim | Shim Pre | Lock Pin | Lock Screw | Stop Ring | Wrench |
|--------------|-------|---------------|-----------------|----|-----|----|------|----------|----------|------------|-----------|--------|
|              |       |               | H               | B  | LF  | HF |      |          |          |            |           |        |
| DVNN2020K16  | ●     | VN A 1604     | 20              | 20 | 125 | 44 | 20   | 10       | DC5020   | LLP13      | DC5020    | TKY19F |
| DVNN2525M16  | ●     | VN G 1604     | 25              | 25 | 150 | 44 | 25   | 12.5     | DC5025   | LLP13      | DC5025    | TKY19F |

\*1 Clamp Torque (N·m) : DC05201~3.5

**PVNN** External turning, Copying **MP type**

| Order Number | Stock | Insert Number | Dimensions (mm) |    |     |    | Shim | Lock Pin | Lock Screw    | Stop Ring | Wrench    |     |        |
|--------------|-------|---------------|-----------------|----|-----|----|------|----------|---------------|-----------|-----------|-----|--------|
|              |       |               | H               | B  | LF  | HF |      |          |               |           |           |     |        |
| PVNN2020K16  | ●     | VN A 1604     | 20              | 20 | 125 | 38 | 20   | 10       | PV322 (PV321) | P115      | HSP05008C | E03 | HKY25R |
| PVNN2525M16  | ●     | VN M 1604     | 25              | 25 | 150 | 38 | 25   | 12.5     | PV323         | P115      | HSP05008C | E03 | HKY25R |

\*1 Clamp Torque (N·m) : HSP05008C>2.5  
\*2 Please use shim no. PV321 and PV323 with RE0.4mm and RE1.2mm thick inserts. When using inserts, shim should be ordered separately.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

**LEGEND FOR STOCK STATUS MARK**  
Is shown on the left hand page of each double-page spread.

**PRODUCT STANDARDS**  
Indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

**REFERENCE PAGE FOR APPLICABLE INSERTS**  
Indicates reference pages giving details of inserts that are applicable to the product.

**PAGE REFERENCE**  
· SPARE PARTS  
· TECHNICAL DATA  
Indicates reference pages, including the above, on the right hand page of each double-page spread.

**FIGURE SHOWING THE TOOLING APPLICATION**  
Uses illustrations and arrows to depict the available machining applications such as external turning, copying, facing, and chamfering together with cutting edge lead angles.

## GEOMETRY

## CHIPBREAKER BY CUTTING APPLICATION

**DVPN** Facing, Copying **DOUBLE CLAMP type**

| Order Number  | Stock | Insert Number | Dimensions (mm) |    |     |    | Shim | Shim Pre | Lock Pin | Lock Screw | Stop Ring | Wrench |
|---------------|-------|---------------|-----------------|----|-----|----|------|----------|----------|------------|-----------|--------|
|               |       |               | H               | B  | LF  | HF |      |          |          |            |           |        |
| DVPNRL2020K16 | ●     | VN A 1604     | 20              | 20 | 125 | 32 | 20   | 25       | DC5020   | LLP13      | DC5020    | TKY19F |
| DVPNRL2525M16 | ●     | VN G 1604     | 25              | 25 | 150 | 32 | 25   | 32       | DC5025   | LLP13      | DC5025    | TKY19F |

\*1 Clamp Torque (N·m) : DC05201~3.5

**PVPN** Facing, Copying **MP type**

| Order Number  | Stock | Insert Number | Dimensions (mm) |    |     |    | Shim | Lock Pin | Lock Screw    | Stop Ring | Wrench    |     |        |
|---------------|-------|---------------|-----------------|----|-----|----|------|----------|---------------|-----------|-----------|-----|--------|
|               |       |               | H               | B  | LF  | HF |      |          |               |           |           |     |        |
| PVPNRL2020K16 | ●     | VN A 1604     | 20              | 20 | 125 | 32 | 20   | 25       | PV322 (PV321) | P115      | HSP05008C | E03 | HKY25R |
| PVPNRL2525M16 | ●     | VN M 1604     | 25              | 25 | 150 | 32 | 25   | 32       | PV323         | P115      | HSP05008C | E03 | HKY25R |

\*1 Clamp Torque (N·m) : HSP05008C>2.5  
\*2 Please use shim no. PV321 and PV323 with RE0.4mm and RE1.2mm thick inserts. When using inserts, shim should be ordered separately.

# TURNING

## EXTERNAL TURNING TOOLS

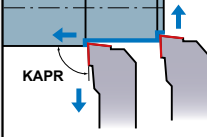
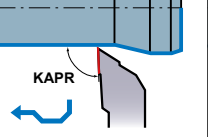
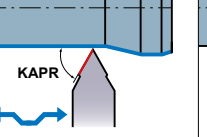
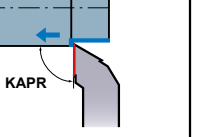
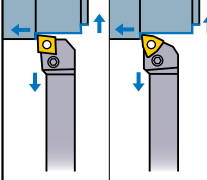
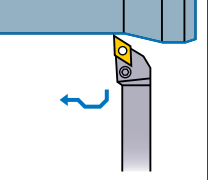
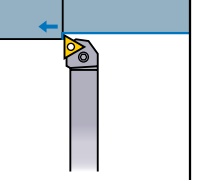
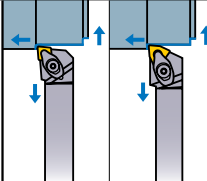
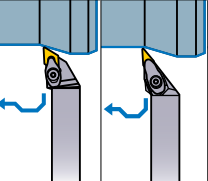
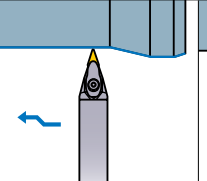
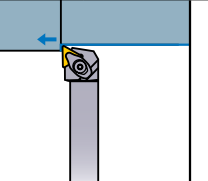
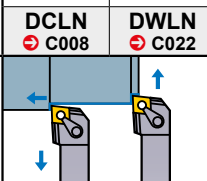
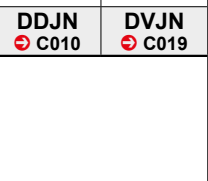
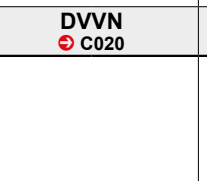
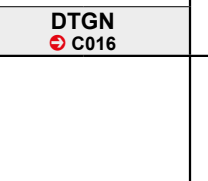
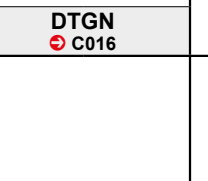
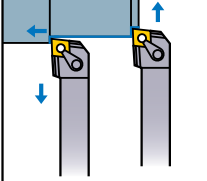
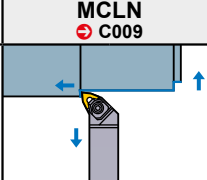
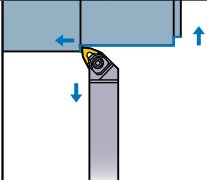
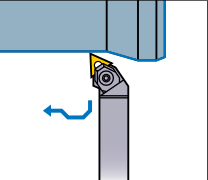
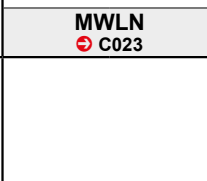
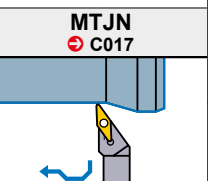
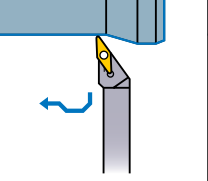
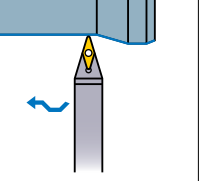
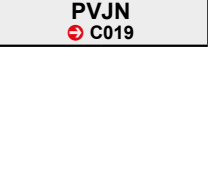
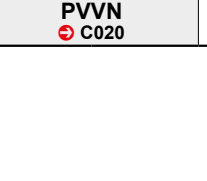
|                                |      |
|--------------------------------|------|
| CLASSIFICATION.....            | C002 |
| IDENTIFICATION .....           | C006 |
| METHOD OF HOLDING .....        | C007 |
| STANDARD HOLDERS               |      |
| CN○○INSERTS TOOL HOLDERS.....  | C008 |
| DN○○INSERTS TOOL HOLDERS.....  | C010 |
| SN○○INSERTS TOOL HOLDERS.....  | C012 |
| TN○○INSERTS TOOL HOLDERS ..... | C016 |
| VN○○INSERTS TOOL HOLDERS.....  | C019 |
| WN○○INSERTS TOOL HOLDERS.....  | C022 |
| CC○○INSERTS TOOL HOLDERS.....  | C024 |
| DC○○INSERTS TOOL HOLDERS.....  | C025 |
| RC○○INSERTS TOOL HOLDERS.....  | C026 |
| SC○○INSERTS TOOL HOLDERS ..... | C028 |
| TC○○INSERTS TOOL HOLDERS ..... | C029 |
| VC○○INSERTS TOOL HOLDERS.....  | C030 |
| XC○○INSERTS TOOL HOLDERS.....  | C032 |
| TL HOLDER .....                | C037 |
| AL HOLDER                      |      |
| DE○○INSERTS TOOL HOLDERS ..... | C034 |
| TE○○INSERTS TOOL HOLDERS ..... | C035 |
| VD○○INSERTS TOOL HOLDERS ..... | C036 |

### \*Alphabetical order index

|           |           |           |
|-----------|-----------|-----------|
| C008 DCLN | C012 PSBN | C029 STGC |
| C010 DDJN | C014 PSDN | C035 STGE |
| C016 DTGN | C015 PSKN | C030 SVJC |
| C019 DVJN | C013 PSSN | C036 SVJD |
| C021 DVPN | C013 PSTN | C031 SVPC |
| C020 DVVN | C017 PTFN | C030 SVVC |
| C022 DWLN | C016 PTGN | C032 SXZC |
| C009 MCLN | C019 PVJN | C037 TLHR |
| C012 MSBN | C021 PVPN |           |
| C014 MSSN | C020 PVVN |           |
| C018 MTEN | C022 PWLN |           |
| C017 MTJN | C024 SCLC |           |
| C018 MTQN | C025 SDJC |           |
| C023 MWLN | C034 SDJE |           |
| C009 PCBN | C025 SDNC |           |
| C008 PCLN | C034 SDNE |           |
| C011 PDHN | C027 SRDC |           |
| C010 PDJN | C027 SRGC |           |
| C026 PRDC | C028 SSSC |           |
| C026 PRGC | C035 STFE |           |



# CLASSIFICATION (Negative insert)

| Tool Holder                                                                                                                              | Features<br>Shank Size<br>(H x W x L)                                                                                                                                                                                                                                                                                                 | External Turning Facing                                                                                      | External Turning Copying                                                                                      |                                                                                                                | External Turning                                                                                              |                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       | KAPR=95°                                                                                                     | KAPR=93°                                                                                                      | KAPR=72.5°                                                                                                     | KAPR=91°                                                                                                      |                                                                                                               |
| <b>LL Holder</b><br>                                    | <ul style="list-style-type: none"> <li>● Lever lock type.</li> <li>● ISO standard.</li> <li>● Various holder shapes.</li> <li>● Suitable for light to heavy cutting.</li> <li>● Economical negative insert.</li> </ul> 10 x 10 x 70   25 x 25 x 150<br>12 x 12 x 80   32 x 25 x 170<br>16 x 16 x 100   32 x 32 x 170<br>20 x 20 x 125 |                             |                             |                             |                            |                                                                                                               |
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       | <br><b>PCLN</b><br>↻ C008   | <br><b>PWLN</b><br>↻ C022   | <br><b>PDJN</b><br>↻ C010   | <br><b>PTGN</b><br>↻ C016  |                                                                                                               |
| <b>DOUBLE CLAMP Holder</b><br>                         | <ul style="list-style-type: none"> <li>● Double clamp type.</li> <li>● Holds inserts securely.</li> <li>● Excellent cutting edge tolerance.</li> <li>● Economical negative insert.</li> <li>● Small insert series.</li> </ul> 16 x 16 x 100   25 x 25 x 150<br>20 x 20 x 125   32 x 25 x 170                                          |                             |                             |                             |                            |                                                                                                               |
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       | <br><b>DCLN</b><br>↻ C008  | <br><b>DWLN</b><br>↻ C022  | <br><b>DDJN</b><br>↻ C010  | <br><b>DVJN</b><br>↻ C019 | <br><b>DVVN</b><br>↻ C020 |
| <b>DOUBLE CLAMP Holder</b><br>(For heavy cutting)<br> | <ul style="list-style-type: none"> <li>● Double clamp holder type.</li> <li>● Holds inserts securely.</li> <li>● Suitable for heavy cutting.</li> <li>● Negative insert.</li> </ul> 32 x 32 x 170<br>40 x 40 x 200                                                                                                                    |                           |                                                                                                               |                                                                                                                |                                                                                                               |                                                                                                               |
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       | <br><b>MCLN</b><br>↻ C009 |                                                                                                               |                                                                                                                |                                                                                                               |                                                                                                               |
| <b>WP Holder</b><br>                                  | <ul style="list-style-type: none"> <li>● Double clamp holder type.</li> <li>● Simple insert exchange.</li> <li>● Economical negative insert.</li> </ul> 20 x 20 x 125<br>25 x 25 x 150<br>32 x 25 x 170                                                                                                                               |                           |                           |                                                                                                                |                                                                                                               |                                                                                                               |
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       | <br><b>MWLN</b><br>↻ C023 | <br><b>MTJN</b><br>↻ C017 |                                                                                                                |                                                                                                               |                                                                                                               |
| <b>MP Holder</b><br>                                  | <ul style="list-style-type: none"> <li>● Pin lock type.</li> <li>● 35° rhombic shape insert.</li> <li>● Suitable for recessing.</li> </ul> 20 x 20 x 125<br>25 x 25 x 150                                                                                                                                                             |                                                                                                              |                           |                           |                                                                                                               |                                                                                                               |
|                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                       |                                                                                                              | <br><b>PVJN</b><br>↻ C019 | <br><b>PVVN</b><br>↻ C020 |                                                                                                               |                                                                                                               |

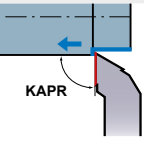
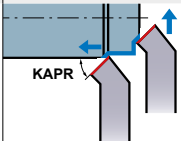
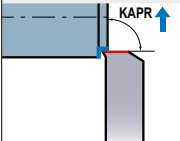
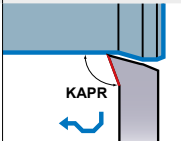
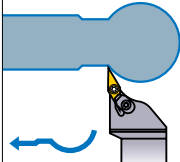
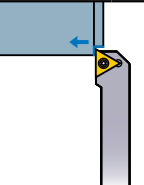
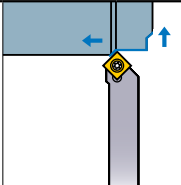
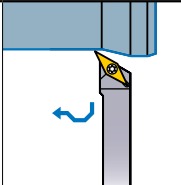
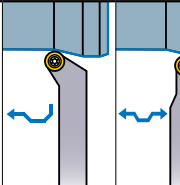
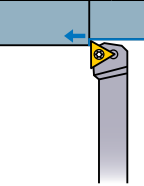
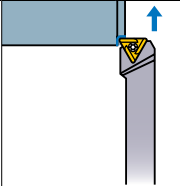
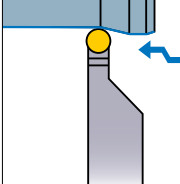
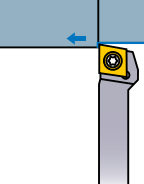
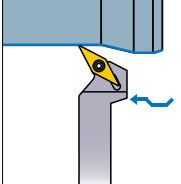
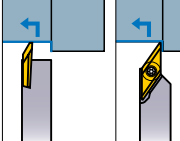


|  | External Turning | External Turning, Chamfering |                | External Turning, Facing, Chamfering | Facing         |                | Facing Copying                | External Turning, Copying            | Selection Standard |                                       |                |                      |             |
|--|------------------|------------------------------|----------------|--------------------------------------|----------------|----------------|-------------------------------|--------------------------------------|--------------------|---------------------------------------|----------------|----------------------|-------------|
|  | KAPR=75°         | KAPR=60°                     | KAPR=45°       | KAPR=45°                             | KAPR=75°       | KAPR=91°       | KAPR=105°<br>107.5°<br>117.5° | Special Design<br>(Positive inserts) | Economical         | Low Cutting Resistance<br>(Sharpness) | Clamp Rigidity | Operation Efficiency | Specialised |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  | PCBN<br>➔ C009   | PSBN<br>➔ C012               | SSTN<br>➔ C013 | PSDN<br>➔ C014                       | PSSN<br>➔ C013 | PSKN<br>➔ C015 | PTFN<br>➔ C017                | PDHN<br>➔ C011                       | PRGC<br>➔ C026     | PRDC<br>➔ C026                        |                |                      |             |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                | DVPN<br>➔ C021                |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  | MSBN<br>➔ C012   |                              |                | MSSN<br>➔ C014                       |                |                |                               |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  |                  | MTEN<br>➔ C018               |                |                                      |                |                | MTQN<br>➔ C018                |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                |                               |                                      |                    |                                       |                |                      |             |
|  |                  |                              |                |                                      |                |                | PVPN<br>➔ C021                |                                      |                    |                                       |                |                      |             |

Note 1) ◎ : 1st recommendation. ○ : 2nd recommendation.

# CLASSIFICATION (Positive insert)

| Tool Holder                                     | Features<br>Shank Size<br>(H x W x L)                                                                                                                                                                                                                                                                      | External Turning,<br>Facing | External Turning,<br>Copying |                          |                          |                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|--------------------------|--------------------------|--------------------------|
|                                                 |                                                                                                                                                                                                                                                                                                            | KAPR=95°                    | KAPR=93°<br>95°              |                          | KAPR=62.5°<br>72.5°      |                          |
| <b>Profile Holder</b>                           | <ul style="list-style-type: none"> <li>Double clamp holder type.</li> <li>25° rhombic shape insert.</li> <li>Possible to machine a face relief with up to 60° inclination.</li> </ul> 16 x 16 x 100<br>20 x 20 x 125<br>25 x 25 x 150                                                                      |                             |                              |                          |                          |                          |
| <b>SP Holder</b>                                | <ul style="list-style-type: none"> <li>Screw-on type.</li> <li>Miniature holder with 7° positive insert.</li> </ul> 8 x 8 x 60<br>10 x 10 x 70<br>12 x 12 x 80<br>16 x 16 x 100<br>20 x 20 x 125<br>25 x 25 x 150                                                                                          |                             |                              |                          |                          |                          |
|                                                 |                                                                                                                                                                                                                                                                                                            | <b>SCLC</b><br>➔ C024       | <b>SDJC</b><br>➔ C025        | <b>SVJC</b><br>➔ C030    | <b>SDNC</b><br>➔ C025    | <b>SVVC</b><br>➔ C030    |
| <b>AL Holder</b><br>(For Aluminium)             | <ul style="list-style-type: none"> <li>Screw-on type.</li> <li>20° positive insert. (35° rhombic shape insert is 15°)</li> <li>High rake and good sharpness.</li> </ul> 16 x 16 x 100<br>20 x 20 x 125<br>25 x 25 x 150                                                                                    |                             |                              |                          |                          |                          |
|                                                 |                                                                                                                                                                                                                                                                                                            |                             | <b>SDJE</b><br>➔ C034        | <b>SVJD</b><br>➔ C036    | <b>SDNE</b><br>➔ C034    |                          |
| <b>TL Holder</b>                                | <ul style="list-style-type: none"> <li>Taper lock type</li> <li>Excellent finished surface with round shape insert.</li> </ul> 20 x 20 x 125<br>25 x 25 x 150<br>32 x 25 x 170                                                                                                                             |                             |                              |                          |                          |                          |
| <b>SMALL TOOLS</b><br>(Tools for front turning) | <ul style="list-style-type: none"> <li>Screw-on type.</li> <li>Tools to be equipped on gang type tool posts.</li> <li>Miniature holder with 7° positive insert.</li> </ul> 8 x 8 x 125<br>10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150                                                                  |                             |                              |                          |                          |                          |
|                                                 |                                                                                                                                                                                                                                                                                                            | <b>SCLC-SM</b><br>➔ D010    | <b>SVLP-SM</b><br>➔ D012     | <b>SDJC-SM</b><br>➔ D011 | <b>SVJB-SM</b><br>➔ D012 | <b>SVJC-SM</b><br>➔ D013 |
| <b>SMALL TOOLS</b><br>(Tools for back turning)  | <ul style="list-style-type: none"> <li>Screw-on type.</li> <li>Tools to be equipped on gang type tool posts.</li> <li>High rigidity due to designing of vertical insert. (BTA/CTB type)</li> <li>Back machining. (BTA/CTB type)</li> </ul> 8 x 10 x 120<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120 |                             |                              |                          |                          |                          |
|                                                 |                                                                                                                                                                                                                                                                                                            |                             |                              |                          |                          |                          |

|  | External Turning                                                                    | External Turning,<br>Facing, Chamfering                                           | Facing                                                                              | Facing,<br>Copying                                                                  | External Turning,<br>Copying                                                          | Selection Standard |                                       |                |                      |             |
|--|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|---------------------------------------|----------------|----------------------|-------------|
|  | <b>KAPR=90°<br/>91°</b>                                                             | <b>KAPR=45°</b>                                                                   | <b>KAPR=91°</b>                                                                     | <b>KAPR=117.5°</b>                                                                  | Special Design                                                                        | Economical         | Low Cutting Resistance<br>(Sharpness) | Clamp Rigidity | Operation Efficiency | Specialised |
|  |    |  |    |    |                                                                                       |                    |                                       |                |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     |    |                    | ◎                                     | ◎              |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     | <b>SXZC</b><br>➔ C032                                                                 |                    |                                       |                |                      |             |
|  |    |  |                                                                                     |    |    |                    | ○                                     |                |                      |             |
|  | <b>STGC</b><br>➔ C029                                                               | <b>SSSC</b><br>➔ C028                                                             |                                                                                     | <b>SVPC</b><br>➔ C031                                                               | <b>SRGC</b><br>➔ C027 <b>SRDC</b><br>➔ C027                                           |                    |                                       |                |                      |             |
|  |  |                                                                                   |  |                                                                                     |                                                                                       |                    | ◎                                     |                |                      | ◎           |
|  | <b>STGE</b><br>➔ C035                                                               |                                                                                   | <b>STFE</b><br>➔ C035                                                               |                                                                                     |                                                                                       |                    |                                       |                |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     |  |                    | ○                                     |                |                      | ◎           |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     | <b>TLHR</b><br>➔ C037                                                                 |                    |                                       |                |                      |             |
|  |  |                                                                                   |                                                                                     |  |                                                                                       |                    | ○                                     |                |                      |             |
|  | <b>SCAC-SM</b><br>➔ D010                                                            |                                                                                   |                                                                                     | <b>SVPP-SM</b><br>➔ D013                                                            |                                                                                       |                    |                                       |                |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     | Special Design                                                                        |                    | ○                                     |                |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     |  |                    |                                       |                |                      |             |
|  |                                                                                     |                                                                                   |                                                                                     |                                                                                     | <b>BTAH/CTBH</b><br>➔ D014, D015 <b>BTVH</b><br>➔ D016                                |                    |                                       |                |                      |             |

Note 1) ◎ : 1st recommendation. ○ : 2nd recommendation.



EXTERNAL TURNING TOOLS

# IDENTIFICATION

■ LL Holder / Double Clamp Holder /  
SP Holder / Profile Holder / AL Holder

**P** **C** **L** **N** **R** **25** **25** **M** **12**

| ①Clamp Structure |                                        |
|------------------|----------------------------------------|
| D                | Double Clamp Type                      |
| M                | Wedge Lock Type<br>Multiple Clamp Type |
| P                | Lever Lock Type                        |
| S                | Screw-on Type                          |

| ③Cutting Angle<br>KAPR |                   |
|------------------------|-------------------|
| A                      | 90°Without Offset |
| B                      | 75°               |
| D                      | 45°Neutral        |
| E                      | 60°               |
| F                      | 90°               |
| G                      | 90°With Offset    |
| H                      | 107.5°            |
| J                      | 93°               |
| K                      | 75°               |
| L                      | 95°               |
| N                      | 62.5°             |
| P                      | 117.5°            |
| Q                      | 105°              |
| S                      | 45°               |
| T                      | 60°               |
| V                      | 72.5°             |
| Z                      | Special           |

| ④Insert Clearance |             |
|-------------------|-------------|
| C                 | 7°Positive  |
| N                 | Negative    |
| E                 | 20°Positive |

| ⑤Hand of Tool |            |
|---------------|------------|
| R             | Right Hand |
| L             | Left Hand  |
| N             | Neutral    |

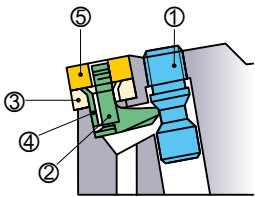
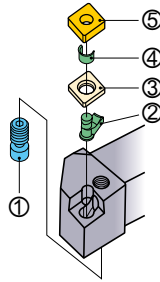
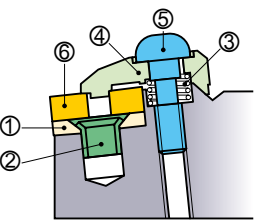
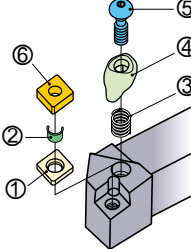
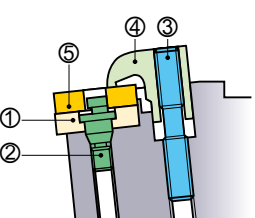
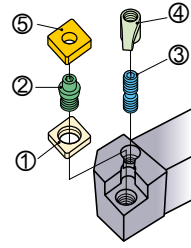
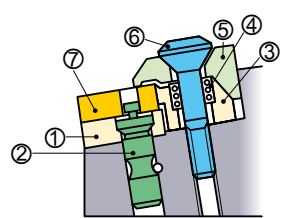
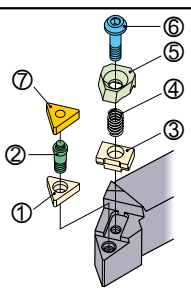
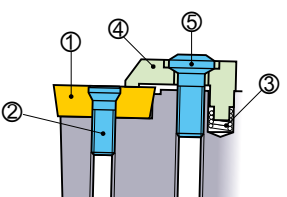
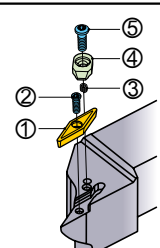
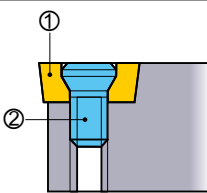
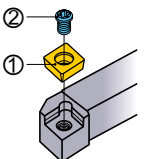
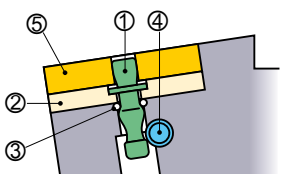
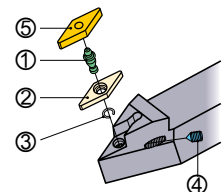
| ⑥Tool Size H/B (mm)<br>(Height and Width) |    |
|-------------------------------------------|----|
| 8                                         | 08 |
| 10                                        | 10 |
| 12                                        | 12 |
| 16                                        | 16 |
| 20                                        | 20 |
| 25                                        | 25 |
| 32                                        | 32 |

| ⑦Tool Length<br>LF (mm) |     |
|-------------------------|-----|
| D                       | 60  |
| E                       | 70  |
| F                       | 80  |
| H                       | 100 |
| K                       | 125 |
| M                       | 150 |
| P                       | 170 |
| Q                       | 180 |
| R                       | 200 |

| ⑧Cutting Edge Length (mm) |              |            |       |                |                |                |
|---------------------------|--------------|------------|-------|----------------|----------------|----------------|
| Inscribed<br>Circle       | Insert Shape |            |       |                |                |                |
|                           | Square       | Triangular | Round | Rhombic<br>80° | Rhombic<br>55° | Rhombic<br>35° |
| 6.00                      | —            | —          | 06    | —              | —              | —              |
| 6.35                      | —            | 11         | —     | 06             | 07             | 11             |
| 7.94                      | —            | 13         | —     | —              | —              | —              |
| 8.00                      | —            | —          | 08    | —              | —              | —              |
| 9.525                     | 09           | 16         | —     | 09             | 11             | 16             |
| 10.00                     | —            | —          | 10    | —              | —              | —              |
| 12.00                     | —            | —          | 12    | —              | —              | —              |
| 12.70                     | 12           | 22         | —     | 12             | 15             | —              |
| 15.875                    | 15           | 27         | —     | 16             | —              | —              |
| 16.00                     | —            | —          | 16    | —              | —              | —              |
| 19.05                     | 19           | —          | —     | 19             | —              | —              |
| 20.00                     | —            | —          | 20    | —              | —              | —              |
| 25.00                     | —            | —          | 25    | —              | —              | —              |
| 25.40                     | 25           | —          | —     | —              | —              | —              |
| 32.00                     | —            | —          | 32    | —              | —              | —              |

| ②Insert Shape |                |
|---------------|----------------|
| C             | Rhombic 80°    |
| D             | Rhombic 55°    |
| R             | Round          |
| S             | Square         |
| T             | Triangular     |
| V             | Rhombic 35°    |
| W             | Trigon         |
| X             | Special Design |

# METHOD OF HOLDING

| Type (Holder)                                                              | Structure                                                                                                                                                                                                                                                            |                                                                                       |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Lever Lock<br/>(LL HOLDER)</b>                                          |  <ul style="list-style-type: none"> <li>① Clamp Screw</li> <li>② Lever</li> <li>③ Shim</li> <li>④ Shim Pin</li> <li>⑤ Insert</li> </ul>                                             |    |
| <b>Double Clamp<br/>(DOUBLE CLAMP)<br/>HOLDER</b>                          |  <ul style="list-style-type: none"> <li>① Shim</li> <li>② Shim Pin</li> <li>③ Spring</li> <li>④ Clamp Bridge</li> <li>⑤ Clamp Screw</li> <li>⑥ Insert</li> </ul>                    |    |
| <b>Multiple Clamp<br/>(DOUBLE CLAMP)<br/>HOLDER</b><br>(For heavy cutting) |  <ul style="list-style-type: none"> <li>① Shim</li> <li>② Shim Pin</li> <li>③ Clamp Screw</li> <li>④ Clamp Bridge</li> <li>⑤ Insert</li> </ul>                                     |   |
| <b>Wedge Lock<br/>(WP HOLDER)</b>                                          |  <ul style="list-style-type: none"> <li>① Shim</li> <li>② Shim Pin</li> <li>③ Plate</li> <li>④ Spring</li> <li>⑤ Clamp Bridge</li> <li>⑥ Clamp Screw</li> <li>⑦ Insert</li> </ul> |  |
| <b>Two Action Double Clamp<br/>(PROFILE HOLDER)</b>                        |  <ul style="list-style-type: none"> <li>① Insert</li> <li>② Clamp Screw (1)</li> <li>③ Spring</li> <li>④ Clamp Bridge</li> <li>⑤ Clamp Screw (2)</li> </ul>                       |  |
| <b>Screw-on<br/>(SP HOLDER)<br/>(AL HOLDER)</b>                            |  <ul style="list-style-type: none"> <li>① Insert</li> <li>② Clamp Screw</li> </ul>                                                                                                |  |
| <b>Pin Lock<br/>(MP HOLDER)</b>                                            |  <ul style="list-style-type: none"> <li>① Lock Pin</li> <li>② Shim</li> <li>③ Stop Ring</li> <li>④ Lock Screw</li> <li>⑤ Insert</li> </ul>                                        |  |

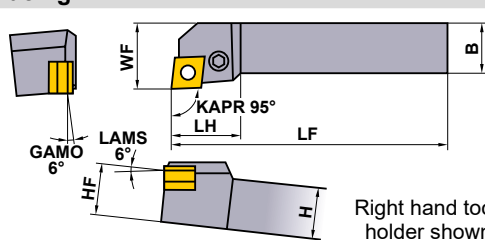
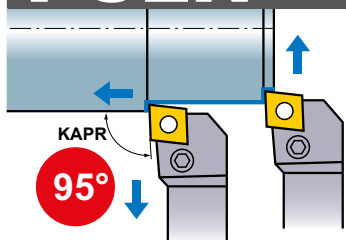
# EXTERNAL TURNING TOOLS

**CN** INSERTS  
TOOL HOLDERS

**PCLN**

External turning,  
Facing

**LL type**



Right hand tool holder shown.

| Finish             | Light                 | Medium          | Medium           |
|--------------------|-----------------------|-----------------|------------------|
| FP<br>(12)         | LP<br>(12)            | MP<br>(12,16)   | MK<br>(12,16,19) |
| Medium<br>Standard | Medium to Rough<br>RP | Stainless<br>MM | CBN<br>(12)      |
| (09,12,16,19)      | (12,16,19)            | (12,16,19)      | (12)             |

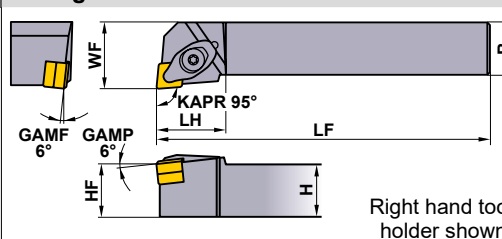
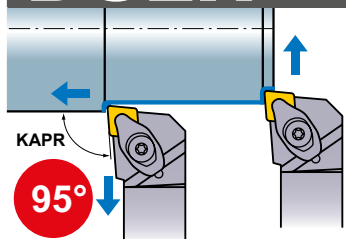
| Order Number   | Stock |   | Insert Number                                |                                                                                        | Dimensions (mm) |    |     |    |    |  |  |  |  |  |        |
|----------------|-------|---|----------------------------------------------|----------------------------------------------------------------------------------------|-----------------|----|-----|----|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | R     | L |                                              |                                                                                        | H               | B  | LF  | LH | HF | WF                                                                                  | Shim                                                                                | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                         | Wrench |
| PCLNR/L1616H09 | ●     | ● | CNMG                                         | 09T3  | 16              | 16 | 100 | 22 | 16 | 20                                                                                  | LLSCN3T3                                                                            | LLP13                                                                               | LLCL13                                                                              | LLCS106                                                                             | HKY25R |
| PCLNR/L2020K09 | ●     | ● |                                              | 09T3  | 20              | 20 | 125 | 22 | 20 | 25                                                                                  | LLSCN3T3                                                                            | LLP13                                                                               | LLCL13                                                                              | LLCS106                                                                             | HKY25R |
| PCLNR/L2525M09 | ●     | ● |                                              | 09T3  | 25              | 25 | 150 | 22 | 25 | 32                                                                                  | LLSCN3T3                                                                            | LLP13                                                                               | LLCL13                                                                              | LLCS106                                                                             | HKY25R |
| PCLNR/L2020K12 | ●     | ● | CNMA<br>CNMG<br>CNMM<br>CNGA<br>CNGG<br>CNGM | 1204  | 20              | 20 | 125 | 28 | 20 | 25                                                                                  | LLSCN42                                                                             | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                             | HKY30R |
| PCLNR/L2525M12 | ●     | ● |                                              | 1204  | 25              | 25 | 150 | 28 | 25 | 32                                                                                  | LLSCN42                                                                             | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                             | HKY30R |
| PCLNR/L3225P12 | ●     | ● |                                              | 1204  | 32              | 25 | 170 | 28 | 32 | 32                                                                                  | LLSCN42                                                                             | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                             | HKY30R |
| PCLNR/L3232P16 | ●     | ● |                                              | 1606  | 32              | 32 | 170 | 32 | 32 | 40                                                                                  | LLSCN53                                                                             | LLP15                                                                               | LLCL25                                                                              | LLCS508                                                                             | HKY30R |
| PCLNR/L3232P19 | ●     | ● |                                              | 1906  | 32              | 32 | 170 | 40 | 32 | 40                                                                                  | LLSCN63                                                                             | LLP16                                                                               | LLCL16                                                                              | LLCS310                                                                             | HKY40R |

\* Clamp Torque (N · m) : LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

**DCLN**

External turning, **DOUBLE CLAMP type**  
Facing



Right hand tool holder shown.

| Finish             | Light                 | Medium          | Medium      |
|--------------------|-----------------------|-----------------|-------------|
| FP<br>(12)         | LP<br>(12)            | MP<br>(12)      | MK<br>(12)  |
| Medium<br>Standard | Medium to Rough<br>RP | Stainless<br>MM | CBN<br>(12) |
| (09,12)            | (12)                  | (12)            | (12)        |

| Order Number     | Stock |   | Insert Number                                |      | Dimensions (mm) |    |     |    |    | *2 |                       |          |              |        | *1          |        |
|------------------|-------|---|----------------------------------------------|------|-----------------|----|-----|----|----|----|-----------------------|----------|--------------|--------|-------------|--------|
|                  | R     | L |                                              |      | H               | B  | LF  | LH | HF | WF | Shim                  | Shim Pin | Clamp Bridge | Spring | Clamp Screw | Wrench |
| DCLNR/L1616H09   | ●     | ● | CNMG                                         | 09T3 | 16              | 16 | 100 | 25 | 16 | 20 | LLSCN3T3<br>(LLSCN33) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L1616H09-T | ●     | ● |                                              | 0903 | 16              | 16 | 100 | 25 | 16 | 20 | LLSCN33               | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L2020K09   | ●     | ● |                                              | 09T3 | 20              | 20 | 125 | 25 | 20 | 25 | LLSCN3T3<br>(LLSCN33) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L2020K09-T | ●     | ● |                                              | 0903 | 20              | 20 | 125 | 25 | 20 | 25 | LLSCN33               | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L2525M09   | ●     | ● |                                              | 09T3 | 25              | 25 | 150 | 25 | 25 | 32 | LLSCN3T3<br>(LLSCN33) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L2525M09-T | ●     | ● |                                              | 0903 | 25              | 25 | 150 | 25 | 25 | 32 | LLSCN33               | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DCLNR/L2020K12   | ●     | ● | CNMA<br>CNMG<br>CNMM<br>CNGA<br>CNGG<br>CNGM | 1204 | 20              | 20 | 125 | 29 | 20 | 25 | LLSCN42               | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DCLNR/L2525M12   | ●     | ● |                                              | 1204 | 25              | 25 | 150 | 29 | 25 | 32 | LLSCN42               | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DCLNR/L3225P12   | ●     | ● |                                              | 1204 | 32              | 25 | 170 | 29 | 32 | 32 | LLSCN42               | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |

\*1 Clamp Torque (N · m) : DC0520T=3.5, DC0621T=5.0

\*2 Please use shim no. LLSCN33 with 3.18mm thick inserts. When using 3.18mm thick inserts, the shim should be ordered separately.

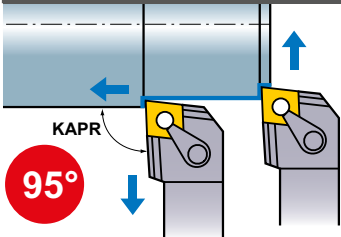
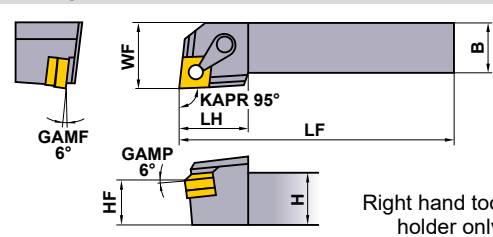
Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

● : Inventory maintained.

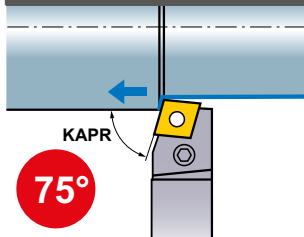
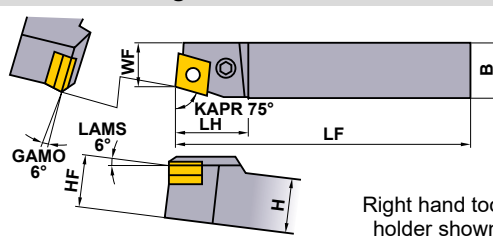
PCLN type inserts > A098—A105  
DCLN type inserts > A098—A105

PCBN & PCD inserts > B022—B024, B049  
RECOMMENDED CUTTING CONDITIONS > A076, B008

| MCLN                                                                              |  |      |  | External turning, <b>DOUBLE CLAMP</b> type Facing                                 |  |                |  |  |  |                 | Medium |     | Medium   |                                                                                    | Medium |                                                                                     | Medium to Rough |                                                                                     |             |                                                                                     |  |                                                                                     |  |
|-----------------------------------------------------------------------------------|--|------|--|-----------------------------------------------------------------------------------|--|----------------|--|--|--|-----------------|--------|-----|----------|------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--|
|  |  |      |  |  |  |                |  |  |  |                 | MH     |     | Standard |                                                                                    | MS     |                                                                                     | RP              |                                                                                     |             |                                                                                     |  |                                                                                     |  |
|                                                                                   |  |      |  |                                                                                   |  |                |  |  |  |                 | (19)   |     | (19)     |                                                                                    | (19)   |                                                                                     | (19)            |                                                                                     |             |                                                                                     |  |                                                                                     |  |
|                                                                                   |  |      |  |                                                                                   |  |                |  |  |  |                 | Heavy  |     | Heavy    |                                                                                    | Heavy  |                                                                                     | M Class         |                                                                                     |             |                                                                                     |  |                                                                                     |  |
|                                                                                   |  |      |  |                                                                                   |  |                |  |  |  |                 | HZ     |     | HX       |                                                                                    | HL     |                                                                                     | Flat Top        |                                                                                     |             |                                                                                     |  |                                                                                     |  |
| (19)                                                                              |  | (19) |  | (19)                                                                              |  | (19)           |  |  |  |                 |        |     |          |                                                                                    |        |                                                                                     |                 |                                                                                     |             |                                                                                     |  |                                                                                     |  |
| Order Number                                                                      |  |      |  | Stock                                                                             |  | Insert Number  |  |  |  | Dimensions (mm) |        |     |          |  |        |  |                 |  |             |  |  |  |  |
|                                                                                   |  |      |  | R                                                                                 |  |                |  |  |  | H               | B      | LF  | LH       | HF                                                                                 | WF     | Shim                                                                                | Shim Pin        | Clamp Bridge                                                                        | Clamp Screw | Wrench                                                                              |  |                                                                                     |  |
| MCLNR3232P19                                                                      |  |      |  | ●                                                                                 |  | CNMG 1906      |  |  |  | 32              | 32     | 170 | 36       | 32                                                                                 | 40     | MSCN63                                                                              | MP6             | CKW6                                                                                | LS25        | HKY40R                                                                              |  |                                                                                     |  |
| MCLNR4040R19                                                                      |  |      |  | ●                                                                                 |  | CNMM CNMA 1906 |  |  |  | 40              | 40     | 200 | 36       | 40                                                                                 | 50     | MSCN63                                                                              | MP6             | CKW6                                                                                | LS25        | HKY40R                                                                              |  |                                                                                     |  |

\* Clamp Torque (N • m) : LS25=8.2

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

| PCBN                                                                                |  |  |  | External turning                                                                    |   |                    |      |    |    |                 | LL type                                                                               |      |                                                                                       |         | Finish                                                                                |        | Light                                                                                 |             | Medium                                                                                |        | Medium                                                                                |  |                                                                                         |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|--|--|--|-------------------------------------------------------------------------------------|---|--------------------|------|----|----|-----------------|---------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |  |  |  |  |   |                    |      |    |    |                 | FP                                                                                    |      | LP                                                                                    |         | MP                                                                                    |        | MK                                                                                    |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    |                 |  |      |  |         |  |        |  |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    |                 | (12)                                                                                  |      | (12)                                                                                  |         | (12)                                                                                  |        | (12)                                                                                  |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    |                 | Medium                                                                                |      | Medium to Rough                                                                       |         | Stainless                                                                             |        |                                                                                       |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    |                 | Standard                                                                              |      | RP                                                                                    |         | MM                                                                                    |        |                                                                                       |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    |                 |  |      |  |         |  |        |                                                                                       |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
|                                                                                     |  |  |  |                                                                                     |   |                    |      |    |    | (12)            |                                                                                       | (12) |                                                                                       | (12)    |                                                                                       |        |                                                                                       |             |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
| Order Number                                                                        |  |  |  | Stock                                                                               |   | Insert Number      |      |    |    | Dimensions (mm) |                                                                                       |      |                                                                                       |         |                                                                                       |        |   |             |  |        |  |  |  * |  |  |  |
|                                                                                     |  |  |  | R                                                                                   | L |                    |      |    |    | H               | B                                                                                     | LF   | LH                                                                                    | HF      | WF                                                                                    | Shim   | Shim Pin                                                                              | Clamp Lever | Clamp Screw                                                                           | Wrench |                                                                                       |  |                                                                                         |  |                                                                                       |  |
| PCBNR/L2020K12                                                                      |  |  |  | ●                                                                                   | ● | CNMA<br>CNG<br>CNM | 1204 | 20 | 20 | 125             | 28                                                                                    | 20   | 17                                                                                    | LLSCN42 | LLP14                                                                                 | LLCL14 | LLCS108                                                                               | HKY30R      |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |
| PCBNR/L2525M12                                                                      |  |  |  | ●                                                                                   | ● | CNMA<br>CNG<br>CNM | 1204 | 25 | 25 | 150             | 25                                                                                    | 25   | 22                                                                                    | LLSCN42 | LLP14                                                                                 | LLCL14 | LLCS108                                                                               | HKY30R      |                                                                                       |        |                                                                                       |  |                                                                                         |  |                                                                                       |  |

\* Clamp Torque (N • m) : LLCS108=3.3

|                    |                     |
|--------------------|---------------------|
| MCLN type inserts  | > A100 – A105       |
| PCBN type inserts  | > A098 – A105       |
| PCBN & PCD inserts | > B022 – B024, B049 |

|                                |              |
|--------------------------------|--------------|
| RECOMMENDED CUTTING CONDITIONS | > A076, B008 |
| SPARE PARTS                    | > N001       |
| TECHNICAL DATA                 | > P001       |



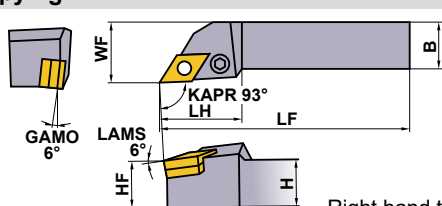
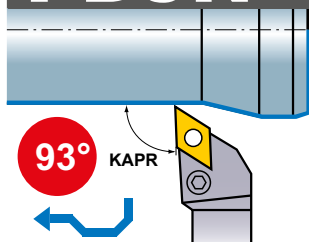
# EXTERNAL TURNING TOOLS

## DN INSERTS TOOL HOLDERS

### PDJN

External turning,  
Copying

LL type



Right hand tool  
holder shown.

| Finish                                                                              | Light                                                                               | Medium                                                                              | Medium                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | LP                                                                                  | MP                                                                                  | MK                                                                                  |
|  |  |  |  |
| (15)                                                                                | (15)                                                                                | (15)                                                                                | (15)                                                                                |
| Medium to Rough                                                                     | Stainless                                                                           | G Class                                                                             | CBN                                                                                 |
| RP                                                                                  | MM                                                                                  | R/L                                                                                 |                                                                                     |
|  |  |  |  |
| (15)                                                                                | (15)                                                                                | (15)                                                                                | (15)                                                                                |

| Order Number   | Stock |   | Insert Number                                        |      | Dimensions (mm) |    |     |    |    |    |  *2 |  |  |  *1 |  |
|----------------|-------|---|------------------------------------------------------|------|-----------------|----|-----|----|----|----|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |                                                      |      | H               | B  | LF  | LH | HF | WF | Shim                                                                                   | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                            | Wrench                                                                              |
| PDJNR/L2020K15 | ●     | ● | DNMA<br>DNMG<br>DNMM<br>DNMX<br>DNGA<br>DNGG<br>DNGM | 1504 | 20              | 20 | 125 | 35 | 20 | 25 | LLSDN43<br>(LLSDN42)                                                                   | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                                | HKY30R                                                                              |
| PDJNR/L2525M15 | ●     | ● |                                                      | 1504 | 25              | 25 | 150 | 35 | 25 | 32 | LLSDN43<br>(LLSDN42)                                                                   | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                                | HKY30R                                                                              |
| PDJNR/L3225P15 | ●     | ● |                                                      | 1504 | 32              | 25 | 170 | 35 | 32 | 32 | LLSDN43<br>(LLSDN42)                                                                   | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                                | HKY30R                                                                              |

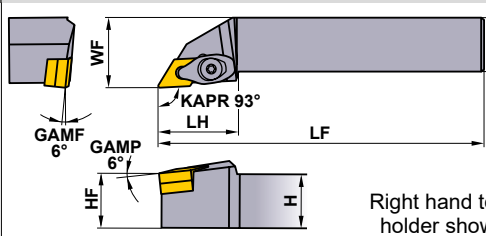
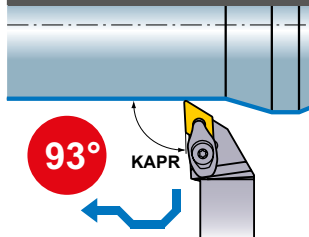
\*1 Clamp Torque (N · m) : LLCS108=3.3

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

### DDJN

External turning, **DOUBLE CLAMP** type  
Copying



Right hand tool  
holder shown.

| Finish                                                                                | Light                                                                                 | Medium                                                                                | Medium                                                                                |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | LP                                                                                    | MP                                                                                    | MK                                                                                    |
|  |  |  |  |
| (15)                                                                                  | (11,15)                                                                               | (15)                                                                                  | (11,15)                                                                               |
| Medium to Rough                                                                       | Stainless                                                                             | G Class                                                                               | CBN                                                                                   |
| RP                                                                                    | MM                                                                                    | R/L                                                                                   |                                                                                       |
|  |  |  |  |
| (15)                                                                                  | (15)                                                                                  | (15)                                                                                  | (15)                                                                                  |

| Order Number     | Stock |   | Insert Number                                        |      | Dimensions (mm) |    |     |    |    | *2 |                      |          |              |        | *1          |        |
|------------------|-------|---|------------------------------------------------------|------|-----------------|----|-----|----|----|----|----------------------|----------|--------------|--------|-------------|--------|
|                  | R     | L |                                                      |      | H               | B  | LF  | LH | HF | WF | Shim                 | Shim Pin | Clamp Bridge | Spring | Clamp Screw | Wrench |
| DDJNR/L1616H11   | ●     | ● | DNMG<br>DNGA                                         | 1104 | 16              | 16 | 100 | 28 | 16 | 20 | LLSDN32              | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DDJNR/L2020K11   | ●     | ● |                                                      | 1104 | 20              | 20 | 125 | 28 | 20 | 25 | LLSDN32              | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DDJNR/L2525M11   | ●     | ● |                                                      | 1104 | 25              | 25 | 150 | 28 | 25 | 32 | LLSDN32              | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DDJNR/L3225P11   | ●     | ● |                                                      | 1104 | 32              | 25 | 170 | 28 | 32 | 32 | LLSDN32              | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DDJNR/L2020K15   | ●     | ● | DNMA<br>DNMG<br>DNMM<br>DNMX<br>DNGA<br>DNGG<br>DNGM | 1504 | 20              | 20 | 125 | 37 | 20 | 25 | LLSDN43<br>(LLSDN42) | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DDJNR/L2020K15-T | ●     | ● |                                                      | 1506 | 20              | 20 | 125 | 37 | 20 | 25 | LLSDN42              | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DDJNR/L2525M15   | ●     | ● |                                                      | 1504 | 25              | 25 | 150 | 37 | 25 | 32 | LLSDN43<br>(LLSDN42) | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DDJNR/L2525M15-T | ●     | ● |                                                      | 1506 | 25              | 25 | 150 | 37 | 25 | 32 | LLSDN42              | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DDJNR/L3225P15   | ●     | ● |                                                      | 1504 | 32              | 25 | 170 | 37 | 32 | 32 | LLSDN43<br>(LLSDN42) | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DDJNR/L3225P15-T | ●     | ● |                                                      | 1506 | 32              | 25 | 170 | 37 | 32 | 32 | LLSDN42              | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |

\*1 Clamp Torque (N · m) : DC0520T=3.5, DC0621T=5.0

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

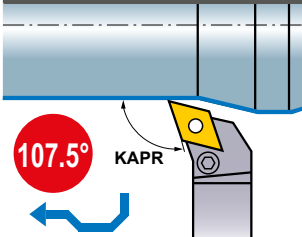
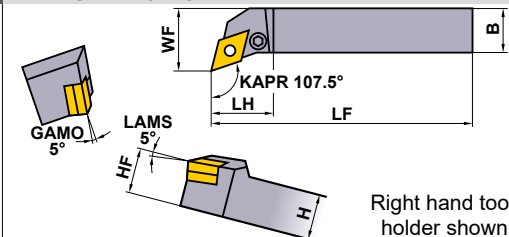
● : Inventory maintained.

PDJN type inserts > A106—A112

DDJN type inserts > A106—A112

PCBN & PCD inserts > B025—B028, B050

RECOMMENDED CUTTING CONDITIONS > A076, B008

| PDHN                                                                              |       |   |               | Facing, Copying                                                                   |                 |    |     |    |    |    | LL type                                                                             |                                                                                     | Finish                                                                              | Light                                                                               | Medium                                                                              | Medium                                                                              |                                                                                     |
|-----------------------------------------------------------------------------------|-------|---|---------------|-----------------------------------------------------------------------------------|-----------------|----|-----|----|----|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |       |   |               |  |                 |    |     |    |    |    |                                                                                     |                                                                                     | FP                                                                                  | LP                                                                                  | MP                                                                                  | MK                                                                                  |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     |  |  |  |  |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     | (15)                                                                                | (15)                                                                                | (15)                                                                                | (15)                                                                                |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     | Medium to Rough                                                                     | Stainless                                                                           | G Class                                                                             | CBN                                                                                 |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    | RP                                                                                  | MM                                                                                  | R/L                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    |  |  |  |  |                                                                                     |                                                                                     |                                                                                     |
|                                                                                   |       |   |               |                                                                                   |                 |    |     |    |    |    | (15)                                                                                | (15)                                                                                | (15)                                                                                | (15)                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Order Number                                                                      | Stock |   | Insert Number |                                                                                   | Dimensions (mm) |    |     |    |    |    | *2                                                                                  |                                                                                     |  |  |  |  |  |
|                                                                                   | R     | L |               |                                                                                   | H               | B  | LF  | LH | HF | WF | Shim                                                                                | Shim Pin                                                                            |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| PDHNR/L2020K15                                                                    | ●     | ● | DNMA          | 1504                                                                              | 20              | 20 | 125 | 34 | 20 | 25 | LLSDN43<br>(LLSDN42)                                                                | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                             | HKY30R                                                                              |                                                                                     |                                                                                     |
| PDHNR/L2525M15                                                                    | ●     | ● | DNMG          | 1504                                                                              | 25              | 25 | 150 | 34 | 25 | 32 | LLSDN43<br>(LLSDN42)                                                                | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                             | HKY30R                                                                              |                                                                                     |                                                                                     |
| PDHNR/L3225P15                                                                    | ●     | ● | DNMM          | 1504                                                                              | 32              | 25 | 170 | 34 | 32 | 32 | LLSDN43<br>(LLSDN42)                                                                | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                             | HKY30R                                                                              |                                                                                     |                                                                                     |
|                                                                                   |       |   | DNGA          |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                   |       |   | DNGG          |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                                                                                   |       |   | DNGM          |                                                                                   |                 |    |     |    |    |    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

\*1 Clamp Torque (N • m) : LLCS108=3.3

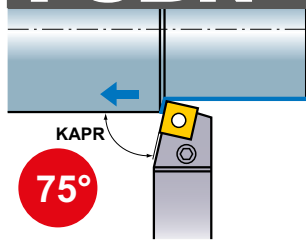
\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

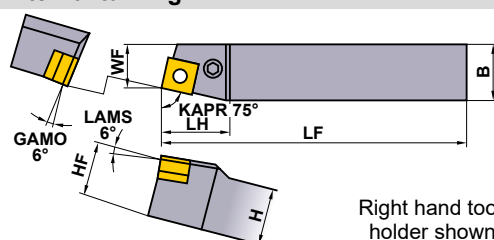
# EXTERNAL TURNING TOOLS

**SN**  **INSERTS**  
**TOOL HOLDERS**

**PSBN**



**External turning LL type**



Right hand tool holder shown.

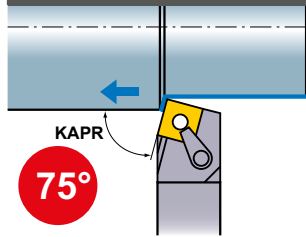
| Finish                                                                                                                     | Light                                                                                                                | Medium                                                                                                           | Medium                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| FP<br><br>(12)                          | LP<br><br>(12)                    | MP<br><br>(12)                | MK<br><br>(12,15,19) |
| Medium to Rough<br>RP<br><br>(12,15,19) | Stainless<br>MM<br><br>(12,15,19) | G Class<br>R/L<br><br>(09,12) | CBN<br><br>(12)      |

| Order Number   | Stock |   | Insert Number                        |                                                                                        | Dimensions (mm) |    |     |    |    |  |  |  |  |  |  |        |
|----------------|-------|---|--------------------------------------|----------------------------------------------------------------------------------------|-----------------|----|-----|----|----|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | R     | L |                                      |                                                                                        | H               | B  | LF  | LH | HF | WF                                                                                 | Shim                                                                                | Shim Pin                                                                            | Lever Spring                                                                        | Clamp Lever                                                                         | Clamp Screw                                                                         | Wrench |
| PSBNR/L1212F09 | ●     |   | SNMA<br>SNMG<br>SNMM<br>SNGA<br>SNGG | 0903  | 12              | 12 | 80  | 20 | 12 | 13                                                                                 | —                                                                                   | —                                                                                   | HLS2                                                                                | LLCL13S                                                                             | LLCS105                                                                             | HKY20R |
| PSBNR/L1616H09 | ●     | ● |                                      | 0903  | 16              | 16 | 100 | 22 | 16 | 13                                                                                 | LLSSN33                                                                             | LLP23                                                                               | —                                                                                   | LLCL13                                                                              | LLCS106                                                                             | HKY25R |
| PSBNR/L2020K12 | ●     | ● |                                      | 1204  | 20              | 20 | 125 | 28 | 20 | 17                                                                                 | LLSSN42                                                                             | LLP14                                                                               | —                                                                                   | LLCL14                                                                              | LLCS108                                                                             | HKY30R |
| PSBNR/L2525M12 | ●     | ● |                                      | 1204  | 25              | 25 | 150 | 25 | 25 | 22                                                                                 | LLSSN42                                                                             | LLP14                                                                               | —                                                                                   | LLCL14                                                                              | LLCS108                                                                             | HKY30R |
| PSBNR/L2525M15 | ●     | ● |                                      | 1506  | 25              | 25 | 150 | 33 | 25 | 22                                                                                 | LLSSN53                                                                             | LLP15                                                                               | —                                                                                   | LLCL25                                                                              | LLCS508                                                                             | HKY30R |
| PSBNR/L3232P19 | ●     | ● |                                      | 1906  | 32              | 32 | 170 | 40 | 32 | 27                                                                                 | LLSSN63                                                                             | LLP16                                                                               | —                                                                                   | LLCL16                                                                              | LLCS310                                                                             | HKY40R |

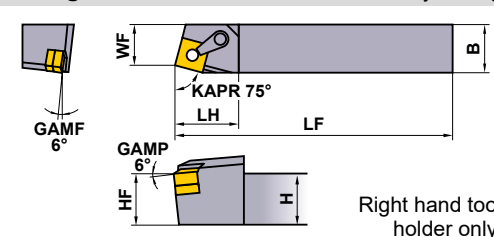
\* Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

**MSBN**



**External turning DOUBLE CLAMP type**  
For heavy cutting



Right hand tool holder only.

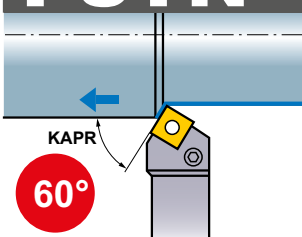
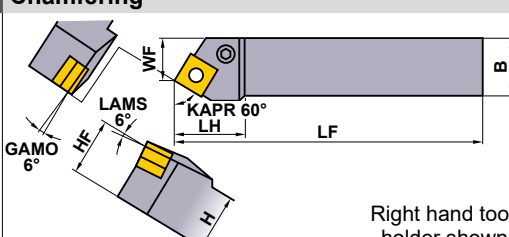
| Medium                                                                                                       | Medium                                                                                                       | Medium                                                                                                       | Medium to Rough                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| MH<br><br>(19)          | Standard<br><br>(19)    | MS<br><br>(19)          | RP<br><br>(19)                  |
| Heavy<br>HZ<br><br>(19) | Heavy<br>HX<br><br>(19) | Heavy<br>HL<br><br>(19) | M Class<br>Flat Top<br><br>(19) |

| Order Number | Stock | Insert Number        |      | Dimensions (mm) |    |     |    |    |    |  |  |  |  |  |
|--------------|-------|----------------------|------|-----------------|----|-----|----|----|----|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              | R     |                      |      | H               | B  | LF  | LH | HF | WF | Shim                                                                                 | Shim Pin                                                                              | Clamp Bridge                                                                          | Clamp Screw                                                                           | Wrench                                                                                |
| MSBNR3232P19 | ●     | SNMG<br>SNMM<br>SNMA | 1906 | 32              | 32 | 170 | 41 | 32 | 27 | MSSN63                                                                               | MP6                                                                                   | CKW6                                                                                  | LS25                                                                                  | HKY40R                                                                                |
| MSBNR4040R19 | ●     |                      | 1906 | 40              | 40 | 200 | 41 | 40 | 35 | MSSN63                                                                               | MP6                                                                                   | CKW6                                                                                  | LS25                                                                                  | HKY40R                                                                                |

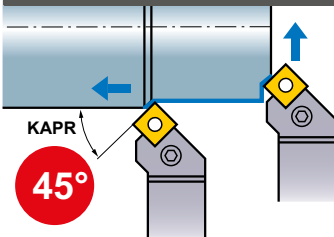
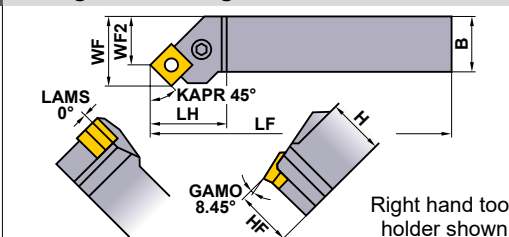
\* Clamp Torque (N • m) : LS25=8.2

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

| PSTN                                                                              |       | External turning, Chamfering                                                      |               |      |                 |    |     |    |    | LL type                                                                                     |                                                                                             | Finish                                                                                         | Light                                                                                       | Medium                                                                              | Medium                                                                                |                                                                                     |
|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|---------------|------|-----------------|----|-----|----|----|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |       |  |               |      |                 |    |     |    |    | FP                                                                                          | LP                                                                                          | MP                                                                                             | MK                                                                                          |                                                                                     |                                                                                       |                                                                                     |
|                                                                                   |       |                                                                                   |               |      |                 |    |     |    |    | <br>(12) | <br>(12) | <br>(12)    | <br>(12) |                                                                                     |                                                                                       |                                                                                     |
|                                                                                   |       |                                                                                   |               |      |                 |    |     |    |    | Medium to Rough                                                                             | Stainless                                                                                   | G Class                                                                                        | CBN                                                                                         |                                                                                     |                                                                                       |                                                                                     |
|                                                                                   |       |                                                                                   |               |      |                 |    |     |    |    | RP                                                                                          | MM                                                                                          | R/L                                                                                            |                                                                                             |                                                                                     |                                                                                       |                                                                                     |
|                                                                                   |       |                                                                                   |               |      |                 |    |     |    |    | <br>(12) | <br>(12) | <br>(09,12) | <br>(12) |                                                                                     |                                                                                       |                                                                                     |
| Order Number                                                                      | Stock |                                                                                   | Insert Number |      | Dimensions (mm) |    |     |    |    |                                                                                             |                                                                                             |              |          |  |  * |  |
|                                                                                   | R     | L                                                                                 |               |      | H               | B  | LF  | LH | HF | WF                                                                                          | Shim                                                                                        | Shim Pin                                                                                       | Clamp Lever                                                                                 | Clamp Screw                                                                         | Wrench                                                                                |                                                                                     |
| PSTNR/L1616H09                                                                    | ●     | ●                                                                                 | SNMA          | 0903 | 16              | 16 | 100 | 20 | 16 | 13                                                                                          | LLSSN33                                                                                     | LLP23                                                                                          | LLCL13                                                                                      | LLCS106                                                                             | HKY25R                                                                                |                                                                                     |
| PSTNR/L2020K12                                                                    | ●     | ★                                                                                 | SNMG          | 1204 | 20              | 20 | 125 | 25 | 20 | 17                                                                                          | LLSSN42                                                                                     | LLP14                                                                                          | LLCL14                                                                                      | LLCS108                                                                             | HKY30R                                                                                |                                                                                     |
| PSTNR/L2525M12                                                                    | ●     | ●                                                                                 | SNMM          | 1204 | 25              | 25 | 150 | 25 | 25 | 22                                                                                          | LLSSN42                                                                                     | LLP14                                                                                          | LLCL14                                                                                      | LLCS108                                                                             | HKY30R                                                                                |                                                                                     |
|                                                                                   |       |                                                                                   | SNGA          |      |                 |    |     |    |    |                                                                                             |                                                                                             |                                                                                                |                                                                                             |                                                                                     |                                                                                       |                                                                                     |
|                                                                                   |       |                                                                                   | SNGG          |      |                 |    |     |    |    |                                                                                             |                                                                                             |                                                                                                |                                                                                             |                                                                                     |                                                                                       |                                                                                     |

\* Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3

| PSSN                                                                                |       |   |                                      | External turning, Facing, Chamfering                                                |    |    |     |    |    |     |      | LL type                                                                                                                      |                                                                                                                        |                                                                                                                    |                                                                                                           | Finish                                                                                | Light | Medium | Medium |
|-------------------------------------------------------------------------------------|-------|---|--------------------------------------|-------------------------------------------------------------------------------------|----|----|-----|----|----|-----|------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|--------|--------|
|  |       |   |                                      |  |    |    |     |    |    |     |      | FP<br><br>(12)                          | LP<br><br>(12)                    | MP<br><br>(12)                | MK<br><br>(12,15,19) |                                                                                       |       |        |        |
|                                                                                     |       |   |                                      |                                                                                     |    |    |     |    |    |     |      | Medium to Rough<br>RP<br><br>(12,15,19) | Stainless<br>MM<br><br>(12,15,19) | G Class<br>R/L<br><br>(09,12) | CBN<br><br>(12)      |                                                                                       |       |        |        |
| Order Number                                                                        | Stock |   | Insert Number                        | Dimensions (mm)                                                                     |    |    |     |    |    |     |      |                                          |                                   |                               |  *                   |  |       |        |        |
|                                                                                     | R     | L |                                      | H                                                                                   | B  | LF | LH  | HF | WF | WF2 | Shim | Shim Pin                                                                                                                     | Clamp Lever                                                                                                            | Clamp Screw                                                                                                        | Wrench                                                                                                    |                                                                                       |       |        |        |
| PSSNR/L1616H09                                                                      | ●     | ● | SNMA<br>SNMG<br>SNMM<br>SNGA<br>SNGG | 0903                                                                                | 16 | 16 | 100 | 22 | 16 | 20  | (14) | LLSSN33                                                                                                                      | LLP23                                                                                                                  | LLCL13                                                                                                             | LLCS106                                                                                                   | HKY25R                                                                                |       |        |        |
| PSSNR/L2020K12                                                                      | ●     | ● |                                      | 1204                                                                                | 20 | 20 | 125 | 31 | 20 | 25  | (17) | LLSSN42                                                                                                                      | LLP14                                                                                                                  | LLCL14                                                                                                             | LLCS108                                                                                                   | HKY30R                                                                                |       |        |        |
| PSSNR/L2525M12                                                                      | ●     | ● |                                      | 1204                                                                                | 25 | 25 | 150 | 31 | 25 | 32  | (24) | LLSSN42                                                                                                                      | LLP14                                                                                                                  | LLCL14                                                                                                             | LLCS108                                                                                                   | HKY30R                                                                                |       |        |        |
| PSSNR/L3232P15                                                                      | ●     | ● |                                      | 1506                                                                                | 32 | 32 | 170 | 34 | 32 | 40  | (29) | LLSSN53                                                                                                                      | LLP15                                                                                                                  | LLCL25                                                                                                             | LLCS508                                                                                                   | HKY30R                                                                                |       |        |        |
| PSSNR/L3232P19                                                                      | ●     | ● |                                      | 1906                                                                                | 32 | 32 | 170 | 40 | 32 | 40  | (27) | LLSSN63                                                                                                                      | LLP16                                                                                                                  | LLCL16                                                                                                             | LLCS310                                                                                                   | HKY40R                                                                                |       |        |        |

\* Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

Note 1) When facing or chamfering only and using insert with right or left hand chipbreaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

|                    |              |
|--------------------|--------------|
| PSTN type inserts  | ➤ A114–A119  |
| PSSN type inserts  | ➤ A114–A119  |
| PCBN & PCD inserts | ➤ B029, B050 |

|                                |              |
|--------------------------------|--------------|
| RECOMMENDED CUTTING CONDITIONS | ➤ A076, B008 |
| SPARE PARTS                    | ➤ N001       |
| TECHNICAL DATA                 | ➤ P001       |

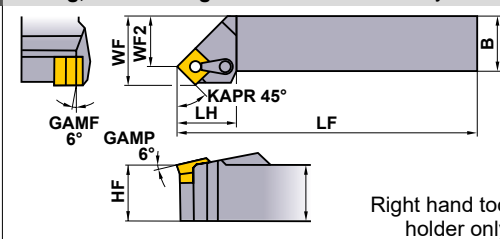
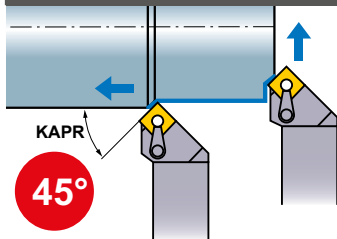
# EXTERNAL TURNING TOOLS

**SN**  **INSERTS**  
**TOOL HOLDERS**

**MSSN**

External turning,  
Facing, Chamfering

**DOUBLE CLAMP type**  
For heavy cutting



Right hand tool  
holder only.

| Medium                                                                              | Medium                                                                              | Medium                                                                              | Rough                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| MH                                                                                  | Standard                                                                            | MS                                                                                  | RP                                                                                  |
|  |  |  |  |
| (19)                                                                                | (19)                                                                                | (19)                                                                                | (19)                                                                                |
| Heavy                                                                               | Heavy                                                                               | Heavy                                                                               | M Class                                                                             |
| HZ                                                                                  | HX                                                                                  | HL                                                                                  | Flat Top                                                                            |
|  |  |  |  |
| (19)                                                                                | (19)                                                                                | (19)                                                                                | (19)                                                                                |

| Order Number | Stock | Insert Number        |      | Dimensions (mm) |    |     |    |    |    |     |  |  |  |  |  |
|--------------|-------|----------------------|------|-----------------|----|-----|----|----|----|-----|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|              | R     |                      |      | H               | B  | LF  | LH | HF | WF | WF2 | Shim                                                                               | Shim Pin                                                                            | Clamp Bridge                                                                        | Clamp Screw                                                                         | Wrench                                                                              |
| MSSNR3232P19 | ●     | SNMG<br>SNMM<br>SNMA | 1906 | 32              | 32 | 170 | 44 | 32 | 40 | 27  | MSSN63                                                                             | MP6                                                                                 | CKW6                                                                                | LS25                                                                                | HKY40R                                                                              |
| MSSNR4040R19 | ●     |                      | 1906 | 40              | 40 | 200 | 44 | 40 | 50 | 37  | MSSN63                                                                             | MP6                                                                                 | CKW6                                                                                | LS25                                                                                | HKY40R                                                                              |

\* Clamp Torque (N · m) : LS25=8.2

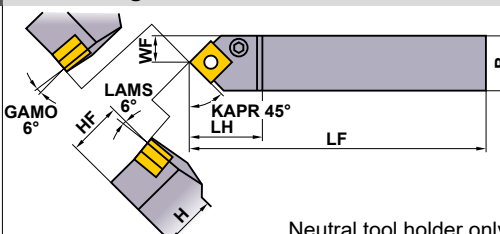
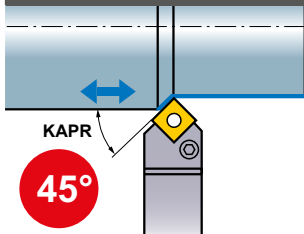
Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

EXTERNAL TURNING TOOLS

**PSDN**

External turning,  
Chamfering

**LL type**



Neutral tool holder only.

| Finish                                                                                | Light                                                                                 | Medium                                                                                | Medium                                                                                |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | LP                                                                                    | MP                                                                                    | MK                                                                                    |
|  |  |  |  |
| (12)                                                                                  | (12)                                                                                  | (12)                                                                                  | (12)                                                                                  |
| Medium to Rough                                                                       | Stainless                                                                             | G Class                                                                               | CBN                                                                                   |
| RP                                                                                    | MM                                                                                    | R/L                                                                                   |                                                                                       |
|  |  |  |  |
| (12)                                                                                  | (12)                                                                                  | (09,12)                                                                               | (12)                                                                                  |

| Order Number | Stock | Insert Number                        |      | Dimensions (mm) |    |     |    |    |      |  |  |  |  |  |  |
|--------------|-------|--------------------------------------|------|-----------------|----|-----|----|----|------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |                                      |      | H               | B  | LF  | LH | HF | WF   | Shim                                                                                 | Shim Pin                                                                              | Lever Spring                                                                          | Clamp Lever                                                                           | Clamp Screw                                                                           | Wrench                                                                                |
| PSDNN1212F09 | ●     | SNMA<br>SNMG<br>SNMM<br>SNGA<br>SNGG | 0903 | 12              | 12 | 80  | 20 | 12 | 6.0  | —                                                                                    | —                                                                                     | HLS2                                                                                  | LLCL13S                                                                               | LLCS105                                                                               | HKY20R                                                                                |
| PSDNN1616H09 | ●     |                                      | 0903 | 16              | 16 | 100 | 22 | 16 | 8.0  | LLSSN33                                                                              | LLP23                                                                                 | —                                                                                     | LLCL13                                                                                | LLCS106                                                                               | HKY25R                                                                                |
| PSDNN2020K12 | ●     |                                      | 1204 | 20              | 20 | 125 | 28 | 20 | 10.0 | LLSSN42                                                                              | LLP14                                                                                 | —                                                                                     | LLCL14                                                                                | LLCS108                                                                               | HKY30R                                                                                |
| PSDNN2525M12 | ●     |                                      | 1204 | 25              | 25 | 150 | 28 | 25 | 12.5 | LLSSN42                                                                              | LLP14                                                                                 | —                                                                                     | LLCL14                                                                                | LLCS108                                                                               | HKY30R                                                                                |
| PSDNN3225P12 | ●     |                                      | 1204 | 32              | 25 | 170 | 28 | 32 | 12.5 | LLSSN42                                                                              | LLP14                                                                                 | —                                                                                     | LLCL14                                                                                | LLCS108                                                                               | HKY30R                                                                                |

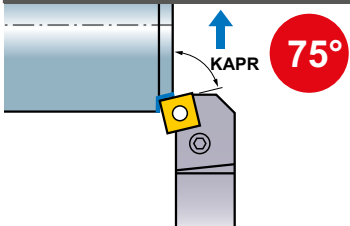
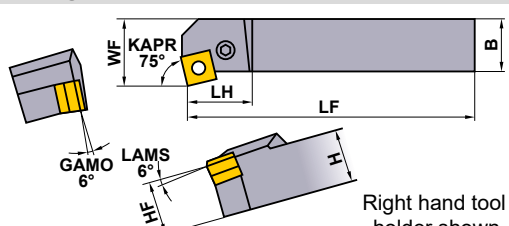
\* Clamp Torque (N · m) : LLCS105=1.5, LLCS106=2.2, LLCS108=3.3

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

● : Inventory maintained.

MSSN type inserts > A115—A119  
PSDN type inserts > A114—A119

PCBN & PCD inserts > B029, B050  
RECOMMENDED CUTTING CONDITIONS > A076, B008

| PSKN                                                                              |       |   |               | Facing                                                                            |                 |    |     |    |    |    | LL type                                                                                                              |                                                                                     |                                                                                                                |                                                                                     | Finish                                                                                                           |  | Light                                                                                              |  | Medium |  | Medium |  |
|-----------------------------------------------------------------------------------|-------|---|---------------|-----------------------------------------------------------------------------------|-----------------|----|-----|----|----|----|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------|--|--------|--|--------|--|
|  |       |   |               |  |                 |    |     |    |    |    | FP<br><br>(12)                    |                                                                                     | LP<br><br>(12)              |                                                                                     | MP<br><br>(12)                |  | MK<br><br>(12)  |  |        |  |        |  |
|                                                                                   |       |   |               | Right hand tool holder shown.                                                     |                 |    |     |    |    |    | Medium to Rough<br>RP<br><br>(12) |                                                                                     | Stainless<br>MM<br><br>(12) |                                                                                     | G Class<br>R/L<br><br>(09,12) |  | CBN<br><br>(12) |  |        |  |        |  |
| Order Number                                                                      | Stock |   | Insert Number |                                                                                   | Dimensions (mm) |    |     |    |    |    |                                    |  |                             |  |                               |  |                                                                                                    |  |        |  |        |  |
|                                                                                   | R     | L |               |                                                                                   | H               | B  | LF  | LH | HF | WF | Shim                                                                                                                 | Shim Pin                                                                            | Clamp Lever                                                                                                    | Clamp Screw                                                                         | Wrench                                                                                                           |  |                                                                                                    |  |        |  |        |  |
| PSKNR/L1616H09                                                                    | ●     | ● | SNMA          | 0903                                                                              | 16              | 16 | 100 | 20 | 16 | 20 | LLSSN33                                                                                                              | LLP23                                                                               | LLCL13                                                                                                         | LLCS106                                                                             | HKY25R                                                                                                           |  |                                                                                                    |  |        |  |        |  |
| PSKNR/L2020K12                                                                    | ●     | ● | SNMG          | 1204                                                                              | 20              | 20 | 125 | 25 | 20 | 25 | LLSSN42                                                                                                              | LLP14                                                                               | LLCL14                                                                                                         | LLCS108                                                                             | HKY30R                                                                                                           |  |                                                                                                    |  |        |  |        |  |
| PSKNR/L2525M12                                                                    | ●     | ● | SNMM          | 1204                                                                              | 25              | 25 | 150 | 25 | 25 | 32 | LLSSN42                                                                                                              | LLP14                                                                               | LLCL14                                                                                                         | LLCS108                                                                             | HKY30R                                                                                                           |  |                                                                                                    |  |        |  |        |  |
|                                                                                   | ●     | ● | SNGA          |                                                                                   |                 |    |     |    |    |    |                                                                                                                      |                                                                                     |                                                                                                                |                                                                                     |                                                                                                                  |  |                                                                                                    |  |        |  |        |  |
|                                                                                   | ●     | ● | SNGG          |                                                                                   |                 |    |     |    |    |    |                                                                                                                      |                                                                                     |                                                                                                                |                                                                                     |                                                                                                                  |  |                                                                                                    |  |        |  |        |  |

\* Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3

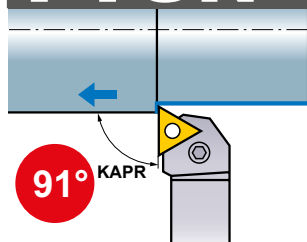
Note 1) When using inserts with right or left hand chipbreakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.



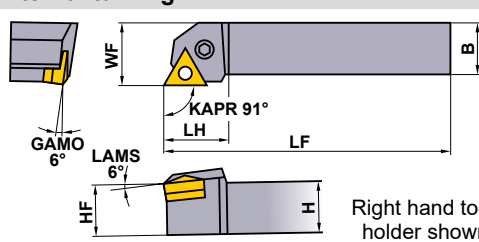
# EXTERNAL TURNING TOOLS

**TN**  **INSERTS**  
**TOOL HOLDERS**

**PTGN**



**External turning** **LL type**



Right hand tool holder shown.

| Finish                                                                              | Light                                                                               | Medium                                                                              | Medium                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | LP                                                                                  | MP                                                                                  | MK                                                                                  |
|  |  |  |  |
| (16)                                                                                | (16,22)                                                                             | (16,22)                                                                             | (16,22)                                                                             |
| Medium to Rough                                                                     | Stainless                                                                           | G Class                                                                             | CBN                                                                                 |
| RP                                                                                  | MM                                                                                  | R/L                                                                                 |                                                                                     |
|  |  |  |  |
| (16,22,27)                                                                          | (16,22)                                                                             | (11,16,22)                                                                          | (16)                                                                                |

| Order Number   | Stock |   | Insert Number                                | Dimensions (mm) |    |    |     |    |    |      | *2                | *2            | Lever Spring | Clamp Lever | Clamp Screw | Wrench |
|----------------|-------|---|----------------------------------------------|-----------------|----|----|-----|----|----|------|-------------------|---------------|--------------|-------------|-------------|--------|
|                | R     | L |                                              | H               | B  | LF | LH  | HF | WF | Shim |                   |               |              |             |             |        |
| PTGNR/L1010E11 | ●     | ● | TNMA<br>TNMG<br>TNMM<br>TNGA<br>TNGG<br>TNGM | 1103            | 10 | 10 | 70  | 17 | 10 | 12   | —                 | —             | HLS1         | LLCL12S     | LLCS105     | HKY20F |
| PTGNR/L1212F11 | ●     | ● |                                              | 1103            | 12 | 12 | 80  | 17 | 12 | 16   | —                 | —             | HLS1         | LLCL12S     | LLCS105     | HKY20F |
| PTGNR/L1616H16 | ●     | ● |                                              | 1604            | 16 | 16 | 100 | 22 | 16 | 20   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | —            | LLCL13      | LLCS106     | HKY25R |
| PTGNR/L2020K16 | ●     | ● |                                              | 1604            | 20 | 20 | 125 | 22 | 20 | 25   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | —            | LLCL13      | LLCS106     | HKY25R |
| PTGNR/L2525M16 | ●     | ● |                                              | 1604            | 25 | 25 | 150 | 22 | 25 | 32   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | —            | LLCL13      | LLCS206     | HKY25R |
| PTGNR/L2525M22 | ●     | ● |                                              | 2204            | 25 | 25 | 150 | 28 | 25 | 32   | LLSTN42           | LLP14         | —            | LLCL14      | LLCS108     | HKY30R |
| PTGNR/L3225P22 | ●     | ● |                                              | 2204            | 32 | 25 | 170 | 28 | 32 | 32   | LLSTN42           | LLP14         | —            | LLCL14      | LLCS108     | HKY30R |
| PTGNR/L3232P27 | ●     | ● |                                              | 2706            | 32 | 32 | 170 | 35 | 32 | 40   | LLSTN53           | LLP15         | —            | LLCL25      | LLCS508     | HKY30R |

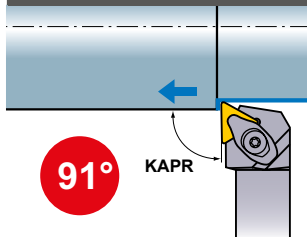
\*1 Clamp Torque (N · m) : LLCS105=1.5, LLCS106=2.2, LLCS206=2.2, LLCS108=3.3, LLCS508=3.3

PTGNR/L1010E11 · PTGNR/L1212F11 Clamp Torque (N · m) : LLCS105=1.0

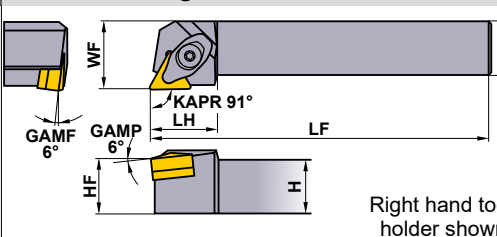
\*2 Please use shim no. LLSTN33 and shim pin no. LLP23 with 3.18mm thick inserts. When using 3.18mm thick inserts, the shim and shim pin should be ordered separately.

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

**DTGN**



**External turning** **DOUBLE CLAMP type**



Right hand tool holder shown.

| Finish                                                                                | Light                                                                                 | Medium                                                                                | Medium                                                                                |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | LP                                                                                    | MP                                                                                    | MK                                                                                    |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |
| Medium to Rough                                                                       | Stainless                                                                             | G Class                                                                               | CBN                                                                                   |
| RP                                                                                    | MM                                                                                    | R/L                                                                                   |                                                                                       |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |

| Order Number     | Stock |   | Insert Number                                | Dimensions (mm) |    |    |     |    |    |      | *2                | *2    | Clamp Bridge | Spring | Clamp Screw | Wrench |
|------------------|-------|---|----------------------------------------------|-----------------|----|----|-----|----|----|------|-------------------|-------|--------------|--------|-------------|--------|
|                  | R     | L |                                              | H               | B  | LF | LH  | HF | WF | Shim |                   |       |              |        |             |        |
| DTGNR/L1616H16   | ●     | ● | TNMA<br>TNMG<br>TNMM<br>TNGA<br>TNGG<br>TNGM | 1604            | 16 | 16 | 100 | 25 | 16 | 20   | LLSTN32 (LLSTN33) | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DTGNR/L1616H16-T | ●     | ● |                                              | 1603            | 16 | 16 | 100 | 25 | 16 | 20   | LLSTN33           | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DTGNR/L2020K16   | ●     | ● |                                              | 1604            | 20 | 20 | 125 | 25 | 20 | 25   | LLSTN32 (LLSTN33) | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DTGNR/L2020K16-T | ●     | ● |                                              | 1603            | 20 | 20 | 125 | 25 | 20 | 25   | LLSTN33           | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DTGNR/L2525M16   | ●     | ● |                                              | 1604            | 25 | 25 | 150 | 25 | 25 | 32   | LLSTN32 (LLSTN33) | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DTGNR/L2525M16-T | ●     | ● |                                              | 1603            | 25 | 25 | 150 | 25 | 25 | 32   | LLSTN33           | LLP23 | DCK2211      | DCS2   | DC0520T     | TKY15F |

\*1 Clamp Torque (N · m) : DC0520T=3.5

\*2 Please use shim no. LLSTN33 with 3.18mm thick inserts. When using 3.18mm thick inserts, the shim should be ordered separately.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

● : Inventory maintained.

PTGN type inserts > A120—A126

DTGN type inserts > A120—A126

PCBN & PCD inserts

> B030, B031, B051

RECOMMENDED CUTTING CONDITIONS > A076, B008



| PTFN           |       |   |               | Facing                            |    |    |     |    |    |      | LL type           |               |             |         |        | Finish |  | Light |  | Medium |  | Medium |  |
|----------------|-------|---|---------------|-----------------------------------|----|----|-----|----|----|------|-------------------|---------------|-------------|---------|--------|--------|--|-------|--|--------|--|--------|--|
| <br>91°        |       |   |               | <br>Right hand tool holder shown. |    |    |     |    |    |      | FP                | LP            | MP          | MK      |        |        |  |       |  |        |  |        |  |
|                |       |   |               |                                   |    |    |     |    |    |      | (16)              | (16.22)       | (16.22)     | (16.22) |        |        |  |       |  |        |  |        |  |
|                |       |   |               |                                   |    |    |     |    |    |      | Medium to Rough   | Stainless     | G Class     | CBN     |        |        |  |       |  |        |  |        |  |
|                |       |   |               |                                   |    |    |     |    |    |      | RP                | MM            | R/L         | (16)    |        |        |  |       |  |        |  |        |  |
|                |       |   |               |                                   |    |    |     |    |    |      | (16.22)           | (16.22)       | (16.22)     | (16)    |        |        |  |       |  |        |  |        |  |
| Order Number   | Stock |   | Insert Number | Dimensions (mm)                   |    |    |     |    |    |      | *2                | *2            |             | *1      |        |        |  |       |  |        |  |        |  |
|                | R     | L |               | H                                 | B  | LF | LH  | HF | WF | Shim | Shim Pin          | Clamp Lever   | Clamp Screw | Wrench  |        |        |  |       |  |        |  |        |  |
| PTFNR/L1616H16 | ●     | ● | TNMA          | 1604                              | 16 | 16 | 100 | 22 | 16 | 20   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | LLCL13      | LLCS106 | HKY25R |        |  |       |  |        |  |        |  |
| PTFNR/L2020K16 | ●     | ● | TNMG          | 1604                              | 20 | 20 | 125 | 22 | 20 | 25   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | LLCL13      | LLCS106 | HKY25R |        |  |       |  |        |  |        |  |
| PTFNR/L2525M16 | ●     | ● | TNMM          | 1604                              | 25 | 25 | 150 | 22 | 25 | 32   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | LLCL13      | LLCS106 | HKY25R |        |  |       |  |        |  |        |  |
| PTFNR/L2525M16 | ●     | ● | TNGA          | 1604                              | 25 | 25 | 150 | 22 | 25 | 32   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | LLCL13      | LLCS206 | HKY25R |        |  |       |  |        |  |        |  |
| PTFNR/L2525M22 | ●     | ● | TNGG          | 2204                              | 25 | 25 | 150 | 28 | 25 | 32   | LLSTN32 (LLSTN33) | LLP13 (LLP23) | LLCL13      | LLCS206 | HKY25R |        |  |       |  |        |  |        |  |
| PTFNR/L2525M22 | ●     | ● | TNGM          | 2204                              | 25 | 25 | 150 | 28 | 25 | 32   | LLSTN42           | LLP14         | LLCL14      | LLCS108 | HKY30R |        |  |       |  |        |  |        |  |

\*1 Clamp Torque (N · m) : LLCS106=2.2, LLCS206=2.2, LLCS108=3.3

\*2 Please use shim no. LLSTN33 and shim pin no. LLP23 with 3.18mm thick inserts. When using 3.18mm thick inserts, the shim should be ordered separately.

Note 1) When using inserts with right or left hand chipbreakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

| MTJN            |       | External turning, Copying     |               |                 |    |    |     |    |    | WP type         |           | Finish       | Light           | Medium | Medium      |         |                  |
|-----------------|-------|-------------------------------|---------------|-----------------|----|----|-----|----|----|-----------------|-----------|--------------|-----------------|--------|-------------|---------|------------------|
|                 |       |                               |               |                 |    |    |     |    |    | FP              | LP        | MP           | MK              |        |             |         |                  |
|                 |       |                               |               |                 |    |    |     |    |    | (16)            | (16.22)   | (16.22)      | (16.22)         |        |             |         |                  |
|                 |       |                               |               |                 |    |    |     |    |    | Medium to Rough | Stainless | G Class      | CBN             |        |             |         |                  |
|                 |       |                               |               |                 |    |    |     |    |    | RP              | MM        | R/L          | (16)            |        |             |         |                  |
|                 |       | Right hand tool holder shown. |               |                 |    |    |     |    |    | (16.22)         | (16.22)   | (16.22)      | (16)            |        |             |         |                  |
| Order Number    | Stock |                               | Insert Number | Dimensions (mm) |    |    |     |    |    |                 |           |              |                 |        |             |         |                  |
|                 | R     | L                             |               | H               | B  | LF | LH  | HF | WF | Shim            | Shim Pin  | Clamp Bridge | Side Lock Plate | Spring | Clamp Screw | Wrench  |                  |
| MTJNR/L2020K16N | ●     | ●                             | TNMA          | 1604            | 20 | 20 | 125 | 31 | 20 | 25              | WPSTN33   | CCP33        | CCK13           | CPT13  | MES2        | SLCS105 | HKY25R<br>HKY40R |
| MTJNR/L2525M16N | ●     | ●                             | TNMG          | 1604            | 25 | 25 | 150 | 31 | 25 | 32              | WPSTN33   | CCP33        | CCK13           | CPT13  | MES2        | SLCS105 | HKY25R<br>HKY40R |
| MTJNR/L2525M22N | ●     | ●                             | TNMG          | 2204            | 25 | 25 | 150 | 38 | 25 | 32              | WPSTN43   | CCP34        | CCK14           | CPT14  | MES3        | SLCS106 | HKY30R<br>HKY40R |

\*1 Clamp Torque (N · m) : SLCS105=7.0, SLCS106=7.0

\*2 HKY25R, HKY30R Wrench for Shim Pin, HKY40R Wrench for Clamp Screw.

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

|                    |                    |
|--------------------|--------------------|
| PTFN type inserts  | ➤ A120—A126        |
| MTJN type inserts  | ➤ A120—A126        |
| PCBN & PCD inserts | ➤ B030, B031, B051 |

|                                |              |
|--------------------------------|--------------|
| RECOMMENDED CUTTING CONDITIONS | ➤ A076, B008 |
| SPARE PARTS                    | ➤ N001       |
| TECHNICAL DATA                 | ➤ P001       |

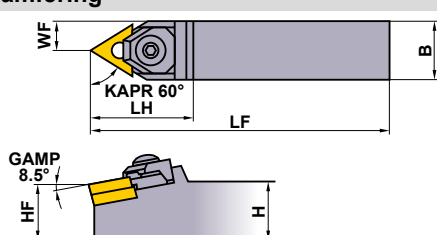
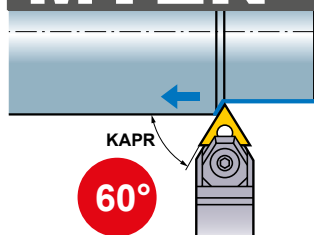
# EXTERNAL TURNING TOOLS

**TN** INSERTS  
TOOL HOLDERS

**MTEN**

External turning,  
Chamfering

**WP type**



| Finish          | Light     | Medium  | Medium  |
|-----------------|-----------|---------|---------|
| FP              | LP        | MP      | MK      |
|                 |           |         |         |
| (16)            | (16.22)   | (16.22) | (16.22) |
| Medium to Rough | Stainless | G Class | CBN     |
| RP              | MM        | R/L     |         |
|                 |           |         |         |
| (16.22)         | (16.22)   | (16.22) | (16)    |

| Order Number  | Stock | Insert Number |      | Dimensions (mm) |    |     |    |    |      |  |  |  |  |  | *1<br> | *2<br> |
|---------------|-------|---------------|------|-----------------|----|-----|----|----|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|               |       |               |      | H               | B  | LF  | LH | HF | WF   | Shim                                                                                | Shim Pin                                                                            | Clamp Bridge                                                                        | Side Lock Plate                                                                   | Spring                                                                            | Clamp Screw                                                                             | Wrench                                                                                  |
| MTENN2020K16N | ●     | TN-A<br>TN-G  | 1604 | 20              | 20 | 125 | 34 | 20 | 10   | WPSTN33                                                                             | CCP33                                                                               | CCK13                                                                               | CPT13                                                                             | MES2                                                                              | SLCS105                                                                                 | HKY25R<br>HKY40R                                                                        |
| MTENN2525M22N | ●     | TN-M<br>TNMX  | 2204 | 25              | 25 | 150 | 44 | 25 | 12.5 | WPSTN43                                                                             | CCP34                                                                               | CCK14                                                                               | CPT14                                                                             | MES3                                                                              | SLCS106                                                                                 | HKY30R<br>HKY40R                                                                        |

\*1 Clamp Torque (N · m) : SLCS105=7.0, SLCS106=7.0

\*2 HKY25R, HKY30R Wrench for Shim Pin, HKY40R Wrench for Clamp Screw.

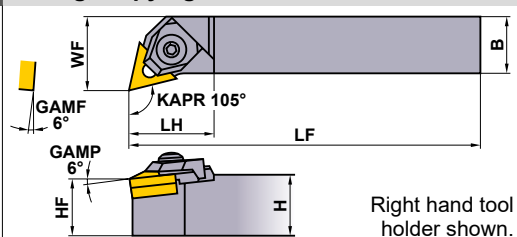
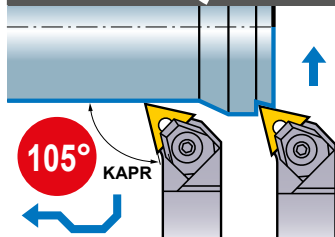
Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

EXTERNAL TURNING TOOLS

**MTQN**

Facing, Copying

**WP type**



| Finish          | Light     | Medium  | Medium  |
|-----------------|-----------|---------|---------|
| FP              | LP        | MP      | MK      |
|                 |           |         |         |
| (16)            | (16.22)   | (16.22) | (16.22) |
| Medium to Rough | Stainless | G Class | CBN     |
| RP              | MM        | R/L     |         |
|                 |           |         |         |
| (16.22)         | (16.22)   | (16.22) | (16)    |

| Order Number    | Stock |   | Insert Number | Dimensions (mm) |    |    |     |    |    |  |  |  |  |  |  |  |                  |
|-----------------|-------|---|---------------|-----------------|----|----|-----|----|----|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------|
|                 | R     | L |               | H               | B  | LF | LH  | HF | WF | Shim                                                                                | Shim Pin                                                                              | Clamp Bridge                                                                          | Side Lock Plate                                                                       | Spring                                                                                | Clamp Screw                                                                           | Wrench                                                                                |                  |
| MTQNR/L2020K16N | ●     | ● | TN-A<br>TN-G  | 1604            | 20 | 20 | 125 | 31 | 20 | 25                                                                                  | WPSTN33                                                                               | CCP33                                                                                 | CCK13                                                                                 | CPT13                                                                                 | MES2                                                                                  | SLCS105                                                                               | HKY25R<br>HKY40R |
| MTQNR/L2525M22N | ●     | ● | TN-M<br>TNMX  | 2204            | 25 | 25 | 150 | 36 | 25 | 32                                                                                  | WPSTN43                                                                               | CCP34                                                                                 | CCK14                                                                                 | CPT14                                                                                 | MES3                                                                                  | SLCS106                                                                               | HKY30R<br>HKY40R |

\*1 Clamp Torque (N · m) : SLCS105=7.0, SLCS106=7.0

\*2 HKY25R, HKY30R Wrench for Shim Pin, HKY40R Wrench for Clamp Screw.

Note 1) When facing only and using inserts with right or left hand chipbreakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

Note 2) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 3) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

● : Inventory maintained.

MTEN type inserts > A120—A126

MTQN type inserts > A120—A126

PCBN & PCD inserts

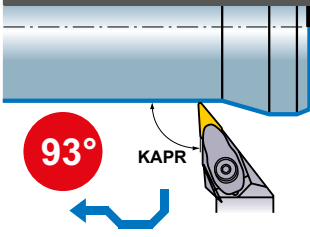
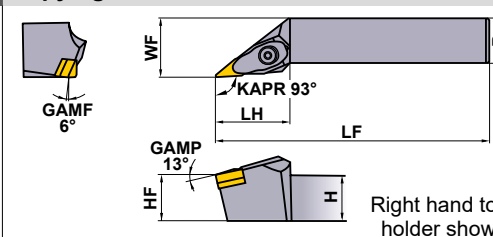
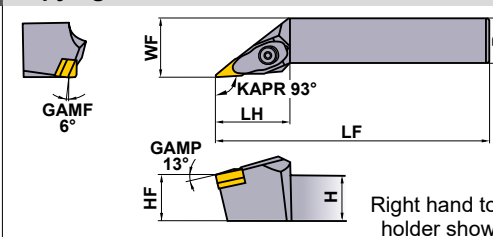
> B030, B031, B051

RECOMMENDED CUTTING CONDITIONS > A076, B008

| PVJN           |       | External turning,<br>Copying |                                                                | MP type                       |    |    |     |    |    |      | Finish                      |            | Light     |        | Medium  |  | Medium |  |
|----------------|-------|------------------------------|----------------------------------------------------------------|-------------------------------|----|----|-----|----|----|------|-----------------------------|------------|-----------|--------|---------|--|--------|--|
|                |       |                              |                                                                |                               |    |    |     |    |    |      | FP                          |            | LP        |        | MP      |  | MK     |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      |                             |            |           |        |         |  |        |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      | (16)                        |            | (16)      |        | (16)    |  | (16)   |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      | Medium                      |            | Stainless |        | G Class |  | CBN    |  |
|                |       |                              |                                                                | Right hand tool holder shown. |    |    |     |    |    |      | Standard                    |            | MM        |        | R/L     |  |        |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      |                             |            |           |        |         |  |        |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      | (16)                        |            | (16)      |        | (16)    |  | (16)   |  |
|                |       |                              |                                                                |                               |    |    |     |    |    |      |                             |            |           |        |         |  |        |  |
| Order Number   | Stock |                              | Insert Number                                                  | Dimensions (mm)               |    |    |     |    |    |      | *2                          |            |           | *1     |         |  |        |  |
|                | R     | L                            |                                                                | H                             | B  | LF | LH  | HF | WF | Shim | Lock Pin                    | Lock Screw | Stop Ring | Wrench |         |  |        |  |
| PVJNR/L2020K16 | ●     | ●                            | VN <sup>00</sup> A<br>VN <sup>00</sup> G<br>VN <sup>00</sup> M | 1604                          | 20 | 20 | 125 | 32 | 20 | 25   | PV322<br>(PV321)<br>(PV323) | P11S       | HSP05008C | E03    | HKY25R  |  |        |  |
| PVJNR/L2525M16 | ●     | ●                            | VN <sup>00</sup> A<br>VN <sup>00</sup> G<br>VN <sup>00</sup> M | 1604                          | 25 | 25 | 150 | 38 | 25 | 32   |                             | P11S       | HSP05008C | E03    | HKY25R  |  |        |  |

\*1 Clamp Torque (N · m) : HSP05008C=2.5

\*2 Please use shim no. PV321 and PV323 with RE0.4mm and RE1.2mm thick inserts. When using inserts, shim should be ordered separately.

|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    |                                                                                       |    |                                                                                       |    |                                                                                       |          |                                                                                       |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------|------|-------------------------------|----|---------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
| <b>DVJN</b>                                                                         |  | <b>External turning, DOUBLE CLAMP type</b>                                          |   |                                                                                     |      |                               |    |                                                                                       |    |                                                                                       |    | Finish                                                                                |          | Light                                                                                 |        | Medium                                                                                |        | Medium                                                                                |  |                                                                                       |  |                                                                                       |  |
|  |  |  |   |  |      | Right hand tool holder shown. |    | FP                                                                                    |    | LP                                                                                    |    | MP                                                                                    |          | MK                                                                                    |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    |  |    |  |    |  |          |  |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    | (16)                                                                                  |    | (16)                                                                                  |    | (16)                                                                                  |          | (16)                                                                                  |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    | Medium                                                                                |    | Stainless                                                                             |    | G Class                                                                               |          | CBN                                                                                   |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    | Standard                                                                              |    | MM                                                                                    |    | R/L                                                                                   |          |                                                                                       |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    |  |    |  |    |  |          |  |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    | (16)                                                                                  |    | (16)                                                                                  |    | (16)                                                                                  |          | (16)                                                                                  |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
|                                                                                     |  |                                                                                     |   |                                                                                     |      |                               |    |                                                                                       |    |                                                                                       |    |                                                                                       |          |                                                                                       |        |                                                                                       |        |                                                                                       |  |                                                                                       |  |                                                                                       |  |
| Order Number                                                                        |  | Stock                                                                               |   | Insert Number                                                                       |      | Dimensions (mm)               |    |                                                                                       |    |                                                                                       |    |   |          |  |        |  |        |  |  |  |  |  |  |
|                                                                                     |  | R                                                                                   | L |                                                                                     |      | H                             | B  | LF                                                                                    | LH | HF                                                                                    | WF | Shim                                                                                  | Shim Pin | Clamp Bridge                                                                          | Spring | Clamp Screw                                                                           | Wrench |                                                                                       |  |                                                                                       |  |                                                                                       |  |
| DVJNR/L2020K16                                                                      |  | ●                                                                                   | ● | VN <sup>00</sup> A<br>VN <sup>00</sup> G<br>VN <sup>00</sup> M                      | 1604 | 20                            | 20 | 125                                                                                   | 41 | 20                                                                                    | 25 | DCSVN32                                                                               | LLP13    | DCK3113                                                                               | DCS2   | DC0520T                                                                               | TKY15F |                                                                                       |  |                                                                                       |  |                                                                                       |  |
| DVJNR/L2525M16                                                                      |  | ●                                                                                   | ● | VN <sup>00</sup> A<br>VN <sup>00</sup> G<br>VN <sup>00</sup> M                      | 1604 | 25                            | 25 | 150                                                                                   | 41 | 25                                                                                    | 32 | DCSVN32                                                                               | LLP13    | DCK3113                                                                               | DCS2   | DC0520T                                                                               | TKY15F |                                                                                       |  |                                                                                       |  |                                                                                       |  |

\* Clamp Torque (N · m) : DC0520T=3.5

|                    |                    |
|--------------------|--------------------|
| PVJN type inserts  | > A127 – A130      |
| DVJN type inserts  | > A127 – A130      |
| PCBN & PCD inserts | > B032, B033, B052 |

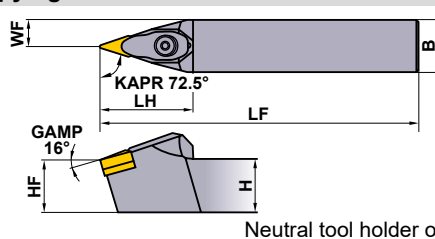
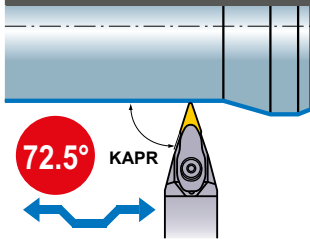
|                                |              |
|--------------------------------|--------------|
| RECOMMENDED CUTTING CONDITIONS | > A076, B008 |
| SPARE PARTS                    | > N001       |
| TECHNICAL DATA                 | > P001       |

# EXTERNAL TURNING TOOLS

**VN**  **INSERTS**  
**TOOL HOLDERS**

**DVVN**

External turning, **DOUBLE CLAMP type**  
Copying



Neutral tool holder only.

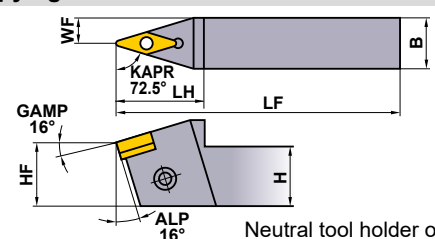
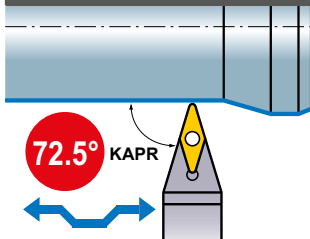
| Finish                                                                              | Light                                                                               | Medium                                                                              | Medium                                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | LP                                                                                  | MP                                                                                  | MK                                                                                  |
|  |  |  |  |
| (16)                                                                                | (16)                                                                                | (16)                                                                                | (16)                                                                                |
| Medium                                                                              | Stainless                                                                           | G Class                                                                             | CBN                                                                                 |
| Standard                                                                            | MM                                                                                  | R/L                                                                                 |                                                                                     |
|  |  |  |  |
| (16)                                                                                | (16)                                                                                | (16)                                                                                | (16)                                                                                |

| Order Number | Stock | Insert Number |      | Dimensions (mm) |    |     |    |    |      |  |  |  |  |  |  |
|--------------|-------|---------------|------|-----------------|----|-----|----|----|------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|              |       |               |      | H               | B  | LF  | LH | HF | WF   | Shim                                                                               | Shim Pin                                                                            | Clamp Bridge                                                                        | Spring                                                                              | Clamp Screw                                                                         | Wrench                                                                              |
| DVVNN2020K16 | ●     | VN-A          | 1604 | 20              | 20 | 125 | 44 | 20 | 10   | DCSVN32                                                                            | LLP13                                                                               | DCK3113                                                                             | DCS2                                                                                | DC0520T                                                                             | TKY15F                                                                              |
| DVVNN2525M16 | ●     | VN-G<br>VN-M  | 1604 | 25              | 25 | 150 | 44 | 25 | 12.5 | DCSVN32                                                                            | LLP13                                                                               | DCK3113                                                                             | DCS2                                                                                | DC0520T                                                                             | TKY15F                                                                              |

\* Clamp Torque (N · m) : DC0520T=3.5

**PVVN**

External turning, **MP type**  
Copying



Neutral tool holder only.

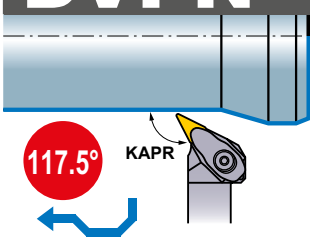
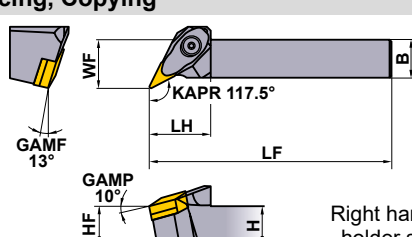
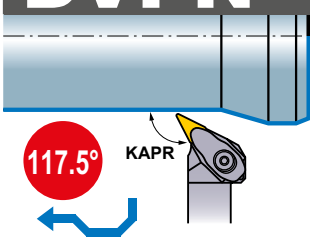
| Finish                                                                                | Light                                                                                 | Medium                                                                                | Medium                                                                                |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | LP                                                                                    | MP                                                                                    | MK                                                                                    |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |
| Medium                                                                                | Stainless                                                                             | G Class                                                                               | CBN                                                                                   |
| Standard                                                                              | MM                                                                                    | R/L                                                                                   |                                                                                       |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |

| Order Number | Stock | Insert Number |      | Dimensions (mm) |    |     |    |    |      |  *2 |  |  *1 |  |  |
|--------------|-------|---------------|------|-----------------|----|-----|----|----|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |               |      | H               | B  | LF  | LH | HF | WF   | Shim                                                                                    | Lock Pin                                                                              | Lock Screw                                                                               | Stop Ring                                                                             | Wrench                                                                                |
| PVVNN2020K16 | ●     | VN-A          | 1604 | 20              | 20 | 125 | 38 | 20 | 10   | PV322<br>(PV321)                                                                        | P11S                                                                                  | HSP05008C                                                                                | E03                                                                                   | HKY25R                                                                                |
| PVVNN2525M16 | ●     | VN-M          | 1604 | 25              | 25 | 150 | 38 | 25 | 12.5 | (PV323)                                                                                 | P11S                                                                                  | HSP05008C                                                                                | E03                                                                                   | HKY25R                                                                                |

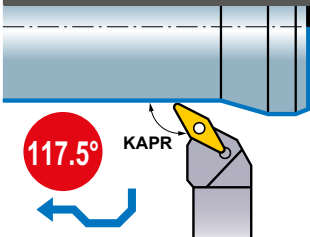
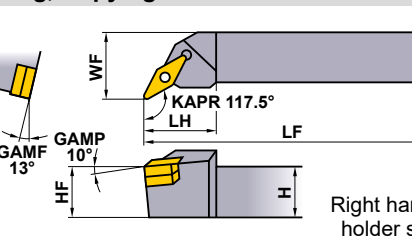
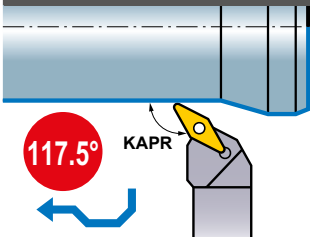
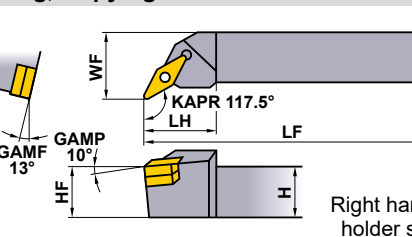
\*1 Clamp Torque (N · m) : HSP05008C=2.5

\*2 Please use shim no. PV321 and PV323 with RE0.4mm and RE1.2mm thick inserts. When using inserts, shim should be ordered separately.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

| DVPN                                                                              |       | DOUBLE CLAMP type                                                                 |                      |                 |    |    |     |    |    |      |                                                                                    | Finish                                                                              |                                                                                     | Light                                                                               |                                                                                     | Medium                                                                              |  | Medium |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|----------------------|-----------------|----|----|-----|----|----|------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--------|--|
|  |       | Facing, Copying                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    | FP                                                                                  | LP                                                                                  | MP                                                                                  | MK                                                                                  |                                                                                     |  |        |  |
|                                                                                   |       |  |                      |                 |    |    |     |    |    |      |                                                                                    |  |  |  |  |                                                                                     |  |        |  |
|                                                                                   |       |                                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    | (16)                                                                                | (16)                                                                                | (16)                                                                                | (16)                                                                                |                                                                                     |  |        |  |
|                                                                                   |       |                                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    | Medium                                                                              | Stainless                                                                           | G Class                                                                             | CBN                                                                                 |                                                                                     |  |        |  |
|  |       |                                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    | Standard                                                                            | MM                                                                                  | R/L                                                                                 |                                                                                     |                                                                                     |  |        |  |
|                                                                                   |       |                                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    |  |  |  |  |                                                                                     |  |        |  |
|                                                                                   |       |                                                                                   |                      |                 |    |    |     |    |    |      |                                                                                    | (16)                                                                                | (16)                                                                                | (16)                                                                                | (16)                                                                                |                                                                                     |  |        |  |
| Order Number                                                                      | Stock |                                                                                   | Insert Number        | Dimensions (mm) |    |    |     |    |    |      |  |  |  |  |  |  |  |        |  |
|                                                                                   | R     | L                                                                                 |                      | H               | B  | LF | LH  | HF | WF | Shim | Shim Pin                                                                           | Clamp Bridge                                                                        | Spring                                                                              | Clamp Screw                                                                         | Wrench                                                                              |                                                                                     |  |        |  |
| DVPNR/L2020K16                                                                    | ●     | ★                                                                                 | VN-A<br>VN-G<br>VN-M | 1604            | 20 | 20 | 125 | 32 | 20 | 25   | DCSVN32                                                                            | LLP13                                                                               | DCK3113                                                                             | DCS2                                                                                | DC0520T                                                                             | TKY15F                                                                              |  |        |  |
| DVPNR/L2525M16                                                                    | ●     | ●                                                                                 | VN-A<br>VN-G<br>VN-M | 1604            | 25 | 25 | 150 | 32 | 25 | 32   | DCSVN32                                                                            | LLP13                                                                               | DCK3113                                                                             | DCS2                                                                                | DC0520T                                                                             | TKY15F                                                                              |  |        |  |

\* Clamp Torque (N • m) : DC0520T=3.5

| PVPN                                                                                |       | Facing, Copying                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | MP type                                                                               |                                                                                       | Finish                                                                                | Light                                                                                 | Medium | Medium |
|-------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|----------------------|-----------------|----|----|-----|----|----|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|--------|
|  |       |  |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | FP                                                                                    | LP                                                                                    | MP                                                                                    | MK                                                                                    |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       |  |  |  |  |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | Medium                                                                                | Stainless                                                                             | G Class                                                                               | CBN                                                                                   |        |        |
|  |       |  |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | Standard                                                                              | MM                                                                                    | R/L                                                                                   |                                                                                       |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       |  |  |  |  |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |        |        |
|                                                                                     |       |                                                                                     |                      |                 |    |    |     |    |    |                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |        |        |
| Order Number                                                                        | Stock |                                                                                     | Insert Number        | Dimensions (mm) |    |    |     |    |    |                                                                                      | *2                                                                                    |                                                                                       | *1                                                                                    |                                                                                       |                                                                                       |        |        |
|                                                                                     | R     | L                                                                                   |                      | H               | B  | LF | LH  | HF | WF |  |  |  |  |  |                                                                                       |        |        |
| PVPNR/L2020K16                                                                      | ●     | ●                                                                                   | VN-A<br>VN-G<br>VN-M | 1604            | 20 | 20 | 125 | 32 | 20 | 25                                                                                   | PV322<br>(PV321)<br>(PV323)                                                           | P11S                                                                                  | HSP05008C                                                                             | E03                                                                                   | HKY25R                                                                                |        |        |
| PVPNR/L2525M16                                                                      | ●     | ●                                                                                   | VN-A<br>VN-G<br>VN-M | 1604            | 25 | 25 | 150 | 32 | 25 | 32                                                                                   | PV322<br>(PV321)<br>(PV323)                                                           | P11S                                                                                  | HSP05008C                                                                             | E03                                                                                   | HKY25R                                                                                |        |        |

\*1 Clamp Torque (N • m) : HSP05008C=2.5

\*2 Please use shim no. PV321 and PV323 with RE0.4mm and RE1.2mm thick inserts. When using inserts, shim should be ordered separately.

|                     |                    |
|---------------------|--------------------|
| DVPN type inserts   | ➤ A127 – A130      |
| PVPN type inserts   | ➤ A127 – A130      |
| PPCBN & PCD inserts | ➤ B032, B033, B052 |

|                                |              |
|--------------------------------|--------------|
| RECOMMENDED CUTTING CONDITIONS | ➤ A076, B008 |
| SPARE PARTS                    | ➤ N001       |
| TECHNICAL DATA                 | ➤ P001       |

# EXTERNAL TURNING TOOLS

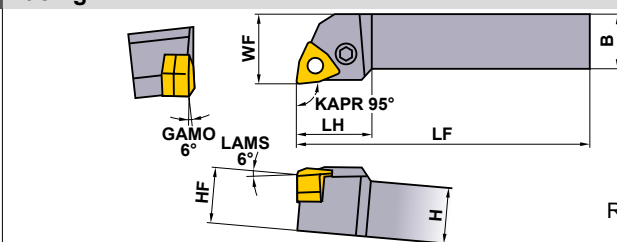
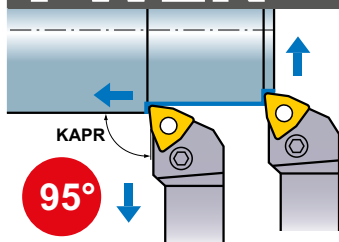
**WN** INSERTS  
TOOL HOLDERS

**PWLN**

External turning,  
Facing

**LL type**

| Light                                                                                             | Medium                                                                                            |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| LP<br><br>(06) | MP<br><br>(06) |
| Stainless                                                                                         |                                                                                                   |
| MM<br><br>(06) |                                                                                                   |



Right hand tool holder shown.

| Order Number  | Stock |   | Insert Number | Dimensions (mm) |    |    |     |    |    |    | Shim               | Shim Pin | Clamp Lever | Clamp Screw | Wrench |
|---------------|-------|---|---------------|-----------------|----|----|-----|----|----|----|--------------------|----------|-------------|-------------|--------|
|               | R     | L |               | H               | B  | LF | LH  | HF | WF |    |                    |          |             |             |        |
| PWLN/L1616H06 | ●     | ● | WNMG          | 06T3            | 16 | 16 | 100 | 22 | 16 | 20 | LLSWN3T3 (LLSWN32) | LLP13    | LLCL13      | LLCS106     | HKY25R |
| PWLN/L2020K06 | ●     | ● |               | 06T3            | 20 | 20 | 125 | 22 | 20 | 25 | LLSWN3T3 (LLSWN32) | LLP13    | LLCL13      | LLCS106     | HKY25R |
| PWLN/L2525M06 | ●     | ● |               | 06T3            | 25 | 25 | 150 | 25 | 25 | 32 | LLSWN3T3 (LLSWN32) | LLP13    | LLCL13      | LLCS106     | HKY25R |

\*1 Clamp Torque (N • m) : LLCS106=2.2

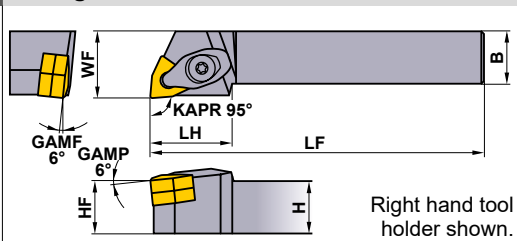
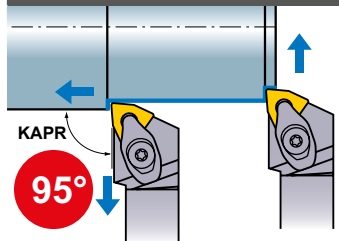
\*2 Please use shim no. LLSWN32 with 4.76mm thick inserts. When using 4.76mm thick inserts, the shim should be ordered separately.

EXTERNAL TURNING TOOLS

**DWLN**

External turning, **DOUBLE CLAMP type**  
Facing

| Finish                                                                                                           | Light                                                                                                                  | Medium                                                                                                              | Medium                                                                                               |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| FP<br><br>(08)              | LP<br><br>(06,08)                 | MP<br><br>(06,08)              | MK<br><br>(08)  |
| Medium Standard<br><br>(08) | Medium to Rough<br>RP<br><br>(08) | Stainless<br>MM<br><br>(06,08) | CBN<br><br>(08) |



Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number        | Dimensions (mm) |    |    |     |    |    |    | Shim               | Shim Pin | Clamp Bridge | Spring | Clamp Screw | Wrench |
|-----------------|-------|---|----------------------|-----------------|----|----|-----|----|----|----|--------------------|----------|--------------|--------|-------------|--------|
|                 | R     | L |                      | H               | B  | LF | LH  | HF | WF |    |                    |          |              |        |             |        |
| DWLN/L1616H06   | ●     | ● | WNMA<br>WNMG<br>WNGA | 06T3            | 16 | 16 | 100 | 25 | 16 | 20 | LLSWN3T3 (LLSWN32) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DWLN/L2020K06   | ●     | ● |                      | 06T3            | 20 | 20 | 125 | 25 | 20 | 25 | LLSWN3T3 (LLSWN32) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DWLN/L2020K06-T | ●     | ● |                      | 0604            | 20 | 20 | 125 | 25 | 20 | 25 | LLSWN32            | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DWLN/L2525M06   | ●     | ● |                      | 06T3            | 25 | 25 | 150 | 25 | 25 | 32 | LLSWN3T3 (LLSWN32) | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DWLN/L2525M06-T | ●     | ● |                      | 0604            | 25 | 25 | 150 | 25 | 25 | 32 | LLSWN32            | LLP23    | DCK2211      | DCS2   | DC0520T     | TKY15F |
| DWLN/L2020K08   | ●     | ● |                      | 0804            | 20 | 20 | 125 | 31 | 20 | 25 | LLSWN42            | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DWLN/L2525M08   | ●     | ● |                      | 0804            | 25 | 25 | 150 | 31 | 25 | 32 | LLSWN42            | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |
| DWLN/L3225P08   | ●     | ● |                      | 0804            | 32 | 25 | 170 | 31 | 32 | 32 | LLSWN42            | LLP14    | DCK2613      | DCS1   | DC0621T     | TKY20F |

\*1 Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0

\*2 Please use shim no. LLSWN32 with 4.76mm thick inserts. When using 4.76mm thick inserts, the shim should be ordered separately.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

● : Inventory maintained.

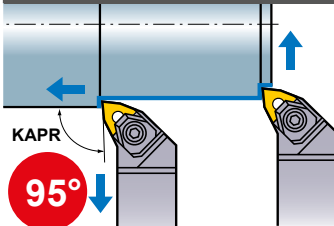
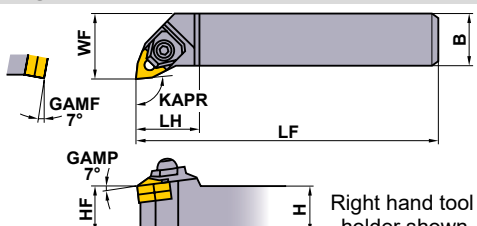
PWLN type inserts > A131—A133

DWLN type inserts > A131—A135

PCBN inserts > B034

RECOMMENDED CUTTING CONDITIONS > A076, B008



| MWLN                                                                              |  |   |   | External turning, Facing                                                          |   |                      |      |    |                 |      |    | WP type                                                                             |          | Finish                                                                              |                                                                                     | Light                                                                               |                                                                                     | Medium                                                                              |                                                                                     | Medium                                                                              |  |
|-----------------------------------------------------------------------------------|--|---|---|-----------------------------------------------------------------------------------|---|----------------------|------|----|-----------------|------|----|-------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
|  |  |   |   |  |   |                      |      |    |                 |      |    | FP                                                                                  |          | LP                                                                                  |                                                                                     | MP                                                                                  |                                                                                     | MK                                                                                  |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 |      |    |  |          |  |                                                                                     |  |                                                                                     |  |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 |      |    | (08)                                                                                |          | (08)                                                                                |                                                                                     | (08)                                                                                |                                                                                     | (08)                                                                                |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 |      |    | Medium                                                                              |          | Medium to Rough                                                                     |                                                                                     | Stainless                                                                           |                                                                                     | CBN                                                                                 |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 |      |    | Standard                                                                            |          | RP                                                                                  |                                                                                     | MM                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 |      |    |  |          |  |                                                                                     |  |                                                                                     |  |                                                                                     |                                                                                     |  |
|                                                                                   |  |   |   |                                                                                   |   |                      |      |    |                 | (08) |    | (08)                                                                                |          | (08)                                                                                |                                                                                     | (08)                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |
| Order Number                                                                      |  |   |   | Stock                                                                             |   | Insert Number        |      |    | Dimensions (mm) |      |    |                                                                                     |          |   |  |  |  |  |  |  |  |
|                                                                                   |  | R | L |                                                                                   |   | H                    | B    | LF | LH              | HF   | WF | Shim                                                                                | Shim Pin | Side Lock Plate                                                                     | Clamp Bridge                                                                        | Clamp Screw                                                                         | Spring                                                                              | Wrench                                                                              |                                                                                     |                                                                                     |  |
| MWLNR/L2020K08                                                                    |  |   |   | ●                                                                                 | ● | WNMA<br>WNMG<br>WNGA | 0804 | 20 | 20              | 125  | 32 | 20                                                                                  | 25       | WPSWN43                                                                             | CCP34                                                                               | CPT24                                                                               | CCK13                                                                               | SLCS105                                                                             | MES2                                                                                | HKY40R                                                                              |  |
| MWLNR/L2525M08                                                                    |  |   |   | ●                                                                                 | ● |                      | 0804 | 25 | 25              | 150  | 32 | 25                                                                                  | 32       | WPSWN43                                                                             | CCP34                                                                               | CPT24                                                                               | CCK13                                                                               | SLCS105                                                                             | MES2                                                                                | HKY40R                                                                              |  |
| MWLNR/L3225P08                                                                    |  |   |   | ●                                                                                 | ● |                      | 0804 | 32 | 25              | 170  | 32 | 32                                                                                  | 32       | WPSWN43                                                                             | CCP34                                                                               | CPT24                                                                               | CCK13                                                                               | SLCS105                                                                             | MES2                                                                                | HKY40R                                                                              |  |

\* Clamp Torque (N • m) : SLCS105=7.0



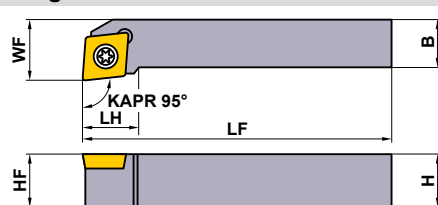
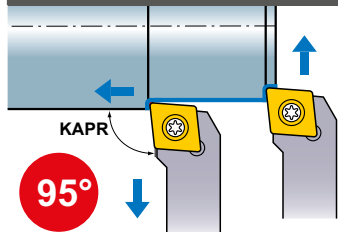
# EXTERNAL TURNING TOOLS

**CC** INSERTS  
TOOL HOLDERS

**SCLC**

External turning,  
Facing

**SP type**



Right hand tool holder shown.

| Finish                                                                                               | Light                                                                                                   | Medium                                                                                                  | Stainless                                                                                            |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| FP<br><br>(06,09) | LP<br><br>(06,09)    | MP<br><br>(06,09,12) | FM<br><br>(06,09) |
| Stainless                                                                                            | Stainless                                                                                               | Flat top                                                                                                | PCD/CBN                                                                                              |
| LM<br><br>(06,09) | MM<br><br>(06,09,12) | <br>(06,09,12)       | <br>(06,09,12)    |

| Order Number   | Stock |   | Insert Number                  | Dimensions (mm) |    |    |     |      |    |             |  *1 |  |
|----------------|-------|---|--------------------------------|-----------------|----|----|-----|------|----|-------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |                                | H               | B  | LF | LH  | HF   | WF | Clamp Screw | Wrench                                                                                 |                                                                                     |
| SCLCR/L0808D06 | ●     | ● | CC-B<br>CC-H*2<br>CC-T<br>CC-W | 0602            | 8  | 8  | 60  | 8.9  | 8  | 10          | TS25                                                                                   | TKY08F                                                                              |
| SCLCR/L1010E06 | ●     | ● |                                | 0602            | 10 | 10 | 70  | 8.9  | 10 | 12          | TS25                                                                                   | TKY08F                                                                              |
| SCLCR/L1212F09 | ●     | ● |                                | 09T3            | 12 | 12 | 80  | 13.6 | 12 | 16          | TS43                                                                                   | TKY15F                                                                              |
| SCLCR/L1616H12 | ●     | ● |                                | 1204            | 16 | 16 | 100 | 16.7 | 16 | 20          | TS5                                                                                    | TKY25F                                                                              |

\*1 Clamp Torque (N • m) : TS25=1.0, TS43=3.5, TS5=7.5

\*2 When using CCGH and CCMH, it is recommended to use TS253 clamp screw.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

EXTERNAL TURNING TOOLS

C

● : Inventory maintained.

|                                |                    |
|--------------------------------|--------------------|
| SCLC type inserts              | > A140—A148        |
| PCBN & PCD inserts             | > B037, B038, B053 |
| RECOMMENDED CUTTING CONDITIONS | > A076, B008       |

| SDJC                   |       |   | External turning, Copying                                        |                 |    |    |     |    |    |         | SP type    |             |           |         | Finish   |         | Light   |  | Medium |  | Stainless |  |
|------------------------|-------|---|------------------------------------------------------------------|-----------------|----|----|-----|----|----|---------|------------|-------------|-----------|---------|----------|---------|---------|--|--------|--|-----------|--|
| <br><b>93°</b><br>KAPR |       |   | <br>KAPR 93°<br>WF LF LH HF B H<br>Right hand tool holder shown. |                 |    |    |     |    |    |         | FP         |             | LP        |         | MP       |         | FM      |  |        |  |           |  |
|                        |       |   |                                                                  |                 |    |    |     |    |    |         | (07,11)    |             | (07,11)   |         | (07,11)  |         | (07,11) |  |        |  |           |  |
|                        |       |   |                                                                  |                 |    |    |     |    |    |         | Stainless  |             | Stainless |         | Flat top |         | PCD/CBN |  |        |  |           |  |
|                        |       |   |                                                                  |                 |    |    |     |    |    |         | LM         |             | MM        |         |          |         |         |  |        |  |           |  |
|                        |       |   |                                                                  |                 |    |    |     |    |    | (07,11) |            | (07,11)     |           | (07,11) |          | (07,11) |         |  |        |  |           |  |
| Order Number           | Stock |   | Insert Number                                                    | Dimensions (mm) |    |    |     |    |    |         |            |             |           |         |          |         |         |  |        |  |           |  |
|                        | R     | L |                                                                  | H               | B  | LF | LH  | HF | WF | Shim    | Shim Screw | Clamp Screw | Wrench    |         |          |         |         |  |        |  |           |  |
| SDJCR/L1010E07         | ●     | ● | DCET<br>DCGT<br>DCMW<br>DCMT<br>DCGW                             | 0702            | 10 | 10 | 70  | 12 | 10 | 12      | —          | —           | TS25      | TKY08F  |          |         |         |  |        |  |           |  |
| SDJCR/L1212F11         | ●     | ● |                                                                  | 11T3            | 12 | 12 | 80  | 18 | 12 | 16      | —          | —           | TS43      | TKY15F  |          |         |         |  |        |  |           |  |
| SDJCR/L1616H11         | ●     | ● |                                                                  | 11T3            | 16 | 16 | 100 | 18 | 16 | 20      | —          | —           | TS43      | TKY15F  |          |         |         |  |        |  |           |  |
| SDJCR/L2020K11         | ●     | ● |                                                                  | 11T3            | 20 | 20 | 125 | 18 | 20 | 25      | SPSDN32    | JSS6        | TS406     | TKY15R  |          |         |         |  |        |  |           |  |
| SDJCR/L2525M11         | ●     | ● |                                                                  | 11T3            | 25 | 25 | 150 | 25 | 25 | 32      | SPSDN32    | JSS6        | TS406     | TKY15R  |          |         |         |  |        |  |           |  |

\* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

| SDNC         |       | External turning, Copying            |                 | SP type                   |    |     |    |      | Finish     | Light       | Medium   | Stainless |
|--------------|-------|--------------------------------------|-----------------|---------------------------|----|-----|----|------|------------|-------------|----------|-----------|
|              |       |                                      |                 |                           |    |     |    |      | FP         | LP          | MP       | FM        |
|              |       |                                      |                 |                           |    |     |    |      | (07,11)    | (07,11)     | (07,11)  | (07,11)   |
|              |       |                                      |                 |                           |    |     |    |      | Stainless  | Stainless   | Flat top | PCD/CBN   |
|              |       |                                      |                 |                           |    |     |    |      | LM         | MM          |          |           |
|              |       |                                      |                 |                           |    |     |    |      | (07,11)    | (07,11)     | (07,11)  | (07,11)   |
|              |       |                                      |                 | Neutral tool holder only. |    |     |    |      |            |             |          |           |
| Order Number | Stock | Insert Number                        | Dimensions (mm) |                           |    |     |    |      |            |             |          |           |
|              |       |                                      | H               | B                         | LF | HF  | WF | Shim | Shim Screw | Clamp Screw | Wrench   |           |
| SDNCN0808D07 | ●     | DCET<br>DCGT<br>DCMW<br>DCMT<br>DCGW | 0702            | 8                         | 8  | 60  | 8  | 4    | —          | —           | TS25     | TKY08F    |
| SDNCN1010E07 | ●     |                                      | 0702            | 10                        | 10 | 70  | 10 | 5    | —          | —           | TS25     | TKY08F    |
| SDNCN1212F11 | ●     |                                      | 11T3            | 12                        | 12 | 80  | 12 | 6    | —          | —           | TS43     | TKY15F    |
| SDNCN1616H11 | ●     |                                      | 11T3            | 16                        | 16 | 100 | 16 | 8    | —          | —           | TS43     | TKY15F    |
| SDNCN2525M11 | ●     |                                      | 11T3            | 25                        | 25 | 150 | 25 | 12.5 | SPSDN32    | JSS6        | TS406    | TKY15R    |

\* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

# EXTERNAL TURNING TOOLS

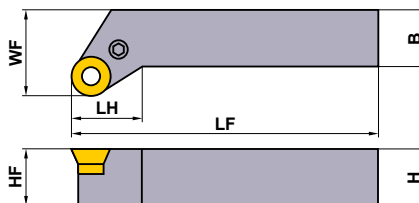
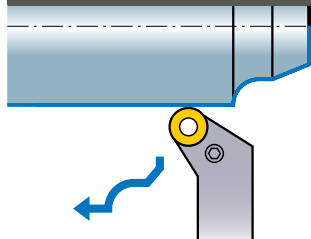
**RC**  **INSERTS**  
**TOOL HOLDERS**

**PRGC**

External turning,  
Facing, Copying

**LL type**

Medium



Right hand tool  
holder shown.



(10,12,16,20)

Heavy Cutting

RR



(16,20)

| Order Number   | Stock |   | Insert Number |        | Dimensions (mm) |    |     |      |    |    |  |  |  |  |  |
|----------------|-------|---|---------------|--------|-----------------|----|-----|------|----|----|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |               |        | H               | B  | LF  | LH   | HF | WF | Shim                                                                               | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                         | Wrench                                                                              |
| PRGCR/L2525M10 | ●     | ● | RCMX          | 1003M0 | 25              | 25 | 150 | 16.7 | 25 | 32 | LLSRN103                                                                           | LLP13                                                                               | LLCL110                                                                             | LLCS205                                                                             | HKY20R                                                                              |
| PRGCR/L2525M12 | ●     | ● |               | 1204M0 | 25              | 25 | 150 | 17.5 | 25 | 32 | LLSRN123                                                                           | LLP13                                                                               | LLCL112                                                                             | LLCS106                                                                             | HKY25R                                                                              |
| PRGCR/L2525M16 | ●     | ★ |               | 1606M0 | 25              | 25 | 150 | 19.9 | 25 | 32 | LLSRN164                                                                           | LLP24                                                                               | LLCL116                                                                             | LLCS306                                                                             | HKY25R                                                                              |
| PRGCR/L3232P20 | ●     | ● |               | 2006M0 | 32              | 32 | 170 | 23.8 | 32 | 40 | LLSRN204                                                                           | LLP15                                                                               | LLCL120                                                                             | LLCS508                                                                             | HKY30R                                                                              |

\* Clamp Torque (N • m) : LLCS205=1.5, LLCS106=2.2, LLCS306=2.2, LLCS508=3.3

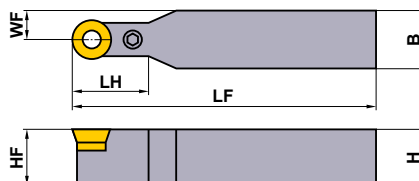
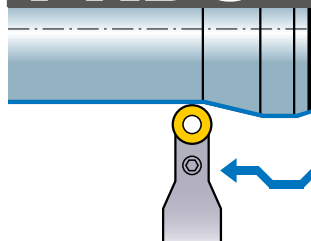
EXTERNAL TURNING TOOLS

**PRDC**

External turning,  
Copying

**LL type**

Medium



Neutral tool holder only.



(10,12,16,20)

Heavy Cutting

RR



(16,20)

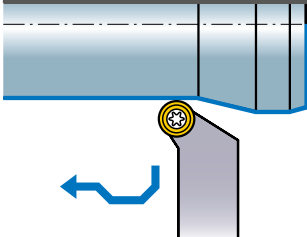
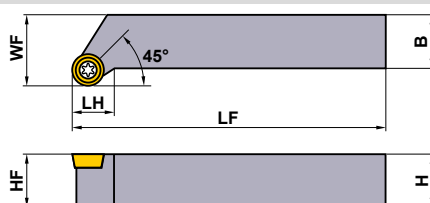
| Order Number | Stock | Insert Number |        | Dimensions (mm) |    |     |    |    |      |  |  |  |  * |  |
|--------------|-------|---------------|--------|-----------------|----|-----|----|----|------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |               |        | H               | B  | LF  | LH | HF | WF   | Shim                                                                                 | Shim Pin                                                                              | Clamp Lever                                                                           | Clamp Screw                                                                             | Wrench                                                                                |
| PRDCN2020K10 | ●     | RCMX          | 1003M0 | 20              | 20 | 125 | 23 | 20 | 10.0 | LLSRN103                                                                             | LLP13                                                                                 | LLCL110                                                                               | LLCS205                                                                                 | HKY20R                                                                                |
| PRDCN2525M12 | ●     |               | 1204M0 | 25              | 25 | 150 | 24 | 25 | 12.5 | LLSRN123                                                                             | LLP13                                                                                 | LLCL112                                                                               | LLCS106                                                                                 | HKY25R                                                                                |
| PRDCN3225P12 | ●     |               | 1204M0 | 32              | 25 | 170 | 24 | 32 | 12.5 | LLSRN123                                                                             | LLP13                                                                                 | LLCL112                                                                               | LLCS106                                                                                 | HKY25R                                                                                |
| PRDCN3225P16 | ●     |               | 1606M0 | 32              | 25 | 170 | 28 | 32 | 12.5 | LLSRN164                                                                             | LLP24                                                                                 | LLCL116                                                                               | LLCS306                                                                                 | HKY25R                                                                                |
| PRDCN3232P20 | ●     |               | 2006M0 | 32              | 32 | 170 | 33 | 32 | 16.0 | LLSRN204                                                                             | LLP15                                                                                 | LLCL120                                                                               | LLCS508                                                                                 | HKY30R                                                                                |

\* Clamp Torque (N • m) : LLCS205=1.5, LLCS106=2.2, LLCS306=2.2, LLCS508=3.3

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

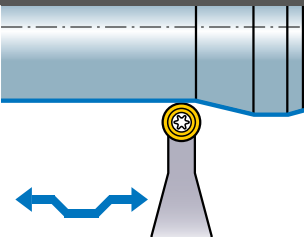
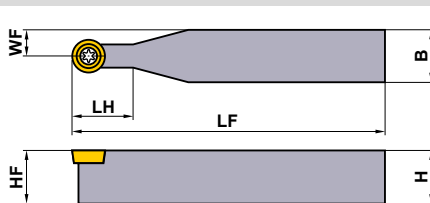
● : Inventory maintained. ★ : Inventory maintained in Japan.

|                                |              |
|--------------------------------|--------------|
| PRGC type inserts              | ➤ A160       |
| PRDC type inserts              | ➤ A160       |
| RECOMMENDED CUTTING CONDITIONS | ➤ A076, B008 |

| SRGC                                                                              |       | External turning, Facing, Copying                                                  |               |      |                 |    |     |      |    | SP type                                                                                        |                                                                                     |        |                                                                                     |
|-----------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------|---------------|------|-----------------|----|-----|------|----|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|
|  |       |  |               |      |                 |    |     |      |    | Medium – Finish Cutting                                                                        |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | AZ                                                                                             |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | <br>(08)    |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | Medium                                                                                         |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | Standard                                                                                       |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | <br>(06,08) |                                                                                     |        |                                                                                     |
|                                                                                   |       |                                                                                    |               |      |                 |    |     |      |    | Right hand tool holder shown.                                                                  |                                                                                     |        |                                                                                     |
| Order Number                                                                      | Stock |                                                                                    | Insert Number |      | Dimensions (mm) |    |     |      |    |                                                                                                |  | *      |  |
|                                                                                   | R     | L                                                                                  |               |      | H               | B  | LF  | LH   | HF | WF                                                                                             | Clamp Screw                                                                         | Wrench |                                                                                     |
| SRGCR/L1616H06                                                                    | ●     | ●                                                                                  | RCMT<br>RCGT  | 0602 | 16              | 16 | 100 | 10   | 16 | 20                                                                                             | TS25                                                                                |        | TKY08F                                                                              |
| SRGCR/L1616H08                                                                    | ●     | ●                                                                                  |               | 0803 | 16              | 16 | 100 | 14.5 | 16 | 22                                                                                             | TS3                                                                                 |        | TKY08F                                                                              |

\* Clamp Torque (N・m) : TS25=1.0, TS3=1.0

\* Clamp Torque (N • m) : TS25=1.0, TS3=1.0

| SRDC                                                                                |       |               |      | External turning, Copying                                                            |    |     |    |    |    |                                                                                       | SP type |                                                                                       | Medium – Finish Cutting<br>AZ                                                                    |        |
|-------------------------------------------------------------------------------------|-------|---------------|------|--------------------------------------------------------------------------------------|----|-----|----|----|----|---------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------|
|  |       |               |      |  |    |     |    |    |    |                                                                                       |         |                                                                                       | <br>(08)    |        |
|                                                                                     |       |               |      |                                                                                      |    |     |    |    |    |                                                                                       |         |                                                                                       | Medium                                                                                           |        |
|                                                                                     |       |               |      |                                                                                      |    |     |    |    |    |                                                                                       |         |                                                                                       | Standard                                                                                         |        |
|                                                                                     |       |               |      |                                                                                      |    |     |    |    |    |                                                                                       |         |                                                                                       | <br>(06,08) |        |
| Order Number                                                                        | Stock | Insert Number |      | Dimensions (mm)                                                                      |    |     |    |    |    |  | *       |  |                                                                                                  |        |
|                                                                                     |       |               |      | H                                                                                    | B  | LF  | LH | HF | WF |                                                                                       |         |                                                                                       | Clamp Screw                                                                                      | Wrench |
| SRDCN1616H06                                                                        | ●     | RCMT<br>RCGT  | 0602 | 16                                                                                   | 16 | 100 | 12 | 16 | 8  | TS25                                                                                  |         | TKY08F                                                                                |                                                                                                  |        |
| SRDCN1616H08                                                                        | ●     |               | 0803 | 16                                                                                   | 16 | 100 | 16 | 16 | 8  | TS3                                                                                   |         | TKY08F                                                                                |                                                                                                  |        |

\* Clamp Torque (N • m) : TS25=1.0, TS3=1.0

|                                |              |
|--------------------------------|--------------|
| SRGC type inserts              | > A160       |
| SRDC type inserts              | > A160       |
| RECOMMENDED CUTTING CONDITIONS | > A076, B008 |

|                |        |
|----------------|--------|
| SPARE PARTS    | > N001 |
| TECHNICAL DATA | > P001 |

# EXTERNAL TURNING TOOLS

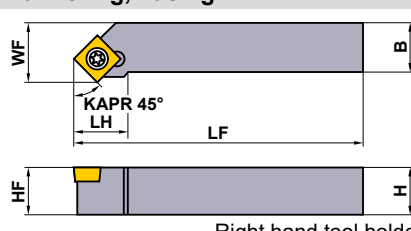
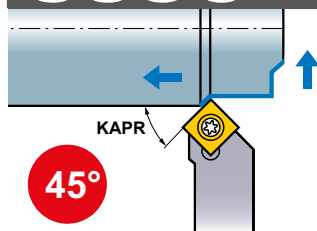
**SC** INSERTS  
TOOL HOLDERS

**SSSC**

External turning,  
Chamfering, Facing

**SP type**

| Finish                                                                                      | Light                                                                                       | Medium                                                                                      | Stainless                                                                                   |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| FP                                                                                          | LP                                                                                          | MP                                                                                          | FM                                                                                          |
| <br>(09) | <br>(09) | <br>(09) | <br>(09) |
| Stainless                                                                                   | Stainless                                                                                   | Medium                                                                                      | Flat top                                                                                    |
| LM                                                                                          | MM                                                                                          | Standard                                                                                    |                                                                                             |
| <br>(09) | <br>(09) | <br>(09) | <br>(09) |



Right hand tool holder shown.

| Order Number   | Stock |   | Insert Number |      | Dimensions (mm) |    |     |      |    |    |  |  |  |  |
|----------------|-------|---|---------------|------|-----------------|----|-----|------|----|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |               |      | H               | B  | LF  | LH   | HF | WF | Shim                                                                                | Shim Screw                                                                          | Clamp Screw                                                                         | Wrench                                                                              |
| SSSCR/L1212F09 | ●     | ● | SCMW<br>SCMT  | 09T3 | 12              | 12 | 80  | 15.2 | 12 | 13 | —                                                                                   | —                                                                                   | TS43                                                                                | TKY15F                                                                              |
| SSSCR/L1616H09 | ●     | ● |               | 09T3 | 16              | 16 | 100 | 15.2 | 16 | 17 | —                                                                                   | —                                                                                   | TS43                                                                                | TKY15F                                                                              |
| SSSCR/L2020K12 | ●     | ● |               | 1204 | 20              | 20 | 125 | 18   | 20 | 22 | SPSSN42                                                                             | JSS7                                                                                | TS53                                                                                | TKY25R                                                                              |
| SSSCR/L2525M12 | ●     | ● |               | 1204 | 25              | 25 | 150 | 25   | 25 | 27 | SPSSN42                                                                             | JSS7                                                                                | TS53                                                                                | TKY25R                                                                              |

\* Clamp Torque (N • m) : TS43=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

EXTERNAL TURNING TOOLS

C

● : Inventory maintained.

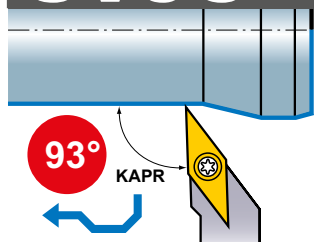
SSSC type inserts > A161, A162  
RECOMMENDED CUTTING CONDITIONS > A076, B008



# EXTERNAL TURNING TOOLS

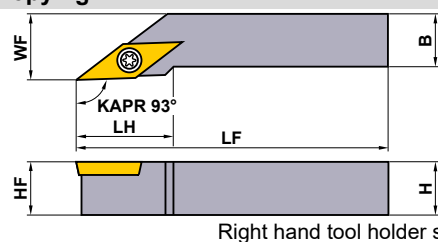
## VC INSERTS TOOL HOLDERS

### SVJC



External turning,  
Copying

SP type



Right hand tool holder shown.

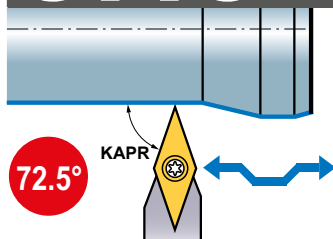
| Finish                                                                              | Light                                                                               | Medium                                                                              | Stainless                                                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | LP                                                                                  | MP                                                                                  | FM                                                                                  |
|  |  |  |  |
| (11,16)                                                                             | (11,16)                                                                             | (16)                                                                                | (11,16)                                                                             |
| Stainless                                                                           | Stainless                                                                           | Medium                                                                              | Flat top                                                                            |
| LM                                                                                  | MM                                                                                  | Standard                                                                            |                                                                                     |
|  |  |  |  |
| (11,16)                                                                             | (16)                                                                                | (11,16)                                                                             | (11,16)                                                                             |

| Order Number   | Stock |   | Insert Number                |      | Dimensions (mm) |    |     |    |    |    |  |  |  |  |
|----------------|-------|---|------------------------------|------|-----------------|----|-----|----|----|----|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |                              |      | H               | B  | LF  | LH | HF | WF | Shim                                                                               | Shim Pin                                                                            | Clamp Screw                                                                         | Wrench                                                                              |
| SVJCR/L1010E11 | ●     | ● | VCGT<br>VCGW<br>VCMT<br>VCMW | 1103 | 10              | 10 | 70  | 17 | 10 | 12 | —                                                                                  | —                                                                                   | TS25                                                                                | ①TKY08F                                                                             |
| SVJCR/L1616H16 | ●     | ● |                              | 1604 | 16              | 16 | 100 | 25 | 16 | 20 | —                                                                                  | —                                                                                   | TS43                                                                                | ①TKY15F                                                                             |
| SVJCR/L2020K16 | ●     | ● |                              | 1604 | 20              | 20 | 125 | 40 | 20 | 25 | SPSVN32                                                                            | BCP141                                                                              | TS44                                                                                | ②TKY15R                                                                             |
| SVJCR/L2525M16 | ●     | ● |                              | 1604 | 25              | 25 | 150 | 40 | 25 | 32 | SPSVN32                                                                            | BCP141                                                                              | TS44                                                                                | ②TKY15R                                                                             |

\* Clamp Torque (N · m) : TS25=1.0, TS43=3.5, TS44=3.5

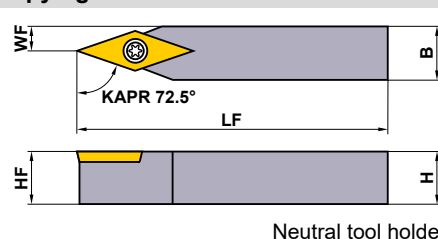
Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

### SVVC



External turning,  
Copying

SP type



Neutral tool holder only.

| Finish                                                                                | Light                                                                                 | Medium                                                                                | Stainless                                                                             |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | LP                                                                                    | MP                                                                                    | FM                                                                                    |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |
| Stainless                                                                             | Stainless                                                                             | Medium                                                                                | Flat top                                                                              |
| LM                                                                                    | MM                                                                                    | Standard                                                                              |                                                                                       |
|  |  |  |  |
| (16)                                                                                  | (16)                                                                                  | (16)                                                                                  | (16)                                                                                  |

| Order Number | Stock | Insert Number |      | Dimensions (mm) |    |     |    |      |  |  |  |  |
|--------------|-------|---------------|------|-----------------|----|-----|----|------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |               |      | H               | B  | LF  | HF | WF   | Shim                                                                                 | Shim Pin                                                                              | Clamp Screw                                                                           | Wrench                                                                                |
| SVVCN1616H16 | ●     | VCGT          | 1604 | 16              | 16 | 100 | 16 | 8    | —                                                                                    | —                                                                                     | TS43                                                                                  | ①TKY15F                                                                               |
| SVVCN2020K16 | ●     | VCGW          | 1604 | 20              | 20 | 125 | 20 | 10   | SPSVN32                                                                              | BCP141                                                                                | TS44                                                                                  | ②TKY15R                                                                               |
|              |       | VCMT          |      |                 |    |     |    |      |                                                                                      |                                                                                       |                                                                                       |                                                                                       |
| SVVCN2525M16 | ●     | VCMW          | 1604 | 25              | 25 | 150 | 25 | 12.5 | SPSVN32                                                                              | BCP141                                                                                | TS44                                                                                  | ②TKY15R                                                                               |

\* Clamp Torque (N · m) : TS43=3.5, TS44=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

● : Inventory maintained.

SVJC type inserts > A177–A180  
SVVC type inserts > A177–A180

PCBN & PCD inserts > B046, B057  
RECOMMENDED CUTTING CONDITIONS > A076, B008



| SVPC           |       | Facing, Copying               |                                  |                 |    |    |     |    |    | SP type   |           |             |           |        |
|----------------|-------|-------------------------------|----------------------------------|-----------------|----|----|-----|----|----|-----------|-----------|-------------|-----------|--------|
|                |       |                               |                                  |                 |    |    |     |    |    | Finish    | Light     | Medium      | Stainless |        |
|                |       |                               |                                  |                 |    |    |     |    |    | FP        | LP        | MP          | FM        |        |
|                |       |                               |                                  |                 |    |    |     |    |    | (16)      | (16)      | (16)        | (16)      |        |
|                |       |                               |                                  |                 |    |    |     |    |    | Stainless | Stainless | Medium      | Flat top  |        |
|                |       | Right hand tool holder shown. |                                  |                 |    |    |     |    |    | LM        | MM        | Standard    |           |        |
|                |       |                               |                                  |                 |    |    |     |    |    | (16)      | (16)      | (16)        | (16)      |        |
| Order Number   | Stock |                               | Insert Number                    | Dimensions (mm) |    |    |     |    |    |           |           |             |           |        |
|                | R     | L                             |                                  | H               | B  | LF | LH  | HF | WF | Shim      | Shim Pin  | Clamp Screw | Wrench    |        |
| SVPCR/L2020K16 | ●     | ●                             | VC GT<br>VC GW<br>VC MT<br>VC MW | 1604            | 20 | 20 | 125 | 30 | 20 | 25        | SPSVN32   | BCP141      | TS44      | TKY15R |
| SVPCR/L2525M16 | ●     | ●                             |                                  | 1604            | 25 | 25 | 150 | 30 | 25 | 32        | SPSVN32   | BCP141      | TS44      | TKY15R |

\* Clamp Torque (N • m) : TS44=3.5

Note 1) When using an insert with a corner radius  $R \geq 1.6$  mm, and dependant on the machined diameter and form, there is a risk the standard shim may interfere with the workpiece. Replace the shim so the maximum corner radius of the shim is positioned under the cutting edge.

# EXTERNAL TURNING TOOLS

**XC** INSERTS  
TOOL HOLDERS

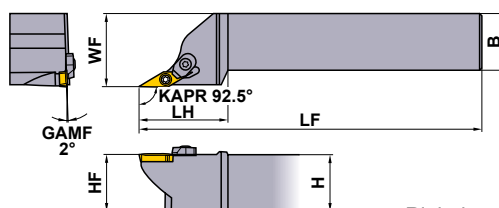
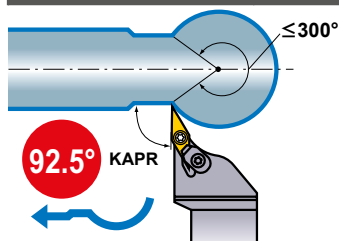
**SXZC**

External turning,  
Copying

**Profile Holder**

Finish

SVX



Right hand tool holder shown.

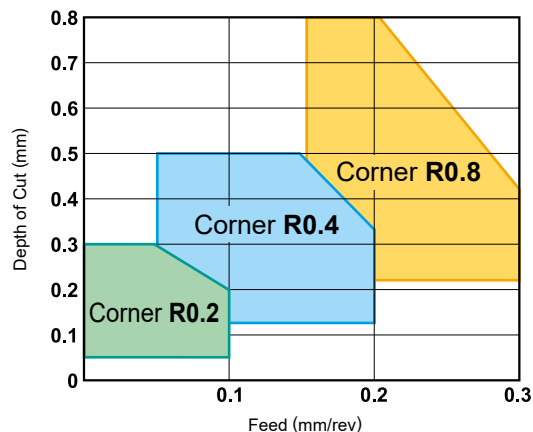


(15)

| Order Number          | Stock |   | Insert Number |      | Dimensions (mm) |    |     |    |    |  * |  |  * |  |  |  |                       |
|-----------------------|-------|---|---------------|------|-----------------|----|-----|----|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------|
|                       | R     | L |               |      | H               | B  | LF  | LH | HF | WF                                                                                  | Clamp Screw                                                                         | Clamp Bridge                                                                          | Clamp Bridge Screw                                                                  | Spring                                                                              | Insert Wrench                                                                       | Wrench (Clamp bridge) |
| <b>SXZCR/L1616H15</b> | ●     | ● | XCMT          | 1503 | 16              | 16 | 100 | 35 | 16 | 20                                                                                  | TS255                                                                               | AMS3                                                                                  | AJS3010T10                                                                          | ASS2                                                                                | TKY08F                                                                              | TKY10F                |
| <b>SXZCR/L2020K15</b> | ●     | ● |               | 1503 | 20              | 20 | 125 | 35 | 20 | 25                                                                                  | TS255                                                                               | AMS3                                                                                  | AJS3010T10                                                                          | ASS2                                                                                | TKY08F                                                                              | TKY10F                |
| <b>SXZCR/L2525M15</b> | ●     | ● |               | 1503 | 25              | 25 | 150 | 40 | 25 | 32                                                                                  | TS255                                                                               | AMS3                                                                                  | AJS3010T10                                                                          | ASS2                                                                                | TKF08F                                                                              | TKF10F                |

\* Clamp Torque (N · m) : TS255=1.0, AJS3010T10=2.5

## APPLICABLE RANGE



## RECOMMENDED CUTTING CONDITIONS

|          | Material                  | Hardness    | Grade         | Cutting Speed (m/min) |
|----------|---------------------------|-------------|---------------|-----------------------|
| <b>P</b> | Mild Steel                | ≤180HB      | <b>UE6020</b> | 250 (150—350)         |
|          | Carbon Steel, Alloy Steel | 150HB—250HB | <b>UE6020</b> | 175 (100—250)         |
| <b>M</b> | Stainless Steel           | ≤200HB      | <b>VP15TF</b> | 100 (70—120)          |

Note 1) The above cutting conditions are general guidelines.

Adjustments may be necessary depending on machine rigidity, workpiece geometry and clamping.

Note 2) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

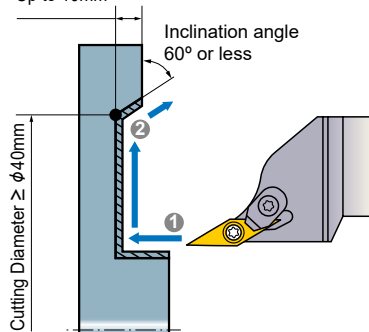
● : Inventory maintained.

## NOTE

### When end face copying

Pay special attention to the following when face copying.

Depth from end face  
Up to 10mm



#### ●Machining of an outer diameter (Step ①)

- To prevent burr formation, the depth of cut should be below half the nose radius.

#### ●Machining of an inclination (Step ②)

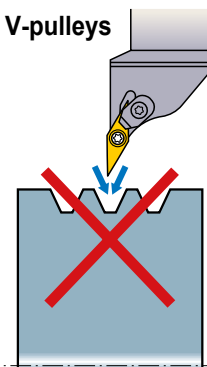
- To reduce the contact length of chips, the depth of cut should be below half the nose radius.
- To prevent interference between the tool and the workpiece, the cutting diameter should be 40mm or larger, inclination angle 60° or less and depth from the end face up to 10mm.

#### ●When changing inserts

- When indexing the inserts, it is recommended to preset the cutting edge position to maintain machining accuracy.

### Not possible

#### ●Machining of V-pulleys



When machining V-pulleys,  
use a VNMG insert.

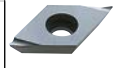
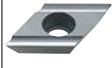
# EXTERNAL TURNING TOOLS [FOR ALUMINIUM]

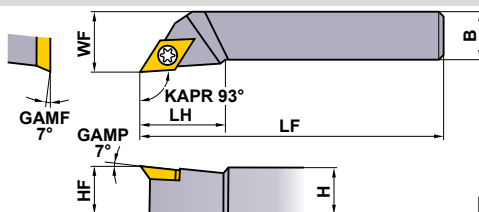
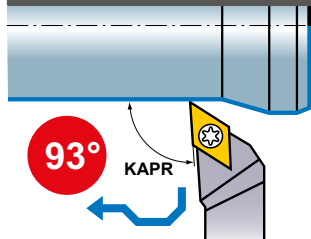
**DE** INSERTS  
TOOL HOLDERS

**SDJE**

External turning,  
Copying

**AL type**

| Finish                                                                                               | Medium                                                                                             |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| R/L-F<br><br>(15) | R/L<br><br>(15) |
| PCD                                                                                                  |                                                                                                    |
| R/L-F<br><br>(15) |                                                                                                    |



Right hand tool holder shown.

| Order Number   | Stock |   | Insert Number |      | Dimensions (mm) |    |     |    |    |    |  * |  |
|----------------|-------|---|---------------|------|-----------------|----|-----|----|----|----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |               |      | H               | B  | LF  | LH | HF | WF | Clamp Screw                                                                           | Wrench                                                                              |
| SDJER/L1616H15 | ●     | ● | DEGX          | 1504 | 16              | 16 | 100 | 27 | 16 | 20 | CS451190T                                                                             | TKY20F                                                                              |
| SDJER/L2020K15 | ●     | ● |               | 1504 | 20              | 20 | 125 | 35 | 20 | 25 | CS451190T                                                                             | TKY20F                                                                              |
| SDJER/L2525M15 | ●     | ● |               | 1504 | 25              | 25 | 150 | 35 | 25 | 32 | CS451190T                                                                             | TKY20F                                                                              |

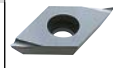
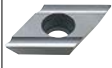
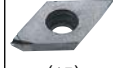
\* Clamp Torque (N · m) : CS451190T=5.0

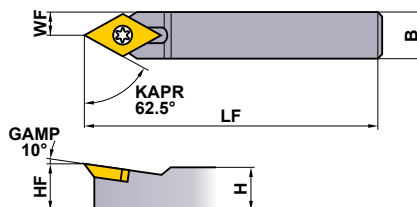
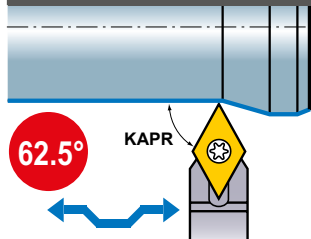
EXTERNAL TURNING TOOLS

**SDNE**

External turning,  
Copying

**AL type**

| Finish                                                                                                 | Medium                                                                                               |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| R/L-F<br><br>(15) | R/L<br><br>(15) |
| PCD                                                                                                    |                                                                                                      |
| R/L-F<br><br>(15) |                                                                                                      |



| Order Number | Stock | Insert Number |      | Dimensions (mm) |    |     |    |      |  * |  |
|--------------|-------|---------------|------|-----------------|----|-----|----|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |               |      | H               | B  | LF  | HF | WF   | Clamp Screw                                                                             | Wrench                                                                                |
| SDNEN1616H15 | ●     | DEGX          | 1504 | 16              | 16 | 100 | 16 | 8    | CS451190T                                                                               | TKY20F                                                                                |
| SDNEN2020K15 | ●     |               | 1504 | 20              | 20 | 125 | 20 | 10   | CS451190T                                                                               | TKY20F                                                                                |
| SDNEN2525M15 | ●     |               | 1504 | 25              | 25 | 150 | 25 | 12.5 | CS451190T                                                                               | TKY20F                                                                                |

\* Clamp Torque (N · m) : CS451190T=5.0

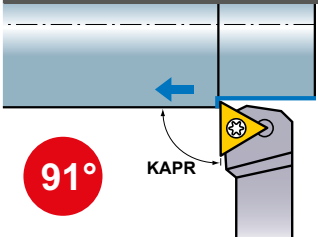
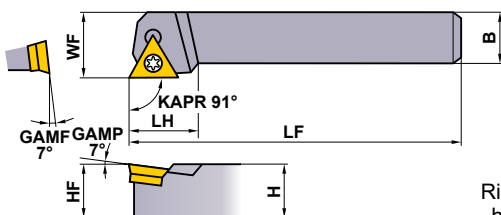
## RECOMMENDED CUTTING CONDITIONS

| Material | Grade | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|-------|-----------------------|---------------|-------------------|
| N        | HTi10 | 400                   | 0.05—0.3      | 0.2—3.0           |
|          | MD220 | 800                   | 0.05—0.3      | 0.2—0.5           |

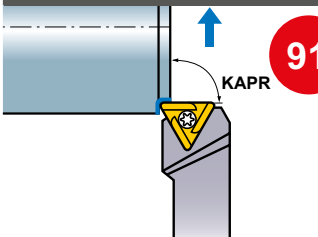
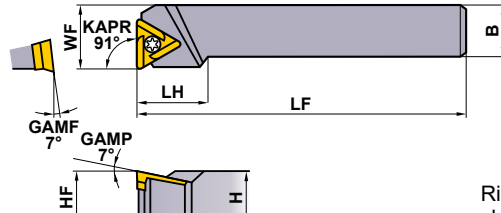
Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

● : Inventory maintained. ★ : Inventory maintained in Japan.

SDJE type inserts > A159  
SDNE type inserts > A159  
PCD inserts > B059

| STGE                                                                              |       |               |      | External turning                                                                   |    |     |    |    |    |                                                                                     | AL type                       |                                                                                     | Medium                                                                              | PCD                                                                                 |
|-----------------------------------------------------------------------------------|-------|---------------|------|------------------------------------------------------------------------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |       |               |      |  |    |     |    |    |    |                                                                                     | Right hand tool holder shown. |                                                                                     | R/L                                                                                 | R/L                                                                                 |
|                                                                                   |       |               |      |                                                                                    |    |     |    |    |    |                                                                                     |                               |                                                                                     |  |  |
|                                                                                   |       |               |      |                                                                                    |    |     |    |    |    |                                                                                     |                               |                                                                                     | (16)                                                                                | (16)                                                                                |
|                                                                                   |       |               |      |                                                                                    |    |     |    |    |    |                                                                                     |                               |                                                                                     | PCD                                                                                 |                                                                                     |
|                                                                                   |       |               |      |                                                                                    |    |     |    |    |    |                                                                                     |                               |                                                                                     |  |                                                                                     |
|                                                                                   |       |               |      |                                                                                    |    |     |    |    |    |                                                                                     |                               |                                                                                     | (16)                                                                                |                                                                                     |
| Order Number                                                                      | Stock | Insert Number |      | Dimensions (mm)                                                                    |    |     |    |    |    |  | *                             |  |                                                                                     |                                                                                     |
|                                                                                   |       |               |      | H                                                                                  | B  | LF  | LH | HF | WF |                                                                                     |                               |                                                                                     | Clamp Screw                                                                         | Wrench                                                                              |
| STGER/L1616H16                                                                    | ★ ★   | TEGX          | 1603 | 16                                                                                 | 16 | 100 | 22 | 16 | 20 | FC400890T                                                                           |                               | TKY10F                                                                              |                                                                                     |                                                                                     |
| STGER/L2020K16                                                                    | ★ ★   |               | 1603 | 20                                                                                 | 20 | 125 | 22 | 20 | 25 | FC400890T                                                                           |                               | TKY10F                                                                              |                                                                                     |                                                                                     |
| STGER/L2525M16                                                                    | ★ ★   |               | 1603 | 25                                                                                 | 25 | 150 | 22 | 25 | 32 | FC400890T                                                                           |                               | TKY10F                                                                              |                                                                                     |                                                                                     |

\* Clamp Torque (N • m) : FC400890T=2.5

| STFE                                                                                |  |       |  | Facing                                                                               |      |                 |    |     |    |    |    |                                                                                                           |                                                                                                 | AL type                       | Medium | PCD  |
|-------------------------------------------------------------------------------------|--|-------|--|--------------------------------------------------------------------------------------|------|-----------------|----|-----|----|----|----|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------|--------|------|
|  |  |       |  |  |      |                 |    |     |    |    |    |                                                                                                           |                                                                                                 | Right hand tool holder shown. | R/L    | R/L  |
|                                                                                     |  |       |  |                                                                                      |      |                 |    |     |    |    |    |                                                                                                           |                                                                                                 |                               | (16)   | (16) |
|                                                                                     |  |       |  |                                                                                      |      |                 |    |     |    |    |    |                                                                                                           |                                                                                                 |                               | PCD    |      |
|                                                                                     |  |       |  |                                                                                      |      |                 |    |     |    |    |    |                                                                                                           |                                                                                                 |                               | (16)   |      |
| Order Number                                                                        |  | Stock |  | Insert Number                                                                        |      | Dimensions (mm) |    |     |    |    |    | <br>*<br>Clamp Screw | <br>Wrench |                               |        |      |
|                                                                                     |  |       |  |                                                                                      |      | H               | B  | LF  | LH | HF | WF |                                                                                                           |                                                                                                 |                               |        |      |
| STFER/L1616H16                                                                      |  | ★ ★   |  | TEGX                                                                                 | 1603 | 16              | 16 | 100 | 22 | 16 | 20 | FC400890T                                                                                                 |                                                                                                 | TKY10F                        |        |      |
| STFER/L2020K16                                                                      |  | ★ ★   |  |                                                                                      | 1603 | 20              | 20 | 125 | 22 | 20 | 25 | FC400890T                                                                                                 |                                                                                                 | TKY10F                        |        |      |
| STFER/L2525M16                                                                      |  | ★ ★   |  |                                                                                      | 1603 | 25              | 25 | 150 | 22 | 25 | 32 | FC400890T                                                                                                 |                                                                                                 | TKY10F                        |        |      |

\* Clamp Torque (N • m) : FC400890T=2.5

Note 1) When using inserts with right or left hand chipbreakers, please use left hand inserts for right hand holders and right hand inserts for left hand holders.

## RECOMMENDED CUTTING CONDITIONS

| Material | Grade           | Cutting Speed (m/min) | Feed (mm/rev) | Depth of Cut (mm) |
|----------|-----------------|-----------------------|---------------|-------------------|
| N        | Aluminium Alloy | HTi10                 | 400           | 0.05—0.3          |
|          |                 | MD220                 | 800           | 0.05—0.3          |

STGE type inserts > A169  
STFE type inserts > A169  
PCD inserts > B059

SPARE PARTS > N001  
TECHNICAL DATA > P001

# EXTERNAL TURNING TOOLS [FOR ALUMINIUM]

**VD** INSERTS  
TOOL HOLDERS

**SVJD**

External turning,  
Copying

**AL type**

Finish

R/L



(16)

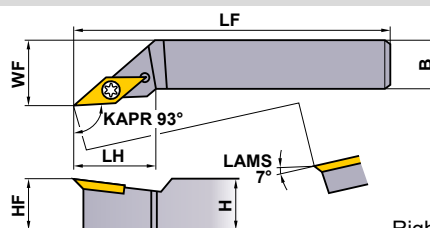
PCD

R/L-F



(16)

Right hand tool holder shown.



| Order Number   | Stock |   | Insert Number |      | Dimensions (mm) |    |     |    |    |  * |  |        |
|----------------|-------|---|---------------|------|-----------------|----|-----|----|----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | R     | L |               |      | H               | B  | LF  | LH | HF | WF                                                                                    | Clamp Screw                                                                         | Wrench |
| SVJDR/L1616H16 | ★     | ★ | VDGX          | 1603 | 16              | 16 | 100 | 30 | 16 | 20                                                                                    | FC400890T                                                                           | TKY10F |
| SVJDR/L2020K16 | ★     | ★ |               | 1603 | 20              | 20 | 125 | 30 | 20 | 25                                                                                    | FC400890T                                                                           | TKY10F |
| SVJDR/L2525M16 | ★     | ★ |               | 1603 | 25              | 25 | 150 | 30 | 25 | 32                                                                                    | FC400890T                                                                           | TKY10F |

\* Clamp Torque (N • m) : FC400890T=2.5

EXTERNAL TURNING TOOLS

## RECOMMENDED CUTTING CONDITIONS

| Material             | Grade | Cutting Speed<br>(m/min) | Feed<br>(mm/rev) | Depth of Cut<br>(mm) |
|----------------------|-------|--------------------------|------------------|----------------------|
| N<br>Aluminium Alloy | HTi10 | 400                      | 0.05—0.3         | 0.2—3.0              |
|                      | MD220 | 800                      | 0.05—0.3         | 0.2—0.5              |

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

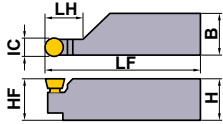
● : Inventory maintained. ★ : Inventory maintained in Japan.

SVJD type inserts > A181

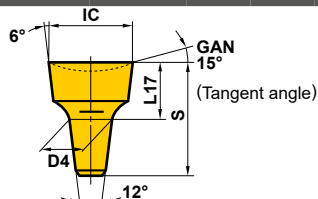
PCD inserts > B060

# TL HOLDER

## HOLDER

| Geometry                                                                                                                     | Revised order number | Conventional order number | Stock | Insert Number | Dimensions (mm) |    |    |    |     |    |
|------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|-------|---------------|-----------------|----|----|----|-----|----|
|                                                                                                                              |                      |                           |       |               | IC              | H  | B  | HF | LF  | LH |
| <b>TLHR</b> (External turning, Copying)<br> | <b>TLHR2020K5</b>    | TLHR2020K5                | ●     | RTG05A        | 5               | 20 | 20 | 20 | 125 | 16 |
|                                                                                                                              | <b>TLHR2020K6</b>    | TLHR2020K6                | ●     | RTG06A        | 6               | 20 | 20 | 20 | 125 | 16 |
|                                                                                                                              | <b>TLHR2525M7</b>    | TLHR2525M7                | ●     | RTG07A        | 7               | 25 | 25 | 25 | 150 | 20 |
|                                                                                                                              | <b>TLHR3225P10</b>   | TLHR54P10                 | ●     | RTG10A        | 10              | 32 | 25 | 32 | 170 | 25 |

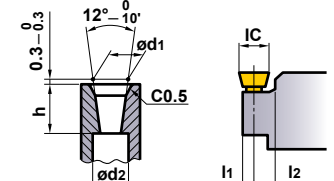
## INSERTS



| Order Number | Stock   |       | Dimensions (mm) |     |     |     |
|--------------|---------|-------|-----------------|-----|-----|-----|
|              | Carbide |       | IC              | S   | D4  | L17 |
|              | UTi20T  | HTi10 |                 |     |     |     |
| RTG05A       | ●       | ●     | 5               | 7.5 | 2.5 | 3.5 |
| RTG06A       | ●       | ●     | 6               | 7.5 | 3.5 | 3.5 |
| RTG07A       | ●       |       | 7               | 11  | 3.5 | 5   |
| RTG08A       | ●       | ●     | 8               | 11  | 4.5 | 5   |
| RTG10A       | ●       | ●     | 10              | 14  | 5.5 | 6.5 |

## INSERT SEAT LOCATION

When manufacturing a special tool holder, please machine the insert seat in accordance to the drawing.

| Insert Seat Dimensions                                                              | Insert Diameter IC | Dimensions (mm) |     |     |      |     | Taper Diameter |
|-------------------------------------------------------------------------------------|--------------------|-----------------|-----|-----|------|-----|----------------|
|                                                                                     |                    | h               | d1  | d2  | l1   | l2  |                |
|  | 5                  | 4               | 2.5 | 1.9 | 1.85 | 3.2 | 1.5            |
|                                                                                     | 6                  | 4               | 3.5 | 2.9 | 2.35 | 3.7 | 2.5            |
|                                                                                     | 7                  | 6               | 3.5 | 2.5 | 2.75 | 4.3 | 2.1            |
|                                                                                     | 8                  | 6               | 4.5 | 3.5 | 3.25 | 4.8 | 3.1            |
|                                                                                     | 10                 | 7.5             | 5.5 | 4.2 | 4.15 | 5.9 | 3.8            |
|                                                                                     | 12                 | 7.5             | 7.5 | 6.2 | 5.15 | 6.9 | 5.8            |



② Shown as Turning → External Grooving → External Cutting Off → Threading → Boring.

**D000**

# TURNING TOOLS

## SMALL TOOLS

|                              |      |
|------------------------------|------|
| OUTLINE OF SMALL TOOLS ..... | D002 |
| CLASSIFICATION .....         | D006 |

### STANDARD OF SMALL TOOLS

#### EXTERNAL FRONT TURNING

|               |      |
|---------------|------|
| SCAC-SM ..... | D010 |
| SCLC-SM ..... | D010 |
| SDJC-SM ..... | D011 |
| SDNC-SM ..... | D011 |
| SVLP-SM ..... | D012 |
| SVJB-SM ..... | D012 |
| SVJC-SM ..... | D013 |
| SVPP-SM ..... | D013 |
| SVVB-SM ..... | D013 |

#### EXTERNAL BACK TURNING

|             |      |
|-------------|------|
| BTAH .....  | D014 |
| CTBH .....  | D015 |
| BT VH ..... | D016 |

#### EXTERNAL GROOVING

|            |      |
|------------|------|
| GTAH ..... | D018 |
| GTBH ..... | D018 |
| GTCH ..... | D018 |

#### EXTERNAL CUTTING OFF

|              |      |
|--------------|------|
| CTAH .....   | D020 |
| CTAH-S ..... | D020 |
| CTBH .....   | D022 |

#### EXTERNAL THREADING

|            |      |
|------------|------|
| TTAH ..... | D024 |
|------------|------|

#### EXTERNAL FRONT TURNING, COPYING, FACING

|          |      |
|----------|------|
| SH ..... | D026 |
|----------|------|

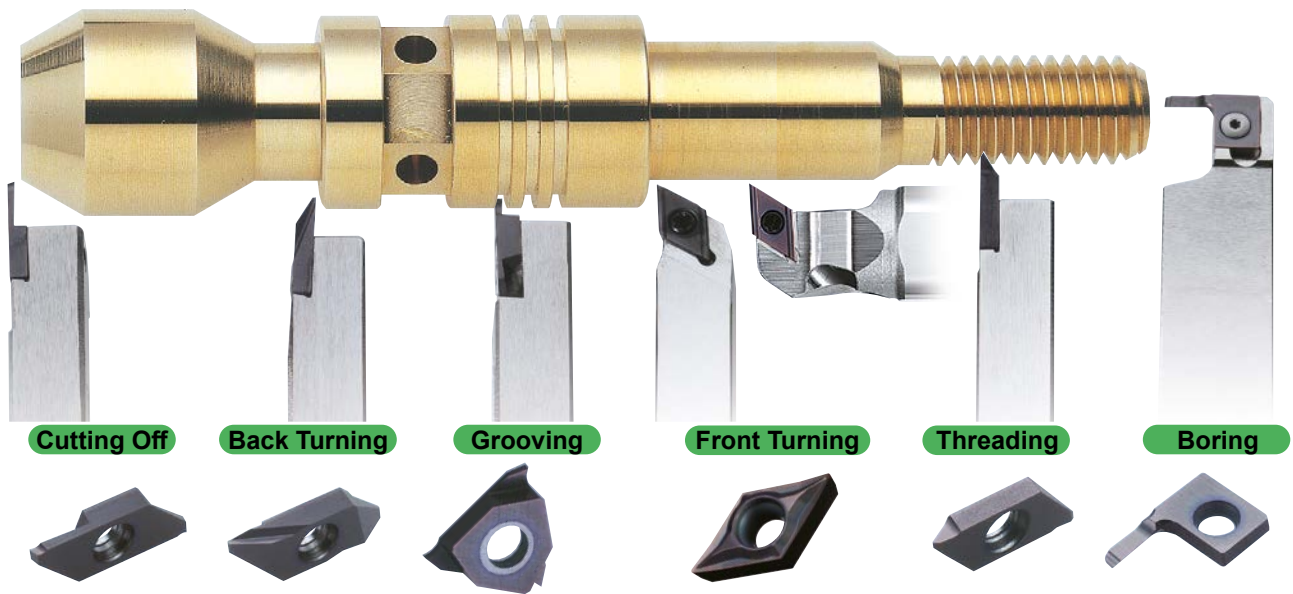
\*Alphabetical order index

|                     |                     |                     |
|---------------------|---------------------|---------------------|
| D014 BTAH           | D018 GTAH           | D026 SH             |
| D014 BTAT (INSERTS) | D018 GTAT (INSERTS) | D012 SVJB-SM        |
| D015 BTBT (INSERTS) | D018 GTBH           | D013 SVJC-SM        |
| D016 BT VH          | D018 GTBT (INSERTS) | D012 SVLP-SM        |
| D016 BTVT (INSERTS) | D018 GTCH           | D013 SVPP-SM        |
| D020 CTAH           | D018 GTCT (INSERTS) | D013 SVVB-SM        |
| D020 CTAH-S         | D010 SCAC-SM        | D024 TTAH           |
| D021 CTAT (INSERTS) | D010 SCLC-SM        | D024 TTAT (INSERTS) |
| D015 CTBH           | D011 SDJC-SM        |                     |
| D022 CTBT (INSERTS) | D011 SDNC-SM        |                     |



# OUTLINE OF SMALL TOOLS

TOOLS FOR GANG TYPE AUTOMATIC LATHES (FOR EXTERNAL TURNING AND BORING)



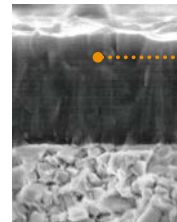
PVD Coated Cemented Carbide Grade for Carbon Steel

## MS6015

Ideal for turning pure iron, carbon and free cutting steels, and for achieving good surface finishes plus excellent dimensional accuracy.

|                                 | <b>MS6015</b>   | Conventional |
|---------------------------------|-----------------|--------------|
| Coating                         | TiCN multilayer | TiAlN        |
| Hardness (HV)                   | 3,000           | 2,800        |
| Wear Coefficient (Carbon Steel) | Low             | High         |
| Base Material Hardness (HRA)    | 92.0            | 92.0         |
| T.R.S (GPa)                     | 2.0             | 2.0          |

Ti-C-N Multilayer Coating

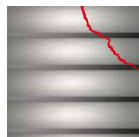


Superior wear and welding resistance and demonstrating the best possible results for machining carbon steel.

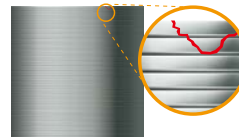
## MS7025 NEW

Dramatically improved welding and wear resistance in low feed machining with a more precise nano-multilayer coating

By combining the high lubrication layer with excellent welding resistance, and the high hardness layer with a greater wear resistance that suppresses the progress of wear at the nano-level, the film damage is significantly reduced and the welding and wear resistance are dramatically improved.



Conventional Multilayer Coating



Nano-multilayer Coating

PVD Coated Grade for High Precision and Small Parts Machining

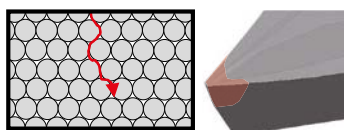
## MS9025

Effective reduction of notch wear with a balance of wear and fracture resistance.

**Improved Cemented Carbide**

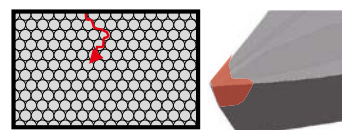
Thermal conductivity has been improved by optimising the grain size and therefore reducing the boundary contact between the WC particles. This optimisation reduces the temperature of the cutting edge during machining.

**MS9025**



Reducing the cutting edge temperature by improved thermal conductivity.

Conventional



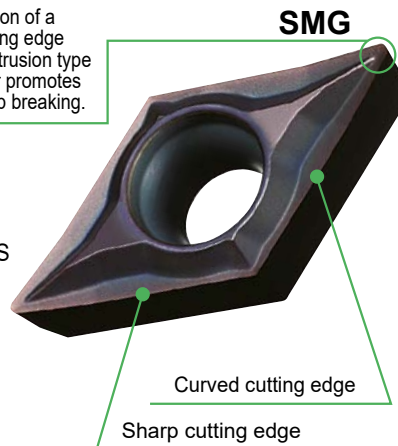
Higher cutting edge temperatures due to more particle boundary contact.

### ● Moulded chipbreaker insert

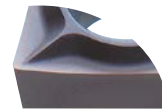
Nose radii designed with minus tolerance

- Suitable for small parts applications that often require minus tolerance dimensions.
- The order number is shown with the letter "M" that indicates minus tolerance. ex. DCGT11T301M-FS
- The radius value is printed on the side of the insert label for easy recognition.

A combination of a curved cutting edge and the protrusion type chipbreaker promotes efficient chip breaking.



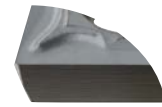
FS



FS-P



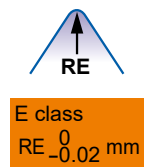
LS



LS-P

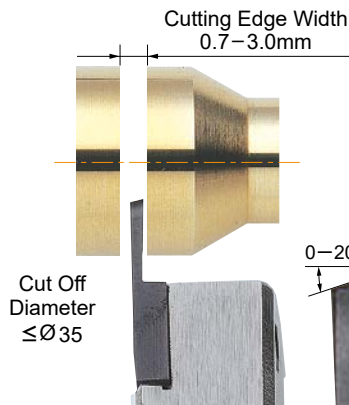


### ● Tolerance Corner R

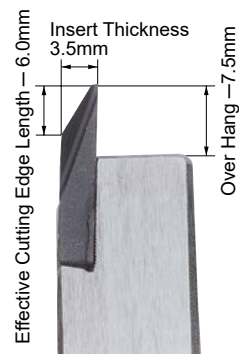


The letter "M" insert  
RE  $0_{-0.05}$  mm  
(Conventional G-class insert  
RE  $\pm 0.10$  mm)

### ● Cutting Off



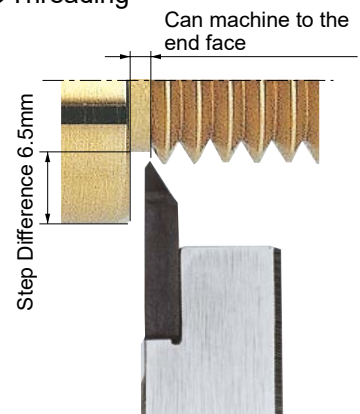
### ● Back Turning



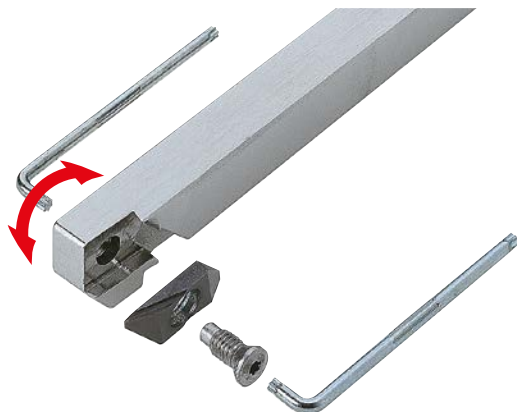
Inserts for  
Moulded Back Turning  
**SMB** Breaker



### ● Threading



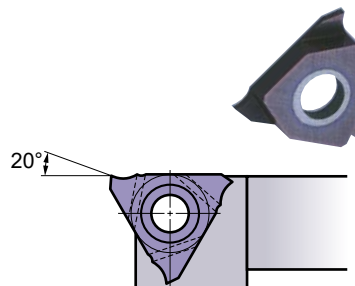
### ● Back Clamping Mechanism



Screw designed for front and back clamping.

### ● Grooving

- 3 cutting edges
- Groove width 0.3-3.0mm
- Traversing possible



### ● Front Turning

- ISO E class accuracy inserts
- A wide variety of small corner R inserts
- Rake angle 30°



# OUTLINE OF SMALL TOOLS

Grooving System

## GY series

### Monoblock Holder for Swiss-type Automatic Lathe

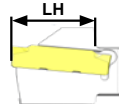
The new geometry with greatly improved rigidity suppresses vibrations and dimensional changes thereby solves common cutting off problems.

Max. Cut Off Diameter : 34mm



### Overhang Length Compatible with Swiss-type Automatic Lathes

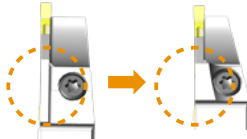
Head length corresponding to the maximum machining diameter of CNC Swiss Type automatic lathes and turret machines.



## Features of High Rigidity Holder

### Strong Clamp Bridge

The strong design of the clamp bridge suppresses chatter and vibration.



### Thicker Tool Base

Tool deflection caused by cutting resistance is greatly reduced.

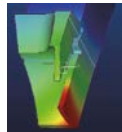


Analysis by Simulation  
Deflection Measurement : 0.044



Analysis by Simulation  
Deflection Measurement : 0.013

Analysis by Simulation



## Tools for an extensive range of small parts machining

|                  |                                                                            |
|------------------|----------------------------------------------------------------------------|
| External Turning | Tools for front turning, back turning, grooving, threading and cutting off |
| Internal Turning | Tools for boring, internal grooving and internal threading                 |
| Drilling         | Drills                                                                     |
| End Milling      | End Mills                                                                  |

## Tools for CNC automatic and small lathes

|                     |                                                          |
|---------------------|----------------------------------------------------------|
| Types of Tool Posts | Gang type, turret type, cam type (radial pattern type)   |
| Tool Sizes          | Square shank: 8 – 16 mm<br>Round shank : less than Ø25.4 |

## Indexable inserts developed under the concept of "high quality, high efficiency and long tool life."

|                 |                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------|
| High Quality    | E class tolerance, sharp cutting edge, high accuracy small corner R, smooth surface finish                         |
| Long Tool Life  | PVD coating<br>MS6015/MS7025/MS9025/VP15TF                                                                         |
| High Efficiency | Regrinding not necessary due to the employment of indexable inserts. A wide variety of top cutting edge geometries |

Cutting Off & Grooving System

## GW series

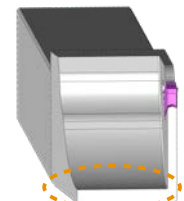
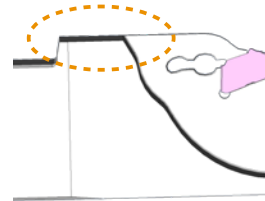
### Monoblock Holder for Swiss-type Automatic Lathe

Max. Cut Off Diameter : 76mm



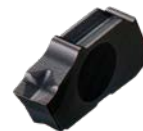
### High Rigidity Holder

Tool deflection caused by cutting resistance and the remaining material pip in the centre are greatly reduced.



### New Low Resistance and High Lead Angle Insert

New inserts with a lead angle of 8° have been added to the range to reduce burrs and the size of the remaining pip in the centre of the workpiece after cutting.



Lead Angle 5°



Lead Angle 8°

## TOOLS FOR CAM TYPE AUTOMATIC LATHES

- The most suitable for use with cam type automatic lathes (radial pattern tool posts)
- The most suitable for machining of small parts with work diameter 5mm or smaller
- Single holder for front turning, back turning, grooving, threading and cutting off operations



Front Turning Back Turning Grooving Threading Cutting Off



## INTERNAL TURNING TOOLS

Solid type **MICRO-MINI TWIN**  
Minimum cutting diameter Ø2.2–

Boring  
Grooving  
Threading

Round Shank

Square Shank



## MICRO-DEX Boring Bars

Minimum cutting diameter  
Ø5.0–



Minimum cutting diameter  
Ø10.0

## DIMPLE BAR

(Please see the Boring Bar section for these tools.)

## DRILLING TOOLS

Violet Coated Precision Drills  
**VAPDS/VAPDM** (General)  
(For stainless steel)  
**VAPDSCB**  
(For counter boring)



Solid Carbide Drill

**MVS/DWAE**

Solid Carbide Flat Bottom Drills

**MFE**

Solid Carbide Drills for  
Centreing and Chamfering

**DLE**



Micro Solid Carbide Drills

**MSE** Drills

**MSE/MSP** (Centre Drills)



Solid Gun Drill

Micro Solid Carbide Gun Drill  
with through coolant holes

**MGS**



## END MILLING TOOLS

Solid Carbide End Mill

**MSTAR / MSTAR Plus** End Mill Series



Vibration Control End Mills for  
Machining Difficult-to-Cut Materials

**SMART MIRACLE** End Mill Series



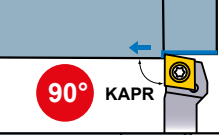
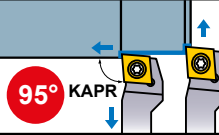
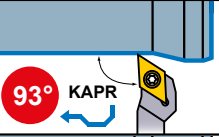
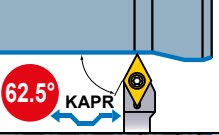
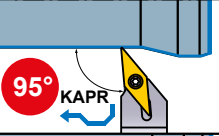
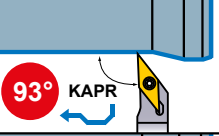
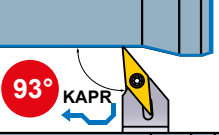
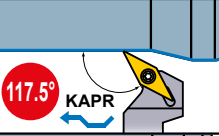
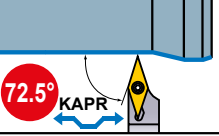
D

SMALL TOOLS

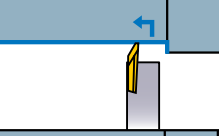
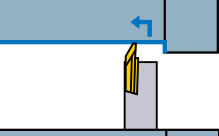
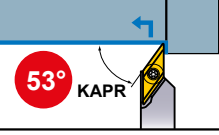
# CLASSIFICATION OF EXTERNAL TURNING TOOLS

## GANG TYPE TOOL POSTS

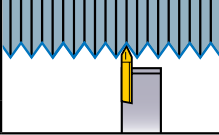
### ● FRONT TURNING

| Name of Tool Holder      | Shank Size (mm)<br>(H x W x L)                                 | Geometry                                                                            |
|--------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>SCAC-SM</b><br>↻ D010 | 8 x 8 x 125<br>10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150 |    |
| <b>SCLC-SM</b><br>↻ D010 | 8 x 8 x 125<br>10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150 |    |
| <b>SDJC-SM</b><br>↻ D011 | 8 x 8 x 125<br>10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150 |    |
| <b>SDNC-SM</b><br>↻ D011 | 8 x 8 x 125<br>10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150 |    |
| <b>SVLP-SM</b><br>↻ D012 | 10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150                |   |
| <b>SVJB-SM</b><br>↻ D012 | 10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150                |  |
| <b>SVJC-SM</b><br>↻ D013 | 10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                |  |
| <b>SVPP-SM</b><br>↻ D013 | 10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150                |  |
| <b>SVVB-SM</b><br>↻ D013 | 10 x 10 x 125<br>12 x 12 x 150<br>16 x 16 x 150                |  |

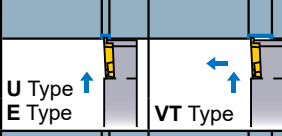
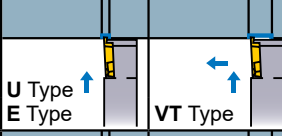
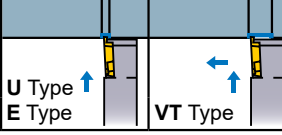
### ● BACK TURNING

| Name of Tool Holder                                    | Shank Size (mm)<br>(H x W x L)                                  | Geometry                                                                            |
|--------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>BTAH</b><br>(Insert Size 2.8, 3.5, 5.0mm)<br>↻ D014 | 8 x 10 x 120<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120 |  |
| <b>CTBH</b><br>(Insert Size 4.5, 6.0mm)<br>↻ D015      | 10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                 |  |
| <b>BTVH</b><br>(Insert Size 7.5mm)<br>↻ D016           | 10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                 |  |

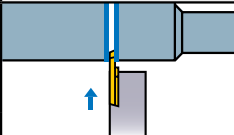
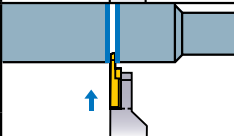
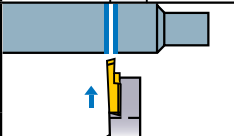
### ● THREADING

| Name of Tool Holder   | Shank Size (mm)<br>(H x W x L)                                  | Geometry                                                                            |
|-----------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>TTAH</b><br>↻ D024 | 8 x 10 x 120<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120 |  |

### ● GROOVING

| Name of Tool Holder                                | Shank Size (mm)<br>(H x W x L)                                                                               | Geometry                                                                             |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>GTAH</b><br>(Groove Width 0.3–3.0mm)<br>↻ D018  | 8 x 8 x 80<br>8 x 8 x 120<br>10 x 10 x 80<br>10 x 10 x 120<br>12 x 12 x 80<br>12 x 12 x 120<br>16 x 16 x 120 |   |
| <b>GTBH</b><br>(Groove Width 1.45–3.0mm)<br>↻ D018 | 10 x 10 x 80<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                                              |   |
| <b>GTCH</b><br>(Groove Width 2.5–3.0mm)<br>↻ D018  | 10 x 10 x 80<br>10 x 10 x 120                                                                                |  |

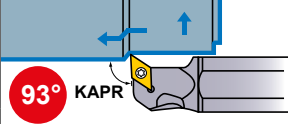
### ● CUTTING OFF

| Name of Tool Holder                                     | Shank Size (mm)<br>(H x W x L)                                  | Geometry                                                                              |
|---------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>CTAH</b><br>(Max. Cut Off Diameter 12mm)<br>↻ D020   | 8 x 10 x 120<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120 |  |
| <b>CTAH-S</b><br>(Max. Cut Off Diameter 12mm)<br>↻ D020 | 10 x 10 x 80                                                    |  |
| <b>CTBH</b><br>(Max. Cut Off Diameter 16mm)<br>↻ D022   | 10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                 |  |

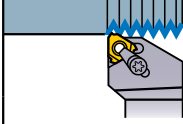


## OPPOSITE TOOL POSTS

### ● DIMPLE SLEEVE HOLDER

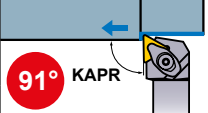
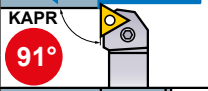
| Name of Tool Holder                              | Shank Size (mm)<br>(Shank Dia. x L)                                                                                                                              | Geometry                                                                          |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>SH</b><br>(Front Turning,<br>Copying, Facing) | $\varnothing 15.875 \times 100$<br>$\varnothing 19.05 \times 125$<br>$\varnothing 20 \times 125$<br>$\varnothing 22 \times 125$<br>$\varnothing 25.4 \times 150$ |  |
| ➡ D026                                           |                                                                                                                                                                  |                                                                                   |

### ● THREADING

| Name of Tool Holder | Shank Size (mm)<br>(H x W x L)                                                                                                                | Geometry                                                                            |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>MMT</b>          | $12 \times 12 \times 100$<br>$16 \times 16 \times 100$<br>$20 \times 20 \times 125$<br>$25 \times 25 \times 150$<br>$32 \times 32 \times 170$ |  |
| ➡ G019              |                                                                                                                                               |                                                                                     |

## TURRET TYPE TOOL POSTS

### ● FRONT TURNING

| Name of Tool Holder | Shank Size (mm)<br>(H x W x L)                                                                                                              | Geometry                                                                            |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>DTGN</b>         | $16 \times 16 \times 100$<br>$20 \times 20 \times 125$<br>$25 \times 25 \times 150$                                                         |    |
| ➡ C016              |                                                                                                                                             |                                                                                     |
| <b>MTJN</b>         | $20 \times 20 \times 125$<br>$25 \times 25 \times 150$                                                                                      |   |
| ➡ C017              |                                                                                                                                             |                                                                                     |
| <b>PTGN</b>         | $10 \times 10 \times 70$<br>$12 \times 12 \times 80$<br>$16 \times 16 \times 100$<br>$20 \times 20 \times 125$<br>$25 \times 25 \times 150$ |  |
| ➡ C016              |                                                                                                                                             |                                                                                     |
| <b>SCLC</b>         | $8 \times 8 \times 60$<br>$10 \times 10 \times 70$<br>$12 \times 12 \times 80$<br>$16 \times 16 \times 100$                                 |  |
| ➡ C024              |                                                                                                                                             |                                                                                     |
| <b>SDJC</b>         | $10 \times 10 \times 70$<br>$12 \times 12 \times 80$<br>$16 \times 16 \times 100$                                                           |  |
| ➡ C025              |                                                                                                                                             |                                                                                     |
| <b>SDNC</b>         | $8 \times 8 \times 60$<br>$10 \times 10 \times 70$<br>$12 \times 12 \times 80$<br>$16 \times 16 \times 100$                                 |  |
| ➡ C025              |                                                                                                                                             |                                                                                     |

D

SMALL TOOLS

# CLASSIFICATION OF INTERNAL TURNING TOOLS (FOR GENERAL USE)

| Product Name                                                          | Holder                                                                                                                                          |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MICRO-MINI TWIN Boring Bars</b><br>(Solid Carbide)<br>➡ E021, E023 | <b>CB CR</b><br><br>Min. Cutting Diameter : 2.2mm              |
| <b>MICRO-DEX Boring Bars</b><br>(Carbide Shank)<br>➡ E018             | <b>SCLC</b><br><br>Min. Cutting Diameter : 5mm                 |
| <b>MICRO-DEX Boring Bars</b><br>(Carbide Shank)<br>➡ E019             | <b>STUC</b><br><br>Min. Cutting Diameter : 8mm                 |
| <b>MICRO-DEX Boring Bars</b><br>(Carbide Shank)<br>➡ E018             | <b>SWUB</b><br><br>Min. Cutting Diameter : 6mm                |
| <b>F type Bars</b><br>(Steel Shank)<br>➡ E030                         | <b>FSWL1</b><br><br>Min. Cutting Diameter : 5.8mm            |
| <b>F type Bars</b><br>(Carbide Shank)<br>➡ E030                       | <b>FSWL2</b><br><br>Min. Cutting Diameter : 5.8mm            |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>(Carbide Shank)<br>➡ E007, E008 | <b>FSCLC/P FSCLC/P-E</b><br><br>Min. Cutting Diameter : 10mm |

| Product Name                                                    | Holder                                                                                                                                            |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>(Carbide Shank)<br>➡ E010 | <b>FSDUC FSDUC-E</b><br><br>Min. Cutting Diameter : 14mm       |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>(Carbide Shank)<br>➡ E011 | <b>FSDQC FSDQC-E</b><br><br>Min. Cutting Diameter : 13mm       |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>(Carbide Shank)<br>➡ E009 | <b>FSTUP FSTUP-E</b><br><br>Min. Cutting Diameter : 10mm       |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>➡ E013                    | <b>FSVUB/C</b><br><br>Min. Cutting Diameter : 16mm            |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>➡ E013                    | <b>FSVPB/C</b><br><br>Min. Cutting Diameter : 16mm           |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>➡ E014                    | <b>FSVJB/C</b><br><br>Min. Cutting Diameter : 16mm           |
| <b>DIMPLE BAR</b><br>(Steel Shank)<br>(Carbide Shank)<br>➡ E012 | <b>FSWUB/P FSWUB/P-E</b><br><br>Min. Cutting Diameter : 10mm |

# TOOLS FOR GROOVING AND THREADING/END MILLS/DRILLS

## FOR GROOVING AND THREADING

| Product Name                                                                                                                                    | Holder                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GY series</b><br><br>Max. Cut Off Diameter : 34mm<br>➔ F018 | <b>External for Swiss-type lathes</b>                                                                                                           |
| <b>GW series</b><br><br>Max. Cut Off Diameter : 76mm<br>➔ F122 | <b>External for Swiss-type lathes</b>                                                                                                           |
| <b>MICRO-MINI TWIN</b><br>(Solid Type)<br>➔ F134                                                                                                | <b>CG TYPE (Grooving)</b><br><br>Min. Cutting Diameter : 3mm   |
| <b>MICRO-MINI TWIN</b><br>(Solid Type)<br>➔ G031                                                                                                | <b>CT TYPE (Threading)</b><br><br>Min. Cutting Diameter : 3mm |

## END MILLS

| Series Title                                                                                   | Shape                                                                                                           |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>NEW</b><br>For Swiss-Type Automatic Lathes<br>MS Plus End Mill Series<br>➔ I105, I108, I111 | <b>MP2ES/MP3ES/MP4EC</b><br> |
| Solid Carbide End Mill Series ➔ I028                                                           |                                                                                                                 |
| HSS End Mill Series ➔ I036                                                                     |                                                                                                                 |

## DRILLS

| Product Name                          | Series Title                                                                                              |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Solid Carbide Drills</b><br>➔ M049 | <b>MVS series</b><br>  |
| <b>Solid Carbide Drills</b><br>➔ M024 | <b>DWAE series</b><br> |
| <b>Centre Drills</b><br>➔ M012        | <b>DLE series</b><br>  |
| <b>Flat Bottom Drills</b><br>➔ M018   | <b>MFE series</b><br> |

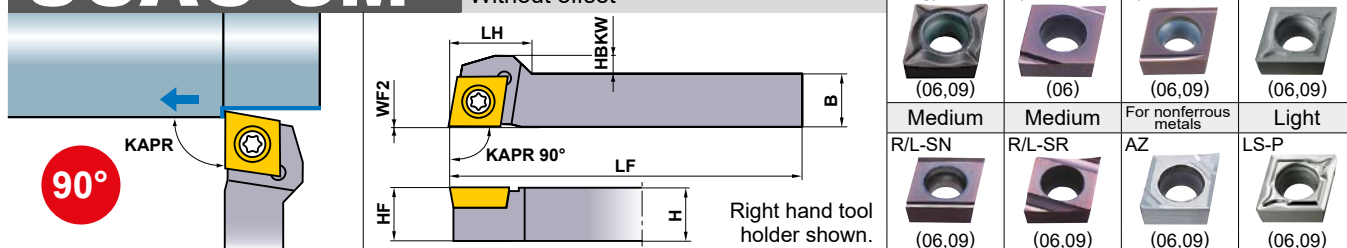
Solid Carbide Drill Series ➔ M004

Solid Gun Drill Series ➔ M075

HSS Drill Series ➔ M005

# EXTERNAL FRONT TURNING

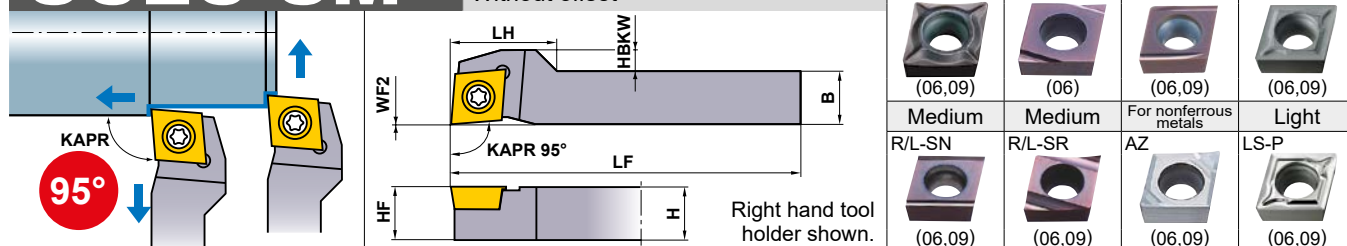
## SCAC-SM



| Order Number      | Stock |   | Insert Number                |        | Dimensions (mm) |    |     |    |      |    |  |  |        |
|-------------------|-------|---|------------------------------|--------|-----------------|----|-----|----|------|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                   | R     | L |                              |        | H               | B  | LF  | LH | HBKW | HF | WF2                                                                                 | Clamp Screw                                                                         | Wrench |
| SCACR/L0808K06-SM | ●     | ★ | CC○B<br>CC○H<br>CC○T<br>CC○W | 0602○○ | 8               | 8  | 125 | 11 | 1.6  | 8  | 0                                                                                   | TS254                                                                               | TKY08R |
| SCACR/L1010K06-SM | ●     | ★ |                              | 0602○○ | 10              | 10 | 125 | —  | —    | 10 | 0                                                                                   | TS254                                                                               | TKY08R |
| SCACR/L1010K09-SM | ●     | ★ |                              | 09T3○○ | 10              | 10 | 125 | 16 | 3.5  | 10 | 0                                                                                   | TS43                                                                                | TKY15R |
| SCACR/L1212M09-SM | ●     | ★ |                              | 09T3○○ | 12              | 12 | 150 | 14 | 1.5  | 12 | 0                                                                                   | TS43                                                                                | TKY15R |
| SCACR/L1616M09-SM | ●     | ★ |                              | 09T3○○ | 16              | 16 | 150 | —  | —    | 16 | 0                                                                                   | TS43                                                                                | TKY15R |

\* Clamp Torque (N · m) : TS254=1.0, TS43=3.5

## SCLC-SM



| Order Number      | Stock |   | Insert Number                |        | Dimensions (mm) |    |     |    |      |    |  |  |        |
|-------------------|-------|---|------------------------------|--------|-----------------|----|-----|----|------|----|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|                   | R     | L |                              |        | H               | B  | LF  | LH | HBKW | HF | WF2                                                                                   | Clamp Screw                                                                           | Wrench |
| SCLCR/L0808K06-SM | ●     | ★ | CC○B<br>CC○H<br>CC○T<br>CC○W | 0602○○ | 8               | 8  | 125 | 11 | 2.1  | 8  | 0                                                                                     | TS254                                                                                 | TKY08R |
| SCLCR/L1010K06-SM | ●     | ★ |                              | 0602○○ | 10              | 10 | 125 | —  | —    | 10 | 0                                                                                     | TS254                                                                                 | TKY08R |
| SCLCR/L1010K09-SM | ●     | ★ |                              | 09T3○○ | 10              | 10 | 125 | 20 | 4    | 10 | 0                                                                                     | TS43                                                                                  | TKY15R |
| SCLCR/L1212M09-SM | ●     | ★ |                              | 09T3○○ | 12              | 12 | 150 | 18 | 2    | 12 | 0                                                                                     | TS43                                                                                  | TKY15R |
| SCLCR/L1616M09-SM | ●     | ★ |                              | 09T3○○ | 16              | 16 | 150 | —  | —    | 16 | 0                                                                                     | TS43                                                                                  | TKY15R |

\* Clamp Torque (N · m) : TS254=1.0, TS43=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.2.

● : Inventory maintained. ★ : Inventory maintained in Japan.

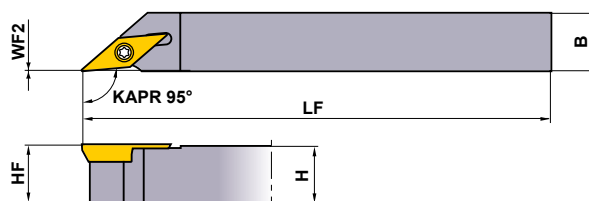
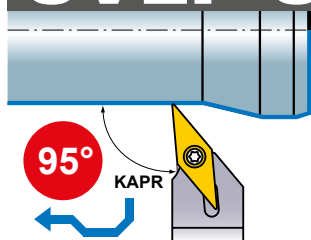
SCAC-SM type inserts > A140—A148  
SCLC-SM type inserts > A140—A148  
CBN & PCD inserts > B037, B038, B053



## EXTERNAL FRONT TURNING

## SVLP-SM

Without offset



Right hand tool holder shown.

Finish  
R/L-SRF

(08,11)

Finish  
SMG

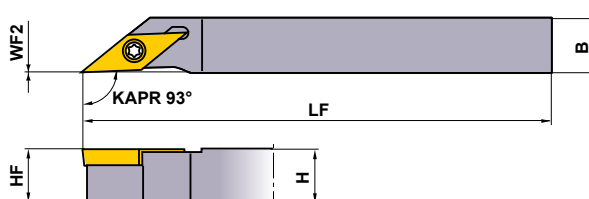
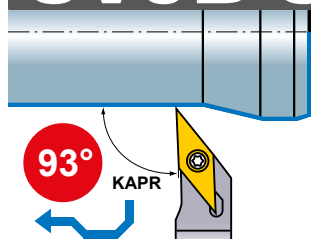
(08,11)

| Order Number      | Stock |   | Insert Number |      | Dimensions (mm) |    |     |    |     |  * |  |
|-------------------|-------|---|---------------|------|-----------------|----|-----|----|-----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                   | R     | L |               |      | H               | B  | LF  | HF | WF2 | Clamp Screw                                                                           | Wrench                                                                              |
| SVLPR/L1010K08-SM | ●     | ★ | VPET<br>VPGT  | 0802 | 10              | 10 | 125 | 10 | 0   | TS202                                                                                 | TKY06R                                                                              |
| SVLPR/L1212M08-SM | ●     | ★ |               | 0802 | 12              | 12 | 150 | 12 | 0   | TS202                                                                                 | TKY06R                                                                              |
| SVLPR/L1010K11-SM | ●     | ★ |               | 1103 | 10              | 10 | 125 | 10 | 0   | TS255                                                                                 | TKY08R                                                                              |
| SVLPR/L1212M11-SM | ●     | ★ |               | 1103 | 12              | 12 | 150 | 12 | 0   | TS255                                                                                 | TKY08R                                                                              |
| SVLPR/L1616M11-SM | ●     | ★ |               | 1103 | 16              | 16 | 150 | 16 | 0   | TS255                                                                                 | TKY08R                                                                              |

\* Clamp Torque (N · m) : TS202=0.6, TS255=1.0

## SVJB-SM

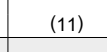
Without offset



Right hand tool holder shown.

Finish  
R/L-F

(11)

Medium  
R/L-SN

(11)

Medium  
R/L-SR

(11)

| Order Number      | Stock |   | Insert Number                |      | Dimensions (mm) |    |     |    |     |  * |  |
|-------------------|-------|---|------------------------------|------|-----------------|----|-----|----|-----|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                   | R     | L |                              |      | H               | B  | LF  | HF | WF2 | Clamp Screw                                                                             | Wrench                                                                                |
| SVJBR/L1010K11-SM | ●     | ★ | VBMT<br>VBET<br>VBGT<br>VBGW | 1103 | 10              | 10 | 125 | 10 | 0   | TS255                                                                                   | TKY08R                                                                                |
| SVJBR/L1212M11-SM | ●     | ★ |                              | 1103 | 12              | 12 | 150 | 12 | 0   | TS255                                                                                   | TKY08R                                                                                |
| SVJBR/L1616M11-SM | ●     | ★ |                              | 1103 | 16              | 16 | 150 | 16 | 0   | TS255                                                                                   | TKY08R                                                                                |

\* Clamp Torque (N · m) : TS255=1.0

## RECOMMENDED CUTTING CONDITIONS

|   | Material                   | Hardness    | Grade                | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|----------------------------|-------------|----------------------|-----------------------|------------------|
| P | Carbon Steel · Alloy Steel | 180HB–280HB | MS6015/VP15TF        | 100 (50–150)          | 0.08 (0.01–0.15) |
|   | Free Cutting Steel         | —           | MS6015               | 110 (30–180)          | 0.08 (0.01–0.15) |
|   |                            |             | NX2525               | 150 (50–250)          | 0.08 (0.01–0.15) |
| M | Stainless Steel            | ≤200HB      | VP15TF/MP9005/MP9015 | 80 (50–120)           | 0.06 (0.02–0.1)  |
|   |                            | 230HB       | MS9025               | 100 (50–180)          | 0.08 (0.01–0.15) |
| N | Non-Ferrous Metal          | —           | HTi10/MT9005         | 150 (70–230)          | 0.09 (0.03–0.15) |
| S | Titanium Alloy             | —           | MT9005               | 60 (40–80)            | 0.08 (0.04–0.12) |
|   | Heat Resistant Alloy       | —           | MP9015/MS9025        | 50 (20–75)            | 0.08 (0.04–0.12) |

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.2.

● : Inventory maintained. ★ : Inventory maintained in Japan.

SVLP-SM type inserts

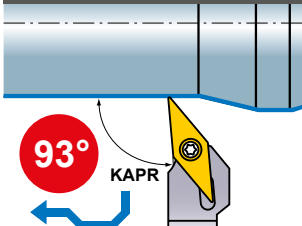
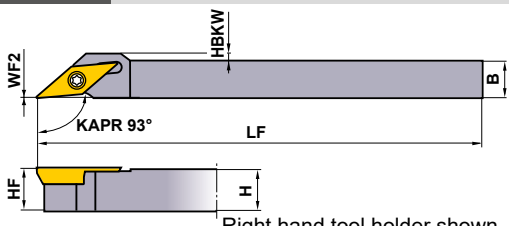
&gt; A182

SVJB-SM type inserts

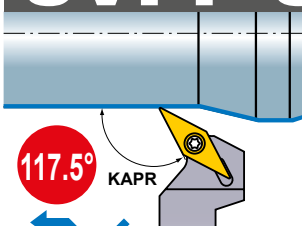
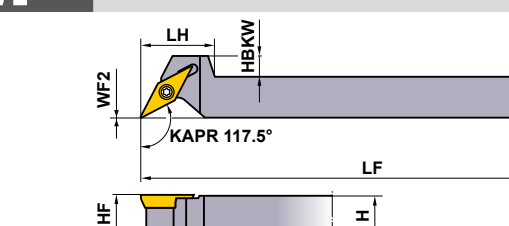
&gt; A174–A176

CBN &amp; PCD inserts

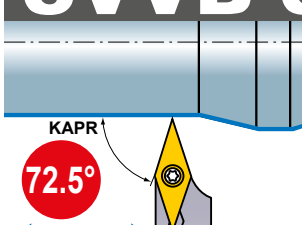
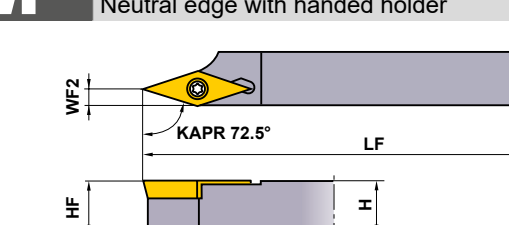
&gt; B045, B057

| SVJC-SM                                                                           |  |       |   | Without offset                                                                    |      |                 |    |     |      | Finish                                                                              |     | Finish                                                                              |        | Light                                                                               |  | Light                                                                               |  |
|-----------------------------------------------------------------------------------|--|-------|---|-----------------------------------------------------------------------------------|------|-----------------|----|-----|------|-------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--|
|  |  |       |   |  |      |                 |    |     |      | FP                                                                                  |     | FM                                                                                  |        | LS                                                                                  |  | LS-P                                                                                |  |
|                                                                                   |  |       |   |                                                                                   |      |                 |    |     |      |  |     |  |        |  |  |  |  |
|                                                                                   |  |       |   |                                                                                   |      |                 |    |     |      | (11)                                                                                |     | (11)                                                                                |        | (11,13)                                                                             |  | (11,13)                                                                             |  |
|                                                                                   |  |       |   |                                                                                   |      |                 |    |     |      | Light                                                                               |     | Light                                                                               |        | Light                                                                               |  |                                                                                     |  |
|                                                                                   |  |       |   | Right hand tool holder shown.                                                     |      |                 |    |     |      | LP                                                                                  |     | LM                                                                                  |        | LS                                                                                  |  |                                                                                     |  |
|                                                                                   |  |       |   |                                                                                   |      |                 |    |     |      |  |     |  |        |  |  |                                                                                     |  |
|                                                                                   |  |       |   |                                                                                   |      |                 |    |     |      | (11)                                                                                |     | (11)                                                                                |        | (11)                                                                                |  |                                                                                     |  |
| Order Number                                                                      |  | Stock |   | Insert Number                                                                     |      | Dimensions (mm) |    |     |      |                                                                                     |     |  |        |  |  |                                                                                     |  |
|                                                                                   |  | R     | L |                                                                                   |      | H               | B  | LF  | HBKW | HF                                                                                  | WF2 | Clamp Screw                                                                         | Wrench |                                                                                     |  |                                                                                     |  |
| SVJCR/L1010JX11-SM                                                                |  | ●     | ● | VCMW<br>VCMT<br>VCGT                                                              | 1103 | 10              | 10 | 120 | —    | 10                                                                                  | 0   | TS255                                                                               | TKY08R |                                                                                     |  |                                                                                     |  |
| SVJCR/L1212JX11-SM                                                                |  | ●     | ● |                                                                                   | 1103 | 12              | 12 | 120 | —    | 12                                                                                  | 0   | TS255                                                                               | TKY08R |                                                                                     |  |                                                                                     |  |
| SVJCR/L1616JX11-SM                                                                |  | ●     | ● |                                                                                   | 1103 | 16              | 16 | 120 | —    | 16                                                                                  | 0   | TS255                                                                               | TKY08R |                                                                                     |  |                                                                                     |  |
| SVJCR/L1010JX13-SM                                                                |  | ●     | ● |                                                                                   | 1303 | 10              | 10 | 120 | 2    | 10                                                                                  | 0   | TS32                                                                                | TKY08R |                                                                                     |  |                                                                                     |  |
| SVJCR/L1212JX13-SM                                                                |  | ●     | ● |                                                                                   | 1303 | 12              | 12 | 120 | —    | 12                                                                                  | 0   | TS32                                                                                | TKY08R |                                                                                     |  |                                                                                     |  |
| SVJCR/L1616JX13-SM                                                                |  | ●     | ● |                                                                                   | 1303 | 16              | 16 | 120 | —    | 16                                                                                  | 0   | TS32                                                                                | TKY08R |                                                                                     |  |                                                                                     |  |

\* Clamp Torque (N · m) : TS255=1.0, TS32=1.0

| SVPP-SM                                                                            |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       | Finish                                                                                |  |
|------------------------------------------------------------------------------------|-------|---|------------------------------------------------------------------------------------|------|-----------------|----|-----|----|------|----|-----|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
|  |       |   |  |      |                 |    |     |    |      |    |     |                                                                                       | R/L-SRF                                                                               |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       |   |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       | (11)                                                                                  |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       | Finish                                                                                |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       | SMG                                                                                   |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       |  |  |
|                                                                                    |       |   |                                                                                    |      |                 |    |     |    |      |    |     |                                                                                       | (11)                                                                                  |  |
|                                                                                    |       |   | SVPPR/L1616M11-SM                                                                  |      |                 |    |     |    |      |    |     |                                                                                       |                                                                                       |  |
|                                                                                    |       |   | Right hand tool holder shown.                                                      |      |                 |    |     |    |      |    |     |                                                                                       |                                                                                       |  |
| Order Number                                                                       | Stock |   | Insert Number                                                                      |      | Dimensions (mm) |    |     |    |      |    |     |  |  |  |
|                                                                                    | R     | L |                                                                                    |      | H               | B  | LF  | LH | HBKW | HF | WF2 | Clamp Screw                                                                           | Wrench                                                                                |  |
| SVPPR/L1010K11-SM                                                                  | ●     | ★ | VPET<br>VPGT                                                                       | 1103 | 10              | 10 | 125 | 20 | 8    | 10 | 0   | TS255                                                                                 | TKY08R                                                                                |  |
| SVPPR/L1212M11-SM                                                                  | ●     | ★ |                                                                                    | 1103 | 12              | 12 | 150 | 20 | 6    | 12 | 0   | TS255                                                                                 | TKY08R                                                                                |  |
| SVPPR/L1616M11-SM                                                                  | ●     | ★ |                                                                                    | 1103 | 16              | 16 | 150 | 17 | —    | 16 | 0   | TS255                                                                                 | TKY08R                                                                                |  |

\* Clamp Torque (N · m) : TS255=1.0

| SVVB-SM                                                                             |       |   |                             | Neutral edge with handed holder                                                     |                 |    |     |    |     | Finish                                                                                | Medium                                                                                |
|-------------------------------------------------------------------------------------|-------|---|-----------------------------|-------------------------------------------------------------------------------------|-----------------|----|-----|----|-----|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |       |   |                             |  |                 |    |     |    |     | R/L-F                                                                                 | R/L-SN                                                                                |
|                                                                                     |       |   |                             |                                                                                     |                 |    |     |    |     |  |  |
|                                                                                     |       |   |                             |                                                                                     |                 |    |     |    |     | (11)                                                                                  | (11)                                                                                  |
|                                                                                     |       |   |                             |                                                                                     |                 |    |     |    |     | Medium                                                                                |                                                                                       |
|                                                                                     |       |   |                             | Right hand tool holder shown.                                                       |                 |    |     |    |     | R/L-SR                                                                                |                                                                                       |
|                                                                                     |       |   |                             |                                                                                     |                 |    |     |    |     |  | (11)                                                                                  |
| Order Number                                                                        | Stock |   | Insert Number               |                                                                                     | Dimensions (mm) |    |     |    |     |  |  |
|                                                                                     | R     | L |                             |                                                                                     | H               | B  | LF  | HF | WF2 | Clamp Screw                                                                           | Wrench                                                                                |
| SVVBR/L1010K11-SM                                                                   | ●     | ★ | VBET<br>VBGT<br>VBM<br>VBGW | 1103                                                                                | 10              | 10 | 125 | 10 | 3   | TS255                                                                                 | TKY08R                                                                                |
| SVVBR/L1212M11-SM                                                                   | ●     | ★ |                             | 1103                                                                                | 12              | 12 | 150 | 12 | 3   | TS255                                                                                 | TKY08R                                                                                |
| SVVBR/L1616M11-SM                                                                   | ●     | ★ |                             | 1103                                                                                | 16              | 16 | 150 | 16 | 3   | TS255                                                                                 | TKY08R                                                                                |

\* Clamp Torque (N · m) : TS255=1.0

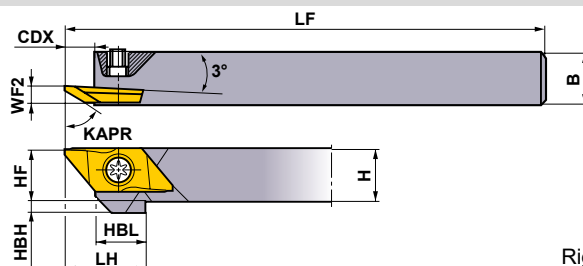
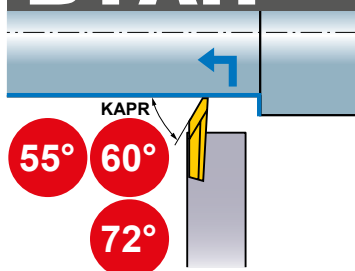
SVJC-SM type inserts > A177—A180  
 SVPP-SM type inserts > A182  
 SVVB-SM type inserts > A174—A176

CBN & PCD inserts > B045, B046, B057  
 SPARE PARTS > N001  
 TECHNICAL DATA > P001



# EXTERNAL BACK TURNING

## BTAH



Right hand tool holder shown.

| Order Number   | Stock |   | Insert Number |              | Dimensions (mm) |    |     |    |    |     |     |     |     |  * |  |
|----------------|-------|---|---------------|--------------|-----------------|----|-----|----|----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     | L |               |              | H               | B  | LF  | LH | HF | WF2 | HBH | HBL | CDX | Clamp Screw                                                                           | Wrench                                                                              |
| BTAHR/L0810-50 | ●     | ★ | BTAT          | 5528○○○R/L-B | 8               | 10 | 120 | 15 | 8  | 3.5 | 4   | 9.5 | 5.5 | NS402W                                                                                | NKY15S                                                                              |
| BTAHR/L1010-50 | ●     | ★ |               | 6035○○○R/L-B | 10              | 10 | 120 | 15 | 10 | 3.5 | 2   | 9.5 | 5.5 | NS402W                                                                                | NKY15S                                                                              |
| BTAHR/L1212-50 | ●     | ★ |               | 605000RX     | 12              | 12 | 120 | 15 | 12 | 3.5 | —   | 9.5 | 5.5 | NS403W                                                                                | NKY15S                                                                              |
| BTAHR/L1616-50 | ●     |   |               | 7235○○○R-SMB | 16              | 16 | 120 | 15 | 16 | 3.5 | —   | 9.5 | 5.5 | NS403W                                                                                | NKY15S                                                                              |

Note 1) Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

★ Clamp Torque (N · m) : NS402W=1.4, NS403W=1.4

## INSERTS

| Order Number     | Hand | Coated |        | Dimensions (mm) |       |     |    |    |      |     | LE*<br>(mm) | Geometry                                                 |
|------------------|------|--------|--------|-----------------|-------|-----|----|----|------|-----|-------------|----------------------------------------------------------|
|                  |      | VP15TF | MS6015 | PSIRR/L*        | RER/L | CF  | L  | W1 | CW   | S   |             |                                                          |
| BTAT7235V5R-SMB  | R    | ●      |        | 72°             | 0.05  | 0.3 | 20 | 8  | 1.4  | 2.5 | 3.5         | With Breaker<br><br><br><br><br><br><br><br><br><br><br> |
| BTAT723501MR-SMB | R    | ●      |        | 72°             | 0.08  | 0.3 | 20 | 8  | 1.4  | 2.5 | 3.5         |                                                          |
| BTAT723502MR-SMB | R    | ●      |        | 72°             | 0.18  | 0.3 | 20 | 8  | 1.4  | 2.5 | 3.5         |                                                          |
| BTAT552800R-B    | R    | ●      | ●      | 55°             | 0     | 0   | 20 | 8  | 0.5  | 2.5 | 2.8         |                                                          |
| BTAT552800L-B    | L    | ★      |        | 55°             | 0     | 0   | 20 | 8  | 0.5  | 2.5 | 2.8         |                                                          |
| BTAT552801R-B    | R    | ●      | ●      | 55°             | 0.1   | 0   | 20 | 8  | 0.5  | 2.5 | 2.8         |                                                          |
| BTAT552801L-B    | L    | ★      |        | 55°             | 0.1   | 0   | 20 | 8  | 0.5  | 2.5 | 2.8         |                                                          |
| BTAT603500R-B    | R    | ●      | ●      | 60°             | 0     | 0   | 20 | 8  | 0.5  | 2.5 | 3.5         |                                                          |
| BTAT603500L-B    | L    | ★      |        | 60°             | 0     | 0   | 20 | 8  | 0.5  | 2.5 | 3.5         |                                                          |
| BTAT603501MR-B   | R    |        | ●      | 60°             | 0.08  | 0   | 20 | 8  | 0.5  | 2.5 | 3.5         |                                                          |
| BTAT603501R-B    | R    | ●      | ●      | 60°             | 0.1   | 0   | 20 | 8  | 0.5  | 2.5 | 3.5         | Right hand insert shown.<br><br>                         |
| BTAT603501L-B    | L    | ★      |        | 60°             | 0.1   | 0   | 20 | 8  | 0.5  | 2.5 | 3.5         |                                                          |
| BTAT605000RX     | R    | ●      |        | 60°             | 0     | 0   | 20 | 8  | 1.25 | 2.5 | 5.0         | Without Breaker<br>                                      |

Note 1) REL, PSIRR dimensions for Right Hand Tool and RER. PSIRL dimensions for Left Hand Tool.

★ Numeric value set insert on holder.

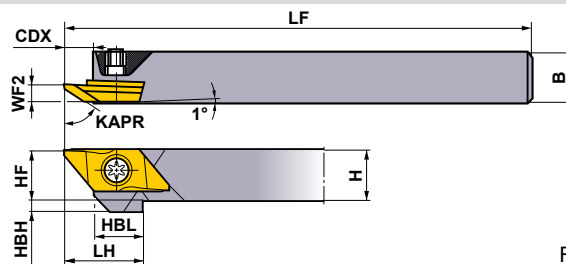
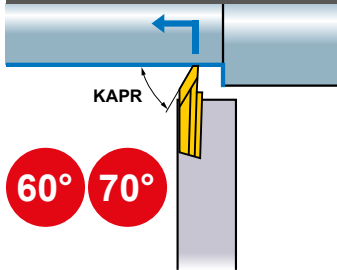
## RECOMMENDED CUTTING CONDITIONS

| Material                     | Hardness           | Grade         | Cutting Speed (m/min) | Feed (mm/rev)    |
|------------------------------|--------------------|---------------|-----------------------|------------------|
| P Carbon Steel · Alloy Steel | 180HB—280HB        | MS6015/VP15TF | 100 (50—150)          | 0.08 (0.01—0.15) |
|                              | Free Cutting Steel | MS6015        | 110 (30—180)          | 0.08 (0.01—0.15) |
| M Stainless Steel            | ≤200HB             | VP15TF        | 80 (50—120)           | 0.06 (0.02—0.1)  |
| N Non-Ferrous Metal          | —                  | MS6015        | 150 (70—230)          | 0.09 (0.03—0.15) |

● : Inventory maintained. ★ : Inventory maintained in Japan.

(5 inserts in one case)

# CTBH



Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number |        | Dimensions (mm)                                                                   |    |    |     |      |     |     |     |  * |  |        |        |
|-----------------|-------|---|---------------|--------|-----------------------------------------------------------------------------------|----|----|-----|------|-----|-----|-----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|--------|
|                 | R     | L |               |        | H                                                                                 | B  | LF | LH  | HF   | WF2 | HBH | HBL | CDX                                                                                   | Clamp Screw                                                                         | Wrench |        |
| CTBHR/L1010-160 | ●     | ● | BTBT          | 60450  |  | 10 | 10 | 120 | 19.5 | 10  | 3.4 | 2   | 12                                                                                    | 7.5                                                                                 | NS402W | NKY15S |
| CTBHR/L1212-160 | ●     | ● |               | 606000 | R/L                                                                               | 12 | 12 | 120 | 19.5 | 12  | 3.4 | —   | 12                                                                                    | 7.5                                                                                 | NS403W | NKY15S |
| CTBHR/L1616-160 | ●     | ● |               | 7055   |  | 16 | 16 | 120 | 19.5 | 16  | 3.4 | —   | 12                                                                                    | 7.5                                                                                 | NS403W | NKY15S |

Note 1) Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length (LE).

\* Clamp Torque (N · m) : NS402W=1.4, NS403W=1.4

## INSERTS

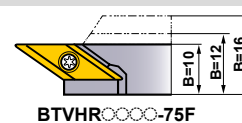
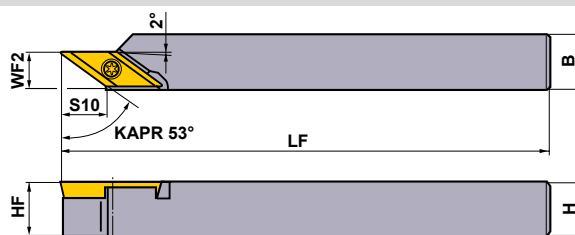
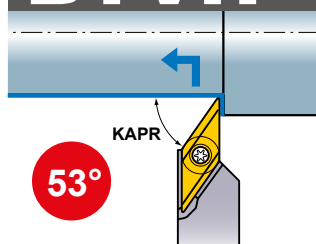
| Order Number     | Hand | Coated |        | Dimensions (mm) |       |     |    |     |      |     |     | LE*<br>(mm) | Geometry |
|------------------|------|--------|--------|-----------------|-------|-----|----|-----|------|-----|-----|-------------|----------|
|                  |      | VP15TF | MS6015 | PSIRRL*         | RER/L | CF  | L  | W1  | CW   | S   | CDX |             |          |
| BTBT7055V5R-SMB  | R    | ●      |        | 70°             | 0.05  | 0.3 | 25 | 9.4 | 1.35 | 3.5 | 6.5 | 5.5         |          |
| BTBT705501MR-SMB | R    | ●      |        | 70°             | 0.08  | 0.3 | 25 | 9.4 | 1.35 | 3.5 | 6.5 | 5.5         |          |
| BTBT705502MR-SMB | R    | ●      |        | 70°             | 0.18  | 0.3 | 25 | 9.4 | 1.35 | 3.5 | 6.5 | 5.5         |          |
| BTBT604500R-B    | R    | ●      | ●      | 60°             | 0     | 0.2 | 25 | 9.4 | 0.7  | 3.5 | 5.5 | 4.5         |          |
| BTBT604500L-B    | L    | ★      |        | 60°             | 0     | 0.2 | 25 | 9.4 | 0.7  | 3.5 | 5.5 | 4.5         |          |
| BTBT604501MR-B   | R    |        | ●      | 60°             | 0.08  | 0.3 | 25 | 9.4 | 0.7  | 3.5 | 5.5 | 4.5         |          |
| BTBT604501R-B    | R    | ●      | ●      | 60°             | 0.1   | 0.3 | 25 | 9.4 | 0.7  | 3.5 | 5.5 | 4.5         |          |
| BTBT604501L-B    | L    | ★      |        | 60°             | 0.1   | 0.3 | 25 | 9.4 | 0.7  | 3.5 | 5.5 | 4.5         |          |
| BTBT606000R      | R    | ●      |        | 60°             | 0     | 0.2 | 25 | 9.4 | 0.7  | 3.5 | 7   | 6.0         |          |
| BTBT606000L      | L    | ★      |        | 60°             | 0     | 0.2 | 25 | 9.4 | 0.7  | 3.5 | 7   | 6.0         |          |

Note 1) REL, PSIRR dimensions for Right Hand Tool and RER. PSIRL dimensions for Left Hand Tool.

\* Numeric value set insert on holder.

# EXTERNAL BACK TURNING

## BTVH



Right hand tool holder only.

| Order Number  | Stock | Insert Number     | Dimensions (mm) |    |     |    |      |     | *<br>Clamp Screw | Wrench |
|---------------|-------|-------------------|-----------------|----|-----|----|------|-----|------------------|--------|
|               | R     |                   | H               | B  | LF  | HF | WF2  | S10 |                  |        |
| BTVHR1010-75  | ●     | BTVT<br>5375○○R-B | 10              | 10 | 120 | 10 | 7.5  | 8.5 | NS251            | NKY15S |
| BTVHR1212-75  | ●     |                   | 12              | 12 | 120 | 12 | 7.5  | 8.5 | NS251            | NKY15S |
| BTVHR1616-75  | ●     |                   | 16              | 16 | 120 | 16 | 7.5  | 8.5 | NS251            | NKY15S |
| BTVHR1010-75F | ●     |                   | 10              | 10 | 120 | 10 | 10.0 | 8.5 | NS251            | NKY15S |
| BTVHR1212-75F | ●     |                   | 12              | 12 | 120 | 12 | 10.0 | 8.5 | NS251            | NKY15S |
| BTVHR1616-75F | ●     |                   | 16              | 16 | 120 | 16 | 10.0 | 8.5 | NS251            | NKY15S |

Note 1) Set the maximum depth of cut at under 30% of the effective cutting edge length (LE).

Note 2) For high load machining, F type is recommended.

\* Clamp Torque (N · m) : NS251=1.4

## INSERTS

| Order Number  | Hand | Coated | Dimensions (mm) |      |      |     | LE<br>(mm) | *<br>Geometry    |
|---------------|------|--------|-----------------|------|------|-----|------------|------------------|
|               |      | VP15TF | IC              | S    | REL  | CW  |            |                  |
| BTVT5375V5R-B | R    | ●      | 6.35            | 3.18 | 0.05 | 0.5 | 7.5        | With Breaker<br> |
| BTVT537501R-B | R    | ●      | 6.35            | 3.18 | 0.1  | 0.5 | 7.5        |                  |

\* Numeric value set insert on holder.

## RECOMMENDED CUTTING CONDITIONS

|   | Material                   | Hardness    | Grade  | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|----------------------------|-------------|--------|-----------------------|------------------|
| P | Carbon Steel · Alloy Steel | 180HB—280HB | VP15TF | 100 (50—150)          | 0.08 (0.01—0.15) |
|   | Free Cutting Steel         | —           | VP15TF | 110 (30—180)          | 0.08 (0.01—0.15) |
| M | Stainless Steel            | ≤200HB      | VP15TF | 80 (50—120)           | 0.06 (0.02—0.1)  |
| N | Non-Ferrous Metal          | —           | VP15TF | 150 (70—230)          | 0.09 (0.03—0.15) |

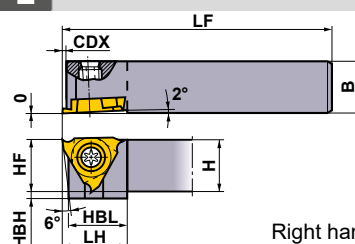
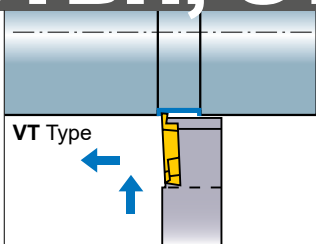
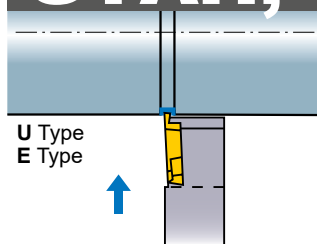
● : Inventory maintained.  
(5 inserts in one case)

SPARE PARTS > N001  
TECHNICAL DATA > P001

[illegible]

# EXTERNAL GROOVING

## GTAH, GTBH, GTCH



Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number |      | Dimensions (mm) |    |    |     |       |    |     |      | Cutting Width<br>(mm) | *2     |        |
|-----------------|-------|---|---------------|------|-----------------|----|----|-----|-------|----|-----|------|-----------------------|--------|--------|
|                 | R     | L |               |      | H               | B  | HF | LF  | CDX*1 | LH | HBH | HBL  |                       |        |        |
| Standard Shank  |       |   |               |      |                 |    |    |     |       |    |     |      |                       |        |        |
| GTAHR/L0808-20S | ●     | ★ | GTAT          | ○○○○ | 8               | 8  | 8  | 80  | 2     | 15 | 5   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTAHR/L1010-20S | ●     | ★ | GTBT *1       | ○○○○ | 10              | 10 | 10 | 80  | 2     | 15 | 3   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTAHR/L1212-20S | ●     | ★ | GTCT *1       | ○○○○ | 12              | 12 | 12 | 80  | 2     | 15 | 1   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTBHR/L1010-30S | ●     | ★ | GTBT, GTCT    | ○○○○ | 10              | 10 | 10 | 80  | 3     | 15 | 3   | 13.4 | 1.45—<br>3.0          | NS404W | NKY15S |
| GTCHR/L1010-30S | ★     | ★ | GTCT          | ○○○○ | 10              | 10 | 10 | 80  | 3     | 15 | 3   | 13.4 | 2.5—<br>3.0           | NS404W | NKY15S |
| Long Shank      |       |   |               |      |                 |    |    |     |       |    |     |      |                       |        |        |
| GTAHR/L0808-20  | ●     | ★ | GTAT          | ○○○○ | 8               | 8  | 8  | 120 | 2     | 15 | 5   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTAHR/L1010-20  | ●     | ★ | GTBT *1       | ○○○○ | 10              | 10 | 10 | 120 | 2     | 15 | 3   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTAHR/L1212-20  | ●     | ★ | GTCT *1       | ○○○○ | 12              | 12 | 12 | 120 | 2     | 15 | 1   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTAHR/L1616-20  | ●     | ★ | GTCT          | ○○○○ | 16              | 16 | 16 | 120 | 2     | 15 | —   | 12.9 | 0.3—<br>3.0           | NS404W | NKY15S |
| GTBHR/L1010-30  | ●     | ★ | GTBT, GTCT    | ○○○○ | 10              | 10 | 10 | 120 | 3     | 15 | 3   | 13.4 | 1.45—<br>3.0          | NS404W | NKY15S |
| GTBHR/L1212-30  | ●     | ★ | GTBT, GTCT    | ○○○○ | 12              | 12 | 12 | 120 | 3     | 15 | 1   | 13.4 | 1.45—<br>3.0          | NS404W | NKY15S |
| GTBHR/L1616-30  | ●     | ★ | GTCT          | ○○○○ | 16              | 16 | 16 | 120 | 3     | 15 | —   | 13.4 | 1.45—<br>3.0          | NS404W | NKY15S |
| GTCHR/L1010-30  | ★     | ★ | GTCT          | ○○○○ | 10              | 10 | 10 | 120 | 3     | 15 | 3   | 13.4 | 2.5—<br>3.0           | NS404W | NKY15S |

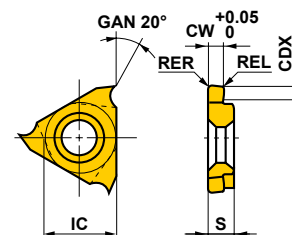
Note 1) Please use right hand inserts for right hand holders and left hand inserts for left hand holders.

\*1 It is not possible to machine depths over CDX dimensions (Max. Groove Depth).

\*2 Clamp Torque (N • m) : NS404W=1.4

### INSERTS

| Order Number   | Hand | Coated        |               |               | Dimensions (mm) |       |       |       |      | Geometry                                  |
|----------------|------|---------------|---------------|---------------|-----------------|-------|-------|-------|------|-------------------------------------------|
|                |      | NEW<br>MS7025 | NEW<br>VP15TF | NEW<br>MT2015 | CW              | CDX*1 | RER/L | IC    | S    |                                           |
| GTAH03006V3R-U | R    | ●             | ●             | ●             | 0.3             | 0.27  | 0.03  | 9.525 | 3.18 | U Type Breaker (General purpose Grooving) |
| GTAH03006V3L-U | L    | ●             | ●             | ●             | 0.3             | 0.27  | 0.03  | 9.525 | 3.18 |                                           |
| GTAH05012V5R-U | R    | ●             | ●             | ●             | 0.5             | 0.9   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH05012V5L-U | L    | ●             | ●             | ●             | 0.5             | 0.9   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH07520V5R-U | R    | ●             | ●             | ●             | 0.75            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH07520V5L-U | L    | ●             | ●             | ●             | 0.75            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH09520V5R-U | R    | ●             | ●             | ●             | 0.95            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH09520V5L-U | L    | ●             | ●             | ●             | 0.95            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH10020V5R-U | R    | ●             | ●             | ●             | 1.0             | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH10020V5L-U | L    | ●             | ●             | ●             | 1.0             | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH10320V5R-U | R    | ●             | ●             | ●             | 1.03            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH12520V5R-U | R    | ●             | ●             | ●             | 1.25            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTAH12520V5L-U | L    | ●             | ●             | ●             | 1.25            | 1.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT14530V5R-U | R    | ●             | ●             | ●             | 1.45            | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT14530V5L-U | L    | ●             | ●             | ●             | 1.45            | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT15030V5R-U | R    | ●             | ●             | ●             | 1.5             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT15030V5L-U | L    | ●             | ●             | ●             | 1.5             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT17530V5R-U | R    | ●             | ●             | ●             | 1.75            | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT17530V5L-U | L    | ●             | ●             | ●             | 1.75            | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT20030V5R-U | R    | ●             | ●             | ●             | 2.0             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTBT20030V5L-U | L    | ●             | ●             | ●             | 2.0             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTCT25030V5R-U | R    | ●             | ●             | ●             | 2.5             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |
| GTCT25030V5L-U | L    | ●             | ●             | ●             | 2.5             | 2.8   | 0.05  | 9.525 | 3.18 |                                           |



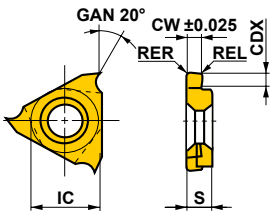
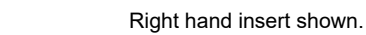
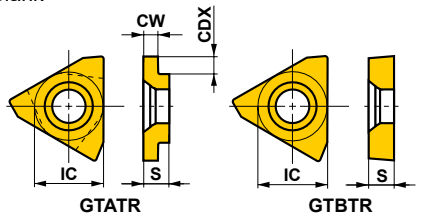
Right hand insert shown.

\*1 It is not possible to machine depths over CDX dimensions (Max. Groove Depth).

● = NEW

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(5 inserts in one case)

# INSERTS

| Order Number       | Hand | Coated        |        | Carbide       |      | Dimensions (mm) |      |       |       |      | Geometry                                                                              |
|--------------------|------|---------------|--------|---------------|------|-----------------|------|-------|-------|------|---------------------------------------------------------------------------------------|
|                    |      | NEW<br>MS7025 | VP15TF | NEW<br>MT2015 | TF15 | CW              | CDX  | RER/L | IC    | S    |                                                                                       |
| GTAT03306V3R-E     | R    |               | ●      |               |      | 0.33            | 0.27 | 0.03  | 9.525 | 3.18 | E Type Breaker (Ring processing Grooving)                                             |
| GTAT03306V3L-E     | L    |               | ★      |               |      | 0.33            | 0.27 | 0.03  | 9.525 | 3.18 |                                                                                       |
| GTAT04312V3R-E     | R    |               | ●      |               |      | 0.43            | 0.9  | 0.03  | 9.525 | 3.18 |                                                                                       |
| GTAT04312V3L-E     | L    |               | ★      |               |      | 0.43            | 0.9  | 0.03  | 9.525 | 3.18 |                                                                                       |
| GTAT05312V5R-E     | R    |               | ●      |               |      | 0.53            | 0.9  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT05312V5L-E     | L    |               | ★      |               |      | 0.53            | 0.9  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT07520V5R-E     | R    |               | ●      |               |      | 0.75            | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT07520V5L-E     | L    |               | ★      |               |      | 0.75            | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT09520V5R-E     | R    |               | ●      |               |      | 0.95            | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT09520V5L-E     | L    |               | ★      |               |      | 0.95            | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT10020V5R-E     | R    |               | ●      |               |      | 1.0             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT10020V5L-E     | L    |               | ★      |               |      | 1.0             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT1002001R-E     | R    |               | ●      |               |      | 1.0             | 1.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTAT1002001L-E     | L    |               | ★      |               |      | 1.0             | 1.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTAT12020V5R-E     | R    |               | ●      |               |      | 1.2             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT12020V5L-E     | L    |               | ★      |               |      | 1.2             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT1202001R-E     | R    |               | ●      |               |      | 1.2             | 1.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTAT1202001L-E     | L    |               | ★      |               |      | 1.2             | 1.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTAT14020V5R-E     | R    |               | ●      |               |      | 1.4             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTAT14020V5L-E     | L    |               | ★      |               |      | 1.4             | 1.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTBT14530V5R-E | R    | ●             |        | ●             |      | 1.45            | 2.8  | 0.05  | 9.525 | 3.18 |   |
| NEW GTBT14530V5L-E | L    | ●             |        | ●             |      | 1.45            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT15030V5R-E     | R    | ●             | ●      | ●             |      | 1.5             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT15030V5L-E     | L    | ●             | ★      | ●             |      | 1.5             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT1503001R-E     | R    |               | ●      |               |      | 1.5             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTBT1503001L-E     | L    |               | ★      |               |      | 1.5             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| NEW GTBT17030V5R-E | R    | ●             |        | ●             |      | 1.70            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTBT17030V5L-E | L    | ●             |        | ●             |      | 1.70            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTBT17530V5R-E | R    | ●             |        | ●             |      | 1.75            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTBT17530V5L-E | L    | ●             |        | ●             |      | 1.75            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT18030V5R-E     | R    | ●             | ●      | ●             |      | 1.8             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT18030V5L-E     | L    | ●             | ★      | ●             |      | 1.8             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT20030V5R-E     | R    | ●             | ●      | ●             |      | 2.0             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT20030V5L-E     | L    | ●             | ★      | ●             |      | 2.0             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT2003001R-E     | R    | ●             | ●      |               |      | 2.0             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTBT2003001L-E     | L    | ●             | ★      |               |      | 2.0             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTBT22530V5R-E     | R    | ●             | ●      | ●             |      | 2.25            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTBT22530V5L-E     | L    | ●             | ★      | ●             |      | 2.25            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTBT2253001R-E | R    | ●             |        |               |      | 2.25            | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| NEW GTBT2253001L-E | L    | ●             |        |               |      | 2.25            | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTCT25030V5R-E     | R    | ●             | ★      | ●             |      | 2.5             | 2.8  | 0.05  | 9.525 | 3.18 |  |
| GTCT25030V5L-E     | L    | ●             | ★      | ●             |      | 2.5             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTCT2503001R-E | R    | ●             |        |               |      | 2.5             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| NEW GTCT2503001L-E | L    | ●             |        |               |      | 2.5             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTCT27530V5R-E     | R    | ●             | ★      | ●             |      | 2.75            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTCT27530V5L-E     | L    | ●             | ★      | ●             |      | 2.75            | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTCT30030V5R-E     | R    | ●             | ★      | ●             |      | 3.0             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| GTCT30030V5L-E     | L    | ●             | ★      | ●             |      | 3.0             | 2.8  | 0.05  | 9.525 | 3.18 |                                                                                       |
| NEW GTCT3003001R-E | R    | ●             |        |               |      | 3.0             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| NEW GTCT3003001L-E | L    | ●             |        |               |      | 3.0             | 2.8  | 0.1   | 9.525 | 3.18 |                                                                                       |
| GTATR              | R    |               |        |               | ★ ★  | 1.76            | —    | —     | 9.525 | 3.18 | Blank                                                                                 |
| GTATL              | L    |               |        |               | ★ ★  | 1.76            | —    | —     | 9.525 | 3.18 |                                                                                       |
| GTBTR              | R    |               |        |               | ★ ★  | —               | —    | —     | 9.525 | 3.18 |                                                                                       |
| GTBTL              | L    |               |        |               | ★ ★  | —               | —    | —     | 9.525 | 3.18 |                                                                                       |
|                    |      |               |        |               |      |                 |      |       |       |      |  |

★ 10 inserts in one case.

● = NEW

CUTTING CONDITIONS > D020  
 SPARE PARTS > N001  
 TECHNICAL DATA > P001

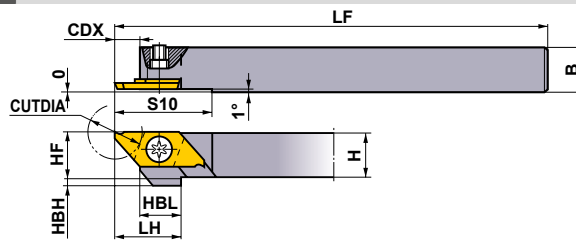
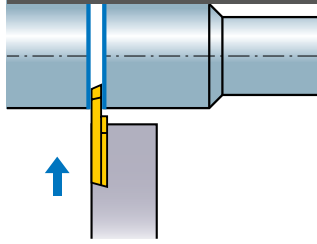
D019

D

SMALL TOOLS

## EXTERNAL CUTTING OFF

## CTAH



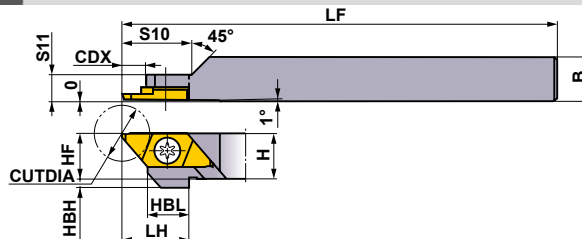
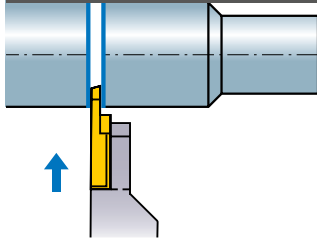
Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number |      | Dimensions (mm) |    |    |     |    |     |     |     | CUTDIA<br>(mm) | *2  |  |        |
|-----------------|-------|---|---------------|------|-----------------|----|----|-----|----|-----|-----|-----|----------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                 | R     | L |               |      | H               | B  | HF | LF  | LH | CDX | HBH | HBL |                | S10                                                                                    | Clamp Screw                                                                         | Wrench |
| CTAHR/L0810-120 | ●     | ● | CTAT          | ○○○○ | 8               | 10 | 8  | 120 | 15 | 5.5 | 4   | 9.5 | 22             | 12<br>(8)*1                                                                            | NS402W                                                                              | NKY15S |
| CTAHR/L1010-120 | ●     | ● |               | ○○○○ | 10              | 10 | 10 | 120 | 15 | 5.5 | 2   | 9.5 | 22             |                                                                                        | NS402W                                                                              | NKY15S |
| CTAHR/L1212-120 | ●     | ● |               | ○○○○ | 12              | 12 | 12 | 120 | 15 | 5.5 | —   | 9.5 | 22             |                                                                                        | NS403W                                                                              | NKY15S |
| CTAHR/L1616-120 | ●     | ● |               | ○○○○ | 16              | 16 | 16 | 120 | 15 | 5.5 | —   | 9.5 | 22             |                                                                                        | NS403W                                                                              | NKY15S |

\*1 When the width of cutting off (CW) is 0.7mm.

\*2 Clamp Torque (N • m) : NS402W=1.4, NS403W=1.4

## CTAH-S



Right hand tool holder only.

| Order Number   | Stock | Insert Number |      | Dimensions (mm) |    |    |    |    |     |     |     |     |     | CUTDIA<br>(mm) |  *2 |  |
|----------------|-------|---------------|------|-----------------|----|----|----|----|-----|-----|-----|-----|-----|----------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                | R     |               |      | H               | B  | HF | LF | LH | CDX | HBH | HBL | S10 | S11 |                | Clamp Screw                                                                              | Wrench                                                                                |
| CTAHR1010-120S | ●     | CTAT          | ○○○○ | 10              | 10 | 10 | 80 | 15 | 16  | 2   | 9.5 | 16  | 5.5 | 12<br>(8)*1    | NS401                                                                                    | NKY25R                                                                                |

\*1 When the width of cutting off (CW) is 0.7mm.

\*2 Clamp Torque (N • m) : NS401=3.5

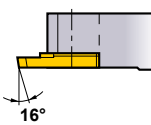
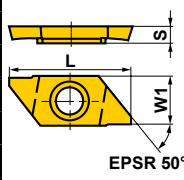
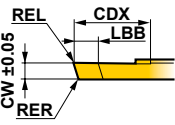
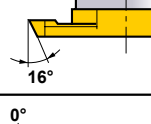
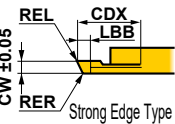
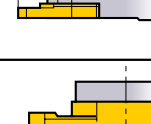
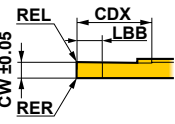
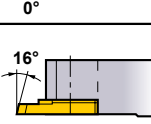
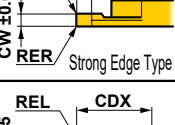
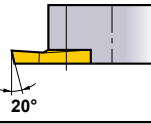
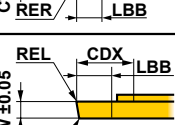
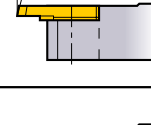
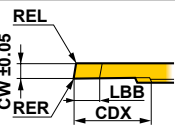
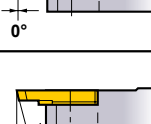
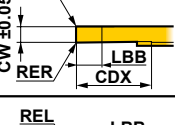
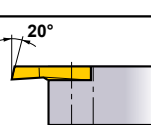
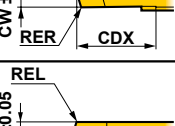
## RECOMMENDED CUTTING CONDITIONS

|   | Material                   | Hardness    | Grade         | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|----------------------------|-------------|---------------|-----------------------|------------------|
| P | Carbon Steel · Alloy Steel | 180HB—280HB | MS6015/VP15TF | 100 (50—150)          | 0.05 (0.02—0.09) |
|   | Free Cutting Steel         | —           | MS6015        | 110 (30—180)          | 0.05 (0.01—0.09) |
| M | Stainless Steel            | ≤200HB      | VP15TF        | 80 (50—120)           | 0.03 (0.02—0.05) |
| N | Non-Ferrous Metal          | —           | MS6015        | 150 (70—230)          | 0.07 (0.03—0.11) |

● : Inventory maintained.  
(5 inserts in one case)



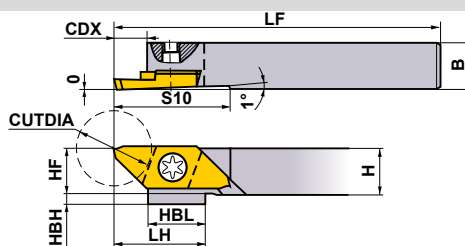
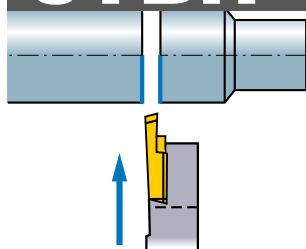
# INSERTS

| Holder         | Setting Geometry                                                                    | Breaker      | Geometry                                                                           | Insert Geometry                                                                     | Order Number                                                             | Hand                                                                                | Coated                                                                   |                  | Dimensions (mm)          |                          |                              |                          |                      |                          |                          |                          | CUTDIA<br>(mm)           |                     |
|----------------|-------------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------|--------------------------|--------------------------|------------------------------|--------------------------|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------|
|                |                                                                                     |              |                                                                                    |                                                                                     |                                                                          |                                                                                     | VP15TF                                                                   | MS6015           | CW                       | CDX                      | RER/L                        | L                        | W1                   | S                        | LBB                      |                          |                          |                     |
| Right Hand (R) |    | With Breaker |  |    | CTAT07080V5RR-B<br>CTAT10120V5RR-B<br>CTAT15120V5RR-B<br>CTAT20120V5RR-B | R<br>R<br>R<br>R                                                                    | ●<br>●<br>●<br>●                                                         | <br>●<br>●<br>●  | 0.7<br>1.0<br>1.5<br>2.0 | 4.5<br>6.7<br>6.7<br>6.7 | 0.05<br>0.05<br>0.05<br>0.05 | 20<br>20<br>20<br>20     | 8<br>8<br>8<br>8     | 2.5<br>2.5<br>2.5<br>2.5 | 1.5<br>1.5<br>1.5<br>1.5 | 8<br>12<br>12<br>12      |                          |                     |
|                |    |              |                                                                                    |    | CTAT15120V5RR-BX<br>CTAT20120V5RR-BX                                     | R<br>R                                                                              | ●<br>●                                                                   | <br>●            | 1.5<br>2.0               | 6.7<br>6.7               | 0.05<br>0.05                 | 20<br>20                 | 8<br>8               | 2.5<br>2.5               | 1.5<br>1.5               | 12<br>12                 |                          |                     |
|                |    |              |                                                                                    |    | CTAT10120V5RN-B<br>CTAT15120V5RN-B<br>CTAT20120V5RN-B                    | N<br>N<br>N                                                                         | ●<br>●<br>●                                                              | ●<br>●<br>●      | 1.0<br>1.5<br>2.0        | 6.7<br>6.7<br>6.7        | 0.05<br>0.05<br>0.05         | 20<br>20<br>20           | 8<br>8<br>8          | 2.5<br>2.5<br>2.5        | 1.5<br>1.5<br>1.5        | 12<br>12<br>12           |                          |                     |
|                |    |              |                                                                                    |    | CTAT15120V5RN-BX<br>CTAT20120V5RN-BX                                     | N<br>N                                                                              | ●<br>●                                                                   | <br>●            | 1.5<br>2.0               | 6.7<br>6.7               | 0.05<br>0.05                 | 20<br>20                 | 8<br>8               | 2.5<br>2.5               | 1.5<br>1.5               | 12<br>12                 |                          |                     |
|                |   |              |                                                                                    |   | CTAT10110V5RL-B<br>CTAT15110V5RL-B<br>CTAT20110V5RL-B                    | L<br>L<br>L                                                                         | ●<br>●<br>●                                                              | <br><br>●        | 1.0<br>1.5<br>2.0        | 6.7<br>6.7<br>6.7        | 0.05<br>0.05<br>0.05         | 20<br>20<br>20           | 8<br>8<br>8          | 2.5<br>2.5<br>2.5        | 1.5<br>1.5<br>1.5        | 11<br>11<br>11           |                          |                     |
|                |  |              |                                                                                    |  | CTAT1012000RR<br>CTAT1512000RR<br>CTAT2012000RR                          | R<br>R<br>R                                                                         | ●<br>●<br>●                                                              | ●<br>●<br>●      | 1.0<br>1.5<br>2.0        | 6.7<br>6.7<br>6.7        | 0<br>0<br>0                  | 20<br>20<br>20           | 8<br>8<br>8          | 2.5<br>2.5<br>2.5        | 3.5<br>3.5<br>3.5        | 12<br>12<br>12           |                          |                     |
|                | Left Hand (L)                                                                       |              |                                                                                    |  | With Breaker                                                             |  | CTAT07080V5LL-B<br>CTAT10120V5LL-B<br>CTAT15120V5LL-B<br>CTAT20120V5LL-B | L<br>L<br>L<br>L | ●<br>●<br>●<br>●         | <br><br>●<br>●           | 0.7<br>1.0<br>1.5<br>2.0     | 4.5<br>6.7<br>6.7<br>6.7 | 0.05<br>0<br>0<br>0  | 20<br>20<br>20<br>20     | 8<br>8<br>8<br>8         | 2.5<br>2.5<br>2.5<br>2.5 | 1.5<br>1.5<br>1.5<br>1.5 | 8<br>12<br>12<br>12 |
|                |                                                                                     |              |                                                                                    |  |                                                                          |  | CTAT10120V5LN-B<br>CTAT15120V5LN-B<br>CTAT20120V5LN-B                    | N<br>N<br>N      | ●<br>●<br>●              | ●<br>●<br>●              | 1.0<br>1.5<br>2.0            | 6.7<br>6.7<br>6.7        | 0.05<br>0.05<br>0.05 | 20<br>20<br>20           | 8<br>8<br>8              | 2.5<br>2.5<br>2.5        | 1.5<br>1.5<br>1.5        | 12<br>12<br>12      |
|                |                                                                                     |              |                                                                                    |  |                                                                          |  | CTAT10110V5LR-B<br>CTAT15110V5LR-B<br>CTAT20110V5LR-B                    | R<br>R<br>R      | ●<br>●<br>●              | ●<br>●<br>●              | 1.0<br>1.5<br>2.0            | 6.7<br>6.7<br>6.7        | 0.05<br>0.05<br>0.05 | 20<br>20<br>20           | 8<br>8<br>8              | 2.5<br>2.5<br>2.5        | 1.5<br>1.5<br>1.5        | 11<br>11<br>11      |
|                |                                                                                     |              |                                                                                    |  |                                                                          |  | CTAT1012000LL<br>CTAT1512000LL<br>CTAT2012000LL                          | L<br>L<br>L      | ●<br>●<br>●              | <br>●<br>●               | 1.0<br>1.5<br>2.0            | 6.7<br>6.7<br>6.7        | 0<br>0<br>0          | 20<br>20<br>20           | 8<br>8<br>8              | 2.5<br>2.5<br>2.5        | 3.5<br>3.5<br>3.5        | 12<br>12<br>12      |

D  
SMALL TOOLS

## EXTERNAL CUTTING OFF

## CTBH

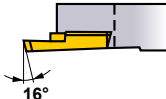
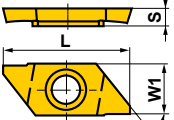
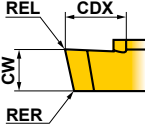
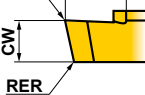
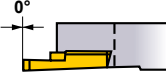
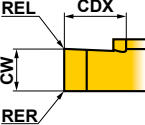
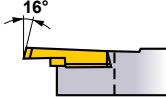
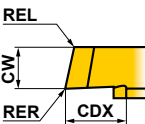
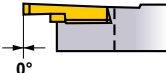
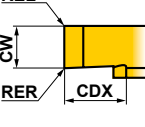
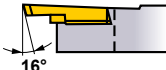
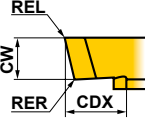


Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number |                                                                                   | Dimensions (mm) |    |    |     |      |     |     |     | CUTDIA (mm) |  |  |        |
|-----------------|-------|---|---------------|-----------------------------------------------------------------------------------|-----------------|----|----|-----|------|-----|-----|-----|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                 | R     | L |               |                                                                                   | H               | B  | HF | LF  | LH   | CDX | HBH | HBL |             | S10                                                                                 | Clamp Screw                                                                         | Wrench |
| CTBHR/L1010-160 | ●     | ● | CTBT          |  | 10              | 10 | 10 | 120 | 19.5 | 7.5 | 2   | 9.5 | 25          | 16                                                                                  | NS402W                                                                              | NKY15S |
| CTBHR/L1212-160 | ●     | ● |               |  | 12              | 12 | 12 | 120 | 19.5 | 7.5 | —   | 9.5 | 25          | 16                                                                                  | NS403W                                                                              | NKY15S |
| CTBHR/L1616-160 | ●     | ● |               |  | 16              | 16 | 16 | 120 | 19.5 | 7.5 | —   | 9.5 | 25          | 16                                                                                  | NS403W                                                                              | NKY15S |

\* Clamp Torque (N · m) : NS402W=1.4, NS403W=1.4

## INSERTS

| Holder                                                                              | Setting Geometry                                                                    | Breaker      | Geometry                                                                            | Insert Geometry                                                                     | Order Number    | Hand | Coated |        | Dimensions (mm) |      |       |     |     |     |      | CUTDIA<br>(mm) |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------|------|--------|--------|-----------------|------|-------|-----|-----|-----|------|----------------|
|                                                                                     |                                                                                     |              |                                                                                     |                                                                                     |                 |      | VP15TF | MS6015 | CW              | CDX  | RER/L | L   | W1  | S   |      |                |
| Right Hand (R)                                                                      |   | With Breaker |  |   | CTBT15160V5RR-B | R    | ●      | ●      | 1.5             | 9.2  | 0.05  | 25  | 9.4 | 3.5 | 16   |                |
|                                                                                     |                                                                                     |              |                                                                                     |   | CTBT20160V5RR-B | R    | ●      | ●      | 2.0             | 9.2  | 0.05  | 25  | 9.4 | 3.5 | 16   |                |
|  |  |              |                                                                                     | CTBT20160V5RN-B                                                                     | N               | ●    | ●      | 2.0    | 9.2             | 0.05 | 25    | 9.4 | 3.5 | 16  |      |                |
|                                                                                     |                                                                                     |              |                                                                                     |                                                                                     |                 |      |        |        |                 |      |       |     |     |     |      |                |
| Left Hand (L)                                                                       |  |              |                                                                                     |  | CTBT20160V5LL-B | L    | ●      |        | 2.0             | 9.2  | 0.05  | 25  | 9.4 | 3.5 | 16   |                |
|                                                                                     |                                                                                     |              |                                                                                     |                                                                                     |                 |      |        |        |                 |      |       |     |     |     |      |                |
|                                                                                     |  |              |                                                                                     |  | CTBT20160V5LN-B | N    | ●      | ●      | 2.0             | 9.2  | 0.05  | 25  | 9.4 | 3.5 | 16   |                |
|                                                                                     |                                                                                     |              |                                                                                     |                                                                                     |                 |      |        |        |                 |      |       |     |     |     |      |                |
|                                                                                     |  |              |                                                                                     |  | CTBT20145V5LR-B | R    | ●      | ●      | 2.0             | 9.2  | 0.05  | 25  | 9.4 | 3.5 | 14.5 |                |
|                                                                                     |                                                                                     |              | Right hand insert shown.                                                            |                                                                                     |                 |      |        |        |                 |      |       |     |     |     |      |                |

Right hand insert shown.

## RECOMMENDED CUTTING CONDITIONS

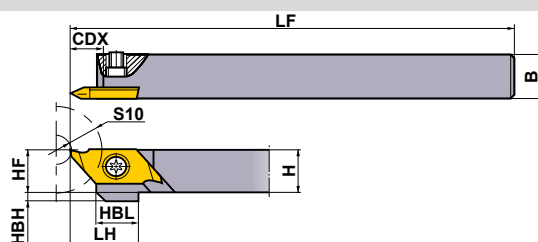
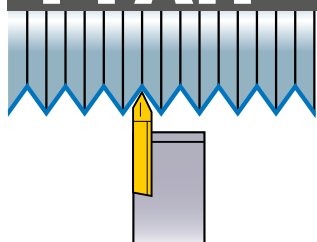
|   | Material                   | Hardness    | Grade         | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|----------------------------|-------------|---------------|-----------------------|------------------|
| P | Carbon Steel · Alloy Steel | 180HB—280HB | MS6015/VP15TF | 100 (50—150)          | 0.05 (0.02—0.09) |
|   | Free Cutting Steel         | —           | MS6015        | 110 (30—180)          | 0.05 (0.01—0.09) |
| M | Stainless Steel            | ≤200HB      | VP15TF        | 80 (50—120)           | 0.03 (0.02—0.05) |
| N | Non-Ferrous Metal          | —           | MS6015        | 150 (70—230)          | 0.07 (0.03—0.11) |

● : Inventory maintained.  
(5 inserts in one case)SPARE PARTS > N001  
TECHNICAL DATA > P001

This image shows a blank sheet of white paper designed as a memo template. At the top left, the word "Memo" is written in a large, bold, black sans-serif font. A thick horizontal black line runs across the entire width of the page directly beneath the word. The remainder of the page is filled with horizontal dashed gray lines, providing space for writing. The lines are evenly spaced and extend from the left margin to the right edge of the page.

## EXTERNAL THREADING

TTAH



Right hand tool holder shown.

| Order Number | Stock |   | Insert Number | Dimensions (mm)                                                                   |    |    |    |     |     |     |     |     |  * |  |        |
|--------------|-------|---|---------------|-----------------------------------------------------------------------------------|----|----|----|-----|-----|-----|-----|-----|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|              | R     | L |               | H                                                                                 | B  | HF | LF | LH  | HBH | HBL | CDX | S10 | Clamp Screw                                                                           | Wrench                                                                              |        |
| TTAHR/L0810  | ●     | ★ | TTAT          |  | 8  | 10 | 8  | 120 | 15  | 4   | 9.5 | 7   | 6.5                                                                                   | NS402W                                                                              | NKY15S |
| TTAHR/L1010  | ●     | ★ |               |  | 10 | 10 | 10 | 120 | 15  | 2   | 9.5 | 7   | 6.5                                                                                   | NS402W                                                                              | NKY15S |
| TTAHR/L1212  | ●     | ★ |               |  | 12 | 12 | 12 | 120 | 15  | —   | 9.5 | 7   | 6.5                                                                                   | NS403W                                                                              | NKY15S |
| TTAHR/L1616  | ●     | ★ |               |  | 16 | 16 | 16 | 120 | 15  | —   | 9.5 | 7   | 6.5                                                                                   | NS403W                                                                              | NKY15S |

\* Clamp Torque (N · m) : NS402W=1.4, NS403W=1.4

## INSERTS

| Holder         | Setting Geometry | Breaker | Geometry                                    | Insert Geometry | Order Number    | Hand | Coated | Dimensions (mm) |           |      |     |     | Pitch of Screw<br>mm<br>(thread/inch) |
|----------------|------------------|---------|---------------------------------------------|-----------------|-----------------|------|--------|-----------------|-----------|------|-----|-----|---------------------------------------|
|                |                  |         |                                             |                 |                 |      | VP15TF | PDX             | RE        | L    | W1  | S   |                                       |
| Right Hand (R) |                  |         | General Purpose<br>Partial Profile<br>(60°) |                 | TTAT60075F5RR-B | R    | ●      | 0.4             | 0.05 Flat | 20.0 | 8.0 | 2.5 | 0.2—0.75<br>(80—36)                   |
|                |                  |         |                                             |                 | TTAT60125V5RR-B | R    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | 0.5—1.25<br>(40—16)                   |
|                |                  |         |                                             |                 | TTAT60075F5RL-B | L    | ●      | 0.4             | 0.05 Flat | 20.0 | 8.0 | 2.5 | 0.2—0.75<br>(80—36)                   |
|                |                  |         |                                             |                 | TTAT60125V5RL-B | L    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | 0.5—1.25<br>(40—16)                   |
| Left Hand (L)  |                  |         | General Purpose<br>Partial Profile<br>(60°) |                 | TTAT6015001RN-B | N    | ●      | 1.25            | 0.1       | 20.0 | 8.0 | 2.5 | 1.0—1.5<br>(24—18)                    |
|                |                  |         |                                             |                 | TTAT60075F5LR-B | R    | ●      | 0.4             | 0.05 Flat | 20.0 | 8.0 | 2.5 | 0.2—0.75<br>(80—36)                   |
|                |                  |         |                                             |                 | TTAT60125V5LR-B | R    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | 0.5—1.25<br>(40—16)                   |
|                |                  |         |                                             |                 | TTAT60075F5LL-B | L    | ●      | 0.4             | 0.05 Flat | 20.0 | 8.0 | 2.5 | 0.2—0.75<br>(80—36)                   |
|                |                  |         |                                             |                 | TTAT60125V5LL-B | L    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | 0.5—1.25<br>(40—16)                   |
|                |                  |         |                                             |                 | TTAT6015001LN-B | N    | ●      | 1.25            | 0.1       | 20.0 | 8.0 | 2.5 | 1.0—1.5<br>(24—18)                    |
|                |                  |         |                                             |                 | TTAT55158V5RR-B | R    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | (40—16)                               |
|                |                  |         |                                             |                 | TTAT55158V5RL-B | L    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | (40—16)                               |
| Right Hand (R) |                  |         | General Purpose<br>Partial Profile<br>(55°) |                 | TTAT55158V5LR-B | R    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | (40—16)                               |
|                |                  |         |                                             |                 | TTAT55158V5LL-B | L    | ●      | 0.8             | 0.05      | 20.0 | 8.0 | 2.5 | (40—16)                               |

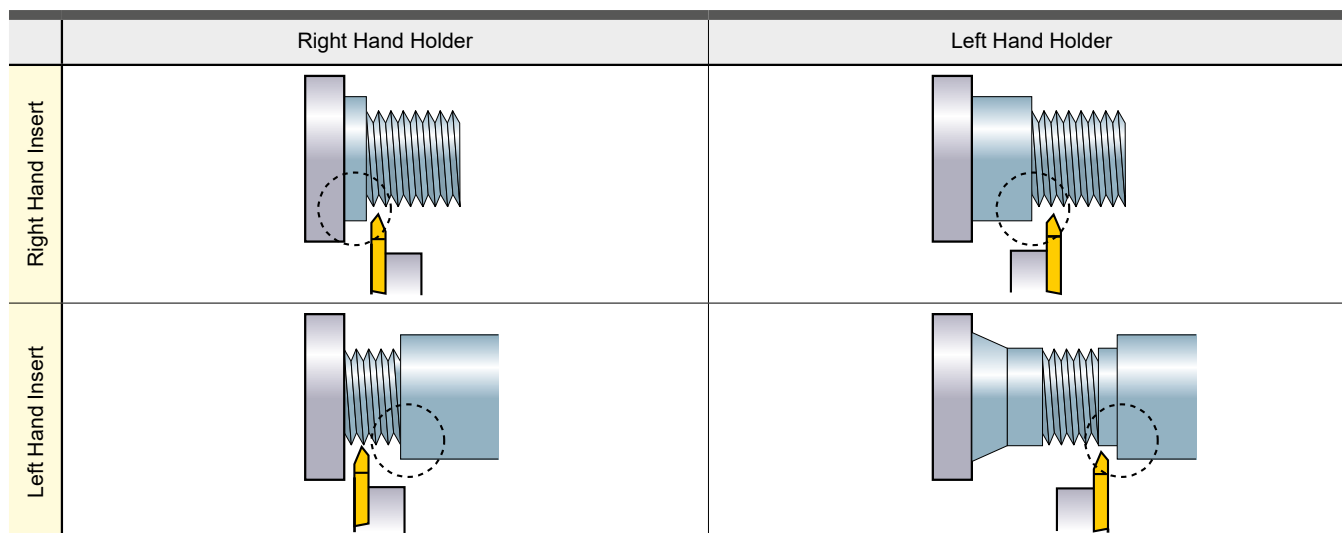
## RECOMMENDED CUTTING CONDITIONS

| Material                     | Hardness    | Cutting Speed (m/min) |
|------------------------------|-------------|-----------------------|
| P Carbon Steel · Alloy Steel | 180HB—280HB | 100 (50—150)          |
| Free Cutting Steel           | —           | 110 (30—180)          |

| Material            | Hardness | Cutting Speed (m/min) |
|---------------------|----------|-----------------------|
| M Stainless Steel   | ≤200HB   | 80 (50—120)           |
| N Non-Ferrous Metal | —        | 150 (70—230)          |

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(5 inserts in one case)

## HOLDER APPLICATION



\*The above combinations enable to machine the side of

D

SMALL TOOLS

## THREAD RANGE

Application range

| Pitch<br>(mm) | Pitch Diameter of Thread (mm) |                      |       |       |       |       |       |       |       |       | Number of<br>Passes |
|---------------|-------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|
|               | ≥Ø1.0                         | ≥Ø1.2                | ≥Ø1.6 | ≥Ø2.0 | ≥Ø2.5 | ≥Ø3.0 | ≥Ø4.0 | ≥Ø5.0 | ≥Ø6.0 | ≥Ø7.0 |                     |
| 0.2           |                               |                      |       |       |       |       |       |       |       |       | 2 – 4               |
| 0.25          |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.3           |                               |                      |       |       |       |       |       |       |       |       | 3 – 5               |
| 0.35          |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.4           |                               |                      |       |       |       |       |       |       |       |       | 4 – 6               |
| 0.45          |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.5           |                               |                      |       |       |       |       |       |       |       |       | 5 – 7               |
| 0.6           |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.7           |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.75          |                               |                      |       |       |       |       |       |       |       |       |                     |
| 0.8           |                               |                      |       |       |       |       |       |       |       |       |                     |
| 1             |                               | Threading impossible |       |       |       |       |       |       |       |       | 6 – 8               |
| 1.25          |                               |                      |       |       |       |       |       |       |       |       |                     |
| 1.5           |                               |                      |       |       |       |       |       |       |       |       |                     |

\*Metric Thread (60°)

| Pitch(thread/inch) | Pitch Diameter of Thread |                      |         |         |         |         |         |         |         | Number of<br>Passes |
|--------------------|--------------------------|----------------------|---------|---------|---------|---------|---------|---------|---------|---------------------|
| Inch               | ≥Ø0.060                  | ≥Ø0.073              | ≥Ø0.086 | ≥Ø0.099 | ≥Ø0.112 | ≥Ø0.164 | ≥Ø0.190 | ≥Ø0.250 | ≥Ø0.313 |                     |
| mm                 | ≥Ø1.524                  | ≥Ø1.854              | ≥Ø2.184 | ≥Ø2.515 | ≥Ø2.845 | ≥Ø4.166 | ≥Ø4.826 | ≥Ø6.350 | ≥Ø7.938 |                     |
| 80                 |                          |                      |         |         |         |         |         |         |         | 3 – 5               |
| 72                 |                          |                      |         |         |         |         |         |         |         |                     |
| 64                 |                          |                      |         |         |         |         |         |         |         | 4 – 6               |
| 56                 |                          |                      |         |         |         |         |         |         |         |                     |
| 48                 |                          |                      |         |         |         |         |         |         |         | 5 – 7               |
| 44                 |                          |                      |         |         |         |         |         |         |         |                     |
| 40                 |                          |                      |         |         |         |         |         |         |         |                     |
| 32                 |                          |                      |         |         |         |         |         |         |         |                     |
| 28                 |                          |                      |         |         |         |         |         |         |         |                     |
| 26                 |                          |                      |         |         |         |         |         |         |         | 6 – 8               |
| 24                 |                          | Threading impossible |         |         |         |         |         |         |         |                     |
| 20                 |                          |                      |         |         |         |         |         |         |         |                     |
| 18                 |                          |                      |         |         |         |         |         |         |         |                     |
| 16                 |                          |                      |         |         |         |         |         |         |         |                     |

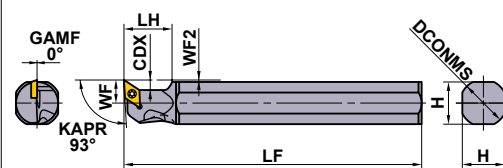
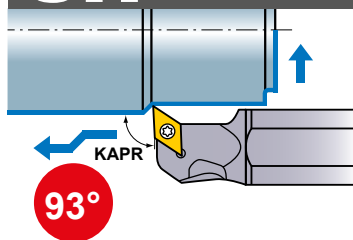
\*American UN, Whitworth

SPARE PARTS > N001  
TECHNICAL DATA > P001

D025

# EXTERNAL FRONT TURNING, COPYING, FACING (FOR OPPOSITE TOOL POSTS)

SH



Left hand tool holder shown.

| Finish                                                                              | Finish                                                                              | Light                                                                               | Light                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| SMG/FS                                                                              | R-F                                                                                 | R-SS                                                                                | LS                                                                                  |
|  |  |  |  |
| (07, 11)                                                                            | (07, 11)                                                                            | (07, 11)                                                                            | (07, 11)                                                                            |
| Medium                                                                              | Medium                                                                              | For nonferrous metals                                                               | Light                                                                               |
| R-SN                                                                                | R-SR                                                                                | AZ                                                                                  | LS-P                                                                                |
|  |  |  |  |
| (07, 11)                                                                            | (07, 11)                                                                            | (07, 11)                                                                            | (07, 11)                                                                            |

| Order Number   | Stock | Insert Number                        |      | Dimensions (mm) |     |    |    |       |     |      |  |  |
|----------------|-------|--------------------------------------|------|-----------------|-----|----|----|-------|-----|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | L     |                                      |      | DCONMS          | LF  | LH | H  | WF    | CDX | WF2  | Clamp Screw                                                                         | Wrench                                                                              |
| SH16H-FSDUCL07 | ★     | DCMT<br>DCMW<br>DCET<br>DCGT<br>DCGW | 0702 | 15.875          | 100 | 20 | 14 | 7.75  | 4.2 | 0.75 | TS254                                                                               | TKY08R                                                                              |
| SH19K-FSDUCL07 | ★     |                                      |      | 19.05           | 125 | 20 | 17 | 9.25  | 4.2 | 0.75 | TS254                                                                               | TKY08R                                                                              |
| SH20K-FSDUCL07 | ★     |                                      |      | 20              | 125 | 20 | 18 | 9.75  | 4.2 | 0.75 | TS254                                                                               | TKY08R                                                                              |
| SH22K-FSDUCL07 | ★     |                                      |      | 22              | 125 | 20 | 20 | 10.75 | 4.2 | 0.75 | TS254                                                                               | TKY08R                                                                              |
| SH25M-FSDUCL07 | ★     |                                      |      | 25.4            | 150 | 20 | 23 | 12.25 | 4.2 | 0.75 | TS254                                                                               | TKY08R                                                                              |
| SH16H-FSDUCL11 | ★     | DCMT<br>DCMW<br>DCET<br>DCGT<br>DCGW | 11T3 | 15.875          | 100 | 20 | 15 | 7.75  | 6.4 | 0.75 | TS43                                                                                | TKY15R                                                                              |
| SH19K-FSDUCL11 | ★     |                                      |      | 19.05           | 125 | 20 | 17 | 9.25  | 6.4 | 0.75 | TS43                                                                                | TKY15R                                                                              |
| SH20K-FSDUCL11 | ★     |                                      |      | 20              | 125 | 20 | 18 | 9.75  | 6.4 | 0.75 | TS43                                                                                | TKY15R                                                                              |
| SH22K-FSDUCL11 | ★     |                                      |      | 22              | 125 | 20 | 20 | 10.75 | 6.4 | 0.75 | TS43                                                                                | TKY15R                                                                              |
| SH25M-FSDUCL11 | ★     |                                      |      | 25.4            | 150 | 20 | 23 | 12.25 | 6.4 | 0.75 | TS43                                                                                | TKY15R                                                                              |

Note 1) When using insert with right and left hand chipbreaker, please use right hand insert.

Note 2) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

\* Clamp Torque (N · m) : TS254=1.0, TS43=3.5

## RECOMMENDED CUTTING CONDITIONS

|   | Material                   | Hardness    | Grade                | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|----------------------------|-------------|----------------------|-----------------------|------------------|
| P | Carbon Steel · Alloy Steel | 180HB–280HB | MS6015/VP15TF        | 100 (50–150)          | 0.08 (0.01–0.15) |
|   | Free Cutting Steel         | —           | MS6015               | 110 (30–180)          | 0.08 (0.01–0.15) |
|   |                            |             | NX2525               | 150 (50–250)          | 0.08 (0.01–0.15) |
| M | Stainless Steel            | ≤200HB      | VP15TF/MP9005/MP9015 | 80 (50–120)           | 0.06 (0.02–0.1)  |
|   |                            | 230HB       | MS9025               | 100 (50–180)          | 0.08 (0.01–0.15) |
| N | Non-Ferrous Metal          | —           | HTi10/MT9005         | 150 (70–230)          | 0.09 (0.03–0.15) |
| S | Titanium Alloy             | —           | MT9005               | 60 (40–80)            | 0.08 (0.04–0.12) |
|   | Heat Resistant Alloy       | —           | MP9015/MS9025        | 50 (20–75)            | 0.08 (0.04–0.12) |

★ : Inventory maintained in Japan.

SH type inserts

➤ A152–A158

CBN &amp; PCD inserts

➤ B040, B041, B054

This image shows a blank sheet of white paper designed as a memo template. At the top left, the word "Memo" is written in a large, bold, black sans-serif font. A thick horizontal black line runs across the entire width of the page directly beneath the title. The rest of the page is filled with horizontal dashed gray lines, providing space for writing. The lines are evenly spaced and extend from the left margin to the right edge of the page.



①Organised by product series.  
(Refer to the index on the next page.)

# E000

# TURNING TOOLS

## BORING BARS

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| DOUBLE CLAMP DIMPLE BAR .....     | E015 |
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| F TYPE BORING BARS .....          | E028 |
| S TYPE BORING BARS .....          | E031 |
| P TYPE BORING BARS .....          | E038 |
| M TYPE BORING BARS .....          | E042 |
| AL TYPE BORING BARS .....         | E043 |

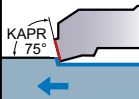
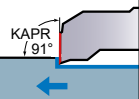
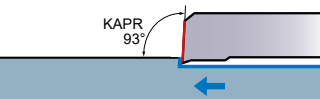
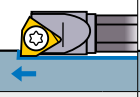
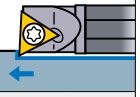
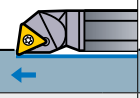
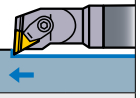
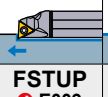
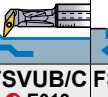
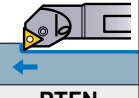
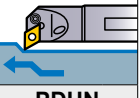
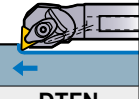
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| E016 A○○○-DTFN | E048 C-SCLP-C | E026 RBH      |
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| E040 A○○○PWLN  | E007 FSCLC/P  | E027 SBH      |
| E018 C○○○SCLC  | E011 FSDQC    | E025 SLV      |
| E033 C○○○SCLC  | E010 FSDUC    | E048 S-SCLC-C |
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| E018 C○○○SWUB  | E013 FSVUB/C  | E054 S-SWUC-C |
| E021 CB        | E030 FSWL1    |               |

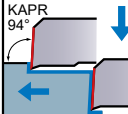
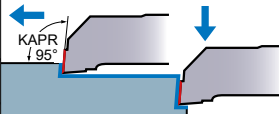
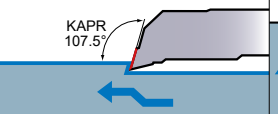
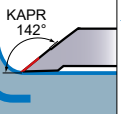
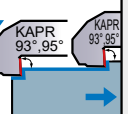
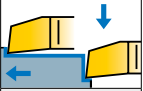
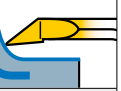
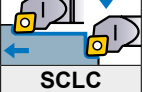
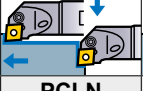
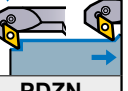
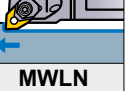


# CLASSIFICATION

| Name of Tool Holder                                                                                                                        | DMIN<br>Minimum<br>Cutting<br>Diameter | Features                                                                                                                                                                                                                                               | KAPR=75°                                                                            | KAPR=91°                                                                             | KAPR=93°                                                                              |                                                                                       |                                                                                     |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                                            |                                        |                                                                                                                                                                                                                                                        |    |    |    |                                                                                       |                                                                                     |                                                                                     |
| <b>MICRO-MINI TWIN Boring Bars</b><br>                    | Ø2.2<br>–<br>Ø8.2                      | <ul style="list-style-type: none"> <li>● Solid carbide type with two cutting edges.</li> <li>● Continuous cutting from boring to facing.</li> <li>● With or without a chipbreaker.</li> </ul>                                                          |                                                                                     |                                                                                      |                                                                                       |                                                                                       |                                                                                     |                                                                                     |
| <b>MICRO-DEX Boring Bars</b><br>(Carbide Shank)<br>       | Ø5<br>–<br>Ø8                          | <ul style="list-style-type: none"> <li>● 5°, 7° positive insert.</li> <li>● Carbide shank type.</li> <li>● Easy-to-use tool geometries.</li> <li>● Suitable for small workpieces.</li> <li>● l/d is 5 times the diameter.</li> </ul>                   |                                                                                     |                                                                                      |    |    |                                                                                     |                                                                                     |
| <b>F Type Boring Bars</b><br>                             | Ø5.8<br>–<br>Ø40                       | <ul style="list-style-type: none"> <li>● 11° positive insert.</li> <li>● Screw-on type and Clamp-on type.</li> <li>● l/d is 3 to 5 times the diameter.</li> <li>● FSWL type is 7° positive insert.</li> </ul>                                          |                                                                                     |                                                                                      |    |    |                                                                                     |                                                                                     |
| <b>DIMPLE BAR</b><br>                                    | Ø10<br>–<br>Ø40                        | <ul style="list-style-type: none"> <li>● 5°, 7°, 11° positive inserts.</li> <li>● Excellent vibration resistance due to a light dimple head.</li> <li>● l/d is 3 to 5 times the diameter (Carbide shank is 3 to 8 times the diameter).</li> </ul>      |                                                                                     |                                                                                      |    |    |  |  |
| <b>S Type Boring Bars</b><br>                           | Ø11<br>–<br>Ø50                        | <ul style="list-style-type: none"> <li>● ISO standard.</li> <li>● 7° positive insert.</li> <li>● Screw-on type.</li> <li>● l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).</li> </ul>                                        |  |  |  |  |                                                                                     |                                                                                     |
| <b>AL Type Boring Bars</b><br>(For Aluminium Alloy)<br> | Ø20<br>–<br>Ø32                        | <ul style="list-style-type: none"> <li>● Suitable for non-ferrous metal.</li> <li>● 20° positive insert.</li> <li>● Screw-on type.</li> <li>● l/d is 6 times the diameter.</li> <li>● Excellent vibration resistance.</li> </ul>                       |                                                                                     |  |                                                                                       |                                                                                       |                                                                                     |                                                                                     |
| <b>P Type Boring Bars</b><br>                           | Ø20<br>–<br>Ø70                        | <ul style="list-style-type: none"> <li>● ISO standard.</li> <li>● Economical negative insert.</li> <li>● Lever lock type, and pin lock type.</li> <li>● l/d is 3 times the diameter.</li> </ul>                                                        |  |  |  |                                                                                       |                                                                                     |                                                                                     |
| <b>DOUBLE CLAMP DIMPLE BAR</b><br>                      | Ø32<br>–<br>Ø50                        | <ul style="list-style-type: none"> <li>● Economical negative insert.</li> <li>● Single action type.</li> <li>● Excellent vibration resistance due to a light dimple head. (With coolant hole.)</li> <li>● l/d is 3 to 4 times the diameter.</li> </ul> |  |  |  |  |                                                                                     |                                                                                     |
| <b>M Type Boring Bars</b><br>                           | Ø63                                    | <ul style="list-style-type: none"> <li>● Negative trigon shape insert.</li> <li>● Double clamp type.</li> <li>● l/d is 3 times the diameter.</li> </ul>                                                                                                |                                                                                     |                                                                                      |                                                                                       |                                                                                       |                                                                                     |                                                                                     |

Note 1) Holders with blue colour symbol have an anti-vibration carbide shank. (Micro-dex boring bars are carbide shank only.)

Note 2) l/d represents the ratio of the projection length L to the cutting edge and the shank diameter d.

|  | KAPR=94°                                                                                               | KAPR=95°                                                                                                 | KAPR=107.5°—117.5°                                                                                    | KAPR=142°                                                                                              | KAPR=93°,95°                                                                                           | Selection Standard |                                     |                |                      |                      |              |             |                        |
|--|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------|----------------|----------------------|----------------------|--------------|-------------|------------------------|
|  |                       |                         |                      |                       |                      | Economical         | Low Cutting Resistance (Sharp edge) | Clamp Rigidity | Vibration Resistance | Operation Efficiency | Coolant Hole | Specialized | Small Diameter Cutting |
|  |                                                                                                        | <br>CBORS(-B)<br>➔ E021 |                                                                                                       | <br>CR<br>➔ E023      |                                                                                                        |                    | ◎                                   |                | ◎*                   |                      |              |             | ◎                      |
|  |                                                                                                        | <br>SCLC<br>➔ E018      |                                                                                                       |                                                                                                        |                                                                                                        |                    |                                     |                | ◎*                   |                      |              |             | ◎                      |
|  |                                                                                                        | <br>FSWL<br>➔ E030      |                                                                                                       |                                                                                                        |                                                                                                        |                    | ○                                   |                | ○*                   |                      |              |             | ○                      |
|  | <br>FSCLC/P<br>➔ E007 |                                                                                                          | <br>FSDQC<br>➔ E011  | <br>FSVPB/C<br>➔ E013 | <br>FSVJB/C<br>➔ E014 |                    | ◎                                   |                | ◎*                   | ◎                    | ◎*           |             |                        |
|  | <br>SCLC<br>➔ E033  |                                                                                                          | <br>SDQC<br>➔ E034 | <br>SVQC<br>➔ E035  | <br>SCZC<br>➔ E037 |                    | ○                                   |                | ○*                   |                      |              |             |                        |
|  |                                                                                                        |                                                                                                          |                                                                                                       |                                                                                                        |                                                                                                        |                    | ◎                                   |                | ○                    |                      |              | ◎           |                        |
|  | <br>PCLN<br>➔ E039  | <br>PWLN<br>➔ E040    | <br>PDQN<br>➔ E040 |                                                                                                        | <br>PDZN<br>➔ E041 |                    | ◎                                   | ○              |                      | ◎                    | ◎            |             |                        |
|  | <br>DCLN<br>➔ E015  | <br>DWLN<br>➔ E017    |                                                                                                       |                                                                                                        |                                                                                                        |                    | ◎                                   | ◎              |                      | ◎                    | ◎            |             |                        |
|  |                                                                                                        | <br>MWLN<br>➔ E042    |                                                                                                       |                                                                                                        |                                                                                                        |                    | ◎                                   | ◎              |                      | ○                    | ◎            |             |                        |

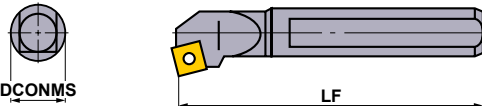
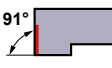
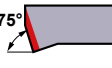
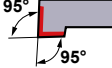
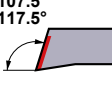
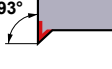
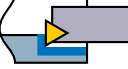
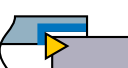
Note 3) ◎: 1st recommendation. ○: 2nd recommendation.  
Note 4) \* Indicates that the shank material is carbide.

E

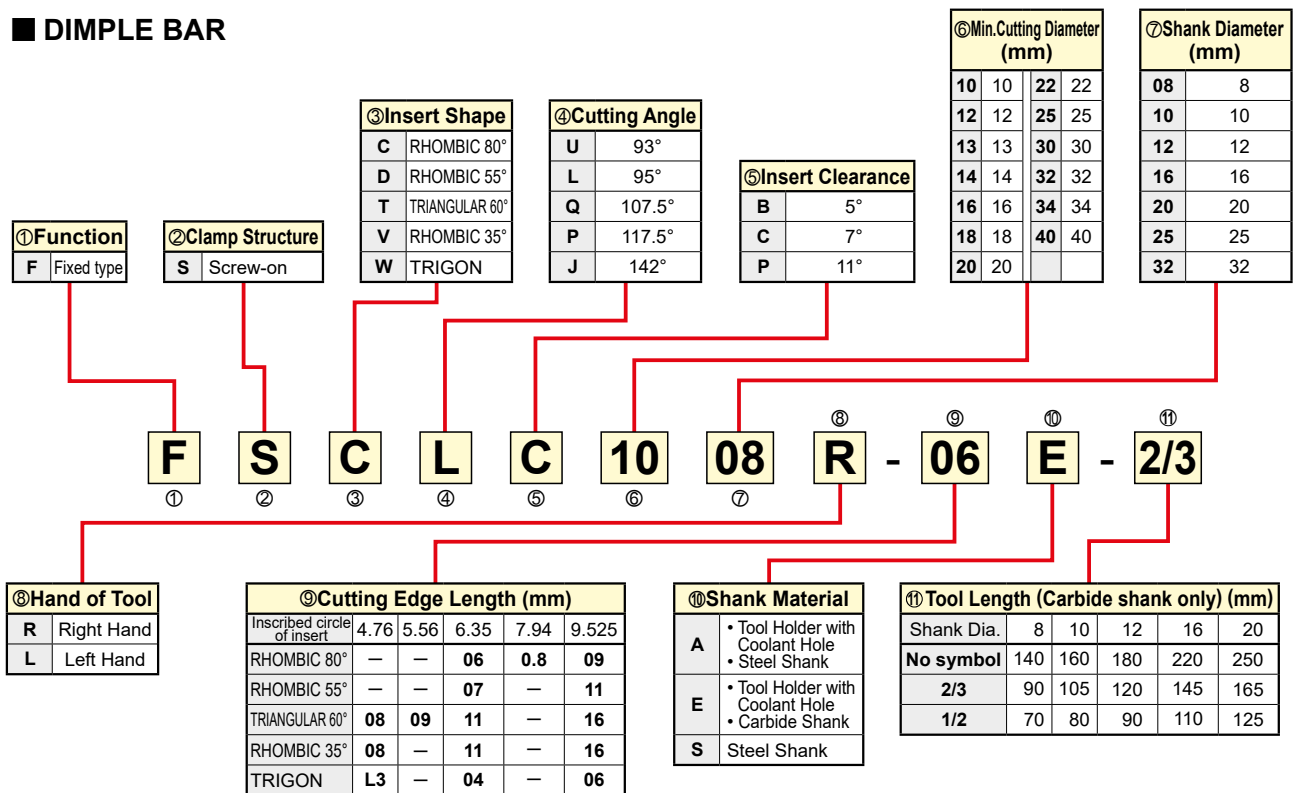
BORING BARS

## IDENTIFICATION

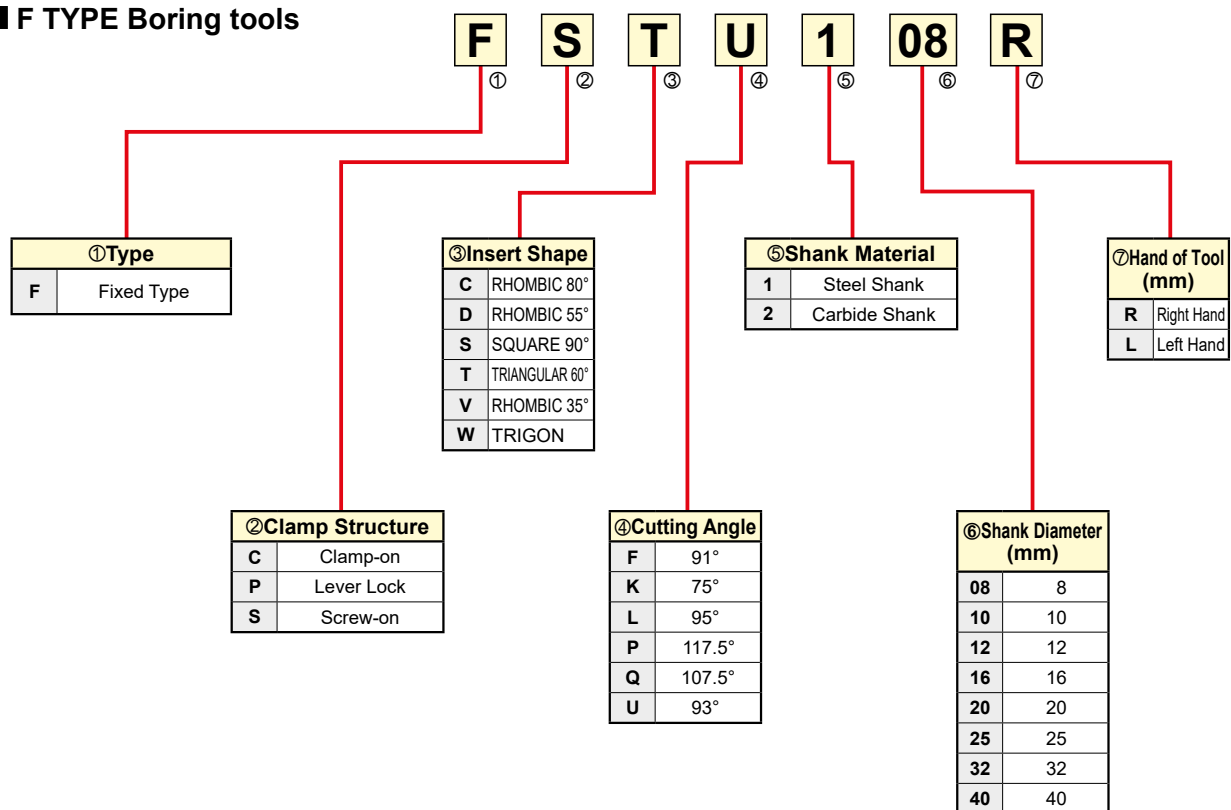
## ■ ISO CODES KEY-Boring Tools for Internal Machining

|                                                                                                      |                                                                                                 |                                                                                                 |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------|--|--|--|--|--|
|                                                                                                      |                                                                                                 |               |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>A</b><br>● Tool Holder with Coolant Hole<br>● Steel Shank                                         | <b>C</b><br>● Carbide Shank                                                                     | <b>08</b><br>Ø 8                                                                                | <b>F</b><br>80        |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      | <b>E</b><br>● Tool Holder with Coolant Hole<br>● Carbide Shank                                  | <b>10</b><br>Ø 10                                                                               | <b>H</b><br>100       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>12</b><br>Ø 12                                                                               | <b>K</b><br>125       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>16</b><br>Ø 16                                                                               | <b>M</b><br>150       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      | <b>S</b><br>● Steel Shank                                                                       | <b>20</b><br>Ø 20                                                                               | <b>Q</b><br>180       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>25</b><br>Ø 25                                                                               | <b>R</b><br>200       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>32</b><br>Ø 32                                                                               | <b>S</b><br>250       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>40</b><br>Ø 40                                                                               | <b>T</b><br>300       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>50</b><br>Ø 50                                                                               | <b>U</b><br>350       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>V</b><br>400                                                                                 |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| ① Shank Material                                                                                     |                                                                                                 | ② Shank Diameter DCONMS (mm)                                                                    | ③ Tool Length LF (mm) |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>M</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>P</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | <b>S</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
|                                                                                                      |                                                                                                 | ④ Clamping Method                                                                               |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>S</b> ① <b>16</b> ② <b>M</b> ③ <b>S</b> ④ <b>C</b> ⑤ <b>L</b> ⑥ <b>C</b> ⑦ <b>R</b> ⑧ <b>09</b> ⑨ |                                                                                                 |                                                                                                 |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| ⑤ Insert Shape                                                                                       |                                                                                                 | ⑥ Tool Style                                                                                    |                       | ⑦ Insert Normal Clearance                                                                                                                                                  |  | ⑨ Insert Size |  |  |  |  |  |
| <b>C</b><br>      | <b>F</b><br> | <b>C</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>D</b><br>      | <b>K</b><br> | <b>E</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>S</b><br>      | <b>L</b><br> | <b>N</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>T</b><br>      | <b>Q</b><br> | <b>P</b><br> |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |
| <b>V</b><br>      | <b>U</b><br> | ⑧ Hand of Tool                                                                                  |                       | <br> |  |               |  |  |  |  |  |
| <b>W</b><br>      | <b>Z</b><br> |                                                                                                 |                       |                                                                                                                                                                            |  |               |  |  |  |  |  |

## ■ DIMPLE BAR



## ■ F TYPE Boring tools

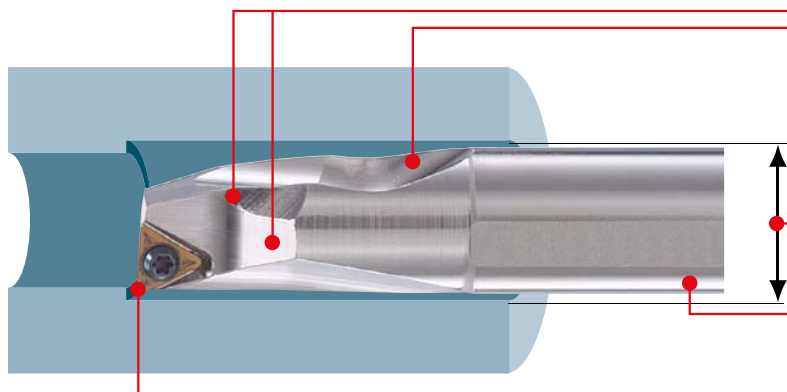


E

BORING BARS

# FEATURES OF DIMPLE BAR

Highly rigid steel shank and a lightweight head configuration. Designed by computer simulation analysis to reduce chatter and improve the vibration damping properties.



Chip disposal is improved by having two channels for chip evacuation.

The lightweight head with its large dimple reduces chatter.

Available in sizes smaller than the ISO standard. Therefore the boring of small diameter holes is possible.

The boring bar has a laser printed scale on the shank to facilitate easy installation.

"F and FS" chipbreakers improve the quality of the surface finish, "MV" chipbreaker offers excellent chip disposal. High wear resistant PCBN inserts are also available for the machining of hardened materials.

E

BORING BARS

## VIBRATION RESISTANCE

### ● DIMPLE BAR

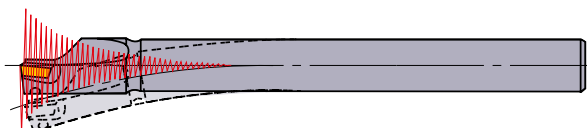
| Weight of the Head | Damping Time |
|--------------------|--------------|
| 49.7g              | 15.8ms       |



By reducing the weight of the head, the damping properties are increased.

### ● Conventional Product

| Weight of the Head | Damping Time |
|--------------------|--------------|
| 70.1g              | 20ms         |



\* The simulation data stated above was conducted with a FSCLP1816R-09A holder, under the following conditions;  $l/d=5$ , depth of cut=0.5mm, and feed=0.05mm/rev.

## How to use CCG/MT•CPG/MT•CPMX•TPG/MX type inserts

By changing the clamp screw, it is possible to use the inserts listed in the table below.

### Holder : FSCLC/P•FSCLC/P...E

| Insert Number       | Clamp Screw           |
|---------------------|-----------------------|
| CCG/MT0602 (Ø6.35)  | Can be used as it is. |
| CPG/MT0802 (Ø7.94)  | Change to TS3         |
| CPG/MT0903 (Ø9.525) | Change to TS4         |
| CPMX0802 (Ø7.94)    | Can be used as it is. |
| CPMX0903 (Ø9.525)   | Can be used as it is. |

### Holder : FSTUP•FSTUP...E

| Insert Number      | Clamp Screw         |
|--------------------|---------------------|
| TPG/MX0802 (Ø4.76) | Change to CS200T    |
| TPG/MX0902 (Ø5.56) | Change to CS250T    |
| TPG/MX1103 (Ø6.35) | Change to CS300890T |

\* If the screw is too long the please shorten as necessary.

Note 1) TPMT/W09, W11 types cannot be used due to a different clamp screw size.

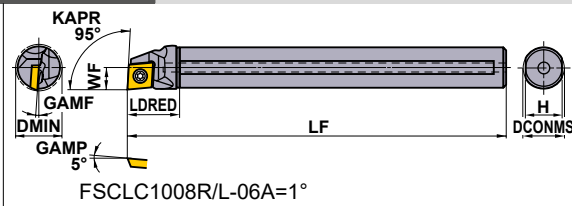
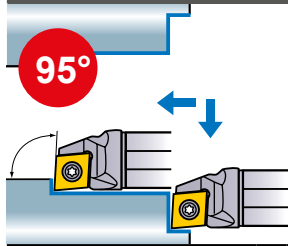


# DIMPLE BAR

- Excellent vibration resistance due to the light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 3 to 8 times the diameter).

## FSCLC/P

### CC<sup>○</sup> inserts, CP<sup>○</sup> inserts



FSCLC1008R/L-06A=1°

Right hand tool holder shown.

| Finish                                                                              | Finish                                                                              | Finish                                                                              | Light                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | FV                                                                                  | FM                                                                                  | SV                                                                                  |
|  |  |  |  |
| (06)                                                                                | (06,08,09)                                                                          | (06)                                                                                | (06,08,09)                                                                          |
| Light                                                                               | Medium                                                                              | Medium                                                                              | PCBN/PCD                                                                            |
| LP                                                                                  | MV                                                                                  | MP                                                                                  |                                                                                     |
|  |  |  |  |
| (06)                                                                                | (06,08,09)                                                                          | (06)                                                                                | (06,08,09)                                                                          |

| Order Number     | Coolant Hole | Stock |   | Insert Number                                      | Dimensions (mm)   |    |       |      |    |      |      | Maximum Recommendation<br>l/d Ratio |  *1 |  |        |
|------------------|--------------|-------|---|----------------------------------------------------|-------------------|----|-------|------|----|------|------|-------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                  |              | R     | L |                                                    | DCONMS            | LF | LDRED | WF   | H  | GAMF | DMIN |                                     | Clamp Screw                                                                            | Wrench                                                                              |        |
| FSCLC1008R/L-06A | ○            | ●     | ● | CC <sup>○</sup> B/H/T/W                            | 0602 <sup>○</sup> | 8  | 125   | 18   | 5  | 7.2  | 12°  | 10                                  | 3                                                                                      | TS253                                                                               | TKY08F |
| FSCLP1210R/L-08A | ○            | ●     | ● | CPMB<br>CPMH<br>CPMT*2<br>CPMX*2<br>CPGB<br>CPGT*2 | 0802 <sup>○</sup> | 10 | 150   | 22.5 | 6  | 9    | 5°   | 12                                  | 3.5                                                                                    | TS3D                                                                                | TKY10F |
| FSCLP1210R/L-08S | —            | ★     | ★ |                                                    | 0802 <sup>○</sup> | 10 | 150   | 22.5 | 6  | 9    | 5°   | 12                                  | 3.5                                                                                    | TS3D                                                                                | TKY10F |
| FSCLP1412R/L-08A | ○            | ●     | ● |                                                    | 0802 <sup>○</sup> | 12 | 150   | 27   | 7  | 11   | 4°   | 14                                  | 4                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1816R/L-09A | ○            | ●     | ● |                                                    | 0903 <sup>○</sup> | 16 | 180   | 36   | 9  | 15   | 3.5° | 18                                  | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP2220R/L-09A | ○            | ●     | ● |                                                    | 0903 <sup>○</sup> | 20 | 220   | 45   | 11 | 19   | 2°   | 22                                  | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP2220R-09S   | —            | ★     |   |                                                    | 0903 <sup>○</sup> | 20 | 220   | 45   | 11 | 19   | 2°   | 22                                  | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP3025R/L-09A | ○            | ●     | ● |                                                    | 0903 <sup>○</sup> | 25 | 250   | 56.3 | 15 | 23.4 | 0°   | 30                                  | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP3025R-09S   | —            | ★     |   |                                                    | 0903 <sup>○</sup> | 25 | 250   | 56.3 | 15 | 23.4 | 0°   | 30                                  | 5                                                                                      | TS4D                                                                                | TKY15F |

\*1 Clamp Torque (N • m) : TS253=1.0, TS3D=2.5, TS4D=3.5

\*2 By changing the clamp screw, it is possible to use the different insert. Please refer to page E006.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

E

BORING BARS

- : Inventory maintained.
- ★ : Inventory maintained in Japan.

|                              |                   |
|------------------------------|-------------------|
| CC <sup>○</sup> type inserts | > A140—A148       |
| CP <sup>○</sup> type inserts | > A149—A151       |
| PCBN & PCD inserts           | > B037—B039, B053 |

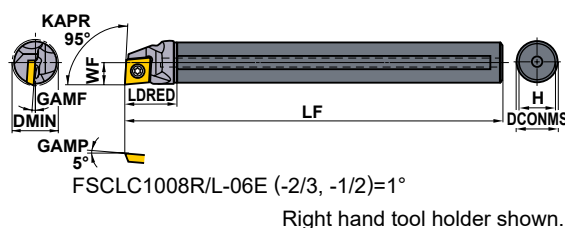
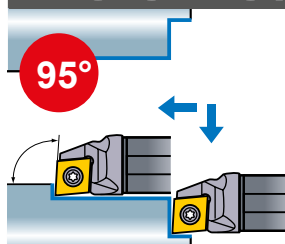
|                    |        |
|--------------------|--------|
| CUTTING CONDITIONS | > E014 |
| SPARE PARTS        | > N001 |
| TECHNICAL DATA     | > P001 |

E007

# DIMPLE BAR

- Excellent vibration resistance due to the light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 3 to 8 times the diameter).

## FSCLC/P.E

Carbide shank  
with coolant holeCC<sup>○</sup> inserts, CP<sup>○</sup> inserts

Right hand tool holder shown.

| Finish | Finish     | Finish | Light      |
|--------|------------|--------|------------|
| FP     | FV         | FM     | SV         |
|        |            |        |            |
| (06)   | (06,08,09) | (06)   | (06,08,09) |
| Light  | Medium     | Medium | PCBN/PCD   |
| LP     | MV         | MP     |            |
|        |            |        |            |
| (06)   | (06,08,09) | (06)   | (06,08,09) |

| Order Number       | Stock |   | Insert Number                                         |                   | Dimensions (mm) |     |       |    |     |      | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio |  *1 |  |        |
|--------------------|-------|---|-------------------------------------------------------|-------------------|-----------------|-----|-------|----|-----|------|------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                    | R     | L |                                                       |                   | DCONMS          | LF  | LDRED | WF | H   | GAMF |                                                | DMIN                                                                                   | Clamp<br>Screw                                                                      | Wrench |
| FSCLC1008R/L-06E   | ●     | ● | CC <sup>○</sup> B                                     | 0602 <sup>○</sup> | 8               | 140 | 13.8  | 5  | 7.2 | 12°  | 10                                             | 7                                                                                      | TS253                                                                               | TKY08F |
| FSCLC1008R-06E-2/3 | ●     |   | CC <sup>○</sup> H                                     | 0602 <sup>○</sup> | 8               | 90  | 13.8  | 5  | 7.2 | 12°  | 10                                             | 5                                                                                      | TS253                                                                               | TKY08F |
| FSCLC1008R-06E-1/2 | ●     |   | CC <sup>○</sup> T<br>CC <sup>○</sup> W                | 0602 <sup>○</sup> | 8               | 70  | 13.8  | 5  | 7.2 | 12°  | 10                                             | 3                                                                                      | TS253                                                                               | TKY08F |
| FSCLP1210R/L-08E   | ●     | ● | CPMB<br>CPMH<br>CPMT *2<br>CPMX *2<br>CPGB<br>CPGT *2 | 0802 <sup>○</sup> | 10              | 160 | 16.0  | 6  | 9   | 5°   | 12                                             | 7.5                                                                                    | TS3D                                                                                | TKY10F |
| FSCLP1210R-08E-2/3 | ●     |   |                                                       | 0802 <sup>○</sup> | 10              | 105 | 16.0  | 6  | 9   | 5°   | 12                                             | 5                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1210R-08E-1/2 | ●     |   |                                                       | 0802 <sup>○</sup> | 10              | 80  | 16.0  | 6  | 9   | 5°   | 12                                             | 3                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1412R/L-08E   | ●     | ● |                                                       | 0802 <sup>○</sup> | 12              | 180 | 17.8  | 7  | 11  | 4°   | 14                                             | 8                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1412R-08E-2/3 | ●     |   |                                                       | 0802 <sup>○</sup> | 12              | 120 | 17.8  | 7  | 11  | 4°   | 14                                             | 5                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1412R-08E-1/2 | ●     |   |                                                       | 0802 <sup>○</sup> | 12              | 90  | 17.8  | 7  | 11  | 4°   | 14                                             | 3                                                                                      | TS3D                                                                                | TKY10F |
| FSCLP1816R/L-09E   | ●     | ● |                                                       | 0903 <sup>○</sup> | 16              | 220 | 21.8  | 9  | 15  | 3.5° | 18                                             | 8                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP1816R-09E-2/3 | ●     |   |                                                       | 0903 <sup>○</sup> | 16              | 145 | 21.8  | 9  | 15  | 3.5° | 18                                             | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP1816R-09E-1/2 | ●     |   |                                                       | 0903 <sup>○</sup> | 16              | 110 | 21.8  | 9  | 15  | 3.5° | 18                                             | 3                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP2220R/L-09E   | ●     | ● |                                                       | 0903 <sup>○</sup> | 20              | 250 | 24.0  | 11 | 19  | 2°   | 22                                             | 8                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP2220R-09E-2/3 | ★     |   |                                                       | 0903 <sup>○</sup> | 20              | 165 | 24.0  | 11 | 19  | 2°   | 22                                             | 5                                                                                      | TS4D                                                                                | TKY15F |
| FSCLP2220R-09E-1/2 | ★     |   |                                                       | 0903 <sup>○</sup> | 20              | 125 | 24.0  | 11 | 19  | 2°   | 22                                             | 3                                                                                      | TS4D                                                                                | TKY15F |

\*1 Clamp Torque (N • m) : TS253=1.0, TS3D=2.5, TS4D=3.5

\*2 By changing the clamp screw, it is possible to use the different insert. Please refer to page E006.

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

| FSTUP                         |       | With coolant hole |                                                  | TP $\circ$ inserts |                 |     |       |    |      |      | Finish                              |      | Light                   |        | Medium                  |  |
|-------------------------------|-------|-------------------|--------------------------------------------------|--------------------|-----------------|-----|-------|----|------|------|-------------------------------------|------|-------------------------|--------|-------------------------|--|
|                               |       |                   |                                                  |                    |                 |     |       |    |      |      | FV<br><br>(08,09,11,16)             |      | SV<br><br>(08,09,11,16) |        | MV<br><br>(08,09,11,16) |  |
|                               |       |                   |                                                  |                    |                 |     |       |    |      |      | PCD                                 |      | PCBN                    |        |                         |  |
|                               |       |                   |                                                  |                    |                 |     |       |    |      |      | R/L-F<br>                           |      |                         |        |                         |  |
|                               |       |                   |                                                  |                    |                 |     |       |    |      |      |                                     |      |                         |        |                         |  |
| Right hand tool holder shown. |       |                   |                                                  |                    |                 |     |       |    |      |      | (08,09,11,16)                       |      | (08,09,11,16)           |        |                         |  |
| Order Number                  | Stock |                   | Insert Number                                    |                    | Dimensions (mm) |     |       |    |      |      | Maximum Recommendation<br>l/d Ratio | *1   |                         |        |                         |  |
|                               | R     | L                 |                                                  |                    | DCONMS          | LF  | LDRED | WF | H    | GAMF |                                     | DMIN | Clamp Screw             | Wrench |                         |  |
| FSTUP1008R/L-08A              | ●     | ●                 | TPMB<br>TPMH<br>TPMX*2<br>TPGB<br>TPGH<br>TPGX*2 | 0802 $\circ$       | 8               | 125 | 18    | 5  | 7.2  | 10°  | 10                                  | 3    | TS2D                    | TKY06F |                         |  |
| FSTUP1210R/L-09A              | ●     | ●                 |                                                  | 0902 $\circ$       | 10              | 150 | 22.5  | 6  | 9    | 8°   | 12                                  | 3.5  | TS25D                   | TKY08F |                         |  |
| FSTUP1412R/L-09A              | ●     | ●                 |                                                  | 0902 $\circ$       | 12              | 150 | 27    | 7  | 11   | 7°   | 14                                  | 4    | TS25D                   | TKY08F |                         |  |
| FSTUP1816R/L-11A              | ●     | ●                 |                                                  | 1103 $\circ$       | 16              | 180 | 36    | 9  | 15   | 4°   | 18                                  | 5    | TS31D                   | TKY10F |                         |  |
| FSTUP2220R/L-11A              | ●     | ●                 |                                                  | 1103 $\circ$       | 20              | 220 | 45    | 11 | 19   | 0°   | 22                                  | 5    | TS31D                   | TKY10F |                         |  |
| FSTUP3225R/L-16A <sup>☆</sup> | ●     | ●                 |                                                  | 1603 $\circ$       | 25              | 270 | 56.3  | 16 | 23.4 | 0°   | 32                                  | 5    | TS4D                    | TKY15F |                         |  |

\*1 Clamp Torque (N · m) : TS2D=0.6, TS25D=1.0, TS31D=2.5, TS4D=3.5

\*2 By changing the clamp screw, it is possible to use the different insert. Please refer to page E006.

| FSTUP_E            |  | Carbide shank<br>with coolant hole |   | TP $\circ$ inserts                               |              |                 |     |       |    |     | Finish           |                                                | Light            |                | Medium           |  |
|--------------------|--|------------------------------------|---|--------------------------------------------------|--------------|-----------------|-----|-------|----|-----|------------------|------------------------------------------------|------------------|----------------|------------------|--|
|                    |  |                                    |   |                                                  |              |                 |     |       |    |     | FV<br>(08,09,11) |                                                | SV<br>(08,09,11) |                | MV<br>(08,09,11) |  |
|                    |  |                                    |   |                                                  |              |                 |     |       |    |     | PCD              |                                                | PCBN             |                |                  |  |
|                    |  |                                    |   |                                                  |              |                 |     |       |    |     | R/L-F            |                                                |                  |                |                  |  |
|                    |  |                                    |   |                                                  |              |                 |     |       |    |     |                  |                                                |                  |                |                  |  |
|                    |  |                                    |   | Right hand tool holder shown.                    |              |                 |     |       |    |     | (08,09,11)       |                                                | (08,09,11)       |                |                  |  |
| Order Number       |  | Stock                              |   | Insert Number                                    |              | Dimensions (mm) |     |       |    |     |                  | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio | ★1               |                |                  |  |
|                    |  | R                                  | L |                                                  |              | DCONMS          | LF  | LDRED | WF | H   | GAMF             |                                                | DMIN             | Clamp<br>Screw | Wrench           |  |
| FSTUP1008R/L-08E   |  | ●                                  | ● | TPMB<br>TPMH<br>TPMX★2<br>TPGB<br>TPGH<br>TPGX★2 | 0802 $\circ$ | 8               | 140 | 13.8  | 5  | 7.2 | 10°              | 10                                             | 7                | TS2D           | TKY06F           |  |
| FSTUP1008R-08E-2/3 |  | ●                                  | ● |                                                  | 0802 $\circ$ | 8               | 90  | 13.8  | 5  | 7.2 | 10°              | 10                                             | 5                | TS2D           | TKY06F           |  |
| FSTUP1008R-08E-1/2 |  | ●                                  | ● |                                                  | 0802 $\circ$ | 8               | 70  | 13.8  | 5  | 7.2 | 10°              | 10                                             | 3                | TS2D           | TKY06F           |  |
| FSTUP1210R/L-09E   |  | ●                                  | ● |                                                  | 0902 $\circ$ | 10              | 160 | 16.0  | 6  | 9   | 8°               | 12                                             | 7.5              | TS25D          | TKY08F           |  |
| FSTUP1210R-09E-2/3 |  | ●                                  | ● |                                                  | 0902 $\circ$ | 10              | 105 | 16.0  | 6  | 9   | 8°               | 12                                             | 5                | TS25D          | TKY08F           |  |
| FSTUP1210R-09E-1/2 |  | ●                                  | ● |                                                  | 0902 $\circ$ | 10              | 80  | 16.0  | 6  | 9   | 8°               | 12                                             | 3                | TS25D          | TKY08F           |  |
| FSTUP1412R/L-09E   |  | ●                                  | ● |                                                  | 0902 $\circ$ | 12              | 180 | 17.8  | 7  | 11  | 7°               | 14                                             | 8                | TS25D          | TKY08F           |  |
| FSTUP1412R-09E-2/3 |  | ●                                  | ● |                                                  | 0902 $\circ$ | 12              | 120 | 17.8  | 7  | 11  | 7°               | 14                                             | 5                | TS25D          | TKY08F           |  |
| FSTUP1412R-09E-1/2 |  | ●                                  | ● |                                                  | 0902 $\circ$ | 12              | 90  | 17.8  | 7  | 11  | 7°               | 14                                             | 3                | TS25D          | TKY08F           |  |
| FSTUP1816R/L-11E   |  | ●                                  | ● |                                                  | 1103 $\circ$ | 16              | 220 | 21.8  | 9  | 15  | 4°               | 18                                             | 8                | TS31D          | TKY10F           |  |
| FSTUP1816R-11E-2/3 |  | ●                                  | ● |                                                  | 1103 $\circ$ | 16              | 145 | 21.8  | 9  | 15  | 4°               | 18                                             | 5                | TS31D          | TKY10F           |  |
| FSTUP1816R-11E-1/2 |  | ●                                  | ● |                                                  | 1103 $\circ$ | 16              | 110 | 21.8  | 9  | 15  | 4°               | 18                                             | 3                | TS31D          | TKY10F           |  |
| FSTUP2220R/L-11E   |  | ●                                  | ● |                                                  | 1103 $\circ$ | 20              | 250 | 24.0  | 11 | 19  | 0°               | 22                                             | 8                | TS31D          | TKY10F           |  |
| FSTUP2220R-11E-2/3 |  | ●                                  | ● |                                                  | 1103 $\circ$ | 20              | 165 | 24.0  | 11 | 19  | 0°               | 22                                             | 5                | TS31D          | TKY10F           |  |
| FSTUP2220R-11E-1/2 |  | ●                                  | ● |                                                  | 1103 $\circ$ | 20              | 125 | 24.0  | 11 | 19  | 0°               | 22                                             | 3                | TS31D          | TKY10F           |  |

\*1 Clamp Torque (N · m) : TS2D=0.6, TS25D=1.0, TS31D=2.5

\*2 By changing the clamp screw, it is possible to use the different insert. Please refer to page E006.

TP $\circ$  type inserts > A170—A173  
PCBN & PCD inserts > B043, B044, B056

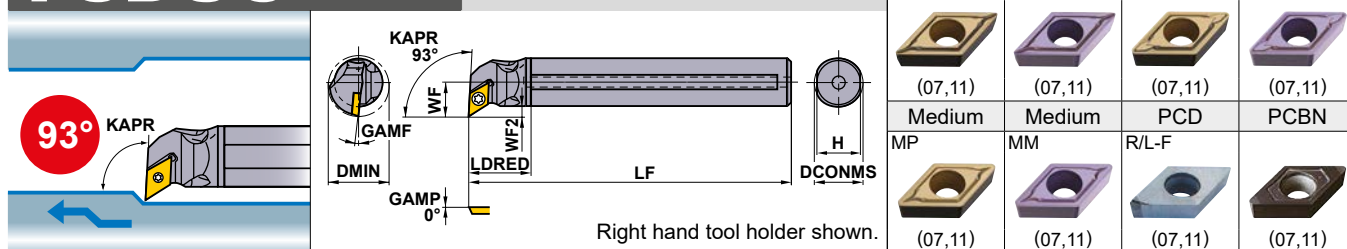
CUTTING CONDITIONS > E014  
SPARE PARTS > N001  
TECHNICAL DATA > P001

# DIMPLE BAR

- Excellent vibration resistance due to the light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 3 to 8 times the diameter).

## FSDUC

### DC $\odot$ inserts



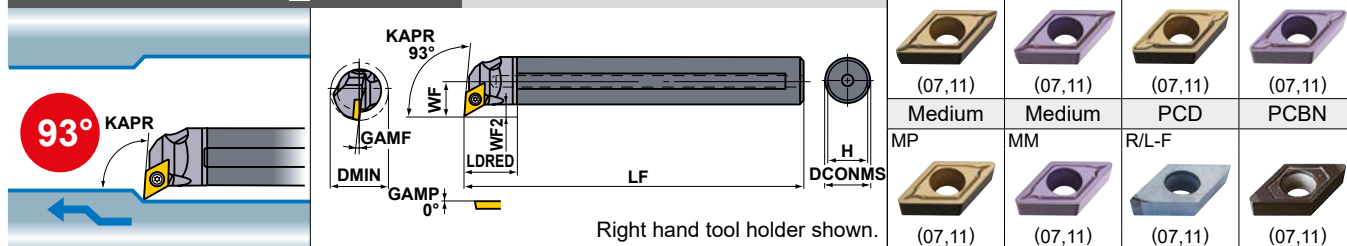
| Order Number                  | Coolant Hole | Stock |   | Insert Number                        | Dimensions (mm) |    |       |      |      |     |      |      | Maximum Recommendation<br>l/d Ratio | *<br> |      |  |
|-------------------------------|--------------|-------|---|--------------------------------------|-----------------|----|-------|------|------|-----|------|------|-------------------------------------|------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|
|                               |              | R     | L |                                      | DCONMS          | LF | LDRED | WF   | WF2  | H   | GAMF | DMIN |                                     | Clamp Screw                                                                              |      |                                                                                     |
|                               |              |       |   |                                      |                 |    |       |      |      |     |      |      |                                     |                                                                                          |      |                                                                                     |
| FSDUC1410R/L-07A              | ○            | ●     | ● | DCMT<br>DCMW<br>DCGT<br>DCGW<br>DCET | 0702○○          | 10 | 150   | 18   | 8.3  | 3.3 | 9    | 7.5° | 14                                  | 3.5                                                                                      | TS25 | TKY08F                                                                              |
| FSDUC1410L-07S                | —            |       | ★ |                                      | 0702○○          | 10 | 150   | 18   | 8.3  | 3.3 | 9    | 7.5° | 14                                  | 3.5                                                                                      | TS25 | TKY08F                                                                              |
| FSDUC1612R/L-07A              | ○            | ●     | ● |                                      | 0702○○          | 12 | 150   | 20   | 9.3  | 3.3 | 11   | 6°   | 16                                  | 4                                                                                        | TS25 | TKY08F                                                                              |
| FSDUC2016R/L-07A              | ○            | ●     | ● |                                      | 0702○○          | 16 | 180   | 20   | 11.3 | 3.3 | 15   | 5°   | 20                                  | 5                                                                                        | TS25 | TKY08F                                                                              |
| FSDUC3220R/L-11A <sup>☆</sup> | ○            | ●     | ● |                                      | 11T3○○          | 20 | 180   | 22.5 | 16.1 | 6.1 | 19   | 5°   | 32                                  | 5                                                                                        | TS43 | TKY15F                                                                              |

★ Clamp Torque (N · m) : TS25=1.0, TS43=3.5

## FSDUC\_E

Carbide shank with coolant hole

### DC $\odot$ inserts



| Order Number                  | Stock |   | Insert Number                        |              | Dimensions (mm) |     |       |      |     |    |      | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio |  * |  |        |
|-------------------------------|-------|---|--------------------------------------|--------------|-----------------|-----|-------|------|-----|----|------|------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|                               | R     | L |                                      |              | DCONMS          | LF  | LDRED | WF   | WF2 | H  | GAMF |                                                |                                                                                         |                                                                                       | DMIN   |
|                               |       |   |                                      |              |                 |     |       |      |     |    |      |                                                |                                                                                         |                                                                                       |        |
| FSDUC1410R/L-07E              | ●     | ★ | DCMT<br>DCMW<br>DCGT<br>DCGW<br>DCET | 0702 $\odot$ | 10              | 160 | 16.0  | 8.3  | 3.3 | 9  | 7.5° | 14                                             | 7.5                                                                                     | TS25                                                                                  | TKY08F |
| FSDUC1612R/L-07E              | ●     | ★ |                                      | 0702 $\odot$ | 12              | 180 | 17.8  | 9.3  | 3.3 | 11 | 6.0° | 16                                             | 8                                                                                       | TS25                                                                                  | TKY08F |
| FSDUC2016R/L-07E              | ●     | ★ |                                      | 0702 $\odot$ | 16              | 220 | 21.8  | 11.3 | 3.3 | 15 | 5.0° | 20                                             | 8                                                                                       | TS25                                                                                  | TKY08F |
| FSDUC3220R/L-11E <sup>☆</sup> | ★     | ★ |                                      | 11T3 $\odot$ | 20              | 250 | 24.0  | 16.1 | 6.1 | 19 | 5.0° | 32                                             | 8                                                                                       | TS43                                                                                  | TKY15F |

★ Clamp Torque (N · m) : TS25=1.0, TS43=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ★ Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

| FSDQC                         |       |   |               | With coolant hole |                 | DC $\odot$ inserts |       |      |     |    |      | Finish  |                                  | Finish  |        | Light       |        | Light   |  |
|-------------------------------|-------|---|---------------|-------------------|-----------------|--------------------|-------|------|-----|----|------|---------|----------------------------------|---------|--------|-------------|--------|---------|--|
|                               |       |   |               |                   |                 |                    |       |      |     |    |      | FP      |                                  | FM      |        | LP          |        | LM      |  |
|                               |       |   |               |                   |                 |                    |       |      |     |    |      | (07,11) |                                  | (07,11) |        | (07,11)     |        | (07,11) |  |
|                               |       |   |               |                   |                 |                    |       |      |     |    |      | Medium  |                                  | Medium  |        | PCD         |        | PCBN    |  |
|                               |       |   |               |                   |                 |                    |       |      |     |    |      | MP      |                                  | MM      |        | R/L-F       |        |         |  |
|                               |       |   |               |                   |                 |                    |       |      |     |    |      | (07,11) |                                  | (07,11) |        | (07,11)     |        | (07,11) |  |
| Order Number                  | Stock |   | Insert Number |                   | Dimensions (mm) |                    |       |      |     |    |      |         | Maximum Recommendation I/d Ratio | *       |        |             |        |         |  |
|                               | R     | L |               |                   | DCONMS          | LF                 | LDRED | WF   | WF2 | H  | GAMF | DMIN    |                                  |         |        | Clamp Screw | Wrench |         |  |
| FSDQC1310R/L-07A              | ●     | ● | DCMT          | 0702 $\odot$      | 10              | 150                | 20.5  | 7.6  | 2.6 | 9  | 8°   | 13      | 3.5                              | TS25    | TKY08F |             |        |         |  |
| FSDQC1612R/L-07A              | ●     | ● | DCMW          | 0702 $\odot$      | 12              | 150                | 22.5  | 8.6  | 2.6 | 11 | 6°   | 16      | 4                                | TS25    | TKY08F |             |        |         |  |
| FSDQC2016R/L-07A              | ●     | ● | DCGT          | 0702 $\odot$      | 16              | 180                | 22.5  | 10.6 | 2.6 | 15 | 5°   | 20      | 5                                | TS25    | TKY08F |             |        |         |  |
| FSDQC2520R/L-11A <sup>☆</sup> | ●     | ● | DCGW          | 0702 $\odot$      | 20              | 180                | 26    | 13.7 | 3.7 | 19 | 7°   | 25      | 5                                | TS43    | TKY15F |             |        |         |  |
|                               | ●     | ● | DCET          | 11T3 $\odot$      |                 |                    |       |      |     |    |      |         |                                  |         |        |             |        |         |  |

<sup>☆</sup> Clamp Torque (N • m) : TS25=1.0, TS43=3.5

| FSDQC_E           |       |   |                                      | Carbide shank<br>with coolant hole |    | DC $\odot$ inserts |      |      |     |      |      | Finish                                         |     | Finish  |                | Light   |  | Light   |  |
|-------------------|-------|---|--------------------------------------|------------------------------------|----|--------------------|------|------|-----|------|------|------------------------------------------------|-----|---------|----------------|---------|--|---------|--|
|                   |       |   |                                      |                                    |    |                    |      |      |     |      |      | FP                                             |     | FM      |                | LP      |  | LM      |  |
|                   |       |   |                                      |                                    |    |                    |      |      |     |      |      | (07,11)                                        |     | (07,11) |                | (07,11) |  | (07,11) |  |
|                   |       |   |                                      |                                    |    |                    |      |      |     |      |      | Medium                                         |     | Medium  |                | PCD     |  | PCBN    |  |
|                   |       |   |                                      |                                    |    |                    |      |      |     |      |      | MP                                             |     | MM      |                | R/L-F   |  |         |  |
|                   |       |   |                                      |                                    |    |                    |      |      |     |      |      | (07,11)                                        |     | (07,11) |                | (07,11) |  | (07,11) |  |
| Order Number      | Stock |   | Insert Number                        | Dimensions (mm)                    |    |                    |      |      |     |      |      | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio | *   |         |                |         |  |         |  |
|                   | R     | L |                                      | DCONMS                             | LF | LDRED              | WF   | WF2  | H   | GAMF | DMIN |                                                |     |         | Clamp<br>Screw | Wrench  |  |         |  |
| FSDQC1310R/L-07E  | ●     | ● | DCMT<br>DCMW<br>DCGT<br>DCGW<br>DCET | 0702 $\odot$                       | 10 | 162                | 18.4 | 7.6  | 2.6 | 9    | 8°   | 13                                             | 7.5 | TS25    | TKY08F         |         |  |         |  |
| FSDQC1612R/L-07E  | ●     | ● |                                      | 0702 $\odot$                       | 12 | 182                | 20.2 | 8.6  | 2.6 | 11   | 6°   | 16                                             | 8   | TS25    | TKY08F         |         |  |         |  |
| FSDQC2016R/L-07E  | ●     | ● |                                      | 0702 $\odot$                       | 16 | 222                | 24.2 | 10.6 | 2.6 | 15   | 5°   | 20                                             | 8   | TS25    | TKY08F         |         |  |         |  |
| FSDQC2520R/L-11E☆ | ●     | ● |                                      | 11T3 $\odot$                       | 20 | 254                | 28.0 | 13.7 | 3.7 | 19   | 7°   | 25                                             | 8   | TS43    | TKY15F         |         |  |         |  |

<sup>☆</sup> Clamp Torque (N • m) : TS25=1.0, TS43=3.5

E

BORING BARS



# BORING BARS

## DIMPLE BAR

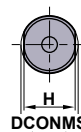
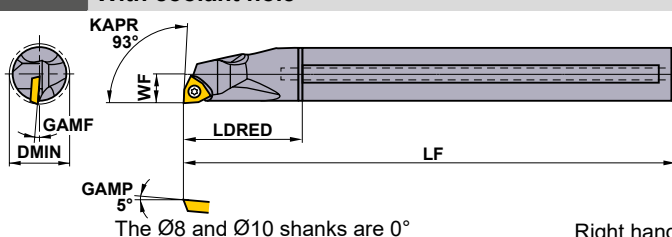
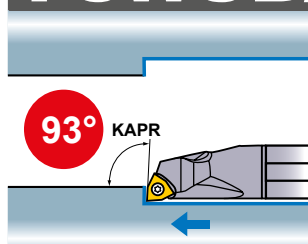
- Excellent vibration resistance due to the light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 3 to 8 times the diameter).

### FSWUB/P

With coolant hole

WB○ inserts, WP○ inserts

Finish  
R/L-F-FS



Medium

MV



(L3,04,06)

The Ø8 and Ø10 shanks are 0°

Right hand tool holder shown.

| Order Number                   | Stock |   | Insert Number |                   | Dimensions (mm) |     |       |    |      |      |      | Maximum Recommendation<br>l/d Ratio | <br>Clamp Screw | <br>Wrench |
|--------------------------------|-------|---|---------------|-------------------|-----------------|-----|-------|----|------|------|------|-------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|                                | R     | L |               |                   | DCONMS          | LF  | LDRED | WF | H    | GAMF | DMIN |                                     |                                                                                                    |                                                                                               |
|                                |       |   |               |                   |                 |     |       |    |      |      |      |                                     |                                                                                                    |                                                                                               |
| FSWUB1008R/L-L3A <sup>☆1</sup> | ●     | ● | WBMT<br>WBGT  | L302 <sup>○</sup> | 8               | 125 | 18    | 5  | 7.2  | 14°  | 10   | 3                                   | TS2                                                                                                | TKY06F                                                                                        |
| FSWUB1210R/L-L3A <sup>☆1</sup> | ●     | ● |               | L302 <sup>○</sup> | 10              | 150 | 22.5  | 6  | 9    | 11°  | 12   | 3.5                                 | TS2                                                                                                | TKY06F                                                                                        |
| FSWUP1412R/L-04A               | ●     | ● | WPMT<br>WPGT  | 0402 <sup>○</sup> | 12              | 150 | 27    | 7  | 11   | 4°   | 14   | 4                                   | TS253                                                                                              | TKY08F                                                                                        |
| FSWUP1816R/L-04A               | ●     | ● |               | 0402 <sup>○</sup> | 16              | 180 | 36    | 9  | 15   | 1°   | 18   | 5                                   | TS253                                                                                              | TKY08F                                                                                        |
| FSWUP2220R/L-06A <sup>☆2</sup> | ●     | ● |               | 0603 <sup>○</sup> | 20              | 220 | 45    | 11 | 19   | 2°   | 22   | 5                                   | TS4                                                                                                | TKY15F                                                                                        |
| FSWUP3025R/L-06A <sup>☆2</sup> | ●     | ● |               | 0603 <sup>○</sup> | 25              | 250 | 56.3  | 15 | 23.4 | 0°   | 30   | 5                                   | TS4                                                                                                | TKY15F                                                                                        |

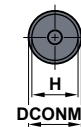
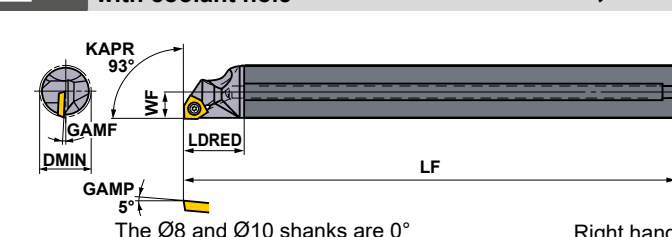
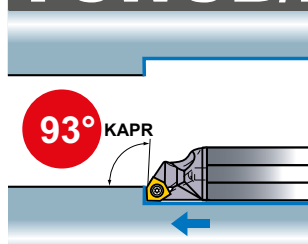
\* Clamp Torque (N · m) : TS2=0.6, TS253=1.0, TS4=3.5

### FSWUB/P\_E

Carbide shank with coolant hole

WB○ inserts, WP○ inserts

Finish  
R/L-F-FS



Medium

MV



(L3,04,06)

The Ø8 and Ø10 shanks are 0°

Right hand tool holder shown.

| Order Number                      | Stock |   | Insert Number |                   | Dimensions (mm) |     |       |    |     |      | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio |  |  |        |
|-----------------------------------|-------|---|---------------|-------------------|-----------------|-----|-------|----|-----|------|------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|                                   | R     | L |               |                   | DCONMS          | LF  | LDRED | WF | H   | GAMF |                                                |                                                                                       |                                                                                       | DMIN   |
|                                   |       |   |               |                   |                 |     |       |    |     |      |                                                |                                                                                       |                                                                                       |        |
| FSWUB1008R/L-L3E <sup>☆1</sup>    | ★     | ★ | WBMT<br>WBGT  | L302 <sup>1</sup> | 8               | 140 | 13.8  | 5  | 7.2 | 14°  | 10                                             | 7                                                                                     | TS2                                                                                   | TKY06F |
| FSWUB1008R-L3E-2/3 <sup>☆1</sup>  | ★     |   |               | L302 <sup>1</sup> | 8               | 90  | 13.8  | 5  | 7.2 | 14°  | 10                                             | 5                                                                                     | TS2                                                                                   | TKY06F |
| FSWUB1008R-L3E-1/2 <sup>☆1</sup>  | ★     |   |               | L302 <sup>1</sup> | 8               | 70  | 13.8  | 5  | 7.2 | 14°  | 10                                             | 3                                                                                     | TS2                                                                                   | TKY06F |
| FSWUB1210R/L-L3E <sup>☆1</sup>    | ★     | ★ |               | L302 <sup>1</sup> | 10              | 160 | 16.0  | 6  | 9   | 11°  | 12                                             | 7.5                                                                                   | TS2                                                                                   | TKY06F |
| FSWUB1210R-L3E-2/3 <sup>☆1</sup>  | ★     |   |               | L302 <sup>1</sup> | 10              | 105 | 16.0  | 6  | 9   | 11°  | 12                                             | 5                                                                                     | TS2                                                                                   | TKY06F |
| FSWUB1210R-L3E-1/2 <sup>☆1</sup>  | ★     |   |               | L302 <sup>1</sup> | 10              | 80  | 16.0  | 6  | 9   | 11°  | 12                                             | 3                                                                                     | TS2                                                                                   | TKY06F |
| FSWUP1412R/L-04E                  | ★     | ★ | WPMT<br>WPGT  | 0402 <sup>1</sup> | 12              | 180 | 17.8  | 7  | 11  | 4°   | 14                                             | 8                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP1412R-04E-2/3                | ★     |   |               | 0402 <sup>1</sup> | 12              | 120 | 17.8  | 7  | 11  | 4°   | 14                                             | 5                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP1412R-04E-1/2                | ★     |   |               | 0402 <sup>1</sup> | 12              | 90  | 17.8  | 7  | 11  | 4°   | 14                                             | 3                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP1816R/L-04E                  | ★     | ★ |               | 0402 <sup>1</sup> | 16              | 220 | 21.8  | 9  | 15  | 1°   | 18                                             | 8                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP1816R-04E-2/3                | ★     |   |               | 0402 <sup>1</sup> | 16              | 145 | 21.8  | 9  | 15  | 1°   | 18                                             | 5                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP1816R-04E-1/2                | ★     |   |               | 0402 <sup>1</sup> | 16              | 110 | 21.8  | 9  | 15  | 1°   | 18                                             | 3                                                                                     | TS253                                                                                 | TKY08F |
| FSWUP2220R/L-06E <sup>☆2</sup>    | ★     | ★ |               | 0603 <sup>1</sup> | 20              | 250 | 24.0  | 11 | 19  | 2°   | 22                                             | 8                                                                                     | TS4                                                                                   | TKY15F |
| FSWUP 2220R-06E-2/3 <sup>☆2</sup> | ★     |   |               | 0603 <sup>1</sup> | 20              | 165 | 24.0  | 11 | 19  | 2°   | 22                                             | 5                                                                                     | TS4                                                                                   | TKY15F |
| FSWUP 2220R-06E-1/2               | ★     |   |               | 0603 <sup>1</sup> | 20              | 125 | 24.0  | 11 | 19  | 2°   | 22                                             | 3                                                                                     | TS4                                                                                   | TKY15F |

\* Clamp Torque (N · m) : TS2=0.6, TS253=1.0, TS4=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆1 Mark is RE 0.2, Model of ☆2 Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained. ★ : Inventory maintained in Japan.

WB○ type inserts > A183

WP○ type inserts > A185

PCD inserts > B058

| FSVUB/C                        |              |       | VC $\circ\circ$ inserts, VB $\circ\circ$ inserts |                   |     |       |      |      |      |      |      |                                     | Finish  |         | Finish   |         | Light  |          | Light       |        |
|--------------------------------|--------------|-------|--------------------------------------------------|-------------------|-----|-------|------|------|------|------|------|-------------------------------------|---------|---------|----------|---------|--------|----------|-------------|--------|
|                                |              |       |                                                  |                   |     |       |      |      |      |      |      |                                     | FP      | FM      | LP       | LM      |        |          |             |        |
|                                |              |       |                                                  |                   |     |       |      |      |      |      |      |                                     | (11,16) | (11,16) | (11,16)  | (11,16) |        |          |             |        |
|                                |              |       |                                                  |                   |     |       |      |      |      |      |      |                                     | Medium  | Medium  | Medium   | PCBN    |        |          |             |        |
|                                |              |       |                                                  |                   |     |       |      |      |      |      |      |                                     | MP      | MM      | Standard |         |        |          |             |        |
| Right hand tool holder shown.  |              |       |                                                  |                   |     |       |      |      |      |      |      | (16)                                | (16)    | (16)    | (11,16)  |         |        |          |             |        |
| Order Number                   | Coolant Hole | Stock | Insert Number                                    | Dimensions (mm)   |     |       |      |      |      |      |      | Maximum Recommendation<br>I/d Ratio |         |         |          |         |        |          |             |        |
|                                |              |       |                                                  | DCONMS            | LF  | LDRED | WF   | WF2  | H    | GAMF | DMIN |                                     |         |         |          |         | Shim   | Shim Pin | Clamp Screw | Wrench |
| FSVUC1612R/L-08A               | ○            | ●●    | VCMT<br>VCMT<br>VBMT<br>VBMT<br>VBET<br>VBGW     | 0802 $\circ\circ$ | 12  | 150   | 25   | 11   | 5.5  | 11   | 8°   | 16                                  | 4       | —       | —        | TS202   | TKY06F |          |             |        |
| FSVUB2016R/L-11A               | ○            | ●●    |                                                  | 1103 $\circ\circ$ | 16  | 180   | 32.5 | 15.5 | 8    | 15   | 8°   | 20                                  | 5       | —       | —        | TS255   | TKY08F |          |             |        |
| FSVUB2520R/L-11A               | ○            | ●●    |                                                  | 1103 $\circ\circ$ | 20  | 200   | 40.5 | 17.5 | 8    | 19   | 7°   | 25                                  | 5       | —       | —        | TS255   | TKY08F |          |             |        |
| FSVUB2520R-11S                 | —            | ★     |                                                  | 1103 $\circ\circ$ | 20  | 200   | 40.5 | 17.5 | 8    | 19   | 7°   | 25                                  | 5       | —       | —        | TS255   | TKY08F |          |             |        |
| FSVUB3425R/L-16A <sup>☆2</sup> | ○            | ●●    |                                                  | 1604 $\circ\circ$ | 25  | 220   | 50   | 20.5 | 8.5  | 23.4 | 13°  | 34                                  | 5       | SPSVN32 | BCP141   | TS35D   | TKY15F |          |             |        |
| FSVUB4032R/L-16A <sup>☆2</sup> | ○            | ●●    | 1604 $\circ\circ$                                | 32                | 250 | 84.0  | 27.5 | 12   | 30.4 | 9°   | 40   | 5                                   | SPSVN32 | BCP141  | TS35D    | TKY15F  |        |          |             |        |

\* Clamp Torque (N • m) : TS202=0.6, TS255=1.0, TS35D=3.5

| FSVPB/C                        |              |       | VC $\circ\circ$ inserts, VB $\circ\circ$ inserts |                 |     |       |      |      |      |      |      |                                     | Finish  |         | Finish   |         | Light |  | Light |  |
|--------------------------------|--------------|-------|--------------------------------------------------|-----------------|-----|-------|------|------|------|------|------|-------------------------------------|---------|---------|----------|---------|-------|--|-------|--|
|                                |              |       |                                                  |                 |     |       |      |      |      |      |      |                                     | FP      | FM      | LP       | LM      |       |  |       |  |
|                                |              |       |                                                  |                 |     |       |      |      |      |      |      |                                     | (11,16) | (11,16) | (11,16)  | (11,16) |       |  |       |  |
|                                |              |       |                                                  |                 |     |       |      |      |      |      |      |                                     | Medium  | Medium  | Medium   | PCBN    |       |  |       |  |
|                                |              |       |                                                  |                 |     |       |      |      |      |      |      |                                     | MP      | MM      | Standard |         |       |  |       |  |
| Right hand tool holder shown.  |              |       |                                                  |                 |     |       |      |      |      |      |      | (16)                                | (16)    | (16)    | (11,16)  |         |       |  |       |  |
| Order Number                   | Coolant Hole | Stock | Insert Number                                    | Dimensions (mm) |     |       |      |      |      |      |      | Maximum Recommendation<br>I/d Ratio |         |         |          |         |       |  |       |  |
|                                |              |       |                                                  | DCONMS          | LF  | LDRED | WF   | WF2  | H    | GAMF | DMIN |                                     |         |         |          |         |       |  |       |  |
| FSVPC1610R/L-08A               | ○            | ●●    | VCGT<br>VCMT 0802 $\circ\circ$                   | 10              | 150 | 25    | 8    | 3    | 9    | 8°   | 16   | 3.5                                 | —       | —       | TS202    | TKY06F  |       |  |       |  |
| FSVPB2012R/L-11A               | ○            | ●●    | VBMT<br>VBMW<br>VBET<br>VBGW                     | 12              | 150 | 28    | 10   | 4.5  | 11   | 8°   | 20   | 4                                   | —       | —       | TS255    | TKY08F  |       |  |       |  |
| FSVPB2516R/L-11A               | ○            | ●●    |                                                  | 16              | 180 | 35    | 12.5 | 5    | 15   | 5°   | 25   | 5                                   | —       | —       | TS255    | TKY08F  |       |  |       |  |
| FSVPB3020R-11S                 | —            | ★     |                                                  | 20              | 200 | 40    | 15   | 5    | 19   | 5°   | 30   | 5                                   | —       | —       | TS255    | TKY08F  |       |  |       |  |
| FSVPB3425R/L-16A <sup>☆2</sup> | ○            | ●●    |                                                  | 25              | 220 | 50    | 17   | 5    | 23.4 | 13°  | 34   | 5                                   | SPSVN32 | BCP141  | TS35D    | TKY15F  |       |  |       |  |
| FSVPB4032R/L-16A <sup>☆2</sup> | ○            | ●●    | 32                                               | 250             | 55  | 22    | 6.5  | 30.4 | 9°   | 40   | 5    | SPSVN32                             | BCP141  | TS35D   | TKY15F   |         |       |  |       |  |

\* Clamp Torque (N • m) : TS202=0.6, TS255=1.0, TS35D=3.5

VB $\circ\circ$  type inserts > A174—A176  
VC $\circ\circ$  type inserts > A177—A180  
PCBN & PCD inserts > B045, B057

CUTTING CONDITIONS > E014  
SPARE PARTS > N001  
TECHNICAL DATA > P001



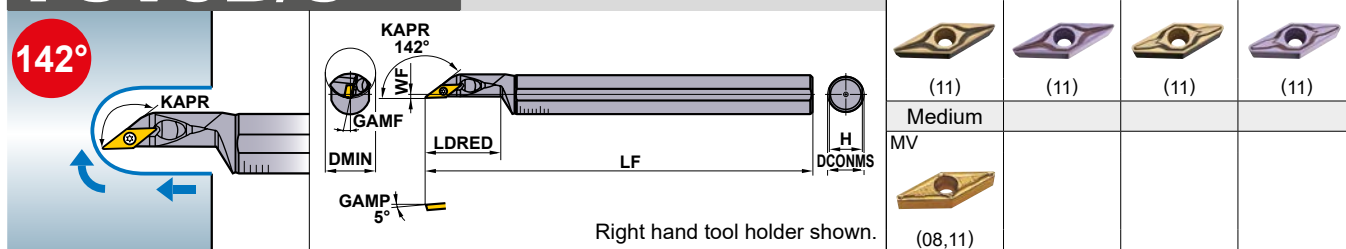
# BORING BARS

# DIMPLE BAR

- Excellent vibration resistance due to the light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- L/d is 3 to 5 times the diameter.

## FSVJB/C

## VC<sup>○</sup> inserts, VB<sup>○</sup> inserts



| Order Number       | Stock |   | Insert Number |      | Dimensions (mm) |     |       |     |      |      | Maximum<br>Recom-<br>mendation<br>l/d<br>Ratio |  * |  |        |
|--------------------|-------|---|---------------|------|-----------------|-----|-------|-----|------|------|------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                    | R     | L |               |      | DCONMS          | LF  | LDRED | WF  | H    | GAMF |                                                |                                                                                       |                                                                                     | DMIN   |
|                    |       |   |               |      |                 |     |       |     |      |      |                                                |                                                                                       |                                                                                     |        |
| FSVJC1612R/L-08S ☆ | ●     | ● | VCGT<br>VCMT  | 0802 | 12              | 150 | 26    | 2   | 11   | 5°   | 16                                             | 4                                                                                     | TS202                                                                               | TKY06F |
| FSVJC2016R/L-08S ☆ | ●     | ● |               | 0802 | 16              | 180 | 36    | 2   | 15   | 5°   | 20                                             | 5                                                                                     | TS202                                                                               | TKY06F |
| FSVJB2520R/L-11S ☆ | ●     | ● | VBMT<br>VBMW  | 1103 | 20              | 200 | 37.5  | 2   | 19   | 5°   | 25                                             | 5                                                                                     | TS255                                                                               | TKY08F |
| FSVJB3025R/L-11S ☆ | ●     | ● | VBET<br>VBGW  | 1103 | 25              | 250 | 45    | 3.5 | 23.4 | 5°   | 30                                             | 5                                                                                     | TS255                                                                               | TKY08F |

★ Clamp Torque (N • m) : TS202=0.6, TS255=1.0

## RECOMMENDED CUTTING CONDITIONS

| Material | Properties                  | Cutting Mode | Chipbreaker | Recom-<br>mendation | Cutting Speed<br>(m/min) | L/D ≤ 3 (Steel shank) |                      | L/D ≤ 4—5 (Steel shank) |                      |
|----------|-----------------------------|--------------|-------------|---------------------|--------------------------|-----------------------|----------------------|-------------------------|----------------------|
|          |                             |              |             |                     |                          | Feed<br>(mm/rev)      | Depth of Cut<br>(mm) | Feed<br>(mm/rev)        | Depth of Cut<br>(mm) |
| P        | Mild Steel                  | Finish       | FP          | FV                  | NX2525                   | 170 (120—220)         | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             |              | LP          | SV                  | MP3025                   | 150 (100—200)         | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Light        | LP          | SV                  | NX2525                   | 160 (110—210)         | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | SV          | —                   | NX3035                   | 150 (100—200)         | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Medium       | MP          | MV                  | MP3025                   | 140 (90—190)          | 0.25 (0.15—0.35)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MP          | MV                  | NX2525                   | 150 (100—200)         | 0.25 (0.15—0.35)     | —2.0                    | 0.20 (0.15—0.25)     |
|          | Carbon Steel<br>Alloy Steel | Finish       | FP          | —                   | MC6115                   | 140 (90—190)          | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             |              | FV          | —                   | VP15TF                   | 140 (90—190)          | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             | Light        | LP          | SV                  | MC6125                   | 140 (90—190)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | LP          | SV                  | MP3025                   | 110 (60—160)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Medium       | SV          | —                   | NX3035                   | 110 (60—160)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | MP          | MV                  | MC6125                   | 130 (80—180)          | 0.25 (0.15—0.35)     | —2.0                    | 0.20 (0.15—0.25)     |
| M        | Stainless Steel             | Finish       | FP          | —                   | MC6115                   | 140 (90—190)          | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             |              | FV          | —                   | VP15TF                   | 140 (90—190)          | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             | Light        | LP          | SV                  | MC6125                   | 140 (90—190)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | LP          | SV                  | MP3025                   | 110 (60—160)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Medium       | SV          | —                   | NX3035                   | 110 (60—160)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | MP          | MV                  | MC6125                   | 130 (80—180)          | 0.25 (0.15—0.35)     | —2.0                    | 0.20 (0.15—0.25)     |
|          | Gray Cast Iron              | Finish       | FM          | FV                  | VP15TF                   | 150 (110—190)         | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             |              | LM          | —                   | MC7025                   | 125 (85—165)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Light        | SV          | —                   | US735                    | 125 (85—165)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             |              | LM          | SV                  | VP15TF                   | 130 (90—170)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Medium       | MM          | —                   | MC7025                   | 105 (70—135)          | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MV          | —                   | US735                    | 125 (85—165)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
| K        | Aluminium Alloy             | Finish       | MM          | MV                  | VP15TF                   | 120 (80—160)          | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MM          | MV                  | VP15TF                   | 120 (80—160)          | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             | Medium       | F           | FS                  | HTi10                    | 130 (90—160)          | 0.15 (0.10—0.20)     | —0.5                    | 0.15 (0.05—0.20)     |
|          |                             |              | MK          | —                   | MC5015                   | 90 (60—120)           | 0.20 (0.15—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             | Flat Top     | MV          | —                   | VP15TF                   | 90 (60—120)           | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MV          | —                   | VP15TF                   | 90 (60—120)           | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          | Hardened Steel              | Finish       | F           | FS                  | HTi10                    | 300 (200—400)         | 0.10 (0.05—0.15)     | —0.5                    | 0.10 (0.05—0.15)     |
|          |                             |              | Flat Top    | —                   | MD220                    | 200 (150—250)         | 0.10 (0.05—0.15)     | —2.0                    | 0.10 (0.05—0.15)     |
|          |                             | Medium       | MM          | —                   | MC7025                   | 105 (70—135)          | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MV          | —                   | US735                    | 125 (85—165)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |
|          |                             | Flat Top     | MM          | —                   | MC7025                   | 105 (70—135)          | 0.20 (0.10—0.25)     | —2.0                    | 0.20 (0.15—0.25)     |
|          |                             |              | MV          | —                   | US735                    | 125 (85—165)          | 0.20 (0.10—0.25)     | —1.0                    | 0.15 (0.05—0.20)     |

Note 1) When vibrations occur, reduce cutting speed by 30%.

Note 2) The depth of cut needs to be less than the corner diameter when using the FSVJ type.

Note 3) The recommended pressure for the internal coolant is 1MPa.

Note 4) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 5) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

Note 6) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained. ★ : Inventory maintained in Japan.

VB<sup>○</sup> type inserts > A174—A176  
VC<sup>○</sup> type inserts > A177—A180  
PCBN & PCD inserts > B045, B057

# DOUBLE CLAMP

# DIMPLE BAR

- Economical negative insert.
- Single action type.
- Excellent vibration resistance due to a light dimple head. (With coolant hole.)
- l/d is 3 to 4 times the diameter.

| A○○○-DCLN      |       |   | With coolant hole |                               | CN○○inserts |       |    |    |      |      | Finish |          | Light        |         | Light       |           | Medium   |  |
|----------------|-------|---|-------------------|-------------------------------|-------------|-------|----|----|------|------|--------|----------|--------------|---------|-------------|-----------|----------|--|
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              | FP      | SA          | LP        | LM       |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              |         |             |           |          |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              | (12)    | (12)        | (12)      | (12)     |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              | Medium  | Medium      | Stainless | PCBN/PCD |  |
|                |       |   |                   | Right hand tool holder shown. |             |       |    |    |      |      |        |          |              | MP      | Standard    | MM        |          |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              |         |             |           |          |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              | (12)    | (12)        | (12)      | (12)     |  |
|                |       |   |                   |                               |             |       |    |    |      |      |        |          |              |         |             |           |          |  |
| Order Number   | Stock |   | Insert Number     | Dimensions (mm)               |             |       |    |    |      |      |        |          |              |         |             |           |          |  |
|                | R     | L |                   | DCONMS                        | LF          | LDRED | WF | H  | GAMF | DMIN | Shim   | Shim Pin | Clamp Bridge | Spring  | Clamp Screw | Wrench    |          |  |
| A25R-DCLNR/L12 | ●     | ● | CN○○A             | 1204○○                        | 25          | 200   | 40 | 17 | 23   | 13°  | 32     | LLSCP42  | LLP14        | DCK2613 | DCS1        | DC0621T   | TKY20F   |  |
| A32S-DCLNR/L12 | ●     | ● | CN○○G             | 1204○○                        | 32          | 250   | 50 | 22 | 30   | 13°  | 40     | LLSCN42  | LLP14        | DCK2613 | DCS1        | DC0621T   | TKY20F   |  |
| A40T-DCLNR/L12 | ●     | ● | CN○○M             | 1204○○                        | 40          | 300   | 63 | 27 | 37   | 10°  | 50     | LLSCN42  | LLP14        | DCK2613 | DCS1        | DC0621T   | TKY20F   |  |

★ Clamp Torque (N · m) : DC0621T=5.0

| A○○○-DDUN      |       |   | With coolant hole |                 | DN○○inserts                   |       |        |    |           |      | Finish  |          | Light        |         | Medium      |         | Medium |  |   |  |  |  |
|----------------|-------|---|-------------------|-----------------|-------------------------------|-------|--------|----|-----------|------|---------|----------|--------------|---------|-------------|---------|--------|--|---|--|--|--|
|                |       |   |                   |                 | Right hand tool holder shown. |       | FP     |    | LP        |      | MP      |          | MH           |         |             |         |        |  |   |  |  |  |
|                |       |   |                   |                 |                               |       |        |    |           |      |         |          |              |         |             |         |        |  |   |  |  |  |
|                |       |   |                   |                 |                               |       | (15)   |    | (15)      |      | (15)    |          | (15)         |         |             |         |        |  |   |  |  |  |
|                |       |   |                   |                 |                               |       | Medium |    | Stainless |      | G Class |          | PCBN/PCD     |         |             |         |        |  |   |  |  |  |
| Standard       |       |   | MM                |                 | R/L                           |       |        |    |           |      |         |          |              |         |             |         |        |  |   |  |  |  |
| (15)           |       |   | (15)              |                 | (15)                          |       | (15)   |    | (15)      |      | (15)    |          | (15)         |         |             |         |        |  |   |  |  |  |
| Order Number   | Stock |   | Insert Number     | Dimensions (mm) |                               |       |        |    |           |      |         |          |              |         |             |         |        |  | * |  |  |  |
|                | R     | L |                   | DCONMS          | LF                            | LDRED | WF     | H  | GAMF      | DMIN | Shim    | Shim Pin | Clamp Bridge | Spring  | Clamp Screw | Wrench  |        |  |   |  |  |  |
| A25R-DDUNR/L15 | ●     | ★ | DN○○A             | 1504○○          | 25                            | 200   | 40     | 17 | 23        | 13°  | 35      | LLSDP42  | LLP14        | DCK2613 | DCS1        | DC0621T | TKY20F |  |   |  |  |  |
| A32S-DDUNR/L15 | ●     | ● | DN○○G             | 1504○○          | 32                            | 250   | 50     | 22 | 30        | 13°  | 40      | LLSDN42  | LLP14        | DCK2613 | DCS1        | DC0621T | TKY20F |  |   |  |  |  |
| A40T-DDUNR/L15 | ●     | ● | DN○○M             | 1504○○          | 40                            | 300   | 63     | 27 | 37        | 10°  | 50      | LLSDN42  | LLP14        | DCK2613 | DCS1        | DC0621T | TKY20F |  |   |  |  |  |

★ Clamp Torque (N · m) : DC0621T=5.0

## RECOMMENDED CUTTING CONDITIONS

| Material                   | Hardness                 | Cutting Mode | l/d ≤ 3               |                |                   | l/d = 3—4             |                 |                   |
|----------------------------|--------------------------|--------------|-----------------------|----------------|-------------------|-----------------------|-----------------|-------------------|
|                            |                          |              | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) | Cutting Speed (m/min) | Feed (mm/rev)   | Depth of Cut (mm) |
| P Carbon Steel Alloy Steel | 180—350HB                | Medium       | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              | 110 (80—140)          | 0.2 (0.1—0.3)   | —4.0              |
| M Stainless Steel          | ≤200HB                   | Medium       | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              | 70 (50—100)           | 0.15 (0.1—0.25) | —3.0              |
| K Gray Cast Iron           | Tensile Strength ≤350MPa | Medium       | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              | 80 (60—100)           | 0.2 (0.1—0.3)   | —4.0              |

|                    |                   |
|--------------------|-------------------|
| CN○○ type inserts  | ➤ A098—A105       |
| DN○○ type inserts  | ➤ A106—A112       |
| PCBN & PCD inserts | ➤ B022—B028, B049 |

|                |        |
|----------------|--------|
| SPARE PARTS    | ➤ N001 |
| TECHNICAL DATA | ➤ P001 |

# BORING BARS

## DOUBLE CLAMP

## DIMPLE BAR

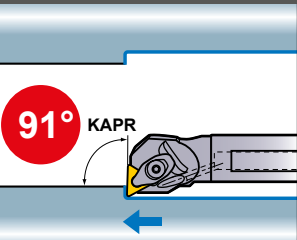
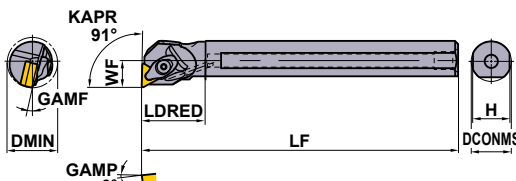
- Economical negative insert.
- Single action type.
- Good vibration resistance due to the light dimple head. (With coolant hole)
- l/d is 3 to 4 times the diameter.

| A <sup>○</sup> ○ <sup>○</sup> ○-DSKN |  |       |   |                                      |                   |                 |     |       |    | With coolant hole |      | SN <sup>○</sup> ○ inserts |         | Finish |         | Light |         | Medium |  | Medium |           |         |          |
|--------------------------------------|--|-------|---|--------------------------------------|-------------------|-----------------|-----|-------|----|-------------------|------|---------------------------|---------|--------|---------|-------|---------|--------|--|--------|-----------|---------|----------|
|                                      |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  |        |           |         |          |
|                                      |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  | (12)   | (12)      | (12)    | (12)     |
|                                      |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  | Medium | Stainless | G Class | PCBN/PCD |
|                                      |  |       |   |                                      |                   |                 |     |       |    | Standard          |      | MM                        |         | R/L    |         |       |         |        |  |        |           |         |          |
|                                      |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  |        |           |         |          |
|                                      |  |       |   |                                      |                   |                 |     |       |    | (12)              |      | (12)                      |         | (12)   |         | (12)  |         |        |  |        |           |         |          |
| Right hand tool holder shown.        |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  |        |           |         |          |
|                                      |  |       |   |                                      |                   |                 |     |       |    |                   |      |                           |         |        |         |       |         |        |  |        |           |         |          |
| Order Number                         |  | Stock |   | Insert Number                        |                   | Dimensions (mm) |     |       |    |                   |      |                           |         |        |         |       |         |        |  |        |           |         |          |
|                                      |  | R     | L |                                      |                   | DCONMS          | LF  | LDRED | WF | H                 | GAMF | DMIN                      |         |        |         |       |         |        |  |        |           |         |          |
| A25R-DSKNR/L12                       |  | ★     | ★ | SNMA<br>SNMG<br>SNMM<br>SNGA<br>SNGG | 1204 <sup>○</sup> | 25              | 200 | 40    | 17 | 23                | 13°  | 32                        | LLSSP42 | LLP14  | DCK2613 | DCS1  | DC0621T | TKY20F |  |        |           |         |          |
| A32S-DSKNR/L12                       |  | ★     | ★ |                                      | 1204 <sup>○</sup> | 32              | 250 | 50    | 22 | 30                | 13°  | 40                        | LLSSN42 | LLP14  | DCK2613 | DCS1  | DC0621T | TKY20F |  |        |           |         |          |

\* Clamp Torque (N · m) : DC0621T=5.0

E

BORING BARS

| A <sup>○○○</sup> -DTFN                                                             |       |   |                                                             | With coolant hole                                                                  |    | TN <sup>○○</sup> inserts |    |    |      | Finish                                                                                       |                                                                                      | Light                                                                                        |                                                                                       | Medium                                                                                       |                                                                                       | Medium                                                                                       |        |
|------------------------------------------------------------------------------------|-------|---|-------------------------------------------------------------|------------------------------------------------------------------------------------|----|--------------------------|----|----|------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------|
|  |       |   |                                                             |  |    |                          |    |    |      | FP                                                                                           |                                                                                      | LP                                                                                           |                                                                                       | MP                                                                                           |                                                                                       | MH                                                                                           |        |
|                                                                                    |       |   |                                                             |                                                                                    |    |                          |    |    |      | <br>(16)  |                                                                                      | <br>(16)  |                                                                                       | <br>(16)  |                                                                                       | <br>(16)  |        |
|                                                                                    |       |   |                                                             |                                                                                    |    |                          |    |    |      | Medium                                                                                       |                                                                                      | Stainless                                                                                    |                                                                                       | G Class                                                                                      |                                                                                       | PCBN/PCD                                                                                     |        |
|                                                                                    |       |   |                                                             |                                                                                    |    |                          |    |    |      | Standard                                                                                     |                                                                                      | MM                                                                                           |                                                                                       | R/L                                                                                          |                                                                                       |                                                                                              |        |
|                                                                                    |       |   |                                                             |                                                                                    |    |                          |    |    |      | <br>(16) |                                                                                      | <br>(16) |                                                                                       | <br>(16) |                                                                                       | <br>(16) |        |
| Right hand tool holder shown.                                                      |       |   |                                                             |                                                                                    |    |                          |    |    |      |                                                                                              |                                                                                      |                                                                                              |                                                                                       |                                                                                              |                                                                                       |                                                                                              |        |
| Order Number                                                                       | Stock |   | Insert Number                                               | Dimensions (mm)                                                                    |    |                          |    |    |      |                                                                                              |  |         |  |         |  |         |        |
|                                                                                    | R     | L |                                                             | DCONMS                                                                             | LF | LDRED                    | WF | H  | GAMF | DMIN                                                                                         |                                                                                      |                                                                                              |                                                                                       |                                                                                              |                                                                                       |                                                                                              | Shim   |
| A25R-DTFNR/L16                                                                     | ●     | ● | TN <sup>○</sup> A<br>TN <sup>○</sup> G<br>TN <sup>○</sup> M | 1604 <sup>○○</sup>                                                                 | 25 | 200                      | 40 | 17 | 23   | 13°                                                                                          | 32                                                                                   | LLSTP32                                                                                      | LLP23                                                                                 | DCK2211                                                                                      | DCS2                                                                                  | DC0520T                                                                                      | TKY15F |
| A32S-DTFNR/L16                                                                     | ★     | ★ |                                                             | 1604 <sup>○○</sup>                                                                 | 32 | 250                      | 50 | 22 | 30   | 13°                                                                                          | 40                                                                                   | LLSTN32                                                                                      | LLP23                                                                                 | DCK2211                                                                                      | DCS2                                                                                  | DC0520T                                                                                      | TKY15F |

\* Clamp Torque (N · m) : DC0520T=3.5

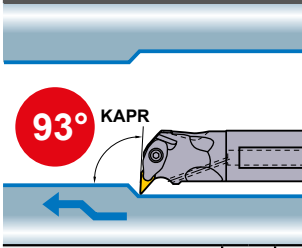
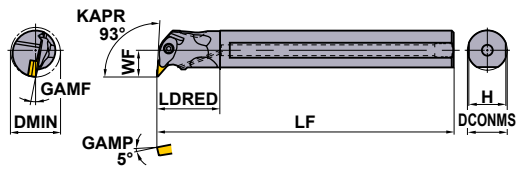
Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.8.

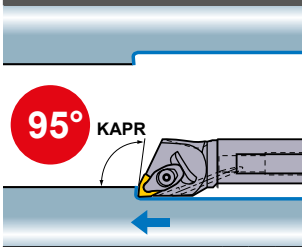
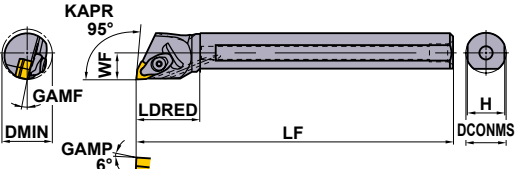
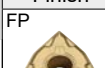
Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

|                                |                   |
|--------------------------------|-------------------|
| SN <sup>○</sup> ○ type inserts | ➤ A114—A119       |
| TN <sup>○</sup> ○ type inserts | ➤ A120—A126       |
| PCBN & PCD inserts             | ➤ B029—B031, B050 |

● : Inventory maintained. ★ : Inventory maintained in Japan.

| A $\circ\circ\circ$ -DVUN                                                         |       |   | With coolant hole                                                                 |                   | VN $\circ\circ$ inserts |       |    |    |      |      | Finish |                                                                                             | Light                                                                                           |                                                                                                     | Medium                                                                                        |                                                                                                      | Medium                                                                                        |                                                                                             |  |
|-----------------------------------------------------------------------------------|-------|---|-----------------------------------------------------------------------------------|-------------------|-------------------------|-------|----|----|------|------|--------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--|
|  |       |   |  |                   |                         |       |    |    |      |      |        | <br>(16) |                                                                                                 | <br>(16)         |                                                                                               | <br>(16)          |                                                                                               | <br>(16) |  |
|                                                                                   |       |   |                                                                                   |                   |                         |       |    |    |      |      |        | Medium                                                                                      |                                                                                                 | Stainless                                                                                           |                                                                                               | G Class                                                                                              |                                                                                               | PCBN/PCD                                                                                    |  |
|                                                                                   |       |   |                                                                                   |                   |                         |       |    |    |      |      |        | Standard                                                                                    |                                                                                                 | MM                                                                                                  |                                                                                               | R/L                                                                                                  |                                                                                               |                                                                                             |  |
|                                                                                   |       |   |                                                                                   |                   |                         |       |    |    |      |      |        | <br>(16) |                                                                                                 | <br>(16)         |                                                                                               | <br>(16)          |                                                                                               | <br>(16) |  |
| Right hand tool holder shown.                                                     |       |   |                                                                                   |                   |                         |       |    |    |      |      |        |                                                                                             |                                                                                                 |                                                                                                     |                                                                                               |                                                                                                      |                                                                                               |                                                                                             |  |
|                                                                                   |       |   |                                                                                   |                   |                         |       |    |    |      |      |        |                                                                                             |                                                                                                 |                                                                                                     |                                                                                               |                                                                                                      |                                                                                               |                                                                                             |  |
| Order Number                                                                      | Stock |   | Insert Number                                                                     | Dimensions (mm)   |                         |       |    |    |      |      |        | <br>Shim  | <br>Shim Pin | <br>Clamp Bridge | <br>Spring | <br>Clamp Screw * | <br>Wrench |                                                                                             |  |
|                                                                                   | R     | L |                                                                                   | DCONMS            | LF                      | LDRED | WF | H  | GAMF | DMIN |        |                                                                                             |                                                                                                 |                                                                                                     |                                                                                               |                                                                                                      |                                                                                               |                                                                                             |  |
| A40T-DVUNR/L16                                                                    | ●     | ★ | VN $\circ$ A<br>VN $\circ$ G<br>VN $\circ$ M                                      | 1604 $\circ\circ$ | 40                      | 300   | 63 | 27 | 37   | 9°   | 50     | DCSVN32                                                                                     | LLP13                                                                                           | DCK3113                                                                                             | DCS2                                                                                          | DC0520T                                                                                              | TKY15F                                                                                        |                                                                                             |  |

\* Clamp Torque (N • m) : DC0520T=3.5

| A○○○-DWLN                                                                          |  |       |   | With coolant hole                                                                  |        |                 |     |       |    |    |      | WN○○inserts                                                                                  |                                                                                       |                                                                                                |                                                                                       | Finish                                                                                          |                                                                                       | Light                                                                                       |  | Medium |  | Medium |  |
|------------------------------------------------------------------------------------|--|-------|---|------------------------------------------------------------------------------------|--------|-----------------|-----|-------|----|----|------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--|--------|--|--------|--|
|  |  |       |   |  |        |                 |     |       |    |    |      | <br>(08)  |                                                                                       | <br>(06,08) |                                                                                       | <br>(06,08)  |                                                                                       | <br>(08) |  |        |  |        |  |
|                                                                                    |  |       |   |                                                                                    |        |                 |     |       |    |    |      | Medium                                                                                       |                                                                                       | Medium—Rough                                                                                   |                                                                                       | Stainless                                                                                       |                                                                                       |                                                                                             |  |        |  |        |  |
|                                                                                    |  |       |   |                                                                                    |        |                 |     |       |    |    |      | Standard                                                                                     |                                                                                       | RP                                                                                             |                                                                                       | MM                                                                                              |                                                                                       |                                                                                             |  |        |  |        |  |
|                                                                                    |  |       |   |                                                                                    |        |                 |     |       |    |    |      | <br>(08) |                                                                                       | <br>(08)   |                                                                                       | <br>(06,08) |                                                                                       |                                                                                             |  |        |  |        |  |
| Right hand tool holder shown.                                                      |  |       |   |                                                                                    |        |                 |     |       |    |    |      |                                                                                              |                                                                                       |                                                                                                |                                                                                       |                                                                                                 |                                                                                       |                                                                                             |  |        |  |        |  |
|                                                                                    |  |       |   |                                                                                    |        |                 |     |       |    |    |      |                                                                                              |                                                                                       |                                                                                                |                                                                                       |                                                                                                 |                                                                                       |                                                                                             |  |        |  |        |  |
| Order Number                                                                       |  | Stock |   | Insert Number                                                                      |        | Dimensions (mm) |     |       |    |    |      |          |  |           |  |            |  |                                                                                             |  |        |  |        |  |
|                                                                                    |  | R     | L |                                                                                    |        | DCONMS          | LF  | LDRED | WF | H  | GAMF | DMIN                                                                                         | Shim                                                                                  | Shim Pin                                                                                       | Clamp Bridge                                                                          | Spring                                                                                          | Clamp Screw                                                                           | Wrench                                                                                      |  |        |  |        |  |
| A25R-DWLNR/L06                                                                     |  | ●     | ★ | WNMA<br>WNMG                                                                       | 0604○○ | 25              | 200 | 40    | 17 | 23 | 13°  | 35                                                                                           | LLSWP32                                                                               | LLP23                                                                                          | DCK2211                                                                               | DCS2                                                                                            | DC0520T                                                                               | TKY15F                                                                                      |  |        |  |        |  |
| A25R-DWLNR/L08                                                                     |  | ●     | ● | WNMA                                                                               | 0804○○ | 25              | 200 | 40    | 17 | 23 | 13°  | 35                                                                                           | LLSWP42                                                                               | LLP14                                                                                          | DCK2613                                                                               | DCS1                                                                                            | DC0621T                                                                               | TKY20F                                                                                      |  |        |  |        |  |
| A32S-DWLNR/L08                                                                     |  | ●     | ● | WNMG<br>WNGA                                                                       | 0804○○ | 32              | 250 | 50    | 22 | 30 | 13°  | 40                                                                                           | LLSWN42                                                                               | LLP14                                                                                          | DCK2613                                                                               | DCS1                                                                                            | DC0621T                                                                               | TKY20F                                                                                      |  |        |  |        |  |
| A40T-DWLNR/L08                                                                     |  | ●     | ● | WNGA                                                                               | 0804○○ | 40              | 300 | 63    | 27 | 37 | 10°  | 50                                                                                           | LLSWN42                                                                               | LLP14                                                                                          | DCK2613                                                                               | DCS1                                                                                            | DC0621T                                                                               | TKY20F                                                                                      |  |        |  |        |  |

\* Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0

E

BORING BARS

## RECOMMENDED CUTTING CONDITIONS

| Material                   | Hardness                 | Cutting Mode | l/d ≤ 3               |                |                   | l/d = 3—4             |                 |                   |
|----------------------------|--------------------------|--------------|-----------------------|----------------|-------------------|-----------------------|-----------------|-------------------|
|                            |                          |              | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) | Cutting Speed (m/min) | Feed (mm/rev)   | Depth of Cut (mm) |
| P Carbon Steel Alloy Steel | 180—350HB                | Medium       | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              | 110 (80—140)          | 0.2 (0.1—0.3)   | —4.0              |
| M Stainless Steel          | ≤200HB                   | Medium       | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              | 70 (50—100)           | 0.15 (0.1—0.25) | —3.0              |
| K Gray Cast Iron           | Tensile Strength ≤350MPa | Medium       | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              | 80 (60—100)           | 0.2 (0.1—0.3)   | —4.0              |

|                              |                   |
|------------------------------|-------------------|
| VN $\circ\circ$ type inserts | ➤ A127—A130       |
| WN $\circ\circ$ type inserts | ➤ A131—A135       |
| PCBN & PCD inserts           | ➤ B032—B034, B052 |

|                |        |
|----------------|--------|
| SPARE PARTS    | ➤ N001 |
| TECHNICAL DATA | ➤ P001 |

# BORING BARS

## MICRO-DEX BORING BARS

- The minimum cutting diameter is from Ø5. ● l/d is 5 times the diameter.
- 5°, 7° positive insert, carbide shank type.
- Easy-to-use tool geometries.
- Suitable for small workpieces.

### COSSCLC

Carbide shank

### CCOinserts

Finish

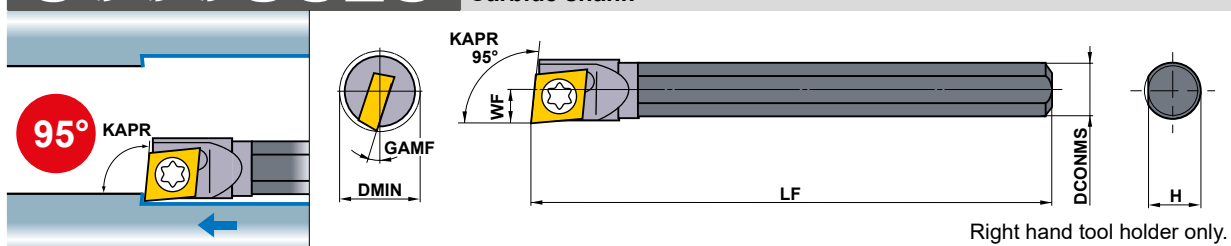
L-F



PCD/PCBN



(03,04)



| Order Number | Stock | Insert Number |        | Dimensions (mm) |     |     |     |      |      | *2  |  |
|--------------|-------|---------------|--------|-----------------|-----|-----|-----|------|------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|              |       |               |        | DCONMS          | LF  | WF  | H   | GAMF | DMIN | Clamp Screw                                                                            | Wrench                                                                              |
|              | R     |               |        |                 |     |     |     |      |      |                                                                                        |                                                                                     |
| C04GSCLCR03  | ●     | *1            | 03S1○○ | 4               | 90  | 2.5 | 3.7 | 15°  | 5    | TS16                                                                                   | TKY06F                                                                              |
| C05HSCLCR03  | ●     | CCGT          | 03S1○○ | 5               | 100 | 3.0 | 4.7 | 13°  | 6    | TS16                                                                                   | TKY06F                                                                              |
| C06JSCLCR04  | ●     | CCGW          | 04T0○○ | 6               | 110 | 3.5 | 5.7 | 13°  | 7    | TS21                                                                                   | TKY08F                                                                              |
| C07KSCLCR04  | ●     | CCMW          | 04T0○○ | 7               | 125 | 4.0 | 6.7 | 11°  | 8    | TS21                                                                                   | TKY08F                                                                              |

\*1 Diameter of inscribed circle is special. (For SCLC type)

\*2 Clamp Torque (N • m) : TS16=0.6, TS21=0.6

### COSSWUB

Carbide shank

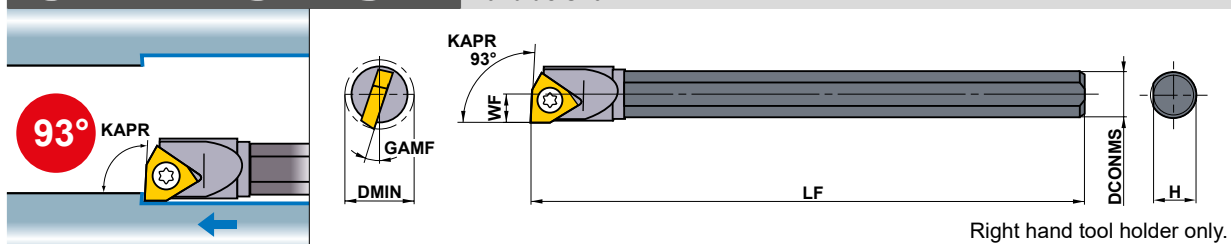
### WBOinserts

Finish

L-F



(02,L3)



| Order Number | Stock | Insert Number |           | Dimensions (mm) |     |     |     |      |      |  * |  |
|--------------|-------|---------------|-----------|-----------------|-----|-----|-----|------|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              |       |               |           | DCONMS          | LF  | WF  | H   | GAMF | DMIN | Clamp Screw                                                                             | Wrench                                                                                |
|              | R     |               |           |                 |     |     |     |      |      |                                                                                         |                                                                                       |
| C05HSWUBR02  | ●     | WBGT<br>WBMT  | 020100L-F | 5               | 100 | 3.0 | 4.7 | 15°  | 6    | TS21                                                                                    | TKY06F                                                                                |
| C06JSWUBR02  | ●     |               | 020100L-F | 6               | 110 | 3.5 | 5.7 | 13°  | 7    | TS2C                                                                                    | TKY06F                                                                                |
| C07KSWUBRL3  | ●     |               | L30200L-F | 7               | 125 | 4.0 | 6.7 | 15°  | 8    | TS2                                                                                     | TKY06F                                                                                |

\* Clamp Torque (N • m) : TS21=0.6, TS2C=0.6, TS2=0.6

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

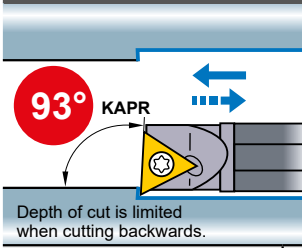
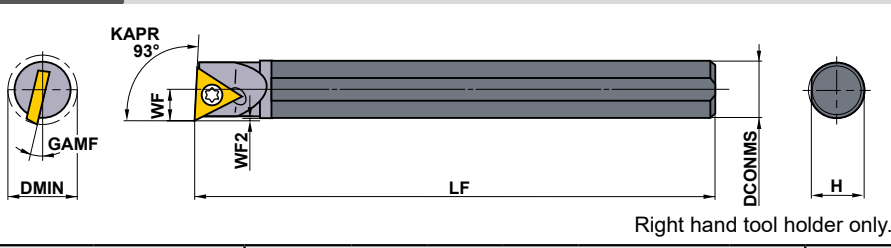
Note 2) Dimensions shown for insert corner RE 0.2.

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained.

|                    |              |
|--------------------|--------------|
| CCO type inserts   | > A141       |
| WBO type inserts   | > A183       |
| PCBN & PCD inserts | > B037, B053 |

# MICRO-DEX BORING BARS

| C000STUC                                                                                                                                                 |       |               |           | Carbide shank                                                                                                                          |     |     |      | TCGT inserts                                                                                                 |      |      |                                                                                       | Finish |                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----|-----|------|--------------------------------------------------------------------------------------------------------------|------|------|---------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|
|  <p>93° KAPR</p> <p>Depth of cut is limited when cutting backwards.</p> |       |               |           |  <p>KAPR 93°</p> <p>Right hand tool holder only.</p> |     |     |      |  <p>R/L-F</p> <p>(06)</p> |      |      |                                                                                       |        |                                                                                     |
|                                                                                                                                                          |       |               |           |                                                                                                                                        |     |     |      |                                                                                                              |      |      |                                                                                       |        |                                                                                     |
| Order Number                                                                                                                                             | Stock | Insert Number |           | Dimensions (mm)                                                                                                                        |     |     |      |                                                                                                              |      |      | *  |        |  |
|                                                                                                                                                          | R     |               |           | DCONMS                                                                                                                                 | LF  | WF  | WF2  | H                                                                                                            | GAMF | DMIN | Clamp Screw                                                                           | Wrench |                                                                                     |
| C07KSTUCR06                                                                                                                                              | ●     | TCGT          | 060100L-F | 7                                                                                                                                      | 125 | 4.0 | 0.35 | 6.7                                                                                                          | 12°  | 8    | TS2C                                                                                  | TKY06F |                                                                                     |

\* Clamp Torque (N • m) : TS2C=0.6

## RECOMMENDED CUTTING CONDITIONS

|   | Material                               | Grade  | Cutting Speed (m/min) | Feed (mm/rev)    | Depth of Cut (mm) | l/d |
|---|----------------------------------------|--------|-----------------------|------------------|-------------------|-----|
| P | Carbon Steel, Alloy Steel<br>180—350HB | NX2525 | 80 (40—120)           | 0.03 (0.01—0.05) | 0.2 (0.1—0.3)     | 3—5 |
| M | Stainless Steel<br>≤200HB              | VP15TF | 80 (40—120)           | 0.03 (0.01—0.05) | 0.2 (0.1—0.3)     | 3—5 |
| K | Gray Cast Iron<br>≤350MPa              | VP15TF | 80 (40—120)           | 0.03 (0.01—0.05) | 0.2 (0.1—0.3)     | 3—5 |
| N | Non-Ferrous Material                   | VP15TF | 120 (80—160)          | 0.05 (0.01—0.08) | 0.4 (0.1—0.6)     | 3—5 |
|   |                                        | MD220  | 120 (80—160)          | 0.05 (0.01—0.08) | 0.4 (0.1—0.6)     | 3—5 |
| H | Hardened Steel<br>35—65HRC             | MB8110 | 80 (40—120)           | 0.03 (0.01—0.05) | 0.1 (0.03—0.2)    | 3—5 |

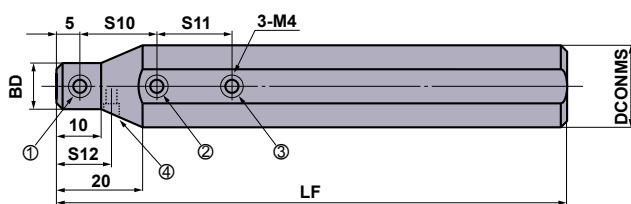
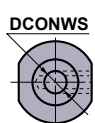
TCGT type inserts > A165  
SPARE PARTS > N001  
TECHNICAL DATA > P001



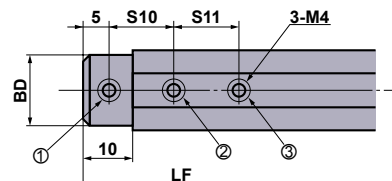
# BORING BARS

## MICRO-DEX BORING BARS

### STANDARD HOLDER



RBH2200N has a temporary set screw for different machine specifications.  
(Represented by number 4)



RBH15800N, RBH1600N,  
RBH19000N

| Order Number | Stock | Dimensions (mm) |        |    |     |     |     |      | MICRO-DEX   | *1 Clamp Screw |   |   |   | Wrench | Torque<br>(N · m) |
|--------------|-------|-----------------|--------|----|-----|-----|-----|------|-------------|----------------|---|---|---|--------|-------------------|
|              |       | DCONMS          | DCONWS | BD | LF  | S10 | S11 | S12  |             | ①              | ② | ③ | ④ |        |                   |
| RBH15840N    | ★     | 15.875          | 4      | 15 | 100 | 15  | 15  | —    | C04GS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH15850N    | ★     | 15.875          | 5      | 15 | 100 | 15  | 15  | —    | C05HS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH15860N    | ★     | 15.875          | 6      | 15 | 100 | 15  | 15  | —    | C06JS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH15870N    | ★     | 15.875          | 7      | 15 | 100 | 20  | 20  | —    | C07KS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH1640N     | ●     | 16              | 4      | 15 | 100 | 15  | 15  | —    | C04GS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH1650N     | ●     | 16              | 5      | 15 | 100 | 15  | 15  | —    | C05HS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH1660N     | ●     | 16              | 6      | 15 | 100 | 15  | 15  | —    | C06JS000R00 | A              | A | A | — | HKY20F | 2.0               |
| RBH1670N     | ●     | 16              | 7      | 15 | 100 | 20  | 20  | —    | C07KS000R00 | A              | A | A | — | HKY20F | 2.0               |
| *2 RBH19040N | ★     | 19.05           | 4      | 18 | 125 | 15  | 15  | —    | C04GS000R00 | B              | B | B | — | HKY20F | 2.0               |
| *2 RBH19050N | ★     | 19.05           | 5      | 18 | 125 | 15  | 15  | —    | C05HS000R00 | B              | B | B | — | HKY20F | 2.0               |
| *2 RBH19060N | ★     | 19.05           | 6      | 18 | 125 | 15  | 15  | —    | C06JS000R00 | B              | B | B | — | HKY20F | 2.0               |
| *2 RBH19070N | ★     | 19.05           | 7      | 18 | 125 | 20  | 20  | —    | C07KS000R00 | B              | B | B | — | HKY20F | 2.0               |
| RBH2040N     | ★     | 20              | 4      | 13 | 125 | 15  | 15  | —    | C04GS000R00 | A              | B | B | — | HKY20F | 2.0               |
| RBH2050N     | ★     | 20              | 5      | 14 | 125 | 15  | 15  | —    | C05HS000R00 | A              | B | B | — | HKY20F | 2.0               |
| RBH2060N     | ★     | 20              | 6      | 15 | 125 | 15  | 15  | —    | C06JS000R00 | A              | B | B | — | HKY20F | 2.0               |
| RBH2070N     | ★     | 20              | 7      | 16 | 125 | 20  | 20  | —    | C07KS000R00 | A              | B | B | — | HKY20F | 2.0               |
| RBH2240N     | ★     | 22              | 4      | 13 | 125 | 15  | 15  | 12.5 | C04GS000R00 | A              | B | B | A | HKY20F | 2.0               |
| RBH2250N     | ★     | 22              | 5      | 14 | 125 | 15  | 15  | 12.5 | C05HS000R00 | A              | B | B | A | HKY20F | 2.0               |
| RBH2260N     | ★     | 22              | 6      | 15 | 125 | 15  | 15  | 15   | C06JS000R00 | A              | B | B | A | HKY20F | 2.0               |
| RBH2270N     | ★     | 22              | 7      | 16 | 125 | 20  | 20  | 15   | C07KS000R00 | A              | B | B | A | HKY20F | 2.0               |
| RBH2540N     | ★     | 25              | 4      | 13 | 150 | 15  | 15  | —    | C04GS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH2550N     | ★     | 25              | 5      | 14 | 150 | 15  | 15  | —    | C05HS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH2560N     | ★     | 25              | 6      | 15 | 150 | 15  | 15  | —    | C06JS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH2570N     | ★     | 25              | 7      | 16 | 150 | 20  | 20  | —    | C07KS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH25440N    | ★     | 25.4            | 4      | 13 | 150 | 15  | 15  | —    | C04GS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH25450N    | ★     | 25.4            | 5      | 14 | 150 | 15  | 15  | —    | C05HS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH25460N    | ★     | 25.4            | 6      | 15 | 150 | 15  | 15  | —    | C06JS000R00 | A              | C | C | — | HKY20F | 2.0               |
| RBH25470N    | ★     | 25.4            | 7      | 16 | 150 | 20  | 20  | —    | C07KS000R00 | A              | C | C | — | HKY20F | 2.0               |

\*1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008

\*2 Revised order number.

| Conventional Order Number | Revised Order Number |
|---------------------------|----------------------|
| RBH1940N                  | RBH19040N            |
| RBH1950N                  | RBH19050N            |
| RBH1960N                  | RBH19060N            |
| RBH1970N                  | RBH19070N            |

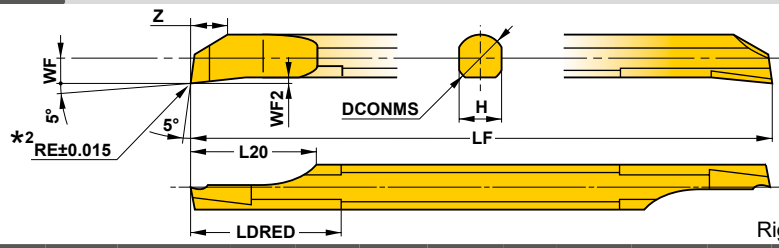
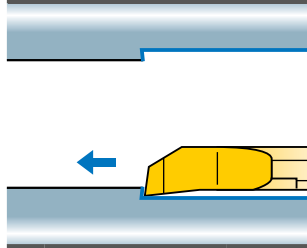
● : Inventory maintained. ★ : Inventory maintained in Japan.



# MICRO-MINI TWIN

## CB

For internal machining



Right hand tool only.

| Order Number     | Stock  |        |        |             | Chipbreaker | Dimensions (mm) |         |      |        |    |       |       |      |      |      |     |  |
|------------------|--------|--------|--------|-------------|-------------|-----------------|---------|------|--------|----|-------|-------|------|------|------|-----|--|
|                  | Coated |        |        | Micro Grain |             | DMIN *1         |         | RE   | DCONMS | LF | L20   | LDRED | WF   | WF2  | H    | Z   |  |
|                  | NEW    | NEW    |        |             |             | l/d ≤ 3         | l/d > 3 |      |        |    |       |       |      |      |      |     |  |
|                  | MS7025 | MS9025 | VP15TF | TF15        |             |                 |         |      |        |    |       |       |      |      |      |     |  |
| CB02RS           |        |        | ●      | ●           | without     | 2.2             | 3.6     | 0.05 | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| CB02RS-B         | ●      | ●      | ●      | ●           | with        | 2.2             | 4.6     | 0.05 | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| CB02RS-01        |        |        | ●      | ●           | without     | 2.2             | 3.6     | 0.1  | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| CB02RS-01B       | ●      | ●      | ●      | ●           | with        | 2.2             | 4.6     | 0.1  | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| NEW CB02RS-015B  | ●      | ●      |        |             | with        | 2.2             | 4.6     | 0.15 | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| CB02RS-02        |        |        | ●      | ●           | without     | 2.2             | 3.6     | 0.2  | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| CB02RS-02B       | ●      | ●      | ●      | ●           | with        | 2.2             | 4.6     | 0.2  | 2.0    | 50 | 5.0   | 6.0   | 1.0  | 0.25 | 1.8  | 1.4 |  |
| NEW CB025RS-B    | ●      | ●      |        |             | with        | 2.7             | 4.7     | 0.05 | 2.5    | 50 | 6.25  | 7.5   | 1.25 | 0.30 | 2.25 | 1.8 |  |
| NEW CB025RS-01B  | ●      | ●      |        |             | with        | 2.7             | 4.7     | 0.1  | 2.5    | 50 | 6.25  | 7.5   | 1.25 | 0.30 | 2.25 | 1.8 |  |
| NEW CB025RS-015B | ●      | ●      |        |             | with        | 2.7             | 4.7     | 0.15 | 2.5    | 50 | 6.25  | 7.5   | 1.25 | 0.30 | 2.25 | 1.8 |  |
| NEW CB025RS-02B  | ●      | ●      |        |             | with        | 2.7             | 4.7     | 0.2  | 2.5    | 50 | 6.25  | 7.5   | 1.25 | 0.30 | 2.25 | 1.8 |  |
| CB03RS           |        |        | ●      | ●           | without     | 3.2             | 4.2     | 0.05 | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| CB03RS-B         | ●      | ●      | ●      | ●           | with        | 3.2             | 4.8     | 0.05 | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| CB03RS-01        |        |        | ●      | ●           | without     | 3.2             | 4.2     | 0.1  | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| CB03RS-01B       | ●      | ●      | ●      | ●           | with        | 3.2             | 4.8     | 0.1  | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| NEW CB03RS-015B  | ●      | ●      |        |             | with        | 3.2             | 4.8     | 0.15 | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| CB03RS-02        |        |        | ●      | ●           | without     | 3.2             | 4.2     | 0.2  | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| CB03RS-02B       | ●      | ●      | ●      | ●           | with        | 3.2             | 4.8     | 0.2  | 3.0    | 50 | 7.5   | 9.0   | 1.5  | 0.35 | 2.7  | 2.3 |  |
| NEW CB035RS-B    | ●      | ●      |        |             | with        | 3.7             | 5.2     | 0.05 | 3.5    | 60 | 8.75  | 10.5  | 1.75 | 0.40 | 3.15 | 2.6 |  |
| NEW CB035RS-01B  | ●      | ●      |        |             | with        | 3.7             | 5.2     | 0.1  | 3.5    | 60 | 8.75  | 10.5  | 1.75 | 0.40 | 3.15 | 2.6 |  |
| NEW CB035RS-015B | ●      | ●      |        |             | with        | 3.7             | 5.2     | 0.15 | 3.5    | 60 | 8.75  | 10.5  | 1.75 | 0.40 | 3.15 | 2.6 |  |
| NEW CB035RS-02B  | ●      | ●      |        |             | with        | 3.7             | 5.2     | 0.2  | 3.5    | 60 | 8.75  | 10.5  | 1.75 | 0.40 | 3.15 | 2.6 |  |
| CB04RS           |        |        | ●      | ●           | without     | 4.2             | 5.1     | 0.05 | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| CB04RS-B         | ●      | ●      | ●      | ●           | with        | 4.2             | 5.5     | 0.05 | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| CB04RS-01        |        |        | ●      | ●           | without     | 4.2             | 5.1     | 0.1  | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| CB04RS-01B       | ●      | ●      | ●      | ●           | with        | 4.2             | 5.5     | 0.1  | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| NEW CB04RS-015B  | ●      | ●      |        |             | with        | 4.2             | 5.5     | 0.15 | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| CB04RS-02        |        |        | ●      | ●           | without     | 4.2             | 5.1     | 0.2  | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| CB04RS-02B       | ●      | ●      | ●      | ●           | with        | 4.2             | 5.5     | 0.2  | 4.0    | 60 | 10.0  | 12.0  | 2.0  | 0.45 | 3.6  | 3.1 |  |
| NEW CB045RS-B    | ●      | ●      |        |             | with        | 4.7             | 6.0     | 0.05 | 4.5    | 70 | 11.25 | 13.5  | 2.25 | 0.50 | 4.05 | 3.4 |  |
| NEW CB045RS-01B  | ●      | ●      |        |             | with        | 4.7             | 6.0     | 0.1  | 4.5    | 70 | 11.25 | 13.5  | 2.25 | 0.50 | 4.05 | 3.4 |  |
| NEW CB045RS-015B | ●      | ●      |        |             | with        | 4.7             | 6.0     | 0.15 | 4.5    | 70 | 11.25 | 13.5  | 2.25 | 0.50 | 4.05 | 3.4 |  |
| NEW CB045RS-02B  | ●      | ●      |        |             | with        | 4.7             | 6.0     | 0.2  | 4.5    | 70 | 11.25 | 13.5  | 2.25 | 0.50 | 4.05 | 3.4 |  |
| CB05RS           |        |        | ●      | ●           | without     | 5.2             | 6.0     | 0.05 | 5      | 70 | 12.5  | 15.0  | 2.5  | 0.55 | 4.5  | 3.9 |  |
| CB05RS-B         | ●      | ●      | ●      | ●           | with        | 5.2             | 6.4     | 0.05 | 5      | 70 | 12.5  | 15.0  | 2.5  | 0.55 | 4.5  | 3.9 |  |
| NEW CB05RS-015B  | ●      | ●      |        |             | with        | 5.2             | 6.4     | 0.15 | 5      | 70 | 12.5  | 15.0  | 2.5  | 0.55 | 4.5  | 3.9 |  |
| CB05RS-02        |        |        | ●      | ●           | without     | 5.2             | 6.0     | 0.2  | 5      | 70 | 12.5  | 15.0  | 2.5  | 0.55 | 4.5  | 3.9 |  |
| CB05RS-02B       | ●      | ●      | ●      | ●           | with        | 5.2             | 6.4     | 0.2  | 5      | 70 | 12.5  | 15.0  | 2.5  | 0.55 | 4.5  | 3.9 |  |
| CB06RS           |        |        | ●      | ●           | without     | 6.2             | 7.2     | 0.05 | 6      | 75 | 12.5  | 18.0  | 3.0  | 0.65 | 5.4  | 4.7 |  |
| CB06RS-B         | ●      | ●      | ●      | ●           | with        | 6.2             | 7.3     | 0.05 | 6      | 75 | 12.5  | 18.0  | 3.0  | 0.65 | 5.4  | 4.7 |  |
| CB06RS-02        |        |        | ●      | ●           | without     | 6.2             | 7.2     | 0.2  | 6      | 75 | 12.5  | 18.0  | 3.0  | 0.65 | 5.4  | 4.7 |  |
| CB06RS-02B       | ●      | ●      | ●      | ●           | with        | 6.2             | 7.8     | 0.2  | 6      | 75 | 12.5  | 18.0  | 3.0  | 0.65 | 5.4  | 4.7 |  |

\*1 DMIN : Min. Cutting Diameter

\*2 The RE dimension represents the size before grinding a chipbreaker.

● = NEW

E

BORING BARS

## MICRO-MINI TWIN

| Order Number | Stock         |               |        |             | Chipbreaker | Dimensions (mm) |       |      |        |    |      |       |     |      |     |     |  |
|--------------|---------------|---------------|--------|-------------|-------------|-----------------|-------|------|--------|----|------|-------|-----|------|-----|-----|--|
|              | Coated        |               |        | Micro Grain |             | DMIN *1         |       | RE   | DCONMS | LF | L20  | LDRED | WF  | WF2  | H   | Z   |  |
|              | NEW<br>MS7025 | NEW<br>MS9025 | VP15TF | TF15        |             | l/d ≤ 3         | l/d>3 |      |        |    |      |       |     |      |     |     |  |
| CB07RS       |               |               | ●      | ●           | without     | 7.2             | 8.6   | 0.05 | 7      | 85 | 12.5 | 21.0  | 3.5 | 0.75 | 6.3 | 5.5 |  |
| CB07RS-B     | ●             | ●             | ●      | ●           | with        | 7.2             | 8.8   | 0.05 | 7      | 85 | 12.5 | 21.0  | 3.5 | 0.75 | 6.3 | 5.5 |  |
| CB07RS-02    |               |               | ●      | ●           | without     | 7.2             | 8.6   | 0.2  | 7      | 85 | 12.5 | 21.0  | 3.5 | 0.75 | 6.3 | 5.5 |  |
| CB07RS-02B   | ●             | ●             | ●      | ●           | with        | 7.2             | 9.2   | 0.2  | 7      | 85 | 12.5 | 21.0  | 3.5 | 0.75 | 6.3 | 5.5 |  |
| CB08RS       |               |               | ●      | ●           | without     | 8.2             | 9.5   | 0.05 | 8      | 95 | 15.0 | 24.0  | 4.0 | 0.85 | 7.2 | 6.3 |  |
| CB08RS-B     | ●             | ●             | ●      | ●           | with        | 8.2             | 9.6   | 0.05 | 8      | 95 | 15.0 | 24.0  | 4.0 | 0.85 | 7.2 | 6.3 |  |
| CB08RS-02    |               |               | ●      | ●           | without     | 8.2             | 9.5   | 0.2  | 8      | 95 | 15.0 | 24.0  | 4.0 | 0.85 | 7.2 | 6.3 |  |
| CB08RS-02B   | ●             | ●             | ●      | ●           | with        | 8.2             | 9.8   | 0.2  | 8      | 95 | 15.0 | 24.0  | 4.0 | 0.85 | 7.2 | 6.3 |  |

\*1 DMIN : Min. Cutting Diameter

\*2 The RE dimension represents the size before grinding a chipbreaker.

● = NEW

## RECOMMENDED CUTTING CONDITIONS

|   | Material                               | Micro-Mini Twin CB       |                     |                      |     | Micro-Mini Twin CR       |                     |                     |
|---|----------------------------------------|--------------------------|---------------------|----------------------|-----|--------------------------|---------------------|---------------------|
|   |                                        | Cutting Speed<br>(m/min) | Feed<br>(mm/rev)    | Depth of Cut<br>(mm) | l/d | Cutting Speed<br>(m/min) | Feed (mm/rev)       |                     |
|   |                                        |                          |                     |                      |     |                          | 03RS/04RS           | 05RS                |
| P | Carbon Steel, Alloy Steel<br>180—350HB | 80<br>(40—120)           | 0.03<br>(0.01—0.05) | 0.2<br>(0.1—0.3)     | 3—5 | 80<br>(40—120)           | 0.02<br>(0.01—0.03) | 0.03<br>(0.01—0.05) |
| M | Stainless Steel<br>≤200HB              | 80<br>(40—120)           | 0.03<br>(0.01—0.05) | 0.2<br>(0.1—0.3)     | 3—5 | 80<br>(40—120)           | 0.02<br>(0.01—0.03) | 0.03<br>(0.01—0.05) |
| K | Gray Cast Iron<br>≤350MPa              | 80<br>(40—120)           | 0.03<br>(0.01—0.05) | 0.2<br>(0.1—0.3)     | 3—5 | 80<br>(40—120)           | 0.03<br>(0.01—0.05) | 0.03<br>(0.01—0.05) |
| N | Non-Ferrous Material                   | 120<br>(80—160)          | 0.05<br>(0.01—0.08) | 0.3<br>(0.1—0.5)     | 3—5 | 120<br>(80—160)          | 0.03<br>(0.01—0.05) | 0.05<br>(0.01—0.08) |
| S | Heat Resistant Alloy                   | 60<br>(40—80)            | 0.02<br>(0.01—0.03) | 0.2<br>(0.1—0.3)     | 3—5 | 60<br>(40—80)            | 0.02<br>(0.01—0.03) | 0.02<br>(0.01—0.03) |

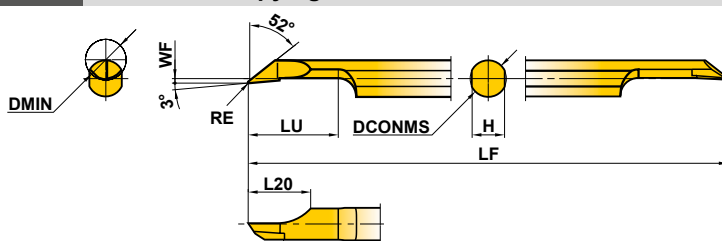
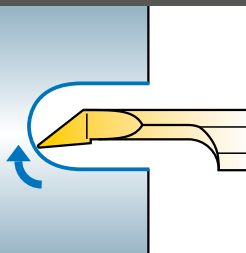
Note 1) Wet machining is recommended.

Note 2) The recommended tool overhang of CR type is LU+2mm.

● : Inventory maintained.

**CR**

For internal copying



Right hand tool only.

| Order Number    | Stock      |            |        |             | Chipbreaker | Dimensions (mm) |     |        |    |    |     |      |      |
|-----------------|------------|------------|--------|-------------|-------------|-----------------|-----|--------|----|----|-----|------|------|
|                 | Coated     |            |        | Micro Grain |             | DMIN            | RE  | DCONMS | LF | LU | L20 | WF   | H    |
|                 | NEW MS7025 | NEW MS9025 | VP15TF |             |             |                 |     |        |    |    |     |      |      |
| CR03RS-01       |            |            | ●      | ●           | without     | 3.5             | 0.1 | 3.0    | 50 | 8  | 6.0 | 0.15 | 2.7  |
| CR03RS-01B      | ●          | ●          | ●      | ●           | with        | 3.5             | 0.1 | 3.0    | 50 | 8  | 6.0 | 0.15 | 2.7  |
| NEW CR035RS-01B | ●          | ●          |        |             | with        | 4.0             | 0.1 | 3.5    | 60 | 8  | 6.5 | 0.15 | 3.15 |
| CR04RS-01       |            |            | ●      | ●           | without     | 4.5             | 0.1 | 4.0    | 60 | 10 | 7.0 | 0.15 | 3.6  |
| CR04RS-01B      | ●          | ●          | ●      | ●           | with        | 4.5             | 0.1 | 4.0    | 60 | 10 | 7.0 | 0.15 | 3.6  |
| NEW CR045RS-01B | ●          | ●          |        |             | with        | 5.0             | 0.1 | 4.5    | 70 | 10 | 7.5 | 0.15 | 4.05 |
| CR05RS-01       |            |            | ●      | ●           | without     | 5.5             | 0.1 | 5.0    | 70 | 12 | 8.0 | 0.15 | 4.5  |
| CR05RS-01B      | ●          | ●          | ●      | ●           | with        | 5.5             | 0.1 | 5.0    | 70 | 12 | 8.0 | 0.15 | 4.5  |

● = NEW

**E**

BORING BARS

**RECOMMENDED CUTTING CONDITIONS**

|          | Material                               | Micro-Mini Twin <b>CB</b> |                     |                      |     | Micro-Mini Twin <b>CR</b> |                     |                     |
|----------|----------------------------------------|---------------------------|---------------------|----------------------|-----|---------------------------|---------------------|---------------------|
|          |                                        | Cutting Speed<br>(m/min)  | Feed<br>(mm/rev)    | Depth of Cut<br>(mm) | l/d | Cutting Speed<br>(m/min)  | Feed (mm/rev)       |                     |
|          |                                        |                           |                     |                      |     |                           | 03RS/04RS           | 05RS                |
| <b>P</b> | Carbon Steel, Alloy Steel<br>180–350HB | 80<br>(40–120)            | 0.03<br>(0.01–0.05) | 0.2<br>(0.1–0.3)     | 3–5 | 80<br>(40–120)            | 0.02<br>(0.01–0.03) | 0.03<br>(0.01–0.05) |
| <b>M</b> | Stainless Steel<br>≤200HB              | 80<br>(40–120)            | 0.03<br>(0.01–0.05) | 0.2<br>(0.1–0.3)     | 3–5 | 80<br>(40–120)            | 0.02<br>(0.01–0.03) | 0.03<br>(0.01–0.05) |
| <b>K</b> | Gray Cast Iron<br>≤350MPa              | 80<br>(40–120)            | 0.03<br>(0.01–0.05) | 0.2<br>(0.1–0.3)     | 3–5 | 80<br>(40–120)            | 0.03<br>(0.01–0.05) | 0.03<br>(0.01–0.05) |
| <b>N</b> | Non-Ferrous Material                   | 120<br>(80–160)           | 0.05<br>(0.01–0.08) | 0.3<br>(0.1–0.5)     | 3–5 | 120<br>(80–160)           | 0.03<br>(0.01–0.05) | 0.05<br>(0.01–0.08) |
| <b>S</b> | Heat Resistant Alloy                   | 60<br>(40–80)             | 0.02<br>(0.01–0.03) | 0.2<br>(0.1–0.3)     | 3–5 | 60<br>(40–80)             | 0.02<br>(0.01–0.03) | 0.02<br>(0.01–0.03) |

Note 1) Wet machining is recommended.

Note 2) The recommended tool overhang of CR type is LU+2mm.

# MICRO-MINI TWIN

## ■ PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

● When using a holder for general purpose / small automatic lathe:

- ① To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

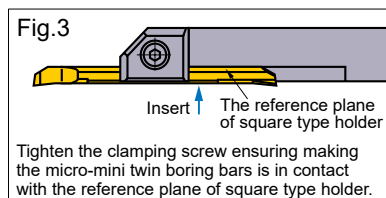
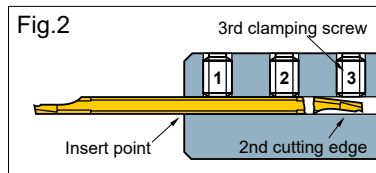
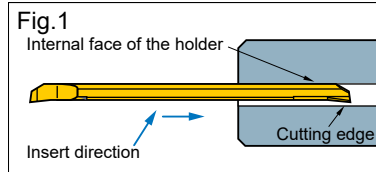
- ② When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

◎ When using Mitsubishi Materials holders

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. (RBH1620N, RBH19020N, RBH2020N and RBH2520N do not have the 3rd screw.) The set torque value for the clamping screw is 2.0 N·m.

● When using a square type holder:

- ① When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.  
② Make sure that the clamping screws are tightened to the recommended values.  
③ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.



E

BORING BARS

## MACHINING METHODS OF THE CR TYPE

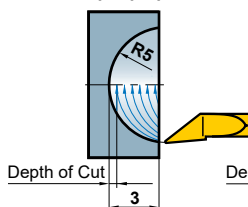
### ● Profile turning

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

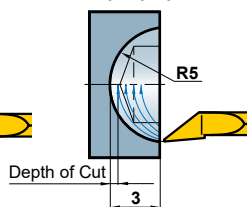
<Cutting Conditions>

Workpiece : DIN S20C  
Holder : CR05RS-01B  
Cutting Speed : 80m/min  
Feed : 0.05mm/rev  
Depth of Cut : 0.05mm  
Wet Cutting

Machining a work piece  
without a pre-prepared hole



Machining a work piece  
with a pre-prepared hole



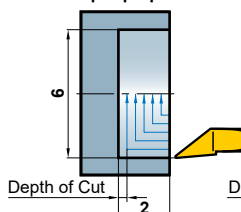
### ● Inner end facing

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

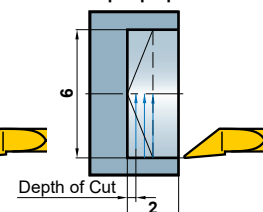
<Cutting Conditions>

Workpiece : DIN S20C  
Holder : CR05RS-01B  
Cutting Speed : 80m/min  
Feed : 0.05mm/rev  
Depth of Cut : 0.05mm  
Wet Cutting

Machining a work piece  
without a pre-prepared hole



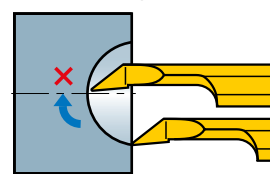
Machining a work piece  
with a pre-prepared hole



## ■ NOTES FOR USE

Profile turning,  
Inner end facing

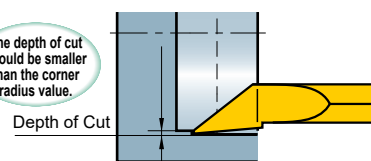
The cutting edge  
should not be cross  
the centre line of the  
work piece.



If the cutting edge crosses the centre line of a work piece, the cutting edge can fracture.

Copying

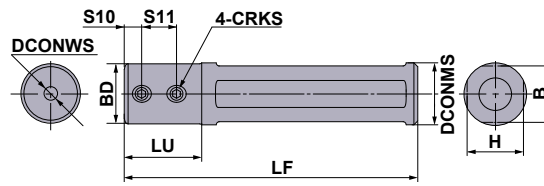
The depth of cut  
should be smaller  
than the corner  
radius value.



With depths of cut larger than the corner radius value, burrs will be formed.

## ■ ROUND TYPE HOLDER

**NEW**



| Order Number  | Stock | Dimensions (mm) |        |      |     |    |      |      |     |     |
|---------------|-------|-----------------|--------|------|-----|----|------|------|-----|-----|
|               |       | DCONMS          | DCONWS | BD   | LF  | LU | H    | B    | S10 | S11 |
| SLV190085025N | ●     | 19.05           | 2.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085035N | ●     | 19.05           | 3.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085045N | ●     | 19.05           | 4.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110025N | ●     | 19.05           | 2.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110035N | ●     | 19.05           | 3.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110045N | ●     | 19.05           | 4.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV200085025N | ●     | 20.0            | 2.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085035N | ●     | 20.0            | 3.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085045N | ●     | 20.0            | 4.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV220135025N | ●     | 22.0            | 2.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135035N | ●     | 22.0            | 3.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135045N | ●     | 22.0            | 4.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV250067025N | ●     | 25.0            | 2.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067035N | ●     | 25.0            | 3.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067045N | ●     | 25.0            | 4.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110025N | ●     | 25.0            | 2.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110035N | ●     | 25.0            | 3.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110045N | ●     | 25.0            | 4.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV254085025N | ●     | 25.4            | 2.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085035N | ●     | 25.4            | 3.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085045N | ●     | 25.4            | 4.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110025N | ●     | 25.4            | 2.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110035N | ●     | 25.4            | 3.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110045N | ●     | 25.4            | 4.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |

E

BORING BARS

## MOUNTING CHART

| Series          |        | Boring Bar Type |           | Holder Type   |
|-----------------|--------|-----------------|-----------|---------------|
| MICRO-MINI TWIN | Boring | CB              | 025RS(-B) | SLV○○○○○○025N |
| MICRO-MINI TWIN | Boring | CB              | 035RS(-B) | SLV○○○○○○035N |
| MICRO-MINI TWIN | Boring | CB              | 045RS(-B) | SLV○○○○○○045N |
| MICRO-MINI TWIN | Boring | CR              | 035RS(-B) | SLV○○○○○○035N |
| MICRO-MINI TWIN | Boring | CR              | 045RS(-B) | SLV○○○○○○045N |

## SPARE PARTS

| Holder Type   | Clamp Screw | Wrench | Clamp Torque<br>(N • m) |
|---------------|-------------|--------|-------------------------|
| SLV○○○○○○025N | HSS04005    | HKY20R | 2.0                     |
| SLV○○○○○○035N | HSS04005    | HKY20R | 2.0                     |
| SLV○○○○○○045N | HSS04005    | HKY20R | 2.0                     |

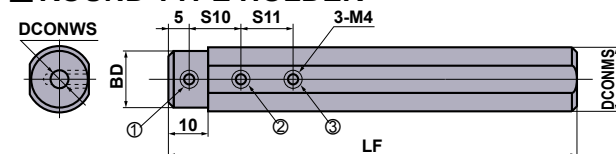
● : Inventory maintained.

SPARE PARTS > N001  
TECHNICAL DATA > P001

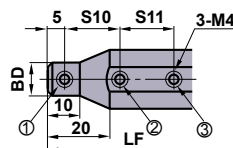
E025

# MICRO-MINI TWIN

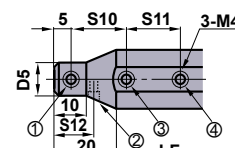
## ■ ROUND TYPE HOLDER



RBH158○N, RBH16○N, RBH190○N



RBH20○N, RBH25○N, RBH254○N



RBH22○N

| Order Number | Stock | Dimensions (mm) |        |    |     |     |     |      | Micro-Mini<br>C | Micro-Mini Twin        |            | *1 Clamp Screw |   |   |   | Wrench | Torque<br>(N·m) |
|--------------|-------|-----------------|--------|----|-----|-----|-----|------|-----------------|------------------------|------------|----------------|---|---|---|--------|-----------------|
|              |       | DCONMS          | DCONWS | BD | LF  | S10 | S11 | S12  |                 | CB                     | CR         | ①              | ② | ③ | ④ |        |                 |
| RBH15820N    | ★     | 15.875          | 2      | 15 | 100 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | B              | B | — | — | HKY20F | 2.0             |
| RBH15830N    | ★     | 15.875          | 3      | 15 | 100 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH15840N    | ★     | 15.875          | 4      | 15 | 100 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH15850N    | ★     | 15.875          | 5      | 15 | 100 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH15860N    | ★     | 15.875          | 6      | 15 | 100 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH15870N    | ★     | 15.875          | 7      | 15 | 100 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH15880N    | ★     | 15.875          | 8      | 15 | 100 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | D              | D | D | — | HKY20F | 2.0             |
| RBH1620N     | ●     | 16              | 2      | 15 | 100 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | B              | B | — | — | HKY20F | 2.0             |
| RBH1630N     | ●     | 16              | 3      | 15 | 100 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH1640N     | ●     | 16              | 4      | 15 | 100 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH1650N     | ●     | 16              | 5      | 15 | 100 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | A | A | — | HKY20F | 2.0             |
| RBH1660N     | ●     | 16              | 6      | 15 | 100 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH1670N     | ●     | 16              | 7      | 15 | 100 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH1680N     | ★     | 16              | 8      | 15 | 100 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | D              | D | D | — | HKY20F | 2.0             |
| *2 RBH19020N | ★     | 19.05           | 2      | 18 | 125 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | C              | C | — | — | HKY20F | 2.0             |
| *2 RBH19030N | ★     | 19.05           | 3      | 18 | 125 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | B              | B | B | — | HKY20F | 2.0             |
| *2 RBH19040N | ★     | 19.05           | 4      | 18 | 125 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | B              | B | B | — | HKY20F | 2.0             |
| *2 RBH19050N | ★     | 19.05           | 5      | 18 | 125 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | B              | B | B | — | HKY20F | 2.0             |
| *2 RBH19060N | ★     | 19.05           | 6      | 18 | 125 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | B              | B | B | — | HKY20F | 2.0             |
| *2 RBH19070N | ★     | 19.05           | 7      | 18 | 125 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | B              | B | B | — | HKY20F | 2.0             |
| RBH19080N    | ★     | 19.05           | 8      | 18 | 125 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH2020N     | ★     | 20              | 2      | 11 | 125 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | A              | A | — | — | HKY20F | 2.0             |
| RBH2030N     | ★     | 20              | 3      | 12 | 125 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | A | B | — | HKY20F | 2.0             |
| RBH2040N     | ★     | 20              | 4      | 13 | 125 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | B | B | — | HKY20F | 2.0             |
| RBH2050N     | ★     | 20              | 5      | 14 | 125 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | B | B | — | HKY20F | 2.0             |
| RBH2060N     | ★     | 20              | 6      | 15 | 125 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | B | B | — | HKY20F | 2.0             |
| RBH2070N     | ★     | 20              | 7      | 16 | 125 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | B | B | — | HKY20F | 2.0             |
| RBH2080N     | ★     | 20              | 8      | 17 | 125 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | A              | A | A | — | HKY20F | 2.0             |
| RBH2220N     | ★     | 22              | 2      | 11 | 125 | 10  | —   | 10   | —               | 02RS-(B)<br>02RS-0-(B) | —          | A              | B | — | A | HKY20F | 2.0             |
| RBH2230N     | ★     | 22              | 3      | 12 | 125 | 10  | 10  | 10   | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | B | C | A | HKY20F | 2.0             |
| RBH2240N     | ★     | 22              | 4      | 13 | 125 | 15  | 15  | 12.5 | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | B | B | A | HKY20F | 2.0             |
| RBH2250N     | ★     | 22              | 5      | 14 | 125 | 15  | 15  | 12.5 | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | B | B | A | HKY20F | 2.0             |
| RBH2260N     | ★     | 22              | 6      | 15 | 125 | 15  | 15  | 15   | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | B | B | A | HKY20F | 2.0             |
| RBH2270N     | ★     | 22              | 7      | 16 | 125 | 20  | 20  | 15   | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | B | B | A | HKY20F | 2.0             |
| RBH2280N     | ★     | 22              | 8      | 17 | 125 | 20  | 20  | 15   | —               | 08RS-(B)<br>08RS-0-(B) | —          | A              | B | B | A | HKY20F | 2.0             |
| RBH2520N     | ★     | 25              | 2      | 11 | 150 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | A              | B | — | — | HKY20F | 2.0             |
| RBH2530N     | ★     | 25              | 3      | 12 | 150 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | B | C | — | HKY20F | 2.0             |
| RBH2540N     | ★     | 25              | 4      | 13 | 150 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | C | C | — | HKY20F | 2.0             |
| RBH2550N     | ★     | 25              | 5      | 14 | 150 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | C | C | — | HKY20F | 2.0             |
| RBH2560N     | ★     | 25              | 6      | 15 | 150 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | C | C | — | HKY20F | 2.0             |
| RBH2570N     | ★     | 25              | 7      | 16 | 150 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | C | C | — | HKY20F | 2.0             |
| RBH2580N     | ★     | 25              | 8      | 17 | 150 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | A              | B | B | — | HKY20F | 2.0             |
| RBH25420N    | ★     | 25.4            | 2      | 11 | 150 | 10  | —   | —    | —               | 02RS-(B)<br>02RS-0-(B) | —          | A              | B | — | — | HKY20F | 2.0             |
| RBH25430N    | ★     | 25.4            | 3      | 12 | 150 | 10  | 10  | —    | 03FR-BLS        | 03RS-(B)<br>03RS-0-(B) | 03RS-01(B) | A              | B | C | — | HKY20F | 2.0             |
| RBH25440N    | ★     | 25.4            | 4      | 13 | 150 | 15  | 15  | —    | 04FR-BLS        | 04RS-(B)<br>04RS-0-(B) | 04RS-01(B) | A              | C | C | — | HKY20F | 2.0             |
| RBH25450N    | ★     | 25.4            | 5      | 14 | 150 | 15  | 15  | —    | 05HR-BLS        | 05RS-(B)<br>05RS-0-(B) | 05RS-01(B) | A              | C | C | — | HKY20F | 2.0             |
| RBH25460N    | ★     | 25.4            | 6      | 15 | 150 | 15  | 15  | —    | —               | 06RS-(B)<br>06RS-0-(B) | —          | A              | C | C | — | HKY20F | 2.0             |
| RBH25470N    | ★     | 25.4            | 7      | 16 | 150 | 20  | 20  | —    | —               | 07RS-(B)<br>07RS-0-(B) | —          | A              | C | C | — | HKY20F | 2.0             |
| RBH25480N    | ★     | 25.4            | 8      | 17 | 150 | 20  | 20  | —    | —               | 08RS-(B)<br>08RS-0-(B) | —          | A              | B | B | — | HKY20F | 2.0             |

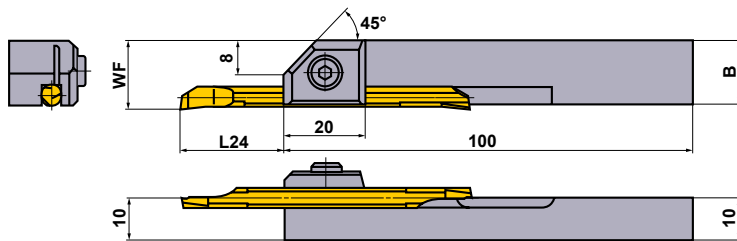
\*1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008, D=HSS04003

\*2 Revised order number.

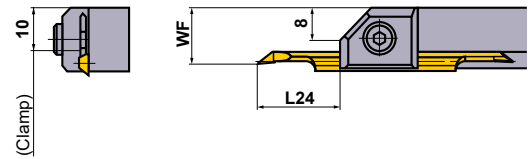
| Conventional Order Number | Revised Order Number | Conventional Order Number | Revised Order Number | Conventional Order Number | Revised Order Number |
|---------------------------|----------------------|---------------------------|----------------------|---------------------------|----------------------|
| RBH1920N                  | RBH19020N            | RBH1940N                  | RBH19040N            | RBH1960N                  | RBH19060N            |
| RBH1930N                  | RBH19030N            | RBH1950N                  | RBH19050N            | RBH1970N                  | RBH19070N            |

## ■ SQUARE TYPE HOLDER

CB type (Boring bar fits in a holder)



CR type (Boring bar fits in a holder)



| Order Number | Stock | Dimensions (mm) |       |                 |              |      |                        | Micro-Mini Twin |          | Clamp Screw | Wrench | Torque (N・m) |
|--------------|-------|-----------------|-------|-----------------|--------------|------|------------------------|-----------------|----------|-------------|--------|--------------|
|              |       | WF              |       | L24 *           |              | B    |                        |                 |          |             |        |              |
|              |       | CB              | CR    | CB              | CR           | CB   | CR                     | CB              | CR       |             |        |              |
| SBH1020R     | ★     | 13              | —     | 6—24 (6—10)     | —            | 12.9 | 02RS(-B)<br>02RS-0🌀(B) | —               | HSC04010 | HKY30R      | 4.8    |              |
| SBH1030R     | ★     | 14              | 12.65 | 8.5—22 (9—15)   | 11—19.5 (12) | 13.8 | 03RS(-B)<br>03RS-0🌀(B) | 03RS-01(B)      | HSC05012 | HKY40R      | 9.5    |              |
| SBH1040R     | ★     | 15              | 13.15 | 11—29.5 (12—20) | 13—27.5 (14) | 14.7 | 04RS(-B)<br>04RS-0🌀(B) | 04RS-01(B)      | HSC05012 | HKY40R      | 9.5    |              |
| SBH1050R     | ★     | 16              | 13.65 | 13.5—37 (15—25) | 15—35.5 (16) | 15.6 | 05RS(-B)<br>05RS-0🌀(B) | 05RS-01(B)      | HSC05012 | HKY40R      | 9.5    |              |
| SBH1060R     | ★     | 17              | —     | 13.5—42 (18—30) | —            | 16.5 | 06RS(-B)<br>06RS-0🌀(B) | —               | HSC05012 | HKY40R      | 9.5    |              |
| SBH1070R     | ★     | 18              | —     | 13.5—52 (21—35) | —            | 17.4 | 07RS(-B)<br>07RS-0🌀(B) | —               | HSC05012 | HKY40R      | 9.5    |              |

Note 1) The MICRO-DEX and the MICRO-MINI cannot be fit to square holders.

\* L24 is the length of overhang for sufficient clamping, and ( ) is the recommended length for machining of carbon and alloy steel.

E

BORING BARS



# BORING BARS

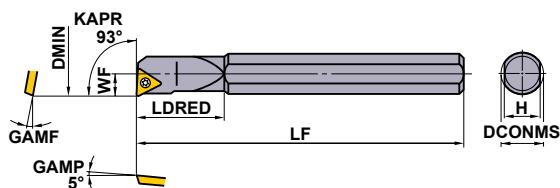
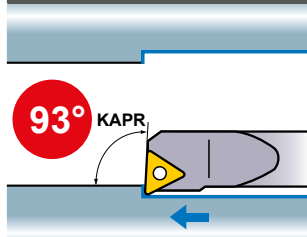
## F TYPE BORING BARS

- The minimum cutting diameter is from Ø10.
- 11° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

### FSTU1

#### TP<sup>○○</sup>inserts

| Light      | Flat Top   |
|------------|------------|
| R/L        | R/L        |
|            |            |
| (08,09,11) | (08,09,11) |
| PCD        | PCD        |
| R/L-F      | R/L-F      |
|            |            |
| (09,11)    | (08,09,11) |



Right hand tool holder shown.

| Order Number | Stock |   | Insert Number |        | Dimensions (mm) |     |       |    |    |      |  |  |        |
|--------------|-------|---|---------------|--------|-----------------|-----|-------|----|----|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|              | R     | L |               |        | DCONMS          | LF  | LDRED | WF | H  | GAMF | DMIN                                                                                |                                                                                     |        |
|              |       |   |               |        |                 |     |       |    |    |      |                                                                                     |                                                                                     |        |
| FSTU108R/L   | ●     | ● | TPGX<br>TPMX  | 0802○○ | 8               | 125 | 18    | 5  | 7  | 15°  | 10                                                                                  | CS200T                                                                              | TKY06F |
| FSTU110R/L   | ●     | ● |               | 0902○○ | 10              | 150 | 22    | 6  | 9  | 13°  | 12                                                                                  | CS250T                                                                              | TKY08F |
| FSTU112R/L   | ●     | ● |               | 0902○○ | 12              | 180 | 25    | 8  | 11 | 10°  | 16                                                                                  | CS250T                                                                              | TKY08F |
| FSTU116R/L   | ●     | ● |               | 1103○○ | 16              | 200 | 30    | 11 | 14 | 7°   | 22                                                                                  | CS300890T                                                                           | TKY08F |

\* Clamp Torque (N · m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

E

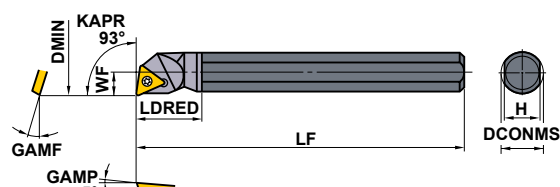
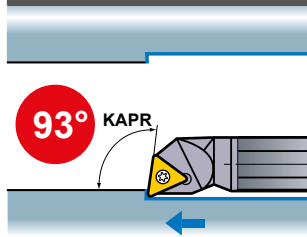
BORING BARS

### FSTU2

#### Carbide shank

#### TP<sup>○○</sup>inserts

| Light      | Flat Top   |
|------------|------------|
| R/L        | R/L        |
|            |            |
| (08,09,11) | (08,09,11) |
| PCD        | PCD        |
| R/L-F      | R/L-F      |
|            |            |
| (09,11)    | (08,09,11) |



Right hand tool holder shown.

| Order Number | Stock |   | Insert Number |        | Dimensions (mm) |     |       |    |    |      |  | *<br> |        |
|--------------|-------|---|---------------|--------|-----------------|-----|-------|----|----|------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
|              | R     | L |               |        | DCONMS          | LF  | LDRED | WF | H  | GAMF |                                                                                       |                                                                                            | DMIN   |
|              |       |   |               |        |                 |     |       |    |    |      | Clamp Screw                                                                           | Wrench                                                                                     |        |
| FSTU208R/L   | ●     | ● | TPGX<br>TPMX  | 0802○○ | 8               | 125 | 13    | 5  | 7  | 15°  | 10                                                                                    | CS200T                                                                                     | TKY06F |
| FSTU210R/L   | ●     | ● |               | 0902○○ | 10              | 150 | 16    | 6  | 9  | 13°  | 12                                                                                    | CS250T                                                                                     | TKY08F |
| FSTU212R/L   | ●     | ★ |               | 0902○○ | 12              | 180 | 19    | 8  | 11 | 10°  | 16                                                                                    | CS250T                                                                                     | TKY08F |
| FSTU216R/L   | ●     | ★ |               | 1103○○ | 16              | 200 | 26    | 11 | 14 | 7°   | 22                                                                                    | CS300890T                                                                                  | TKY08F |

\* Clamp Torque (N · m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4.

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained. ★ : Inventory maintained in Japan.

TP<sup>○○</sup> type inserts

➤ A170—A173

PCD inserts

➤ B056

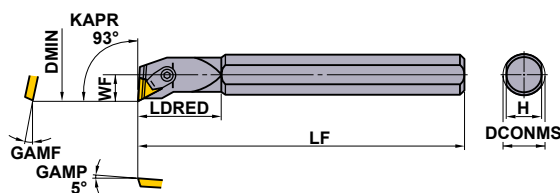
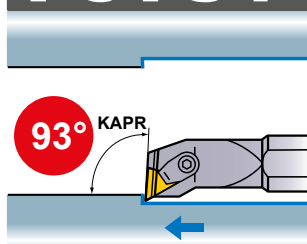
# F TYPE BORING BARS

- The minimum cutting diameter is from Ø22.
- 11° positive insert.
- Clamp-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

## FCTU1

### TP<sup>+</sup> inserts

| M Class                                                                             | M Class                                                                             | G Class                                                                             |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Standard                                                                            |                                                                                     | R/L                                                                                 |
|  |  |  |
| (11,16)                                                                             | (11,16)                                                                             | (11,16)                                                                             |
| G Class                                                                             | PCBN/PCD                                                                            |                                                                                     |
|  |  |                                                                                     |
| (11,16)                                                                             | (11,16)                                                                             |                                                                                     |



Right hand tool holder shown.

| Order Number                        | Stock |   | Insert Number                |      | Dimensions (mm) |     |       |    |    |      |      |  |  |  |  |  |
|-------------------------------------|-------|---|------------------------------|------|-----------------|-----|-------|----|----|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                     | R     | L |                              |      | DCONMS          | LF  | LDRED | WF | H  | GAMF | DMIN | Shim                                                                                | Shim Pin                                                                            | Clamp Set                                                                           | Breaker Piece                                                                       | Wrench                                                                              |
|                                     |       |   |                              |      |                 |     |       |    |    |      |      |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| FCTU116R/L                          | ●     | ● | TPMN<br>TPMR<br>TPGN<br>TPGR | 1103 | 16              | 200 | 30    | 11 | 14 | 7°   | 22   | —                                                                                   | —                                                                                   | C3                                                                                  | CBT2N                                                                               | HKY25R                                                                              |
| FCTU120R/L ☆                        | ●     | ● |                              | 1603 | 20              | 200 | 37    | 13 | 18 | 5°   | 26   | —                                                                                   | —                                                                                   | C4                                                                                  | CBT3F                                                                               | HKY30R                                                                              |
| FCTU125R/L ☆<br>(4 Side Flat Shank) | ●     | ● |                              | 1603 | 25              | 250 | 40    | 16 | 22 | 5°   | 32   | PT32                                                                                | BCP202                                                                              | C4                                                                                  | CBT3F                                                                               | HKY30R                                                                              |
| FCTU132R/L ☆<br>(4 Side Flat Shank) | ●     | ● |                              | 1603 | 32              | 300 | 45    | 20 | 29 | 0°   | 40   | PT32                                                                                | BCP201                                                                              | C4                                                                                  | CBT3F                                                                               | HKY30R                                                                              |

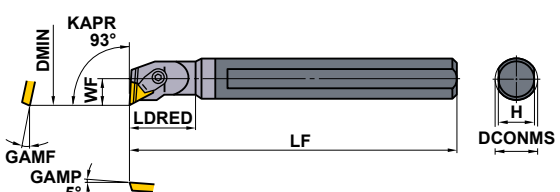
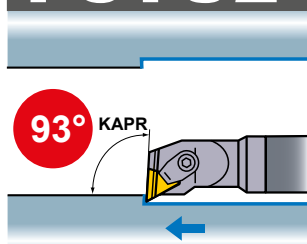
\* Clamp Torque (N · m) : C3=2.2, C4=3.3

## FCTU2

### Carbide shank

### TP<sup>+</sup> inserts

| M Class                                                                               | M Class                                                                               | G Class                                                                             |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                       |                                                                                       | R/L                                                                                 |
|    |    |  |
| (11,16)                                                                               | (11,16)                                                                               | (11,16)                                                                             |
| G Class                                                                               | PCBN/PCD                                                                              |                                                                                     |
|  |  |                                                                                     |
| (11,16)                                                                               | (11,16)                                                                               |                                                                                     |



Right hand tool holder only.

| Order Number          | Stock | Insert Number                |                   | Dimensions (mm) |     |       |    |    |      |      |  |  |  |  |  |
|-----------------------|-------|------------------------------|-------------------|-----------------|-----|-------|----|----|------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                       | R     |                              |                   | DCONMS          | LF  | LDRED | WF | H  | GAMF | DMIN | Shim                                                                                  | Shim Pin                                                                              | Clamp Set                                                                             | Breaker Piece                                                                         | Wrench                                                                                |
| FCTU216R              | ★     | TPMN<br>TPMR<br>TPGN<br>TPGR | 1103 <sup>+</sup> | 16              | 200 | 26    | 11 | 14 | 7°   | 22   | —                                                                                     | —                                                                                     | C3                                                                                    | CBT2N                                                                                 | HKY25R                                                                                |
| FCTU220R <sup>☆</sup> | ★     |                              | 1603 <sup>+</sup> | 20              | 200 | 33    | 13 | 18 | 5°   | 26   | —                                                                                     | —                                                                                     | C4                                                                                    | CBT3F                                                                                 | HKY30R                                                                                |
| FCTU225R <sup>☆</sup> | ★     |                              | 1603 <sup>+</sup> | 25              | 250 | 37    | 16 | 22 | 5°   | 32   | PT32                                                                                  | BCP202                                                                                | C4                                                                                    | CBT3F                                                                                 | HKY30R                                                                                |

\* Clamp Torque (N · m) : C3=2.2, C4=3.3

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

## RECOMMENDED CUTTING CONDITIONS

| Steel Shank   |                             |           | l/d≤3          |                          |                  |                      | l/d=3—4 (Shank Diameter≥25mm) |                  |                      |
|---------------|-----------------------------|-----------|----------------|--------------------------|------------------|----------------------|-------------------------------|------------------|----------------------|
| Carbide Shank |                             |           | l/d≤5          |                          |                  |                      | l/d=6—7                       |                  |                      |
| Material      |                             | Hardness  | Cutting Mode   | Cutting Speed<br>(m/min) | Feed<br>(mm/rev) | Depth of Cut<br>(mm) | Cutting Speed<br>(m/min)      | Feed<br>(mm/rev) | Depth of Cut<br>(mm) |
| P             | Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)             | 0.1 (0.05—0.15)  | 0.2                  | 120 (80—150)                  | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 90 (60—120)              | 0.25 (0.15—0.35) | —3.0                 | 80 (50—110)                   | 0.15 (0.1—0.2)   | —1.5                 |
| M             | Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)            | 0.1 (0.05—0.15)  | 0.2                  | 140 (100—180)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 70 (50—90)               | 0.2 (0.15—0.25)  | —2.0                 | 60 (40—80)                    | 0.15 (0.1—0.2)   | —1.0                 |
| N             | Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)            | 0.1 (0.05—0.15)  | 0.2                  | 300 (200—400)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 200 (150—250)            | 0.1 (0.05—0.15)  | —2.0                 | 200 (150—250)                 | 0.1 (0.05—0.15)  | —1.5                 |

TP<sup>+</sup> type inserts > A190, A191  
PCBN & PCD inserts > B043, B061

SPARE PARTS > N001  
TECHNICAL DATA > P001

# BORING BARS

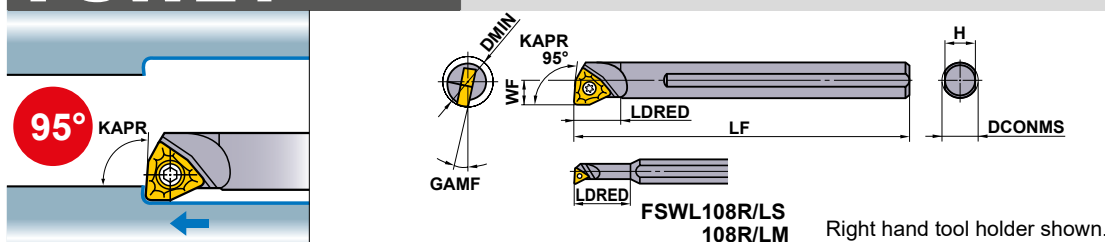
## F TYPE BORING BARS

- The minimum cutting diameter is from Ø5.8.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

### FSWL1

#### WC $\circ$ ○ inserts

| Finish     | Light         |
|------------|---------------|
| R/L        | Standard      |
|            |               |
| (02,L3)    | (02,L3,04,06) |
| PCBN/PCD   |               |
|            |               |
| (L3,04,06) |               |



| Order Number | Stock |   | Insert Number        |        | Dimensions (mm) |     |       |     |    |      |  * |  |        |
|--------------|-------|---|----------------------|--------|-----------------|-----|-------|-----|----|------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|              | R     | L |                      |        | DCONMS          | LF  | LDRED | WF  | H  | GAMF |                                                                                       |                                                                                     | DMIN   |
|              |       |   |                      |        |                 |     |       |     |    |      | Clamp Screw                                                                           | Wrench                                                                              |        |
| FSWL108R/LS  | ●     | ● | WCMT<br>WCGT         | 0201○○ | 8               | 100 | 19    | 2.9 | 7  | 17°  | 5.8                                                                                   | TS21                                                                                | TKY06F |
| FSWL108R/LM  | ●     | ● | WCMT<br>WCGT<br>WCMW | L302○○ | 8               | 100 | 25    | 4   | 7  | 15°  | 8                                                                                     | TS2                                                                                 | TKY06F |
| FSWL108R/L   | ●     | ● | WCMT<br>WCMW         | 0402○○ | 8               | 125 | 10    | 5   | 7  | 15°  | 10                                                                                    | TS25                                                                                | TKY08F |
| FSWL110R/L   | ●     | ● |                      | 0402○○ | 10              | 150 | 12    | 6   | 9  | 13°  | 12                                                                                    | TS25                                                                                | TKY08F |
| FSWL112R/L ☆ | ●     | ● |                      | 06T3○○ | 12              | 180 | 15    | 8   | 11 | 13°  | 16                                                                                    | TS4                                                                                 | TKY15F |
| FSWL116R/L ☆ | ●     | ● |                      | 06T3○○ | 16              | 200 | 20    | 11  | 14 | 7°   | 22                                                                                    | TS4                                                                                 | TKY15F |

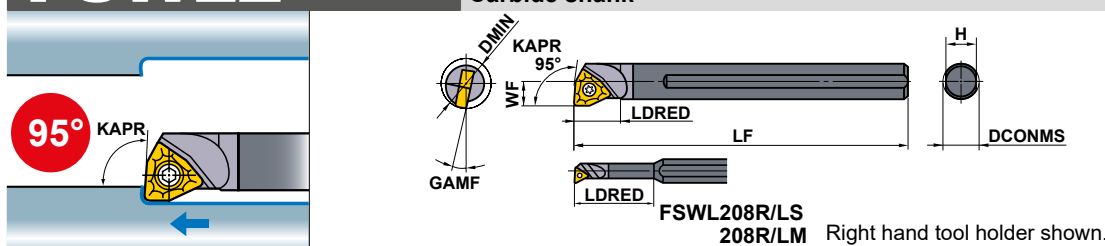
\* Clamp Torque (N • m) : TS21=0.6, TS2=0.6, TS25=1.0, TS4=3.5

### FSWL2

#### Carbide shank

#### WC $\circ$ ○ inserts

| Finish     | Light         |
|------------|---------------|
| R/L        | Standard      |
|            |               |
| (02,L3)    | (02,L3,04,06) |
| PCBN/PCD   |               |
|            |               |
| (L3,04,06) |               |



| Order Number | Stock |   | Insert Number        |        | Dimensions (mm) |     |       |     |    |      |  * |  |        |
|--------------|-------|---|----------------------|--------|-----------------|-----|-------|-----|----|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|              | R     | L |                      |        | DCONMS          | LF  | LDRED | WF  | H  | GAMF |                                                                                         |                                                                                       | DMIN   |
|              |       |   |                      |        |                 |     |       |     |    |      | Clamp Screw                                                                             | Wrench                                                                                |        |
| FSWL208R/LS  | ●     | ● | WCMT<br>WCGT         | 0201○○ | 8               | 122 | 25    | 2.9 | 7  | 17°  | 5.8                                                                                     | TS21                                                                                  | TKY06F |
| FSWL208R/LM  | ●     | ● | WCMT<br>WCGT<br>WCMW | L302○○ | 8               | 125 | 33    | 4   | 7  | 15°  | 8                                                                                       | TS2                                                                                   | TKY06F |
| FSWL208R/L   | ●     | ● | WCMT<br>WCMW         | 0402○○ | 8               | 125 | 10    | 5   | 7  | 15°  | 10                                                                                      | TS25                                                                                  | TKY08F |
| FSWL210R/L   | ●     | ● |                      | 0402○○ | 10              | 150 | 12    | 6   | 9  | 13°  | 12                                                                                      | TS25                                                                                  | TKY08F |
| FSWL212R/L ☆ | ●     | ● |                      | 06T3○○ | 12              | 180 | 15    | 8   | 11 | 13°  | 16                                                                                      | TS4                                                                                   | TKY15F |
| FSWL216R/L ☆ | ●     | ● |                      | 06T3○○ | 16              | 200 | 20    | 11  | 14 | 7°   | 22                                                                                      | TS4                                                                                   | TKY15F |

\* Clamp Torque (N • m) : TS21=0.6, TS2=0.6, TS25=1.0, TS4=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

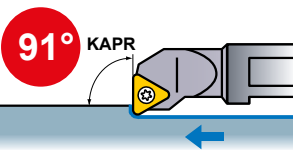
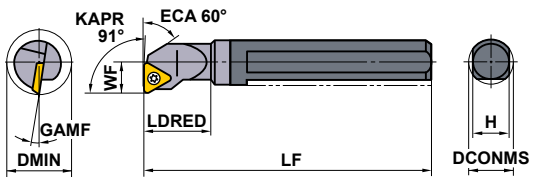
Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

# S TYPE BORING BARS

- The minimum cutting diameter is from Ø11.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

| S TFC                         |       |            |                                                  | TC inserts |                 |         |       |            |    |      | Finish     |             | Finish     |  | Light      |  | Light      |  |
|-------------------------------|-------|------------|--------------------------------------------------|------------|-----------------|---------|-------|------------|----|------|------------|-------------|------------|--|------------|--|------------|--|
|                               |       |            |                                                  |            |                 |         |       |            |    |      | FP         |             | FM         |  | LP         |  | LM         |  |
|                               |       |            |                                                  |            |                 |         |       |            |    |      |            |             |            |  |            |  |            |  |
|                               |       |            |                                                  |            |                 |         |       |            |    |      | (09,11,16) |             | (09,11,16) |  | (09,11,16) |  | (09,11,16) |  |
|                               |       |            |                                                  |            |                 |         |       |            |    |      | Medium     |             | Medium     |  | Flat Top   |  | PCBN/PCD   |  |
| Right hand tool holder shown. |       |            |                                                  |            |                 |         |       |            |    |      | MP         |             | MM         |  |            |  |            |  |
|                               |       |            |                                                  |            |                 |         |       |            |    |      |            |             |            |  |            |  |            |  |
|                               |       | (09,11,16) |                                                  | (09,11,16) |                 | (11,16) |       | (09,11,16) |    |      |            |             |            |  |            |  |            |  |
| Order Number                  | Stock |            | Insert Number                                    |            | Dimensions (mm) |         |       |            |    |      |            | *           |            |  |            |  |            |  |
|                               | R     | L          |                                                  |            | DCONMS          | LF      | LDRED | WF         | H  | GAMF | DMIN       | Clamp Screw | Wrench     |  |            |  |            |  |
|                               |       |            |                                                  |            |                 |         |       |            |    |      |            |             |            |  |            |  |            |  |
| S08FSTFCR/L09                 | ●     | ●          | TCMT<br>TCGW<br><br>TCMW<br>TCMT<br>TCGW<br>TCGT | 0902       | 8               | 80      | 12    | 6          | 7  | 15°  | 11         | TS22        | TKY06F     |  |            |  |            |  |
| S10HSTFCR/L11                 | ●     | ●          |                                                  | 1102       | 10              | 100     | 16    | 7          | 9  | 13°  | 13         | TS25        | TKY08F     |  |            |  |            |  |
| S12KSTFCR/L11                 | ●     | ●          |                                                  | 1102       | 12              | 125     | 20    | 9          | 11 | 10°  | 16         | TS25        | TKY08F     |  |            |  |            |  |
| S16MSTFCR/L11                 | ●     | ●          |                                                  | 1102       | 16              | 150     | 25    | 11         | 14 | 7°   | 20         | TS25        | TKY08F     |  |            |  |            |  |
| S20QSTFCR/L16 ☆               | ●     | ●          |                                                  | 16T3       | 20              | 180     | 32    | 13         | 18 | 7°   | 25         | TS4         | TKY15F     |  |            |  |            |  |
| S25RSTFCR/L16 ☆               | ●     | ●          |                                                  | 16T3       | 25              | 200     | 40    | 17         | 23 | 5°   | 32         | TS4         | TKY15F     |  |            |  |            |  |
| S32SSTFCR/L16 ☆               | ●     | ●          | 16T3                                             | 32         | 250             | 50      | 22    | 30         | 5° | 40   | TS4        | TKY15F      |            |  |            |  |            |  |

\* Clamp Torque (N · m) : TS22=0.6, TS25=1.0, TS4=3.5

| CSTFC                                                                               |        |                              |      | Carbide shank                                                                       |       | TCinserts |    |      |      | Finish                                                                                |                                                                                                      | Finish                                                                                |                                                                                                 | Light                                                                                 |  | Light                                                                                 |  |
|-------------------------------------------------------------------------------------|--------|------------------------------|------|-------------------------------------------------------------------------------------|-------|-----------|----|------|------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |        |                              |      |  |       |           |    |      |      | FP                                                                                    |                                                                                                      | FM                                                                                    |                                                                                                 | LP                                                                                    |  | LM                                                                                    |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      |  |                                                                                                      |  |                                                                                                 |  |  |  |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      | (09,11,16)                                                                            |                                                                                                      | (09,11,16)                                                                            |                                                                                                 | (09,11,16)                                                                            |  | (09,11,16)                                                                            |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      | Medium                                                                                |                                                                                                      | Medium                                                                                |                                                                                                 | Flat Top                                                                              |  | PCBN/PCD                                                                              |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      | MP                                                                                    |                                                                                                      | MM                                                                                    |                                                                                                 |                                                                                       |  |                                                                                       |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      |  |                                                                                                      |  |                                                                                                 |  |  |  |  |
|                                                                                     |        |                              |      | Right hand tool holder only.                                                        |       |           |    |      |      | (09,11,16)                                                                            |                                                                                                      | (09,11,16)                                                                            |                                                                                                 | (11,16)                                                                               |  | (11)                                                                                  |  |
|                                                                                     |        |                              |      |                                                                                     |       |           |    |      |      |                                                                                       |                                                                                                      |                                                                                       |                                                                                                 |                                                                                       |  |                                                                                       |  |
| Order Number                                                                        | Stock  | Insert Number                |      | Dimensions (mm)                                                                     |       |           |    |      |      |                                                                                       | <br>Clamp Screw |                                                                                       | <br>Wrench |                                                                                       |  |                                                                                       |  |
|                                                                                     | DCONMS |                              |      | LF                                                                                  | LDRED | WF        | H  | GAMF | DMIN |                                                                                       |                                                                                                      |                                                                                       |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C08HSTFCR09                                                                         | ●      | TCMT<br>TCGW                 | 0902 | 8                                                                                   | 100   | 12        | 6  | 7    | 15°  | 11                                                                                    | TS22                                                                                                 | TKY06F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C10KSTFCR11                                                                         | ●      | TCMW<br>TCMT<br>TCGW<br>TCGT | 1102 | 10                                                                                  | 125   | 16        | 7  | 9    | 13°  | 13                                                                                    | TS25                                                                                                 | TKY08F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C12MSTFCR11                                                                         | ●      |                              | 1102 | 12                                                                                  | 150   | 20        | 9  | 11   | 10°  | 16                                                                                    | TS25                                                                                                 | TKY08F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C16RSTFCR11                                                                         | ●      |                              | 1102 | 16                                                                                  | 200   | 25        | 11 | 14   | 7°   | 20                                                                                    | TS25                                                                                                 | TKY08F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C20SSTFCR16 ☆                                                                       | ●      |                              | 16T3 | 20                                                                                  | 250   | 32        | 13 | 18   | 7°   | 25                                                                                    | TS4                                                                                                  | TKY15F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |
| C25TSTFCR16 ☆                                                                       | ●      |                              | 16T3 | 25                                                                                  | 300   | 40        | 17 | 23   | 5°   | 32                                                                                    | TS4                                                                                                  | TKY15F                                                                                |                                                                                                 |                                                                                       |  |                                                                                       |  |

\* Clamp Torque (N · m) : TS22=0.6, TS25=1.0, TS4=3.5

## RECOMMENDED CUTTING CONDITIONS

| Steel Shank                      |           |                | l/d ≤ 3               |                  |                   | l/d = 3—4 (Shank Diameter ≥ 25mm) |                 |                   |
|----------------------------------|-----------|----------------|-----------------------|------------------|-------------------|-----------------------------------|-----------------|-------------------|
| Carbide Shank                    |           |                | l/d ≤ 5               |                  |                   | l/d = 6—7                         |                 |                   |
| Material                         | Hardness  | Cutting Mode   | Cutting Speed (m/min) | Feed (mm/rev)    | Depth of Cut (mm) | Cutting Speed (m/min)             | Feed (mm/rev)   | Depth of Cut (mm) |
| P<br>Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)          | 0.1 (0.05—0.15)  | 0.2               | 120 (80—150)                      | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 90 (60—120)           | 0.25 (0.15—0.35) | —3.0              | 80 (50—110)                       | 0.15 (0.1—0.2)  | —1.5              |
| M<br>Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)         | 0.1 (0.05—0.15)  | 0.2               | 140 (100—180)                     | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 70 (50—90)            | 0.2 (0.15—0.25)  | —2.0              | 60 (40—80)                        | 0.15 (0.1—0.2)  | —1.0              |
| N<br>Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)         | 0.1 (0.05—0.15)  | 0.2               | 300 (200—400)                     | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 200 (150—250)         | 0.1 (0.05—0.15)  | —2.0              | 200 (150—250)                     | 0.1 (0.05—0.15) | —1.5              |

TC type inserts > A165—A168  
PCBN & PCD inserts > B055

SPARE PARTS > N001  
TECHNICAL DATA > P001

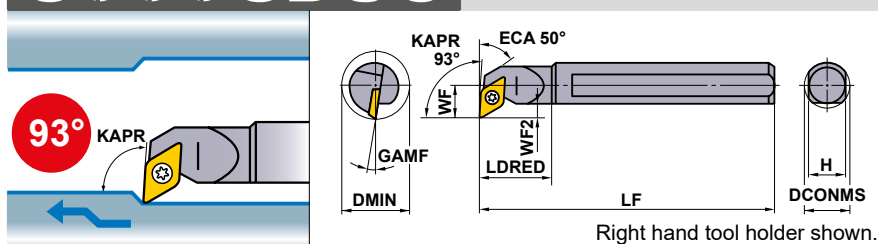
# BORING BARS

## S TYPE BORING BARS

- The minimum cutting diameter is from Ø11.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

### S DUC

### DC Inserts



| Finish                                                                              | Finish                                                                              | Light                                                                               | Light                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | FM                                                                                  | LP                                                                                  | LM                                                                                  |
|  |  |  |  |
| (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             |
| Medium                                                                              | Medium                                                                              | Medium                                                                              | Flat Top                                                                            |
| MP                                                                                  | MM                                                                                  | Standard                                                                            |                                                                                     |
|  |  |  |  |
| (07,11,15)                                                                          | (07,11,15)                                                                          | (07,11,15)                                                                          | (07,11,15)                                                                          |

Right hand tool holder shown.

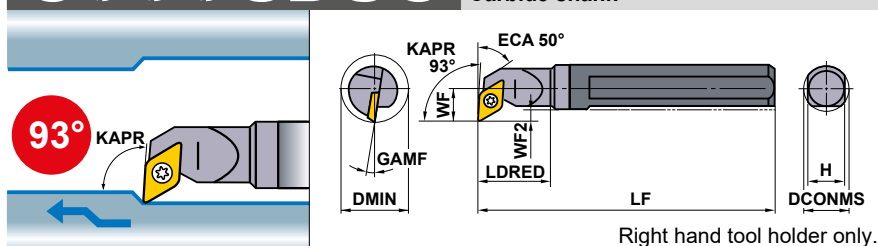
| Order Number   | Stock |   | Insert Number                        |        | Dimensions (mm) |     |       |    |     |    |      |  * |  |        |
|----------------|-------|---|--------------------------------------|--------|-----------------|-----|-------|----|-----|----|------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | R     | L |                                      |        | DCONMS          | LF  | LDRED | WF | WF2 | H  | GAMF |                                                                                       |                                                                                     | DMIN   |
|                |       |   |                                      |        |                 |     |       |    |     |    |      |                                                                                       |                                                                                     |        |
| S10HSDUCR/L07  | ●     | ● | DCMT<br>DCET<br>DCGT<br>DCMW<br>DCGW | 0702○○ | 10              | 100 | 16    | 7  | 2.4 | 9  | 13°  | 13                                                                                    | TS25                                                                                | TKY08F |
| S12KSDUCR/L07  | ●     | ● |                                      | 0702○○ | 12              | 125 | 20    | 9  | 3.4 | 11 | 10°  | 16                                                                                    | TS25                                                                                | TKY08F |
| S16MSDUCR/L07  | ●     | ● |                                      | 0702○○ | 16              | 150 | 25    | 11 | 3.9 | 14 | 7°   | 20                                                                                    | TS25                                                                                | TKY08F |
| S20QSDUCR/L11☆ | ●     | ● |                                      | 11T3○○ | 20              | 180 | 32    | 13 | 4.4 | 18 | 7°   | 25                                                                                    | TS4                                                                                 | TKY15F |
| S25RSDUCR/L15☆ | ●     | ● |                                      | 1504○○ | 25              | 200 | 40    | 17 | 6.9 | 23 | 5°   | 32                                                                                    | TS5                                                                                 | TKY25F |
| S32SSDUCR/L15☆ | ●     | ● |                                      | 1504○○ | 32              | 250 | 50    | 22 | 8.4 | 30 | 5°   | 40                                                                                    | TS5                                                                                 | TKY25F |
| S40TSDUCR/L15☆ | ●     | ● |                                      | 1504○○ | 40              | 300 | 63    | 27 | 9.4 | 37 | 5°   | 50                                                                                    | TS5                                                                                 | TKY25F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5, TS5=7.5

### C DUC

Carbide shank

### DC Inserts



| Finish                                                                                | Finish                                                                                | Light                                                                                 | Light                                                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | FM                                                                                    | LP                                                                                    | LM                                                                                    |
|  |  |  |  |
| (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               |
| Medium                                                                                | Medium                                                                                | Medium                                                                                | Flat Top                                                                              |
| MP                                                                                    | MM                                                                                    | Standard                                                                              |                                                                                       |
|  |  |  |  |
| (07,11,15)                                                                            | (07,11,15)                                                                            | (07,11,15)                                                                            | (07,11,15)                                                                            |

Right hand tool holder only.

| Order Number  | Stock | Insert Number                        |        | Dimensions (mm) |     |       |    |     |    |      |      |  * |  |
|---------------|-------|--------------------------------------|--------|-----------------|-----|-------|----|-----|----|------|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|               |       |                                      |        | DCONMS          | LF  | LDRED | WF | WF2 | H  | GAMF | DMIN |                                                                                         |                                                                                       |
|               | R     |                                      |        |                 |     |       |    |     |    |      |      | Clamp Screw                                                                             | Wrench                                                                                |
| C10KSDUCR07   | ●     | DCMT<br>DCET<br>DCGT<br>DCMW<br>DCGW | 0702○○ | 10              | 125 | 16    | 7  | 2.1 | 9  | 13°  | 13   | TS25                                                                                    | TKY08F                                                                                |
| C12MSDUCR07   | ●     |                                      | 0702○○ | 12              | 150 | 20    | 9  | 3.1 | 11 | 10°  | 16   | TS25                                                                                    | TKY08F                                                                                |
| C16RSDUCR07   | ●     |                                      | 0702○○ | 16              | 200 | 25    | 11 | 3.1 | 14 | 7°   | 20   | TS25                                                                                    | TKY08F                                                                                |
| C20SSDUCR11 ☆ | ●     |                                      | 11T3○○ | 20              | 250 | 32    | 13 | 3.1 | 18 | 7°   | 25   | TS4                                                                                     | TKY15F                                                                                |
| C25TSDUCR15 ☆ | ●     |                                      | 1504○○ | 25              | 300 | 40    | 17 | 4.9 | 23 | 5°   | 32   | TS5                                                                                     | TKY25F                                                                                |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5, TS5=7.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained.

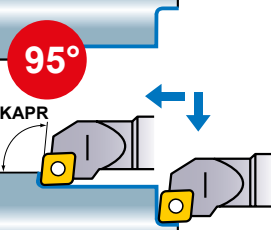
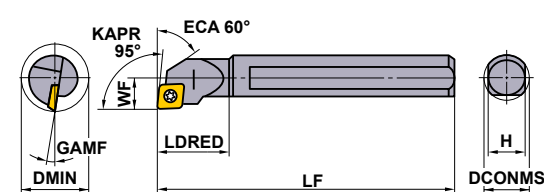
DC type inserts

➤ A152—A158

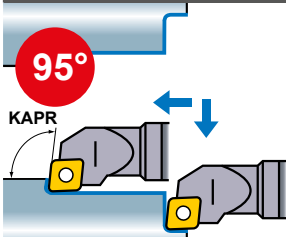
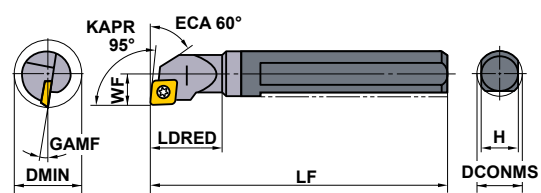
PCBN & PCD inserts

➤ B040, B041, B054



| SCLC                                                                              |       |   |                                                                      | CC inserts                                                                                                         |    |       |    |    |      |      | Finish      |                                                                                     | Finish                                                                              |            | Light |  | Light |  |
|-----------------------------------------------------------------------------------|-------|---|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----|-------|----|----|------|------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|-------|--|-------|--|
|  |       |   |                                                                      | <br>Right hand tool holder shown. |    |       |    |    |      |      | FP          | FM                                                                                  | LP                                                                                  | LM         |       |  |       |  |
|                                                                                   |       |   |                                                                      |                                                                                                                    |    |       |    |    |      |      | (06,09)     | (06,09)                                                                             | (06,09)                                                                             | (06,09)    |       |  |       |  |
|                                                                                   |       |   |                                                                      |                                                                                                                    |    |       |    |    |      |      | Medium      | Medium                                                                              | Flat Top                                                                            | PCBN/PCD   |       |  |       |  |
|                                                                                   |       |   |                                                                      |                                                                                                                    |    |       |    |    |      |      | MP          | MM                                                                                  | (06,09,12)                                                                          | (06,09,12) |       |  |       |  |
|                                                                                   |       |   |                                                                      |                                                                                                                    |    |       |    |    |      |      | (06,09,12)  | (06,09,12)                                                                          | (06,09,12)                                                                          | (06,09,12) |       |  |       |  |
| Order Number                                                                      | Stock |   | Insert Number                                                        | Dimensions (mm)                                                                                                    |    |       |    |    |      |      |             |  |  |            |       |  |       |  |
|                                                                                   | R     | L |                                                                      | DCONMS                                                                                                             | LF | LDRED | WF | H  | GAMF | DMIN | Clamp Screw |                                                                                     |                                                                                     | Wrench     |       |  |       |  |
| S08FSCLCR/L06                                                                     | ●     | ● | CCMB<br>CCMH<br>CCMT<br>CCMW<br>CCET<br>CCGB<br>CCGH<br>CCGT<br>CCGW | 0602                                                                                                               | 8  | 80    | 12 | 6  | 7    | 15°  | 11          | TS25                                                                                | TKY08F                                                                              |            |       |  |       |  |
| S10HSCLCR/L06                                                                     | ●     | ● |                                                                      | 0602                                                                                                               | 10 | 100   | 16 | 7  | 9    | 13°  | 13          | TS25                                                                                | TKY08F                                                                              |            |       |  |       |  |
| S12KSCLCR/L06                                                                     | ●     | ● |                                                                      | 0602                                                                                                               | 12 | 125   | 20 | 9  | 11   | 10°  | 16          | TS25                                                                                | TKY08F                                                                              |            |       |  |       |  |
| S16MSCLCR/L09                                                                     | ☆     | ● |                                                                      | 09T3                                                                                                               | 16 | 150   | 25 | 11 | 14   | 7°   | 20          | TS4                                                                                 | TKY15F                                                                              |            |       |  |       |  |
| S20QSCLCR/L09                                                                     | ☆     | ● |                                                                      | 09T3                                                                                                               | 20 | 180   | 32 | 13 | 18   | 7°   | 25          | TS4                                                                                 | TKY15F                                                                              |            |       |  |       |  |
| S25RSCLCR/L12                                                                     | ☆     | ● |                                                                      | 1204                                                                                                               | 25 | 200   | 40 | 17 | 23   | 5°   | 32          | TS5                                                                                 | TKY25F                                                                              |            |       |  |       |  |
| S32SSCLCR/L12                                                                     | ☆     | ● |                                                                      | 1204                                                                                                               | 32 | 250   | 50 | 22 | 30   | 5°   | 40          | TS5                                                                                 | TKY25F                                                                              |            |       |  |       |  |
| S40TSCLCR/L12                                                                     | ☆     | ● |                                                                      | 1204                                                                                                               | 40 | 300   | 63 | 27 | 37   | 5°   | 50          | TS5                                                                                 | TKY25F                                                                              |            |       |  |       |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5, TS5=7.5

| C SCLC                                                                              |  |  |  | Carbide shank CC inserts                                                                                            |  |  |  |  |  |  | Finish                                                                                |                                                                                       | Finish                                                                                |                                                                                       | Light |  | Light |  |
|-------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|--|-------|--|
|  |  |  |  | <br>Right hand tool holder only. |  |  |  |  |  |  | FP                                                                                    | FM                                                                                    | LP                                                                                    | LM                                                                                    |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  |  |  |  |  |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  | (06,09)                                                                               | (06,09)                                                                               | (06,09)                                                                               | (06,09)                                                                               |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  | Medium                                                                                | Medium                                                                                | Flat Top                                                                              | PCBN/PCD                                                                              |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  | MP                                                                                    | MM                                                                                    |                                                                                       |                                                                                       |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  |  |  |  |  |       |  |       |  |
|                                                                                     |  |  |  |                                                                                                                     |  |  |  |  |  |  | (06,09)                                                                               | (06,09)                                                                               | (06,09)                                                                               | (06,09)                                                                               |       |  |       |  |

| Order Number  | Stock | Insert Number |              | Dimensions (mm) |    |       |    |    |      |      |  |  |             |
|---------------|-------|---------------|--------------|-----------------|----|-------|----|----|------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------|
|               | R     |               |              | DCONMS          | LF | LDRED | WF | H  | GAMF | DMIN |                                                                                       |                                                                                       | Clamp Screw |
| C08HSCLCR06   | ●     | ●             | CCMB<br>CCMH | 0602            | 8  | 100   | 12 | 6  | 7    | 15°  | 11                                                                                    | TS25                                                                                  | TKY08F      |
| C10KSCLCR06   | ●     | ●             | CCMT<br>CCMW | 0602            | 10 | 125   | 16 | 7  | 9    | 13°  | 13                                                                                    | TS25                                                                                  | TKY08F      |
| C12MSCLCR06   | ●     | ●             | CCET         | 0602            | 12 | 150   | 20 | 9  | 11   | 10°  | 16                                                                                    | TS25                                                                                  | TKY08F      |
| C16RSCLCR09 ☆ | ●     | ●             | CCGB<br>CCGH | 09T3            | 16 | 200   | 25 | 11 | 14   | 7°   | 20                                                                                    | TS4                                                                                   | TKY15F      |
| C20SSCLCR09 ☆ | ●     | ●             | CCGT<br>CCGW | 09T3            | 20 | 250   | 32 | 13 | 18   | 7°   | 25                                                                                    | TS4                                                                                   | TKY15F      |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

## RECOMMENDED CUTTING CONDITIONS

| Steel Shank   |                             |           | l/d≤3          |                          |                  |                      | l/d=3—4 (Shank Diameter≥25mm) |                  |                     |
|---------------|-----------------------------|-----------|----------------|--------------------------|------------------|----------------------|-------------------------------|------------------|---------------------|
| Carbide Shank |                             |           | l/d≤5          |                          |                  |                      | l/d=6—7                       |                  |                     |
| Material      |                             | Hardness  | Cutting Mode   | Cutting Speed<br>(m/min) | Feed<br>(mm/rev) | Depth of Cut<br>(mm) | Cutting Speed<br>(m/min)      | Feed<br>(mm/rev) | Depth of Cu<br>(mm) |
| P             | Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)             | 0.1 (0.05—0.15)  | 0.2                  | 120 (80—150)                  | 0.1 (0.05—0.15)  | 0.2                 |
|               |                             |           | Medium Cutting | 90 (60—120)              | 0.25 (0.15—0.35) | —3.0                 | 80 (50—110)                   | 0.15 (0.1—0.2)   | —1.5                |
| M             | Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)            | 0.1 (0.05—0.15)  | 0.2                  | 140 (100—180)                 | 0.1 (0.05—0.15)  | 0.2                 |
|               |                             |           | Medium Cutting | 70 (50—90)               | 0.2 (0.15—0.25)  | —2.0                 | 60 (40—80)                    | 0.15 (0.1—0.2)   | —1.0                |
| N             | Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)            | 0.1 (0.05—0.15)  | 0.2                  | 300 (200—400)                 | 0.1 (0.05—0.15)  | 0.2                 |
|               |                             |           | Medium Cutting | 200 (150—250)            | 0.1 (0.05—0.15)  | —2.0                 | 200 (150—250)                 | 0.1 (0.05—0.15)  | —1.5                |

CC type inserts > A140-A148  
PCBN & PCD inserts > B037, B038, B053

SPARE PARTS > N001  
TECHNICAL DATA > P001

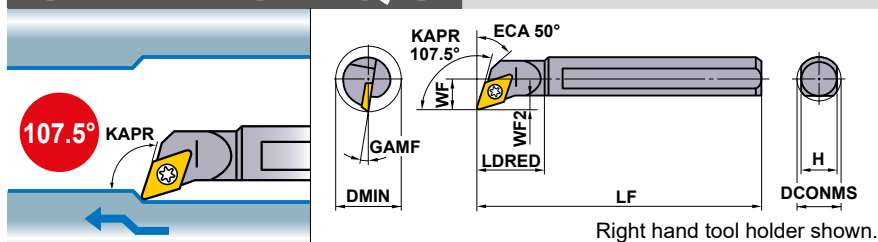
# BORING BARS

## S TYPE BORING BARS

- The minimum cutting diameter is from Ø11.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

### SDQC

### DC Inserts



| Finish                                                                              | Finish                                                                              | Light                                                                               | Light                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FP                                                                                  | FM                                                                                  | LP                                                                                  | LM                                                                                  |
|  |  |  |  |
| (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             |
| Medium                                                                              | Medium                                                                              | Flat Top                                                                            | PCBN/PCD                                                                            |
| MP                                                                                  | MM                                                                                  |                                                                                     |                                                                                     |
|  |  |  |  |
| (07,11,15)                                                                          | (07,11,15)                                                                          | (07,11,15)                                                                          | (07,11)                                                                             |

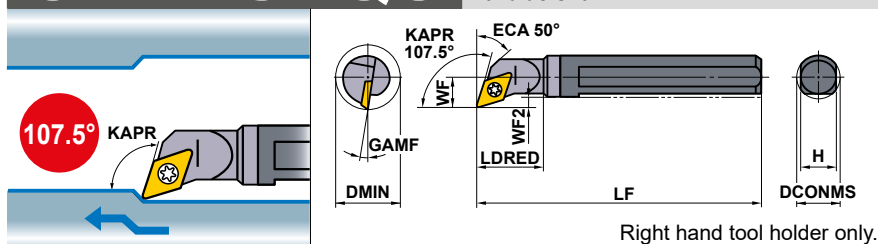
| Order Number   | Stock |   | Insert Number                        |      | Dimensions (mm) |     |       |    |     |    |      |  * |  |        |
|----------------|-------|---|--------------------------------------|------|-----------------|-----|-------|----|-----|----|------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | R     | L |                                      |      | DCONMS          | LF  | LDRED | WF | WF2 | H  | GAMF | DMIN                                                                                  | Clamp<br>Screw                                                                      | Wrench |
|                |       |   |                                      |      |                 |     |       |    |     |    |      |                                                                                       |                                                                                     |        |
| S10HSDQCR/L07  | ●     | ● | DCMT<br>DCET<br>DCGT<br>DCMW<br>DCGW | 0702 | 10              | 100 | 16    | 7  | 2.4 | 9  | 13°  | 13                                                                                    | TS25                                                                                | TKY08F |
| S12KSDQCR/L07  | ●     | ● |                                      | 0702 | 12              | 125 | 20    | 9  | 3.4 | 11 | 10°  | 16                                                                                    | TS25                                                                                | TKY08F |
| S16MSDQCR/L07  | ●     | ● |                                      | 0702 | 16              | 150 | 25    | 11 | 3.9 | 14 | 7°   | 20                                                                                    | TS25                                                                                | TKY08F |
| S20QSDQCR/L11☆ | ●     | ● |                                      | 11T3 | 20              | 180 | 32    | 13 | 4.4 | 18 | 7°   | 25                                                                                    | TS4                                                                                 | TKY15F |
| S25RSDQCR/L15☆ | ●     | ● |                                      | 1504 | 25              | 200 | 40    | 17 | 6.9 | 23 | 5°   | 32                                                                                    | TS5                                                                                 | TKY25F |
| S32SSDQCR15☆   | ●     |   |                                      | 1504 | 32              | 250 | 50    | 22 | 8.4 | 30 | 5°   | 40                                                                                    | TS5                                                                                 | TKY25F |
| S40TSDQCR15☆   | ●     |   |                                      | 1504 | 40              | 300 | 63    | 27 | 9.4 | 37 | 5°   | 50                                                                                    | TS5                                                                                 | TKY25F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5, TS5=7.5

### CSDQC

### Carbide shank

### DC Inserts



| Finish                                                                                | Finish                                                                                | Light                                                                                 | Light                                                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FP                                                                                    | FM                                                                                    | LP                                                                                    | LM                                                                                    |
|  |  |  |  |
| (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               |
| Medium                                                                                | Medium                                                                                | Flat Top                                                                              | PCBN/PCD                                                                              |
| MP                                                                                    | MM                                                                                    |                                                                                       |                                                                                       |
|  |  |  |  |
| (07,11,15)                                                                            | (07,11,15)                                                                            | (07,11,15)                                                                            | (07,11)                                                                               |

| Order Number  | Stock | Insert Number                        |              | Dimensions (mm) |     |       |    |     |     |      |      |  * |  |
|---------------|-------|--------------------------------------|--------------|-----------------|-----|-------|----|-----|-----|------|------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|               | R     |                                      |              | DCONMS          | LF  | LDRED | WF | WF2 | H   | GAMF | DMIN | Clamp<br>Screw                                                                          | Wrench                                                                                |
|               |       |                                      |              |                 |     |       |    |     |     |      |      |                                                                                         |                                                                                       |
| C10KSDQCR07   | ●     | DCMT<br>DCET<br>DCGT<br>DCMW<br>DCGW | 0702○○       | 10              | 125 | 16    | 7  | 2.1 | 9   | 13°  | 13   | TS25                                                                                    | TKY08F                                                                                |
| C12MSDQCR07   | ●     |                                      | 0702○○       | 12              | 150 | 20    | 9  | 3.1 | 11  | 10°  | 16   | TS25                                                                                    | TKY08F                                                                                |
| C16RSDQCR07   | ●     |                                      | 0702○○       | 16              | 200 | 25    | 11 | 3.1 | 14  | 7°   | 20   | TS25                                                                                    | TKY08F                                                                                |
| C20SSDQCR11 ☆ | ●     |                                      | 11T3○○       | 20              | 250 | 32    | 13 | 3.1 | 18  | 7°   | 25   | TS4                                                                                     | TKY15F                                                                                |
| C25TSDQCR15 ☆ | ★     |                                      | DCMW<br>DCMT | 1504○○          | 25  | 300   | 40 | 17  | 4.9 | 23   | 5°   | 32                                                                                      | TS5                                                                                   |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5, TS5=7.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

● : Inventory maintained. ★ : Inventory maintained in Japan.

DC type inserts

➤ A152—A158

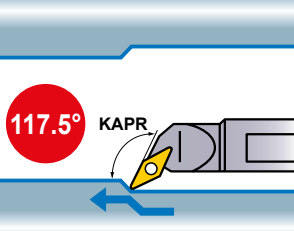
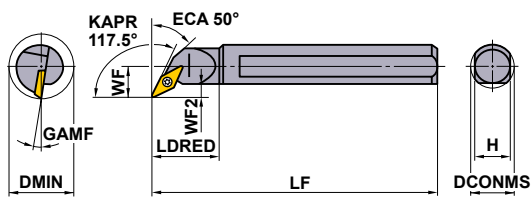
PCBN & PCD inserts

➤ B040, B041, B054

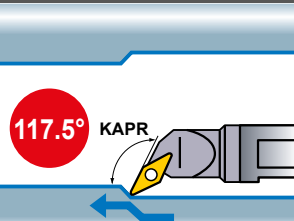
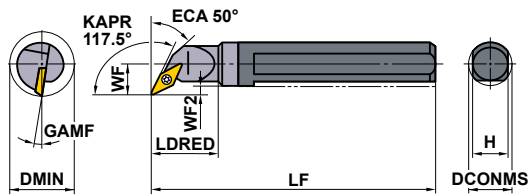
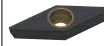


# S TYPE BORING BARS

- The minimum cutting diameter is from Ø20. ● l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).
- ISO standard.
- 7° positive insert.
- Screw-on type.

| SVCQ                                                                              |  |       |   | VCinserts                                                                                                          |      |                 |     |       |    |     |    | Finish                                                                              |      | Finish                                                                                             |        | Light                                                                                         |  | Light                                                                               |  |
|-----------------------------------------------------------------------------------|--|-------|---|--------------------------------------------------------------------------------------------------------------------|------|-----------------|-----|-------|----|-----|----|-------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--|
|  |  |       |   | <br>Right hand tool holder shown. |      |                 |     |       |    |     |    | FP                                                                                  | FM   | LP                                                                                                 | LM     |                                                                                               |  |                                                                                     |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    |  |      |                 |        |            |  |  |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    | (11,16)                                                                             |      | (11,16)                                                                                            |        | (11,16)                                                                                       |  | (11,16)                                                                             |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    | Medium                                                                              |      | Medium                                                                                             |        | Medium                                                                                        |  | Flat Top                                                                            |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    | MP                                                                                  | MM   | Standard                                                                                           |        |                                                                                               |  |                                                                                     |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    |  |      |                 |        |            |  |  |  |
|                                                                                   |  |       |   |                                                                                                                    |      |                 |     |       |    |     |    | (16)                                                                                |      | (16)                                                                                               |        | (11,16)                                                                                       |  | (11,16)                                                                             |  |
| Order Number                                                                      |  | Stock |   | Insert Number                                                                                                      |      | Dimensions (mm) |     |       |    |     |    |                                                                                     |      | <br>Clamp Screw |        | <br>Wrench |  |                                                                                     |  |
|                                                                                   |  | R     | L |                                                                                                                    |      | DCONMS          | LF  | LDRED | WF | WF2 | H  | GAMF                                                                                | DMIN |                                                                                                    |        |                                                                                               |  |                                                                                     |  |
| S16MSVQCR/L11                                                                     |  | ●     | ● | VCMW<br>VCMT<br>VCGW<br>VCGT                                                                                       | 1103 | 16              | 150 | 25    | 11 | 3.9 | 14 | 7°                                                                                  | 20   | TS25                                                                                               | TKY08F |                                                                                               |  |                                                                                     |  |
| S20QSVQCR/L11                                                                     |  | ●     | ● |                                                                                                                    | 1103 | 20              | 180 | 32    | 13 | 4.4 | 18 | 7°                                                                                  | 25   | TS25                                                                                               | TKY08F |                                                                                               |  |                                                                                     |  |
| S25RSVQCR/L16 ☆                                                                   |  | ●     | ● |                                                                                                                    | 1604 | 25              | 200 | 40    | 17 | 6.9 | 23 | 5°                                                                                  | 32   | TS4                                                                                                | TKY15F |                                                                                               |  |                                                                                     |  |
| S32SSVQCR/L16 ☆                                                                   |  | ●     | ● |                                                                                                                    | 1604 | 32              | 250 | 50    | 22 | 8.4 | 30 | 5°                                                                                  | 40   | TS4                                                                                                | TKY15F |                                                                                               |  |                                                                                     |  |
| S40TSVQCR16 ☆                                                                     |  | ●     | ● |                                                                                                                    | 1604 | 40              | 300 | 63    | 27 | 9.4 | 37 | 5°                                                                                  | 50   | TS4                                                                                                | TKY15F |                                                                                               |  |                                                                                     |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

| CVCQ                                                                               |        |               |      | Carbide shank                                                                                                      |       | VC Inserts |     |     |      |      |             | Finish                                                                                |                                                                                       | Finish                                                                                |                                                                                       | Light                                                                                 |                                                                                       | Light |  |
|------------------------------------------------------------------------------------|--------|---------------|------|--------------------------------------------------------------------------------------------------------------------|-------|------------|-----|-----|------|------|-------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|--|
|  |        |               |      | <br>Right hand tool holder only. |       |            |     |     |      |      |             |                                                                                       |                                                                                       | FP                                                                                    | FM                                                                                    | LP                                                                                    | LM                                                                                    |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       |   |   |   |   |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       | (11,16)                                                                               | (11,16)                                                                               | (11,16)                                                                               | (11,16)                                                                               |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       | Medium                                                                                | Medium                                                                                | Medium                                                                                | Flat Top                                                                              |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       | MP                                                                                    | MM                                                                                    | Standard                                                                              |                                                                                       |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       |  |  |  |  |       |  |
|                                                                                    |        |               |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       | (16)                                                                                  | (16)                                                                                  | (11,16)                                                                               | (11,16)                                                                               |       |  |
| Order Number                                                                       | Stock  | Insert Number |      | Dimensions (mm)                                                                                                    |       |            |     |     |      |      |             |  |  |                                                                                       |                                                                                       |                                                                                       |                                                                                       |       |  |
|                                                                                    | DCONMS |               |      | LF                                                                                                                 | LDRED | WF         | WF2 | H   | GAMF | DMIN | Clamp Screw |                                                                                       |                                                                                       | Wrench                                                                                |                                                                                       |                                                                                       |                                                                                       |       |  |
| C16RSVQCR11                                                                        | ●      | VCMW          | 1103 | 16                                                                                                                 | 200   | 25         | 11  | 3.1 | 14   | 7°   | 20          | TS25                                                                                  | TKY08F                                                                                |                                                                                       |                                                                                       |                                                                                       |                                                                                       |       |  |
| C20SSVQCR11                                                                        | ★      | VCMT          | 1103 | 20                                                                                                                 | 250   | 32         | 13  | 3.1 | 18   | 7°   | 25          | TS25                                                                                  | TKY08F                                                                                |                                                                                       |                                                                                       |                                                                                       |                                                                                       |       |  |
| C25TSVQCR16 ☆                                                                      | ★      | VCGW          | 1604 | 25                                                                                                                 | 300   | 40         | 17  | 4.9 | 23   | 5°   | 32          | TS4                                                                                   | TKY15F                                                                                |                                                                                       |                                                                                       |                                                                                       |                                                                                       |       |  |
|                                                                                    |        | VCGT          |      |                                                                                                                    |       |            |     |     |      |      |             |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |       |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

## RECOMMENDED CUTTING CONDITIONS

| Steel Shank   |                             |           |                | l/d≤3                    |                  |                      | l/d=3—4 (Shank Diameter≥25mm) |                  |                      |
|---------------|-----------------------------|-----------|----------------|--------------------------|------------------|----------------------|-------------------------------|------------------|----------------------|
| Carbide Shank |                             |           |                | l/d≤5                    |                  |                      | l/d=6—7                       |                  |                      |
| Material      |                             | Hardness  | Cutting Mode   | Cutting Speed<br>(m/min) | Feed<br>(mm/rev) | Depth of Cut<br>(mm) | Cutting Speed<br>(m/min)      | Feed<br>(mm/rev) | Depth of Cut<br>(mm) |
| P             | Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)             | 0.1 (0.05—0.15)  | 0.2                  | 120 (80—150)                  | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 90 (60—120)              | 0.25 (0.15—0.35) | —3.0                 | 80 (50—110)                   | 0.15 (0.1—0.2)   | —1.5                 |
| M             | Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)            | 0.1 (0.05—0.15)  | 0.2                  | 140 (100—180)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 70 (50—90)               | 0.2 (0.15—0.25)  | —2.0                 | 60 (40—80)                    | 0.15 (0.1—0.2)   | —1.0                 |
| N             | Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)            | 0.1 (0.05—0.15)  | 0.2                  | 300 (200—400)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 200 (150—250)            | 0.1 (0.05—0.15)  | —2.0                 | 200 (150—250)                 | 0.1 (0.05—0.15)  | —1.5                 |

VC type inserts > A177—A180  
PCBN & PCD inserts > B046, B057

SPARE PARTS > N001  
TECHNICAL DATA > P001

# BORING BARS

## S TYPE BORING BARS

- The minimum cutting diameter is from Ø20.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).

| S             |  |        |     | SSKC          |      |                 |     | SC      |      |         |    | inserts         |     |            |  | Finish |  | Finish |  | Light |  | Light |  |
|---------------|--|--------|-----|---------------|------|-----------------|-----|---------|------|---------|----|-----------------|-----|------------|--|--------|--|--------|--|-------|--|-------|--|
|               |  |        |     |               |      |                 |     | FP      |      | FM      |    | LP              |     | LM         |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     |         |      |         |    |                 |     |            |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     | (09)    |      | (09)    |    | (09)            |     | (09)       |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     | Medium  |      | Medium  |    | Medium          |     | Flat Top   |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     | MP      |      | MM      |    | Standard        |     |            |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     |         |      |         |    |                 |     |            |  |        |  |        |  |       |  |       |  |
|               |  |        |     |               |      |                 |     | (09,12) |      | (09,12) |    | (09,12)         |     | (09,12)    |  |        |  |        |  |       |  |       |  |
| Order Number  |  | Stock  |     | Insert Number |      | Dimensions (mm) |     |         |      |         |    | <br>Clamp Screw |     | <br>Wrench |  |        |  |        |  |       |  |       |  |
|               |  | DCONMS | LF  |               |      | LDRED           | WF  | H       | GAMF | DMIN    |    |                 |     |            |  |        |  |        |  |       |  |       |  |
| S16MSSKCR/L09 |  | ☆      | ● ● | SCMW<br>SCMT  | 09T3 | 16              | 150 | 25      | 11   | 14      | 7° | 20              | TS4 | TKY15F     |  |        |  |        |  |       |  |       |  |
| S20QSSKCR/L09 |  | ☆      | ● ● |               | 09T3 | 20              | 180 | 32      | 13   | 18      | 7° | 25              | TS4 | TKY15F     |  |        |  |        |  |       |  |       |  |
| S25RSSKCR/L12 |  | ☆      | ★ ★ |               | 1204 | 25              | 200 | 40      | 17   | 23      | 5° | 32              | TS5 | TKY25F     |  |        |  |        |  |       |  |       |  |

\* Clamp Torque (N · m) : TS4=3.5, TS5=7.5

BORING BARS

| S <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> SVUC |  |  |  | VC <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> inserts |   |                              |                                                                                                                                                                            |                 |     |       |    | Finish  |    | Finish  |      | Light    |        | Light    |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----|-------|----|---------|----|---------|------|----------|--------|----------|--|
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    | FP      |    | FM      |      | LP       |        | LM       |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    |         |    |         |      |          |        |          |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    | (11,16) |    | (11,16) |      | (11,16)  |        | (11,16)  |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    | Medium  |    | Medium  |      | Medium   |        | Flat Top |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    | MP      |    | MM      |      | Standard |        |          |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    |         |    |         |      |          |        |          |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            |                 |     |       |    | (16)    |    | (16)    |      | (11,16)  |        | (11,16)  |  |
| Order Number                                                                                                                                                                                                                                                    |  |  |  | Stock                                                                                                                                                                            |   | Insert Number                |                                                                                                                                                                            | Dimensions (mm) |     |       |    |         |    |         |      | *        |        |          |  |
|                                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                                                                  |   |                              |                                                                                                                                                                            | DCONMS          | LF  | LDRED | WF | WF2     | H  | GAMF    | DMIN |          |        |          |  |
| S20QSVUCR/L11                                                                                                                                                                                                                                                   |  |  |  | ●                                                                                                                                                                                | ● | VCMW<br>VCMT<br>VCGW<br>VCGT | 1103 <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> | 20              | 180 | 32    | 13 | 4.4     | 18 | 7°      | 25   | TS25     | TKY08F |          |  |
| S25RSVUCR/L16 <span style="font-size: 0.8em;">☆</span>                                                                                                                                                                                                          |  |  |  | ●                                                                                                                                                                                | ● |                              | 1604 <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> | 25              | 200 | 40    | 17 | 6.9     | 23 | 5°      | 32   | TS4      | TKY15F |          |  |
| S32SSVUCR/L16 <span style="font-size: 0.8em;">☆</span>                                                                                                                                                                                                          |  |  |  | ●                                                                                                                                                                                | ● |                              | 1604 <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> | 32              | 250 | 50    | 22 | 8.4     | 30 | 5°      | 40   | TS4      | TKY15F |          |  |
| S40TSVUCR/L16 <span style="font-size: 0.8em;">☆</span>                                                                                                                                                                                                          |  |  |  | ●                                                                                                                                                                                | ● |                              | 1604 <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> <span style="border: 1px dashed black; border-radius: 50%; padding: 2px;"> </span> | 40              | 300 | 63    | 27 | 9.4     | 37 | 5°      | 50   | TS4      | TKY15F |          |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4. (Model of ☆ Mark is RE 0.8)

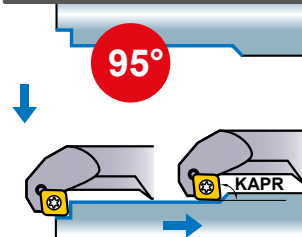
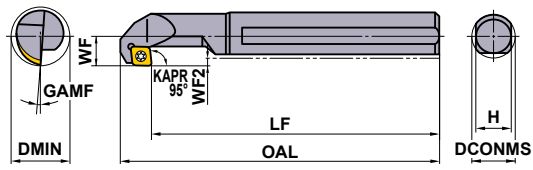
Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

## RECOMMENDED CUTTING CONDITIONS

| Steel Shank   |                             |           | l/d≤3          |                          |                  |                      | l/d=3—4 (Shank Diameter≥25mm) |                  |                      |
|---------------|-----------------------------|-----------|----------------|--------------------------|------------------|----------------------|-------------------------------|------------------|----------------------|
| Carbide Shank |                             |           | l/d≤5          |                          |                  |                      | l/d=6—7                       |                  |                      |
| Material      |                             | Hardness  | Cutting Mode   | Cutting Speed<br>(m/min) | Feed<br>(mm/rev) | Depth of Cut<br>(mm) | Cutting Speed<br>(m/min)      | Feed<br>(mm/rev) | Depth of Cut<br>(mm) |
| P             | Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)             | 0.1 (0.05—0.15)  | 0.2                  | 120 (80—150)                  | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 90 (60—120)              | 0.25 (0.15—0.35) | —3.0                 | 80 (50—110)                   | 0.15 (0.1—0.2)   | —1.5                 |
| M             | Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)            | 0.1 (0.05—0.15)  | 0.2                  | 140 (100—180)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 70 (50—90)               | 0.2 (0.15—0.25)  | —2.0                 | 60 (40—80)                    | 0.15 (0.1—0.2)   | —1.0                 |
| N             | Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)            | 0.1 (0.05—0.15)  | 0.2                  | 300 (200—400)                 | 0.1 (0.05—0.15)  | 0.2                  |
|               |                             |           | Medium Cutting | 200 (150—250)            | 0.1 (0.05—0.15)  | —2.0                 | 200 (150—250)                 | 0.1 (0.05—0.15)  | —1.5                 |

● : Inventory maintained. ★ : Inventory maintained in Japan.

SC type inserts > A161, A162  
VC type inserts > A177—A180  
PCBN & PCD inserts > B046, B057

| S $\odot\odot\odot$ SCZC                                                          |       | CC $\odot\odot$ inserts                                                           |                                                              |                   |                 |     |     |    |     |    |      | Finish                                                                              |                                                                                                      | Finish                                                                              |                                                                                               | Light |  | Light |  |
|-----------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------|-----------------|-----|-----|----|-----|----|------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------|--|-------|--|
|  |       |  |                                                              |                   |                 |     |     |    |     |    |      | FP                                                                                  | FM                                                                                                   | LP                                                                                  | LM                                                                                            |       |  |       |  |
|                                                                                   |       |                                                                                   |                                                              |                   |                 |     |     |    |     |    |      |  |                   |  |            |       |  |       |  |
|                                                                                   |       |                                                                                   |                                                              |                   |                 |     |     |    |     |    |      | (06,09)                                                                             | (06,09)                                                                                              | (06,09)                                                                             | (06,09)                                                                                       |       |  |       |  |
|                                                                                   |       |                                                                                   |                                                              |                   |                 |     |     |    |     |    |      | Medium                                                                              | Medium                                                                                               | Flat Top                                                                            | PCBN/PCD                                                                                      |       |  |       |  |
|                                                                                   |       | Right hand tool holder shown.                                                     |                                                              |                   |                 |     |     |    |     |    |      | MP                                                                                  | MM                                                                                                   |                                                                                     |                                                                                               |       |  |       |  |
|                                                                                   |       |                                                                                   |                                                              |                   |                 |     |     |    |     |    |      |  |                   |  |            |       |  |       |  |
|                                                                                   |       |                                                                                   |                                                              |                   |                 |     |     |    |     |    |      | (06,09)                                                                             | (06,09)                                                                                              | (06,09)                                                                             | (06,09)                                                                                       |       |  |       |  |
| Order Number                                                                      | Stock |                                                                                   | Insert Number                                                |                   | Dimensions (mm) |     |     |    |     |    |      |                                                                                     |  *<br>Clamp Screw |                                                                                     | <br>Wrench |       |  |       |  |
|                                                                                   | R     | L                                                                                 |                                                              |                   | DCONMS          | OAL | LF  | WF | WF2 | H  | GAMF | DMIN                                                                                |                                                                                                      |                                                                                     |                                                                                               |       |  |       |  |
| S16MSCZCR/L06                                                                     | ●     | ●                                                                                 | CC $\odot$ B<br>CC $\odot$ H<br>CC $\odot$ T<br>CC $\odot$ W | 0602 $\odot\odot$ | 16              | 161 | 150 | 11 | 3   | 14 | 10°  | 20                                                                                  | TS25                                                                                                 | TKY08F                                                                              |                                                                                               |       |  |       |  |
| S20QSCZCR/L09                                                                     | ●     | ●                                                                                 |                                                              | 09T3 $\odot\odot$ | 20              | 198 | 180 | 13 | 3   | 18 | 7°   | 25                                                                                  | TS4                                                                                                  | TKY15F                                                                              |                                                                                               |       |  |       |  |

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) When using inserts with right or left hand chipbreakers, please use right hand inserts for right hand holders and left hand inserts for left hand holders.

\* Clamp Torque (N • m) : TS25=1.0, TS4=3.5

E

BORING BARS

## RECOMMENDED CUTTING CONDITIONS

| Material                         | Hardness  | Cutting Mode   | l/d ≤ 3               |                  |                   | l/d = 3—4 (Shank Diameter ≥ 25mm) |                 |                   |
|----------------------------------|-----------|----------------|-----------------------|------------------|-------------------|-----------------------------------|-----------------|-------------------|
|                                  |           |                | Cutting Speed (m/min) | Feed (mm/rev)    | Depth of Cut (mm) | Cutting Speed (m/min)             | Feed (mm/rev)   | Depth of Cut (mm) |
| P<br>Carbon Steel<br>Alloy Steel | 180—350HB | Light Cutting  | 130 (90—160)          | 0.1 (0.05—0.15)  | 0.2               | 120 (80—150)                      | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 90 (60—120)           | 0.25 (0.15—0.35) | —3.0              | 80 (50—110)                       | 0.15 (0.1—0.2)  | —1.5              |
| M<br>Stainless Steel             | ≤200HB    | Light Cutting  | 140 (100—180)         | 0.1 (0.05—0.15)  | 0.2               | 140 (100—180)                     | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 70 (50—90)            | 0.2 (0.15—0.25)  | —2.0              | 60 (40—80)                        | 0.15 (0.1—0.2)  | —1.0              |
| N<br>Aluminium Alloy             | —         | Light Cutting  | 300 (200—400)         | 0.1 (0.05—0.15)  | 0.2               | 300 (200—400)                     | 0.1 (0.05—0.15) | 0.2               |
|                                  |           | Medium Cutting | 200 (150—250)         | 0.1 (0.05—0.15)  | —2.0              | 200 (150—250)                     | 0.1 (0.05—0.15) | —1.5              |

CC $\odot\odot$  type inserts

> A140—A148

PCBN & PCD inserts

> B037, B038, B053

SPARE PARTS

> N001

TECHNICAL DATA

> P001

E037

- The minimum cutting diameter is from Ø25.
- ISO standard.
- Economical negative insert.
- Lever lock type and pin lock type.

\*1 Pin Lock Type : A20QPSKNR/L09, A25RPSKNR/L12  
\*2 Clamp Torque (N・m) : LLCS108S=3.3. HP3T=2.2. HP43=3.3

E

\*1 Pin Lock Type : A20QPTFNR/L16, A25RPTFNR/L16  
\*2 Clamp Torque (N・m) : LLCS106=2.2, LLCS108S=3.3, HP31=2.2, HP33=2.2

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

|                    |                    |
|--------------------|--------------------|
| SN type inserts    | ➤ A114–A119        |
| TN type inserts    | ➤ A120–A126        |
| PCBN & PCD inserts | ➤ B030, B031, B051 |

# P TYPE BORING BARS

- The minimum cutting diameter is from Ø20. ● l/d is 3 times the diameter.
- ISO standard.
- Economical negative insert.
- Lever lock type and pin lock type.

| A○○○PDUN      |       |   | With coolant hole DN○○inserts |                 |    |       |    |     |      |      |          |    | Finish    |       | Light   |          | Medium           |           | Medium |        |          |
|---------------|-------|---|-------------------------------|-----------------|----|-------|----|-----|------|------|----------|----|-----------|-------|---------|----------|------------------|-----------|--------|--------|----------|
|               |       |   |                               |                 |    |       |    |     |      |      | FP       |    | LP        |       | MP      |          | MH               |           |        |        |          |
|               |       |   |                               |                 |    |       |    |     |      |      | (15)     |    | (11,15)   |       | (15)    |          | (15)             |           |        |        |          |
|               |       |   |                               |                 |    |       |    |     |      |      | Medium   |    | Stainless |       | G Class |          | PCBN/PCD         |           |        |        |          |
|               |       |   |                               |                 |    |       |    |     |      |      | Standard |    | MM        |       | R/L     |          |                  |           |        |        |          |
|               |       |   |                               |                 |    |       |    |     |      |      | (11,15)  |    | (15)      |       | (15)    |          | (15)             |           |        |        |          |
| Order Number  | Stock |   | Insert Number                 | Dimensions (mm) |    |       |    |     |      |      |          |    |           |       | *2      |          |                  | *2        |        |        |          |
|               | R     | L |                               | DCONMS          | LF | LDRED | WF | WF2 | H    | GAMP | DMIN     |    |           |       |         |          |                  |           |        |        | Shim     |
| A20QPDUNR/L11 | ●     | ● | DNMA<br>DNMG<br>DNMX          | 1104○○          | 20 | 180   | 32 | 15  | 6.4  | 18   | 13°      | 26 | —         | —     | LLCL23S | LLCS125  | HKY20R           | HGM-PT1/8 | —      | —      | —        |
| A25RPDUNR/L11 | ●     | ● |                               | 1104○○          | 25 | 200   | 40 | 17  | 6.9  | 23   | 15°      | 32 | LLSDN32   | LLP13 | LLCL23  | LLCS106  | HKY25R           | HGM-PT1/4 | —      | —      | —        |
| A25RPDUNR/L15 | ●     | ● |                               | 1504○○          | 25 | 200   | 40 | 17  | 6.9  | 23   | 13°      | 32 | MLDP42    | —     | —       | —        | HKY15R<br>HKY30R | HGM-PT1/4 | HP43   | P210AM | HSS03005 |
| A32SPDUNR/L11 | ●     | ● | DNMM                          | 1104○○          | 32 | 250   | 50 | 22  | 8.4  | 30   | 13°      | 44 | LLSDN32   | LLP13 | LLCL23  | LLCS106  | HKY25R           | HGM-PT3/8 | —      | —      | —        |
| A32SPDUNR/L15 | ●     | ● | DNGA                          | 1504○○          | 32 | 250   | 50 | 22  | 8.4  | 30   | 13°      | 44 | LLSDN42   | LLP14 | LLCL24  | LLCS108S | HKY30R           | HGM-PT3/8 | —      | —      | —        |
| A40TPDUNR/L15 | ●     | ● | DNGG                          | 1504○○          | 40 | 300   | 63 | 27  | 9.4  | 37   | 10°      | 54 | LLSDN42   | LLP14 | LLCL24  | LLCS108S | HKY30R           | HGM-PT3/8 | —      | —      | —        |
| A50UPDUNR/L15 | ●     | ● | DNGM                          | 1504○○          | 50 | 350   | 80 | 35  | 12.4 | 47   | 9°       | 70 | LLSDN42   | LLP14 | LLCL24  | LLCS108S | HKY30R           | HGM-PT3/8 | —      | —      | —        |

\*1 Pin Lock Type : A25RPDUNR/L15

\*2 Clamp Torque (N · m) : LLCS125=1.5, LLCS106=2.2, LLCS108S=3.3, HP43=3.3

| A○○○PCLN       |       |   | With coolant hole CN○○inserts                |                 |    |       |    |    |      |      | Finish |          | Light       |             | Light    |        | Medium    |      |        |          |
|----------------|-------|---|----------------------------------------------|-----------------|----|-------|----|----|------|------|--------|----------|-------------|-------------|----------|--------|-----------|------|--------|----------|
|                |       |   |                                              |                 |    |       |    |    |      |      | FP     | SA       | LP          | MP          |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      |        |          |             |             |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      | (12)   | (12)     | (12)        | (12)        |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      | Medium | Medium   | Stainless   | PCBN/PCD    |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      | MH     | Standard | MM          |             |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      |        |          |             |             |          |        |           |      |        |          |
|                |       |   |                                              |                 |    |       |    |    |      |      | (12)   | (09,12)  | (12)        | (12)        |          |        |           |      |        |          |
| Order Number   | Stock |   | Insert Number                                | Dimensions (mm) |    |       |    |    |      |      |        |          |             | *3          | *2       |        |           | *2   |        |          |
|                | R     | L |                                              | DCONMS          | LF | LDRED | WF | H  | GAMP | DMIN | Shim   | Shim Pin | Clamp Lever | Clamp Screw | Wrench   | Plug   | Clamp Pin | Pin  | Screw  |          |
| A16MPCLNR/L09  | ●     | ● | CNMA<br>CNMG<br>CNMM<br>CNGA<br>CNGG<br>CNGM | 09T3○○          | 16 | 150   | 25 | 11 | 14   | 15°  | 20     | —        | —           | LLCL13S     | LLCS105  | HKY20R | HGM-PT1/8 | —    | —      | —        |
| A20QPCLNR/L09  | ●     | ● |                                              | 09T3○○          | 20 | 180   | 32 | 13 | 18   | 13°  | 25     | —        | —           | —           | —        | HKY25R | HGM-PT1/8 | HP3T | P208AM | HSS03005 |
| A20QPCLNR/L09N | ●     | ★ |                                              | 09T3○○          | 20 | 180   | 32 | 13 | 18   | 13°  | 25     | —        | —           | LLCL13S     | LLCS105  | HKY20R | HGM-PT1/8 | —    | —      | —        |
| A25RPCLNR/L09  | ●     | ★ |                                              | 09T3○○          | 25 | 200   | 40 | 17 | 23   | 13°  | 32     | —        | —           | LLCL13S     | LLCS105  | HKY20R | HGM-PT1/4 | —    | —      | —        |
| A25RPCLNR/L12  | ●     | ● |                                              | 1204○○          | 25 | 200   | 40 | 17 | 23   | 13°  | 32     | MLCP42   | —           | —           | —        | HKY30R | HGM-PT1/4 | HP43 | P210AM | HSS03005 |
| A32SPCLNR/L12  | ●     | ● |                                              | 1204○○          | 32 | 250   | 50 | 22 | 30   | 13°  | 44     | LLSCN42  | LLP14       | LLCL14      | LLCS108S | HKY30R | HGM-PT3/8 | —    | —      | —        |
| A40TPCLNR/L12  | ●     | ● |                                              | 1204○○          | 40 | 300   | 63 | 27 | 37   | 10°  | 54     | LLSCN42  | LLP14       | LLCL14      | LLCS108S | HKY30R | HGM-PT3/8 | —    | —      | —        |
| A50UPCLNR12    | ●     | ● |                                              | 1204○○          | 50 | 350   | 80 | 35 | 47   | 10°  | 63     | LLSCP42  | LLP14       | LLCL14      | LLCS108S | HKY30R | HGM-PT3/8 | —    | —      | —        |

\*1 Pin Lock Type : A20QPCLNR/L09, A25RPCLNR/L12

\*2 Clamp Torque (N · m) : LLCS105=1.5, LLCS106=2.2, LLCS108S=3.3, HP3T=2.2, HP43=3.3

\*3 When replacing clamp Lever LLCL13S, please consider purchasing lever spring HLS2 as necessary.

## RECOMMENDED CUTTING CONDITIONS

| Material                   | Hardness                 | Cutting Mode   | l/d ≤ 3               |                |                   |
|----------------------------|--------------------------|----------------|-----------------------|----------------|-------------------|
|                            |                          |                | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) |
| P Carbon Steel Alloy Steel | 180—350HB                | Medium Cutting | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              |
| M Stainless Steel          | ≤200HB                   | Medium Cutting | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              |
| K Gray Cast Iron           | Tensile Strength ≤350MPa | Medium Cutting | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              |

DN○○ type inserts

➤ A106—A112

CN○○ type inserts

➤ A098—A105, A137

PCBN & PCD inserts

➤ B022—B024, B049

SPARE PARTS

➤ N001

TECHNICAL DATA

➤ P001



# BORING BARS

## P TYPE BORING BARS

- The minimum cutting diameter is from Ø20. ● l/d is 3 times the diameter.
- ISO standard.
- Economical negative insert.
- Lever lock type and pin lock type.

| A○○○PWLNR                     |       |   |               | With coolant hole                                           |                 |     |       | WN○○inserts |    |      |      | Light       |             | Medium |           |  |
|-------------------------------|-------|---|---------------|-------------------------------------------------------------|-----------------|-----|-------|-------------|----|------|------|-------------|-------------|--------|-----------|--|
| <br>95° KAPR<br>6° GAMP       |       |   |               | <br>KAPR 95°<br>WF<br>LDRED<br>LF<br>H<br>DCONMS<br>6° GAMP |                 |     |       |             |    |      |      | LP          | MP          |        |           |  |
|                               |       |   |               |                                                             |                 |     |       |             |    |      |      | <br>(06)    | <br>(06)    |        |           |  |
|                               |       |   |               |                                                             |                 |     |       |             |    |      |      | Stainless   |             |        |           |  |
|                               |       |   |               |                                                             |                 |     |       |             |    |      |      | MM          |             |        |           |  |
|                               |       |   |               |                                                             |                 |     |       |             |    |      |      | <br>(06)    |             |        |           |  |
| Right hand tool holder shown. |       |   |               |                                                             |                 |     |       |             |    |      |      |             |             |        |           |  |
| Order Number                  | Stock |   | Insert Number |                                                             | Dimensions (mm) |     |       |             |    |      |      |             | *2          | *1     |           |  |
|                               | R     | L |               |                                                             | DCONMS          | LF  | LDRED | WF          | H  | GAMF | DMIN | Clamp Lever | Clamp Screw |        |           |  |
| A16MPWLNR/L06                 | ●     | ● | WNMG          | 06T3○○                                                      | 16              | 150 | 25    | 11          | 14 | 15°  | 20   | LLCL13S     | LLCS105     | HKY20R | HGM-PT1/8 |  |
| A20QPWLNR/L06                 | ●     | ● |               | 06T3○○                                                      | 20              | 180 | 32    | 13          | 18 | 13°  | 25   | LLCL13S     | LLCS105     | HKY20R | HGM-PT1/8 |  |
| A25RPWLNR/L06                 | ●     | ● |               | 06T3○○                                                      | 25              | 200 | 40    | 17          | 23 | 13°  | 32   | LLCL13S     | LLCS105     | HKY20R | HGM-PT1/4 |  |

\*1 Clamp Torque (N · m) : LLCS105=1.5

\*2 When replacing clamp Lever LLCL13S, please consider purchasing lever spring HLS2 as necessary.

| A○○○PDQN         |       |   |               |                 |    |       |    |     |      |      |      |      | With coolant hole             |             | DN○○inserts  |          | Finish           |           | Light    |        | Medium   |  | Medium |  |
|------------------|-------|---|---------------|-----------------|----|-------|----|-----|------|------|------|------|-------------------------------|-------------|--------------|----------|------------------|-----------|----------|--------|----------|--|--------|--|
|                  |       |   |               |                 |    |       |    |     |      |      |      |      | FP                            |             | LP           |          | MP               |           | MH       |        |          |  |        |  |
|                  |       |   |               |                 |    |       |    |     |      |      |      |      | (15)                          |             | (15)         |          | (15)             |           | (15)     |        |          |  |        |  |
|                  |       |   |               |                 |    |       |    |     |      |      |      |      | Medium Standard               |             | Stainless MM |          | G Class R/L      |           | PCBN/PCD |        |          |  |        |  |
|                  |       |   |               |                 |    |       |    |     |      |      |      |      | (15)                          |             | (15)         |          | (15)             |           | (15)     |        |          |  |        |  |
| *1 Pin Lock Type |       |   |               |                 |    |       |    |     |      |      |      |      | Right hand tool holder shown. |             |              |          |                  |           |          |        |          |  |        |  |
|                  |       |   |               |                 |    |       |    |     |      |      |      |      |                               |             |              |          |                  |           |          |        |          |  |        |  |
| Order Number     | Stock |   | Insert Number | Dimensions (mm) |    |       |    |     |      |      |      |      |                               |             | *2           |          |                  | *2        |          |        |          |  |        |  |
|                  | R     | L |               | DCONMS          | LF | LDRED | WF | WF2 | H    | GAMP | DMIN | Shim | Shim Pin                      | Clamp Lever | Clamp Screw  | Wrench   | Plug             | Clamp Pin | Pin      | Screw  |          |  |        |  |
| A25RPDQNR/L15    | ●     | ● | DNMA          | 1504○○          | 25 | 200   | 40 | 17  | 6.9  | 23   | 13°  | 32   | MLDP42                        | —           | —            | —        | HKY15R<br>HKY30R | HGM-PT1/4 | HP43     | P210AM | HSS03005 |  |        |  |
| A32SPDQNR/L15    | ●     | ● | DNMG          | 1504○○          | 32 | 250   | 50 | 22  | 8.4  | 30   | 13°  | 44   | LLSDN42                       | LLP14       | LLCL24       | LLCS108S | HKY30R           | HGM-PT3/8 | —        | —      | —        |  |        |  |
| A40TPDQNR/L15    | ●     | ● | DNMM          | 1504○○          | 40 | 300   | 63 | 27  | 9.4  | 37   | 10°  | 54   | LLSDN42                       | LLP14       | LLCL24       | LLCS108S | HKY30R           | HGM-PT3/8 | —        | —      | —        |  |        |  |
| A50UPDQNR15      | ★     | — | DNGA          | 1504○○          | 50 | 350   | 80 | 35  | 12.4 | 47   | 9°   | 70   | LLSDN42                       | LLP14       | LLCL24       | LLCS108S | HKY30R           | HGM-PT3/8 | —        | —      | —        |  |        |  |

\*1 Pin Lock Type : A25RPDQNR/L15

\*2 Clamp Torque (N · m) : LLCS108S=3.3, HP43=3.3

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4.

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

## RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Hardness                    | Cutting Mode   | l/d ≤ 3               |                |                   |
|---|-----------------------------|-----------------------------|----------------|-----------------------|----------------|-------------------|
|   |                             |                             |                | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) |
| P | Carbon Steel<br>Alloy Steel | 180—350HB                   | Medium Cutting | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              |
| M | Stainless Steel             | ≤200HB                      | Medium Cutting | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              |
| K | Gray Cast Iron              | Tensile Strength<br>≤350MPa | Medium Cutting | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              |

|                    |                   |
|--------------------|-------------------|
| WN○○ type inserts  | ➤ A131—A135       |
| DN○○ type inserts  | ➤ A106—A112       |
| PCBN & PCD inserts | ➤ B025—B028, B050 |

● : Inventory maintained. ★ : Inventory maintained in Japan.

# P TYPE BORING BARS

- The minimum cutting diameter is from Ø32.
- ISO standard.
- Economical negative insert.
- Lever lock type and pin lock type.

| A○○○PDZN         |       |   |               |                 |     |     |     |     |      |      |      | With coolant hole             |         | DN○○ inserts |        | Finish   |                  | Light     |      | Medium |          | Medium |  |  |  |  |  |  |  |  |  |
|------------------|-------|---|---------------|-----------------|-----|-----|-----|-----|------|------|------|-------------------------------|---------|--------------|--------|----------|------------------|-----------|------|--------|----------|--------|--|--|--|--|--|--|--|--|--|
|                  |       |   |               |                 |     |     |     |     |      |      |      |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |
| *1 Pin Lock Type |       |   |               |                 |     |     |     |     |      |      |      | Right hand tool holder shown. |         | FP           |        | LP       |                  | MP        |      | MH     |          |        |  |  |  |  |  |  |  |  |  |
|                  |       |   |               |                 |     |     |     |     |      |      |      | (15)                          |         | (15)         |        | (15)     |                  | (15)      |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  |       |   |               |                 |     |     |     |     |      |      |      | Medium                        |         | Stainless    |        | G Class  |                  | PCBN/PCD  |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  |       |   |               |                 |     |     |     |     |      |      |      | Standard                      |         | MM           |        | R/L      |                  | PCBN/PCD  |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  |       |   |               |                 |     |     |     |     |      |      |      | (15)                          |         | (15)         |        | (15)     |                  | (15)      |      |        |          |        |  |  |  |  |  |  |  |  |  |
| Order Number     | Stock |   | Insert Number | Dimensions (mm) |     |     |     |     |      |      |      |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  | R     | L |               | DCONMS          | OAL | LF  | WF  | WF2 | H    | GAMP | DMIN |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |
| A25RPDZNR/L15    | ●     | ● | DNMA          | 1504○○          | 25  | 225 | 200 | 17  | 6.7  | 23   | 13°  | 32                            | MLDP42  | —            | —      | —        | HKY15R<br>HKY30R | HGM-PT1/4 | HP43 | P210AM | HSS03005 |        |  |  |  |  |  |  |  |  |  |
| A32SPDZNR/L15    | ●     | ● | DNMG          | 1504○○          | 32  | 275 | 250 | 22  | 8.2  | 30   | 13°  | 40                            | LLSDN42 | LLP14        | LLCL24 | LLCS108S | HKY30R           | HGM-PT3/8 | —    | —      | —        |        |  |  |  |  |  |  |  |  |  |
| A40TPDZNR/L15    | ●     | ● | DNMX          | 1504○○          | 40  | 325 | 300 | 27  | 9.2  | 37   | 10°  | 50                            | LLSDN42 | LLP14        | LLCL24 | LLCS108S | HKY30R           | HGM-PT3/8 | —    | —      | —        |        |  |  |  |  |  |  |  |  |  |
| A50UPDZNR/L15    | ●     | ● | DNMM          | 1504○○          | 50  | 375 | 350 | 35  | 12.2 | 47   | 9°   | 63                            | LLSDN42 | LLP14        | LLCL24 | LLCS108S | HKY30R           | HGM-PT3/8 | —    | —      | —        |        |  |  |  |  |  |  |  |  |  |
|                  | ●     | ● | DNGA          | 1504○○          |     |     |     |     |      |      |      |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  | ●     | ● | DNGG          | 1504○○          |     |     |     |     |      |      |      |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |
|                  | ●     | ● | DNGM          | 1504○○          |     |     |     |     |      |      |      |                               |         |              |        |          |                  |           |      |        |          |        |  |  |  |  |  |  |  |  |  |

\*1 Pin Lock Type

\*2 Clamp Torque (N • m) : LLCS108S=3.3, HP43=3.3

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.8.

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for left hand holders and right hand inserts with right hand holders.

E

BORING BARS

## RECOMMENDED CUTTING CONDITIONS

| Material                   | Hardness                 | Cutting Mode   | l/d ≤ 3               |                |                   | l/d = 3—4             |                 |                   |
|----------------------------|--------------------------|----------------|-----------------------|----------------|-------------------|-----------------------|-----------------|-------------------|
|                            |                          |                | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) | Cutting Speed (m/min) | Feed (mm/rev)   | Depth of Cut (mm) |
| P Carbon Steel Alloy Steel | 180—350HB                | Medium Cutting | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              | 110 (80—140)          | 0.2 (0.1—0.3)   | —4.0              |
| M Stainless Steel          | ≤200HB                   | Medium Cutting | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              | 70 (50—100)           | 0.15 (0.1—0.25) | —3.0              |
| K Gray Cast Iron           | Tensile Strength ≤350MPa | Medium Cutting | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              | 80 (60—100)           | 0.2 (0.1—0.3)   | —4.0              |

DN○○ type inserts > A106—A112  
PCBN & PCD inserts > B025—B028, B050

SPARE PARTS > N001  
TECHNICAL DATA > P001

E041



# BORING BARS

## M TYPE BORING BARS

- The minimum cutting diameter is from Ø63.
- Negative trigon shape insert.
- Double clamp type.
- l/d is 3 times the diameter.

| A○○○MWLN     |  |  |  | With coolant hole WN○○inserts |                      |      |    |                |    |       |    | Finish   |      | Light           |       | Medium    |              | Medium          |         |                  |               |      |
|--------------|--|--|--|-------------------------------|----------------------|------|----|----------------|----|-------|----|----------|------|-----------------|-------|-----------|--------------|-----------------|---------|------------------|---------------|------|
|              |  |  |  |                               |                      |      |    |                |    |       |    | FP       |      | LP              |       | MP        |              | MH              |         |                  |               |      |
|              |  |  |  |                               |                      |      |    |                |    |       |    | (08)     |      | (08)            |       | (08)      |              | (08)            |         |                  |               |      |
|              |  |  |  |                               |                      |      |    |                |    |       |    | Medium   |      | Medium to Rough |       | Stainless |              |                 |         |                  |               |      |
|              |  |  |  |                               |                      |      |    |                |    |       |    | Standard |      | RP              |       | MM        |              |                 |         |                  |               |      |
|              |  |  |  | (08)                          |                      | (08) |    | (08)           |    |       |    |          |      |                 |       |           |              |                 |         |                  |               |      |
| Order Number |  |  |  | Stock                         | Insert Number        |      |    | Dimensions(mm) |    |       |    |          |      |                 |       |           |              |                 |         |                  |               |      |
|              |  |  |  | R                             |                      |      |    | DCONMS         | LF | LDRED | WF | H        | GAMF | DMIN            | Shim  | Shim Pin  | Clamp Bridge | Side Lock Plate | Spring  | Clamp Screw      | Wrench        | Plug |
| A50UMWLN08   |  |  |  | ●                             | WNMA<br>WNMG<br>WNGA | 0804 | 50 | 350            | 80 | 35    | 63 | 9°       | 63   | WPS<br>WC43     | CCP44 | CCK13     | CPT24        | MES2            | SLCS105 | HKY25R<br>HKY40R | HGM-<br>PT3/8 |      |

\*Clamp Torque (N • m) : SLCS105=7.0

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.8.

E

BORING BARS

## RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Hardness                    | Cutting Mode   | l/d ≤ 3               |                |                   |
|---|-----------------------------|-----------------------------|----------------|-----------------------|----------------|-------------------|
|   |                             |                             |                | Cutting Speed (m/min) | Feed (mm/rev)  | Depth of Cut (mm) |
| P | Carbon Steel<br>Alloy Steel | 180—350HB                   | Medium Cutting | 110 (80—140)          | 0.25 (0.1—0.4) | —5.0              |
| M | Stainless Steel             | ≤200HB                      | Medium Cutting | 80 (60—100)           | 0.2 (0.1—0.3)  | —4.0              |
| K | Gray Cast Iron              | Tensile Strength<br>≤350MPa | Medium Cutting | 80 (60—100)           | 0.25 (0.1—0.4) | —5.0              |

● : Inventory maintained. ★ : Inventory maintained in Japan.

WN○○ type inserts > A131—A135  
PCBN & PCD inserts > B034

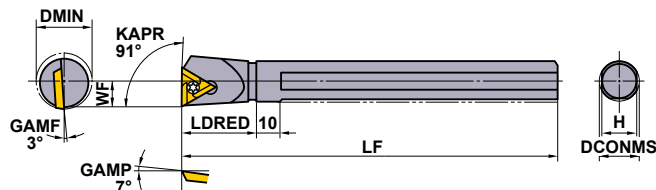
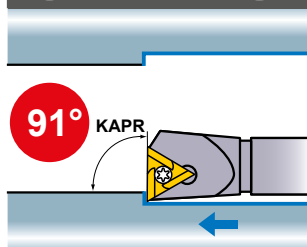
# AL TYPE BORING BARS

- Suitable for non-ferrous metal.
- 20° positive insert.
- Screw-on type.
- l/d is 6 times the diameter.
- Excellent vibration resistance.
- The minimum cutting diameter is from Ø20.

## SSTFE

## TE inserts

| Medium                                                                              | PCD                                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| R/L                                                                                 | R/L                                                                                 |
|  |  |
| (16)                                                                                | (16)                                                                                |
| PCD                                                                                 |                                                                                     |
|  |                                                                                     |
| (16)                                                                                |                                                                                     |



Right hand tool holder shown.

| Order Number  | Stock |   | Insert Number |      | Dimensions (mm) |     |       |    |      |      |  | *      |  |
|---------------|-------|---|---------------|------|-----------------|-----|-------|----|------|------|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|
|               |       |   |               |      | DCONMS          | LF  | LDRED | WF | H    | DMIN | Clamp Screw                                                                         | Wrench |                                                                                     |
|               | R     | L |               |      |                 |     |       |    |      |      |                                                                                     |        |                                                                                     |
| S16RSTFER/L16 | ★     | ★ | TEGX          | 1603 | 16              | 200 | 30    | 11 | 14.6 | 20   | FC400890T                                                                           | TKY10F |                                                                                     |
| S20RSTFER/L16 | ★     | ★ |               | 1603 | 20              | 200 | 37    | 13 | 18   | 25   | FC400890T                                                                           | TKY10F |                                                                                     |
| S25SSTFER/L16 | ★     | ★ |               | 1603 | 25              | 250 | 40    | 17 | 23   | 32   | FC400890T                                                                           | TKY10F |                                                                                     |

\* Clamp Torque (N • m) : FC400890T=2.5

Note 1) The insert photos are only examples. The letters refer to the chipbreaker and the dimension refers to the inscribed circle.

Note 2) Dimensions shown for insert corner RE 0.4.

Note 3) When using inserts with a right or left handed chipbreaker, please use left hand inserts for right hand holders and right hand inserts with left hand holders.

E

BORING BARS

## RECOMMENDED CUTTING CONDITIONS

| Material | Grade | Cutting Speed<br>(m/min) | l/d=3               |                      | l/d=4               |                      | l/d=5             |                      | l/d=6             |                      |
|----------|-------|--------------------------|---------------------|----------------------|---------------------|----------------------|-------------------|----------------------|-------------------|----------------------|
|          |       |                          | Feed<br>(mm/rev)    | Depth of Cut<br>(mm) | Feed<br>(mm/rev)    | Depth of Cut<br>(mm) | Feed<br>(mm/rev)  | Depth of Cut<br>(mm) | Feed<br>(mm/rev)  | Depth of Cut<br>(mm) |
| N        | HTi10 | 400<br>(200—600)         | 0.15<br>(0.05—0.25) | —3.0                 | 0.15<br>(0.05—0.25) | —3.0                 | 0.1<br>(0.05—0.2) | —2.5                 | 0.1<br>(0.05—0.2) | —1.0                 |
|          | MD220 | 800<br>(200—1500)        | 0.15<br>(0.05—0.25) | —3.0                 | 0.15<br>(0.05—0.25) | —3.0                 | 0.1<br>(0.05—0.2) | —2.5                 | 0.1<br>(0.05—0.2) | —1.0                 |

TE type inserts > A169

PCD inserts > B059

SPARE PARTS > N001

TECHNICAL DATA > P001

E043

# **BORING BAR FOR MACHINING SMALL PARTS**

**Overall length compatible with Swiss-Type automatic lathes**

**Carbide Shank : 80 mm, 90 mm, 140 mm, 180 mm**

**Steel Shank : 90 mm, 150 mm**

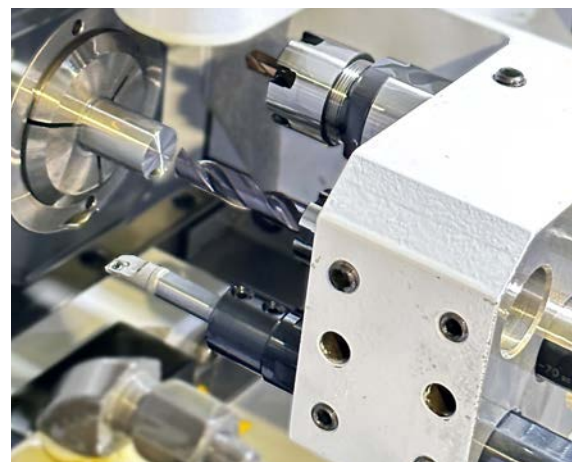
**Screw-On Type**

**With Coolant Hole**

Some items with a small diameter carbide shank do not have a through coolant hole.

**No Need to Shorten the Shank**

The length of the tools are compatible with Swiss-type automatic lathes, therefore no need to cut the shank to prevent interference.

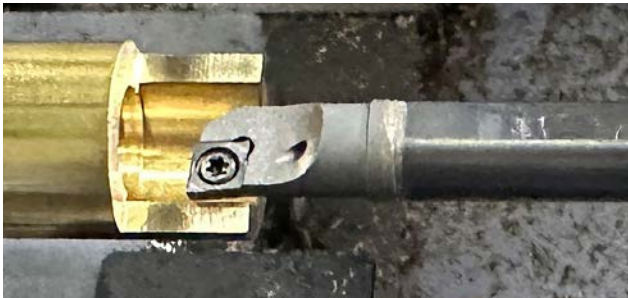


## FEATURES

### Through Coolant Carbide Shank with Minimum Machining Diameter of 9 mm

The boring bar with a minimum machining diameter of 9mm provides a large clearance and enables excellent chip evacuation.

### Clearance comparison : Hole diameter 11 mm



Boring Bars for small parts machining  
Minimum Machining Diameter of 9 mm

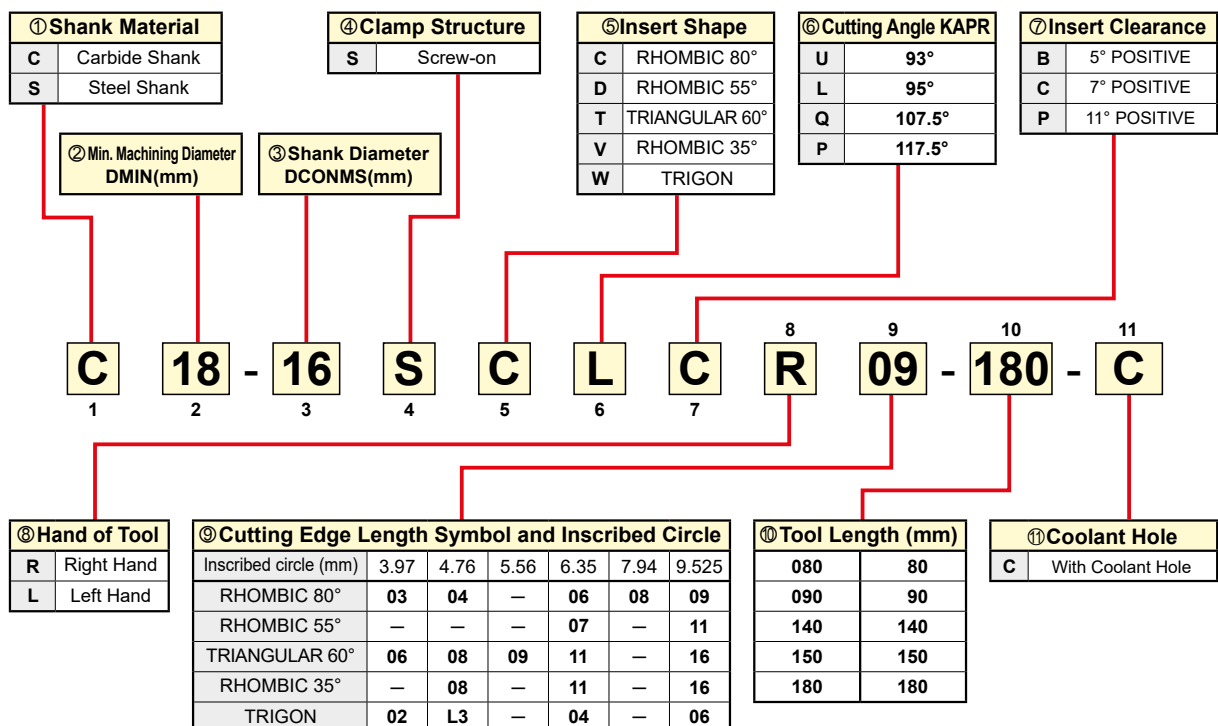


Dimple Bar  
Minimum Machining Diameter of 10 mm

E

BORING BARS

## IDENTIFICATION



## SELECTION STANDARD

| Insert Shape                           | Holder Type | Tool Cutting Edge Angle<br>KAPR | Shank Material | Tool Length | Min Machining Diameter<br>DMIN | Shank Diameter<br>DCONMS | Economical | Cutting Edge Strength | Profile Turning | Internal Coolant | Deep Boring<br>(L/D≥6) | Holder Page |
|----------------------------------------|-------------|---------------------------------|----------------|-------------|--------------------------------|--------------------------|------------|-----------------------|-----------------|------------------|------------------------|-------------|
| RHOMBIC 80°<br>Normal Clearance 7°     | SCLC        | 95°                             | Carbide        | 80,90       | 5—8                            | 4—7                      |            | ◎                     |                 |                  | ◎                      | E047        |
|                                        |             |                                 | Carbide        | 90,140,180  | 9—34                           | 8—32                     |            | ◎                     |                 | ◎                | ◎                      | E047        |
|                                        |             |                                 | Steel          | 90,150      | 14—34                          | 12—32                    |            | ◎                     |                 | ◎                |                        | E048        |
| RHOMBIC 80°<br>Normal Clearance 11°    | SCLP        | 95°                             | Carbide        | 140,180     | 12—30                          | 10—25                    |            | ◎                     |                 | ◎                | ◎                      | E048        |
|                                        |             |                                 | Steel          | 90,150      | 14—30                          | 12—25                    |            | ◎                     |                 | ◎                |                        | E049        |
| TRIANGULAR 60°<br>Normal Clearance 7°  | STUC        | 93°                             | Carbide        | 90          | 7—8                            | 6—7                      | ◎          |                       |                 |                  | ◎                      | E049        |
|                                        |             |                                 | Carbide        | 90,140,180  | 9—32                           | 8—25                     | ◎          |                       |                 | ◎                | ◎                      | E050        |
|                                        |             |                                 | Steel          | 90,150      | 14—40                          | 12—32                    | ◎          |                       |                 | ◎                |                        | E050        |
| TRIANGULAR 60°<br>Normal Clearance 11° | STUP        | 93°                             | Carbide        | 90,140,180  | 10—34                          | 8—25                     | ◎          |                       |                 | ◎                | ◎                      | E051        |
|                                        |             |                                 | Steel          | 90,150      | 14—34                          | 12—25                    | ◎          |                       |                 | ◎                |                        | E051        |
| RHOMBIC 55°<br>Normal Clearance 7°     | SDUC        | 93°                             | Carbide        | 140,180     | 14—32                          | 10—25                    |            |                       | ◎               | ◎                | ◎                      | E052        |
|                                        |             |                                 | Steel          | 150         | 16—32                          | 12—25                    |            |                       | ◎               | ◎                |                        | E052        |
| RHOMBIC 55°<br>Normal Clearance 7°     | SDQC        | 107.5°                          | Carbide        | 140,180     | 13—30                          | 10—25                    |            |                       | ◎               | ◎                | ◎                      | E053        |
|                                        |             |                                 | Steel          | 90,150      | 16—30                          | 12—25                    |            |                       | ◎               | ◎                |                        | E053        |
| TRIGON<br>Normal Clearance 7°          | SWUC        | 93°                             | Carbide        | 80,90       | 6—8                            | 5—7                      | ◎          | ◎                     |                 |                  | ◎                      | E054        |
|                                        |             |                                 | Carbide        | 90,140,180  | 10—22                          | 8—20                     | ◎          | ◎                     |                 | ◎                | ◎                      | E054        |
|                                        |             |                                 | Steel          | 90,150      | 14—22                          | 12—20                    | ◎          | ◎                     |                 | ◎                |                        | E054        |

E

BORING BARS

## Instructions for the use of CPGT · TPG/MX type inserts

Boring bars for machining small parts can use the inserts listed in the table below by changing the clamp screws.

| Insert Type                          | Clamp Screw | Insert Type                            | Clamp Screw |
|--------------------------------------|-------------|----------------------------------------|-------------|
| CPGT0802 $\bigcirc\bigcirc$ (Ø7.94)  | TS3         | TPGX0802 $\bigcirc\bigcirc$ (Ø4.76)    | CS200T      |
| CPGT0903 $\bigcirc\bigcirc$ (Ø9.525) | TS4         | TPG/MX0902 $\bigcirc\bigcirc$ (Ø5.56)  | CS250T      |
|                                      |             | TPG/MX1103 $\bigcirc\bigcirc$ (Ø9.525) | CS300890T   |

★ If the screw is too long, shorten it as necessary.

# BORING BARS

## C-SCLC

**NEW**

Carbide shank  
without coolant hole

CC<sup>○</sup>inserts

Finish

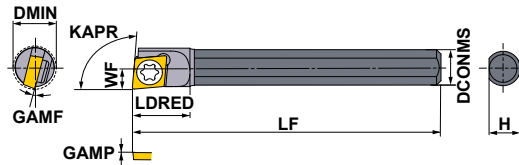
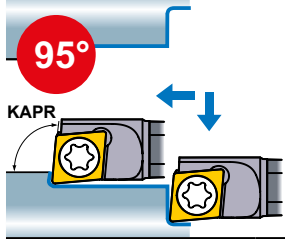
L-F



PCBN/PCD



(03,04)



Right hand tool holder shown.

| Order Number        | Stock |   | Insert Number                                                                        |                                                                                        | Dimensions (mm) |    |       |     |     |      |      |  * |      |  |
|---------------------|-------|---|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|----|-------|-----|-----|------|------|---------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|
|                     | R     | L |                                                                                      |                                                                                        | DCONMS          | LF | LDRED | WF  | H   | GAMF | GAMP | DMIN                                                                                  |      |                                                                                     |
|                     |       |   |                                                                                      |                                                                                        |                 |    |       |     |     |      |      |                                                                                       |      |                                                                                     |
| C05-04SCLCR/L03-080 | ●     | ● | CC  | 03S1  | 4               | 80 | 7     | 2.5 | 3.7 | 15°  | 0°   | 5                                                                                     | TS16 | TKY06F                                                                              |
| C06-05SCLCR/L03-080 | ●     | ● |                                                                                      | 03S1  | 5               | 80 | 9     | 3.0 | 4.7 | 13°  | 0°   | 6                                                                                     | TS16 | TKY06F                                                                              |
| C07-06SCLCR/L04-090 | ●     | ● |                                                                                      | 04T0  | 6               | 90 | 9     | 3.5 | 5.7 | 13°  | 0°   | 7                                                                                     | TS21 | TKY06F                                                                              |
| C08-07SCLCR/L04-090 | ●     | ● |                                                                                      | 04T0  | 7               | 90 | 10    | 4.0 | 6.7 | 11°  | 0°   | 8                                                                                     | TS21 | TKY06F                                                                              |

\* Clamp Torque (N · m) : TS16=0.6, TS21=0.6

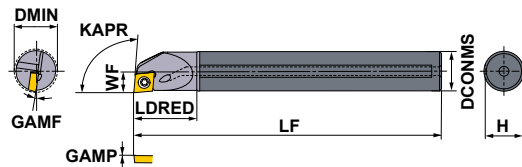
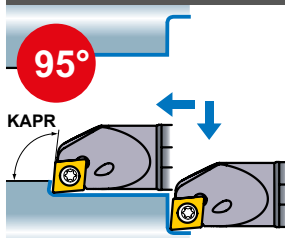
## C-SCLC-C

**NEW**

Carbide shank  
with coolant hole

CC<sup>○</sup>inserts

| Finish  | Finish  | Light    | Light      |
|---------|---------|----------|------------|
| FS      | FS-P    | LS       | LS-P       |
|         |         |          |            |
| (06,09) | (06,09) | (06,09)  | (06,09)    |
| Medium  | Medium  | Flat Top | PCBN/PCD   |
| MP      | MM      |          |            |
|         |         |          |            |
| (06,09) | (06,09) | (06,09)  | (04,06,09) |



Right hand tool holder shown.

| Order Number          | Stock |   | Insert Number   |                   | Dimensions (mm) |     |       |      |    |      |      |  | *<br> |        |
|-----------------------|-------|---|-----------------|-------------------|-----------------|-----|-------|------|----|------|------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
|                       | R     | L |                 |                   | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                       |                                                                                            | DMIN   |
|                       |       |   |                 |                   |                 |     |       |      |    |      |      | Clamp Screw                                                                           | Wrench                                                                                     |        |
| C09-08SCLCR04-090-C   | ●     |   | CC <sup>○</sup> | 04T0 <sup>○</sup> | 8               | 90  | 14    | 4.5  | 7  | 10°  | 0°   | 9                                                                                     | TS21                                                                                       | TKY06F |
| C10-08SCLCR04-090-C   | ●     |   |                 | 04T0 <sup>○</sup> | 8               | 90  | 14    | 5.0  | 7  | 9°   | 0°   | 10                                                                                    | TS21                                                                                       | TKY06F |
| C10-08SCLCR/L06-140-C | ●     | ● |                 | 0602 <sup>○</sup> | 8               | 140 | 14    | 5.0  | 7  | 9°   | 0°   | 10                                                                                    | TS25                                                                                       | TKY08F |
| C12-10SCLCR/L06-140-C | ●     | ● |                 | 0602 <sup>○</sup> | 10              | 140 | 18    | 6.0  | 9  | 12°  | 0°   | 12                                                                                    | TS25                                                                                       | TKY08F |
| C14-12SCLCR/L06-140-C | ●     | ● |                 | 0602 <sup>○</sup> | 12              | 140 | 23    | 7.0  | 11 | 10°  | 0°   | 14                                                                                    | TS25                                                                                       | TKY08F |
| C18-16SCLCR/L09-180-C | ●     | ● |                 | 09T3 <sup>○</sup> | 16              | 180 | 28    | 9.0  | 15 | 10°  | 0°   | 18                                                                                    | TS4                                                                                        | TKY15F |
| C22-20SCLCR09-180-C   | ●     |   |                 | 09T3 <sup>○</sup> | 20              | 180 | 32    | 11.0 | 19 | 8°   | 0°   | 22                                                                                    | TS4                                                                                        | TKY15F |
| C27-25SCLCR09-180-C   | ★     |   |                 | 09T3 <sup>○</sup> | 25              | 180 | 38    | 13.5 | 24 | 6°   | 0°   | 27                                                                                    | TS4                                                                                        | TKY15F |
| C34-32SCLCR09-180-C   | ★     |   |                 | 09T3 <sup>○</sup> | 32              | 180 | 48    | 17.0 | 31 | 4°   | 0°   | 34                                                                                    | TS4                                                                                        | TKY15F |

\* Clamp Torque (N · m) : TS21=0.6, TS25=1.0, TS4=3.5

● : Inventory maintained. ★ : Inventory maintained in Japan.

|                              |                    |
|------------------------------|--------------------|
| CC <sup>○</sup> type inserts | > A140—A148        |
| PCBN & PCD inserts           | > B037, B038, B053 |
| SPARE PARTS                  | > N001             |
| TECHNICAL DATA               | > P001             |

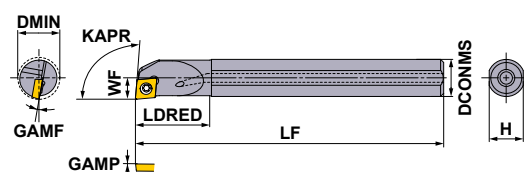
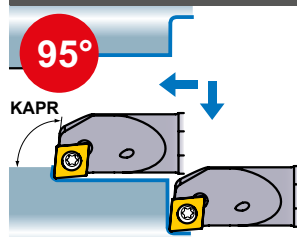
E047

E

BORING BARS



## BORING BARS

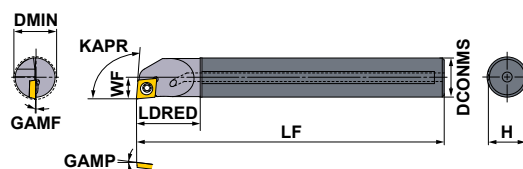
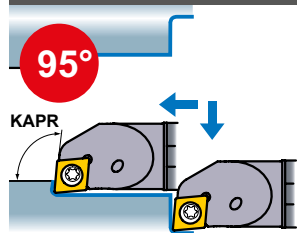
S-SCLC-C **NEW**Steel shank  
with coolant hole **CC** inserts

Right hand tool holder shown.

| Finish                                                                                                   | Finish                                                                                                   | Light                                                                                                      | Light                                                                                                      |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| FS<br><br>(06,09)     | FS-P<br><br>(06,09)   | LS<br><br>(06,09)       | LS-P<br><br>(06,09)     |
| Medium<br><br>(06,09) | Medium<br><br>(06,09) | Flat Top<br><br>(06,09) | PCBN/PCD<br><br>(06,09) |

| Order Number          | Stock |   | Insert Number |      | Dimensions (mm) |     |       |      |    |      |      |  |  |        |
|-----------------------|-------|---|---------------|------|-----------------|-----|-------|------|----|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                       | R     | L |               |      | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                     |                                                                                     | DMIN   |
|                       |       |   |               |      |                 |     |       |      |    |      |      |                                                                                     |                                                                                     |        |
| S14-12SCLCR/L06-090-C | ●     | ● | CC            | 0602 | 12              | 90  | 24    | 7.0  | 11 | 10°  | 0°   | 14                                                                                  | TS25                                                                                | TKY08F |
| S18-16SCLCR/L09-150-C | ●     | ● |               | 09T3 | 16              | 150 | 30    | 9.0  | 15 | 10°  | 0°   | 18                                                                                  | TS4                                                                                 | TKY15F |
| S22-20SCLCR/L09-150-C | ●     | ● |               | 09T3 | 20              | 150 | 36    | 11.0 | 19 | 8°   | 0°   | 22                                                                                  | TS4                                                                                 | TKY15F |
| S27-25SCLCR/L09-150-C | ●     | ● |               | 09T3 | 25              | 150 | 46    | 13.5 | 24 | 6°   | 0°   | 27                                                                                  | TS4                                                                                 | TKY15F |
| S34-32SCLCR/L09-150-C | ●     | ★ |               | 09T3 | 32              | 150 | 58    | 17.0 | 31 | 4°   | 0°   | 34                                                                                  | TS4                                                                                 | TKY15F |

★ Clamp Torque (N • m) : TS25=1.0, TS4=3.5

C-SCLP-C **NEW**Carbide shank  
with coolant hole **CP** inserts

Right hand tool holder shown.

| Finish                                                                                                     | Finish                                                                                                     | Light                                                                                                        |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| FV<br><br>(08,09)     | FS<br><br>(08,09)     | LM<br><br>(08,09)       |
| Medium<br><br>(08,09) | Medium<br><br>(08,09) | PCBN/PCD<br><br>(08,09) |

| Order Number          | Stock |   | Insert Number |      | Dimensions (mm) |     |       |      |    |      |      |  |  |        |
|-----------------------|-------|---|---------------|------|-----------------|-----|-------|------|----|------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|                       | R     | L |               |      | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                       |                                                                                       | DMIN   |
|                       |       |   |               |      |                 |     |       |      |    |      |      |                                                                                       |                                                                                       |        |
| C12-10SCLPR/L08-140-C | ●     | ● | CP            | 0802 | 10              | 140 | 18    | 6.0  | 9  | 5°   | 5°   | 12                                                                                    | TS3D                                                                                  | TKY10F |
| C14-12SCLPR/L08-140-C | ●     | ● |               | 0802 | 12              | 140 | 23    | 7.0  | 11 | 4°   | 5°   | 14                                                                                    | TS3D                                                                                  | TKY10F |
| C16-12SCLPR/L09-140-C | ●     | ● |               | 0903 | 12              | 140 | 23    | 8.0  | 11 | 4°   | 5°   | 16                                                                                    | TS4D                                                                                  | TKY15F |
| C18-16SCLPR/L09-180-C | ●     | ● |               | 0903 | 16              | 180 | 28    | 9.0  | 15 | 3.5° | 5°   | 18                                                                                    | TS4D                                                                                  | TKY15F |
| C22-20SCLPR/L09-180-C | ●     | ● |               | 0903 | 20              | 180 | 32    | 11.0 | 19 | 2°   | 5°   | 22                                                                                    | TS4D                                                                                  | TKY15F |
| C27-25SCLPR09-180-C   | ★     |   |               | 0903 | 25              | 180 | 38    | 13.5 | 24 | 0°   | 5°   | 27                                                                                    | TS4D                                                                                  | TKY15F |
| C30-25SCLPR09-180-C   | ★     |   |               | 0903 | 25              | 180 | 38    | 15.0 | 24 | 0°   | 5°   | 30                                                                                    | TS4D                                                                                  | TKY15F |

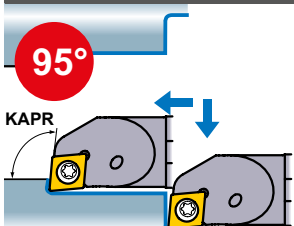
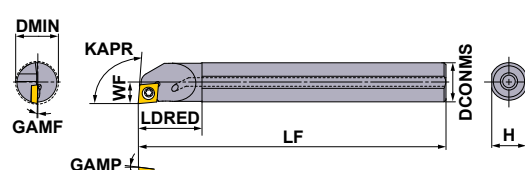
\*1 Clamp Torque (N • m) : TS3D=2.5, TS4D=3.5

\*2 By changing the clamp screw, It is possible to use the inserts listed page E046 for details.

● : Inventory maintained. ★ : Inventory maintained in Japan.

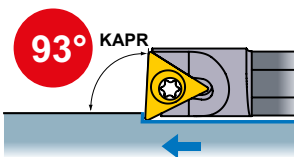
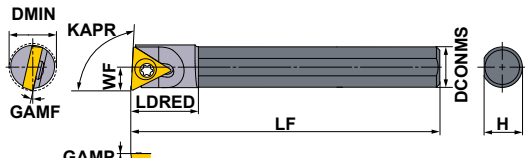
|                    |                     |
|--------------------|---------------------|
| CC type inserts    | ➤ A140 – A148       |
| CP type inserts    | ➤ A149 – A151       |
| PCBN & PCD inserts | ➤ B037 – B039, B053 |



| S-SCLP-C <span>NEW</span>                                                         |       |   | Steel shank<br>with coolant hole                                                   |                   | CP $\circ\circ$ inserts |     |       |      |    |      |      | Finish |                                                                                                | Finish |                                                                                                | Light |                                                                                                |  |
|-----------------------------------------------------------------------------------|-------|---|------------------------------------------------------------------------------------|-------------------|-------------------------|-----|-------|------|----|------|------|--------|------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------|--|
|  |       |   |  |                   |                         |     |       |      |    |      |      |        | <br>(08,09) |        | <br>(08,09) |       | <br>(08,09) |  |
|                                                                                   |       |   |                                                                                    |                   |                         |     |       |      |    |      |      |        | Medium<br>MM                                                                                   |        | Medium<br>MS                                                                                   |       | PCBN/PCD                                                                                       |  |
|                                                                                   |       |   |                                                                                    |                   |                         |     |       |      |    |      |      |        | <br>(08,09) |        | <br>(08,09) |       | <br>(08,09) |  |
| Right hand tool holder shown.                                                     |       |   |                                                                                    |                   |                         |     |       |      |    |      |      |        |                                                                                                |        |                                                                                                |       |                                                                                                |  |
| Order Number                                                                      | Stock |   | Insert Number                                                                      |                   | Dimensions (mm)         |     |       |      |    |      |      |        | <br>*1      |        |             |       |                                                                                                |  |
|                                                                                   | R     | L |                                                                                    |                   | DCONMS                  | LF  | LDRED | WF   | H  | GAMF | GAMP | DMIN   | Clamp<br>Screw                                                                                 | Wrench |                                                                                                |       |                                                                                                |  |
| S14-12SCLPR/L08-090-C                                                             | ●     | ● | CP $\circ\circ$                                                                    | 0802 $\circ\circ$ | 12                      | 90  | 24    | 7.0  | 11 | 4°   | 5°   | 14     | TS3D                                                                                           | TKY10F |                                                                                                |       |                                                                                                |  |
| S16-12SCLPR/L09-090-C                                                             | ★     | ★ |                                                                                    | 0903 $\circ\circ$ | 12                      | 90  | 24    | 8.0  | 11 | 4°   | 5°   | 16     | TS4D                                                                                           | TKY15F |                                                                                                |       |                                                                                                |  |
| S18-16SCLPR/L09-150-C                                                             | ★     | ★ |                                                                                    | 0903 $\circ\circ$ | 16                      | 150 | 30    | 9.0  | 15 | 3.5° | 5°   | 18     | TS4D                                                                                           | TKY15F |                                                                                                |       |                                                                                                |  |
| S22-20SCLPR/L09-150-C                                                             | ★     | ★ |                                                                                    | 0903 $\circ\circ$ | 20                      | 150 | 36    | 11.0 | 19 | 2°   | 5°   | 22     | TS4D                                                                                           | TKY15F |                                                                                                |       |                                                                                                |  |
| S27-25SCLPR/L09-150-C                                                             | ★     | ★ |                                                                                    | 0903 $\circ\circ$ | 25                      | 150 | 46    | 13.5 | 24 | 0°   | 5°   | 27     | TS4D                                                                                           | TKY15F |                                                                                                |       |                                                                                                |  |
| S30-25SCLPR/L09-150-C                                                             | ●     | ★ |                                                                                    | 0903 $\circ\circ$ | 25                      | 150 | 46    | 15.0 | 24 | 0°   | 5°   | 30     | TS4D                                                                                           | TKY15F |                                                                                                |       |                                                                                                |  |

\*1 Clamp Torque (N • m) : TS3D=2.5, TS4D=3.5

\*2 By changing the clamp screw, It is possible to use the inserts listed page E046 for details.

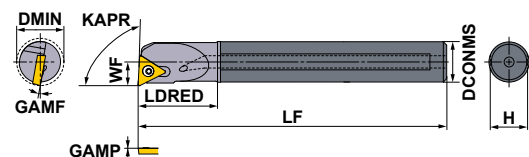
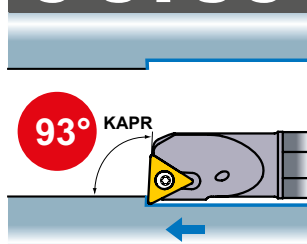
| C-STUC                                                                              |       | NEW                                                                                  |                 | Carbide shank<br>without coolant hole |                 | TC $\circ\circ$ inserts |       |     |     |      |      | Finish<br>R/L-F                                                                               |                |                                                                                       |
|-------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------|-----------------|---------------------------------------|-----------------|-------------------------|-------|-----|-----|------|------|-----------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------|
|  |       |  |                 |                                       |                 |                         |       |     |     |      |      | <br>(06) |                |                                                                                       |
|                                                                                     |       |                                                                                      |                 |                                       |                 |                         |       |     |     |      |      |                                                                                               |                |                                                                                       |
|                                                                                     |       | Right hand tool holder shown.                                                        |                 |                                       |                 |                         |       |     |     |      |      |                                                                                               |                |                                                                                       |
| Order Number                                                                        | Stock |                                                                                      | Insert Number   |                                       | Dimensions (mm) |                         |       |     |     |      |      | *        |                |  |
|                                                                                     | R     | L                                                                                    |                 |                                       | DCONMS          | LF                      | LDRED | WF  | H   | GAMF | GAMP | DMIN                                                                                          | Clamp<br>Screw |                                                                                       |
| C07-06STUCR/L06-090                                                                 | ●     | ●                                                                                    | TC $\circ\circ$ | 0601 $\circ\circ$                     | 6               | 90                      | 10    | 3.5 | 5.7 | 13°  | 0°   | 7                                                                                             | TS2C           | TKY06F                                                                                |
| C08-07STUCR/L06-090                                                                 | ●     | ●                                                                                    |                 | 0601 $\circ\circ$                     | 7               | 90                      | 10    | 4.0 | 6.7 | 12°  | 0°   | 8                                                                                             | TS2C           | TKY06F                                                                                |

\* Clamp Torque (N • m) : TS2C=0.6

|                              |               |
|------------------------------|---------------|
| CP $\circ\circ$ type inserts | > A149 – A151 |
| TC $\circ\circ$ type inserts | > A165 – A168 |
| PCBN & PCD inserts           | > B042, B055  |

|                |        |
|----------------|--------|
| SPARE PARTS    | > N001 |
| TECHNICAL DATA | > P001 |

## BORING BARS

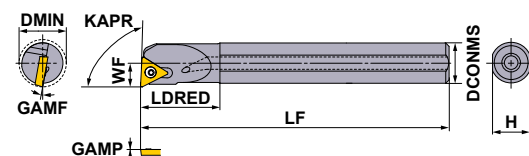
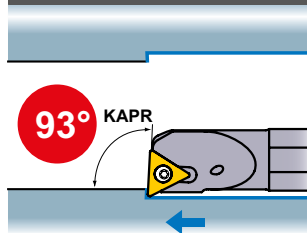
**C-STUC-C** **NEW**Carbide shank  
with coolant hole**TC** inserts

Right hand tool holder shown.

| Finish     | Finish     | Light      | Light         |
|------------|------------|------------|---------------|
| FP         | FM         | LP         | LM            |
|            |            |            |               |
| (09,11,16) | (09,11,16) | (09,11,16) | (09,11,16)    |
| Medium     | Medium     | Flat Top   | PCBN/PCD      |
| MP         | MM         |            |               |
|            |            |            |               |
| (09,11,16) | (09,11,16) | (11,16)    | (06,09,11,16) |

| Order Number          | Stock |   | Insert Number                                                                        |                                                                                        | Dimensions (mm) |     |       |      |    |      |      |  |  |        |
|-----------------------|-------|---|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|-----|-------|------|----|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                       | R     | L |                                                                                      |                                                                                        | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                     |                                                                                     | DMIN   |
|                       |       |   |                                                                                      |                                                                                        |                 |     |       |      |    |      |      |                                                                                     |                                                                                     |        |
| C09-08STUCR06-090-C   | ●     |   | TC  | 0601  | 8               | 90  | 14    | 4.5  | 7  | 11°  | 0°   | 9                                                                                   | TS2C                                                                                | TKY06F |
| C10-08STUCR/L09-090-C | ●     | ● |                                                                                      | 0902  | 8               | 90  | 14    | 5.0  | 7  | 14°  | 0°   | 10                                                                                  | TS22                                                                                | TKY06F |
| C12-10STUCR/L09-140-C | ●     | ● |                                                                                      | 0902  | 10              | 140 | 18    | 6.2  | 9  | 12°  | 0°   | 12                                                                                  | TS22                                                                                | TKY06F |
| C14-12STUCR/L09-140-C | ●     | ● |                                                                                      | 0902  | 12              | 140 | 23    | 7.2  | 11 | 10°  | 0°   | 14                                                                                  | TS22                                                                                | TKY06F |
| C18-16STUCR/L11-180-C | ●     | ● |                                                                                      | 1102  | 16              | 180 | 28    | 9.2  | 15 | 8°   | 0°   | 18                                                                                  | TS25                                                                                | TKY08F |
| C22-20STUCR/L11-180-C | ●     | ● |                                                                                      | 1102  | 20              | 180 | 32    | 11.2 | 19 | 6°   | 0°   | 22                                                                                  | TS25                                                                                | TKY08F |
| C27-20STUCR/L11-180-C | ●     | ● |                                                                                      | 1102  | 20              | 180 | 32    | 13.5 | 19 | 5°   | 0°   | 27                                                                                  | TS25                                                                                | TKY08F |
| C32-25STUCR/L16-180-C | ●     | ★ |                                                                                      | 16T3  | 25              | 180 | 38    | 17.0 | 24 | 5°   | 0°   | 32                                                                                  | TS4                                                                                 | TKY15F |

★ Clamp Torque (N · m) : TS2C=0.6, TS22=0.6, TS25=1.0, TS4=3.5

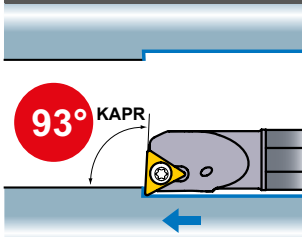
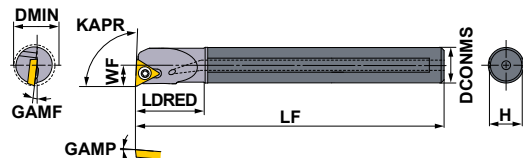
**S-STUC-C** **NEW**Steel shank  
with coolant hole**TC** inserts

Right hand tool holder shown.

| Finish     | Finish     | Light      | Light         |
|------------|------------|------------|---------------|
| FP         | FM         | LP         | LM            |
|            |            |            |               |
| (09,11,16) | (09,11,16) | (09,11,16) | (09,11,16)    |
| Medium     | Medium     | Flat Top   | PCBN/PCD      |
| MP         | MM         |            |               |
|            |            |            |               |
| (09,11,16) | (09,11,16) | (11,16)    | (06,09,11,16) |

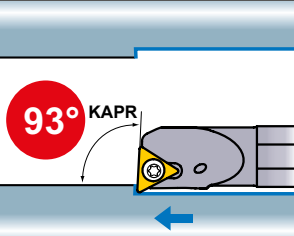
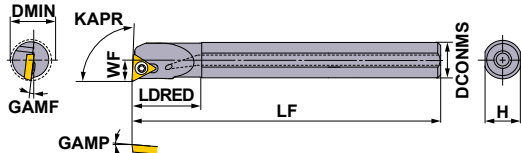
| Order Number          | Stock |   | Insert Number                                                                          |                                                                                          | Dimensions (mm) |     |       |      |    |      |      |  * |             |  |
|-----------------------|-------|---|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------|-----|-------|------|----|------|------|-----------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|
|                       | R     | L |                                                                                        |                                                                                          | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP | DMIN                                                                                    | Clamp Screw | Wrench                                                                                |
|                       |       |   |                                                                                        |                                                                                          |                 |     |       |      |    |      |      |                                                                                         |             |                                                                                       |
| S14-12STUCR/L09-090-C | ●     | ● | TC  | 0902  | 12              | 90  | 24    | 7.2  | 11 | 10°  | 0°   | 14                                                                                      | TS22        | TKY06F                                                                                |
| S18-16STUCR/L11-150-C | ●     | ● |                                                                                        | 1102  | 16              | 150 | 30    | 9.2  | 15 | 8°   | 0°   | 18                                                                                      | TS25        | TKY08F                                                                                |
| S22-20STUCR/L11-150-C | ●     | ● |                                                                                        | 1102  | 20              | 150 | 36    | 11.2 | 19 | 6°   | 0°   | 22                                                                                      | TS25        | TKY08F                                                                                |
| S27-20STUCR/L11-150-C | ●     | ● |                                                                                        | 1102  | 20              | 150 | 36    | 13.5 | 19 | 5°   | 0°   | 27                                                                                      | TS25        | TKY08F                                                                                |
| S32-25STUCR/L16-150-C | ●     | ● |                                                                                        | 16T3  | 25              | 150 | 46    | 17.0 | 24 | 5°   | 0°   | 32                                                                                      | TS4         | TKY15F                                                                                |
| S40-32STUCR/L16-150-C | ★     | ★ |                                                                                        | 16T3  | 32              | 150 | 58    | 22.0 | 31 | 3°   | 0°   | 40                                                                                      | TS4         | TKY15F                                                                                |

★ Clamp Torque (N · m) : TS22=0.6, TS25=1.0, TS4=3.5

| C-STUP-C                                                                          |       | NEW | Carbide shank<br>with coolant hole                                                 |              | TP $\odot$ inserts |     |       |      |    |      |      | Finish                                                                              | Finish                                                                              |                                                                                     |
|-----------------------------------------------------------------------------------|-------|-----|------------------------------------------------------------------------------------|--------------|--------------------|-----|-------|------|----|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |       |     |  |              |                    |     |       |      |    |      |      |                                                                                     | FS                                                                                  | FV                                                                                  |
|                                                                                   |       |     |                                                                                    |              |                    |     |       |      |    |      |      |                                                                                     |  |  |
|                                                                                   |       |     |                                                                                    |              |                    |     |       |      |    |      |      |                                                                                     | Light                                                                               | PCBN/PCD                                                                            |
|                                                                                   |       |     |                                                                                    |              |                    |     |       |      |    |      |      |                                                                                     | LP                                                                                  |  |
| Right hand tool holder shown.                                                     |       |     |                                                                                    |              |                    |     |       |      |    |      |      | (08,09,11)                                                                          | (09,11)                                                                             |                                                                                     |
| Order Number                                                                      | Stock |     | Insert Number                                                                      |              | Dimensions (mm)    |     |       |      |    |      |      |  |  |                                                                                     |
|                                                                                   | R     | L   |                                                                                    |              | DCONMS             | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                     |                                                                                     | DMIN                                                                                |
| C10-08STUPR/L08-090-C                                                             | ●     | ●   | TP $\odot$                                                                         | 0802 $\odot$ | 8                  | 90  | 14    | 5.0  | 7  | 10°  | 5°   | 10                                                                                  | TS2D                                                                                | TKY06F                                                                              |
| C12-10STUPR/L09-140-C                                                             | ●     | ●   |                                                                                    | 0902 $\odot$ | 10                 | 140 | 18    | 6.2  | 9  | 8°   | 5°   | 12                                                                                  | TS25D                                                                               | TKY08F                                                                              |
| C14-12STUPR/L09-140-C                                                             | ●     | ●   |                                                                                    | 0902 $\odot$ | 12                 | 140 | 23    | 7.2  | 11 | 7°   | 5°   | 14                                                                                  | TS25D                                                                               | TKY08F                                                                              |
| C18-16STUPR/L11-180-C                                                             | ●     | ★   |                                                                                    | 1103 $\odot$ | 16                 | 180 | 28    | 9.2  | 15 | 3.5° | 5°   | 18                                                                                  | TS31D                                                                               | TKY10F                                                                              |
| C22-20STUPR/L11-180-C                                                             | ●     | ★   |                                                                                    | 1103 $\odot$ | 20                 | 180 | 32    | 11.2 | 19 | 2°   | 5°   | 22                                                                                  | TS31D                                                                               | TKY10F                                                                              |
| C27-25STUPR/L11-180-C                                                             | ★     | ★   |                                                                                    | 1103 $\odot$ | 25                 | 180 | 38    | 13.7 | 24 | 0°   | 5°   | 27                                                                                  | TS31D                                                                               | TKY10F                                                                              |
| C34-25STUPR/L11-180-C                                                             | ★     | ★   |                                                                                    | 1103 $\odot$ | 25                 | 180 | 38    | 17.2 | 24 | 0°   | 5°   | 34                                                                                  | TS31D                                                                               | TKY10F                                                                              |

\*1 Clamp Torque (N · m) : TS2D=0.6, TS25D=1.6, TS31D=2.5

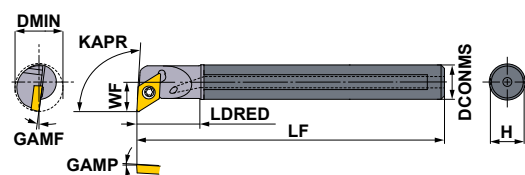
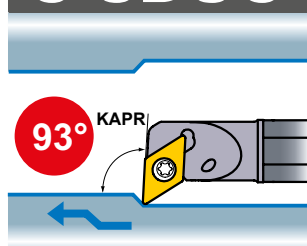
\*2 By changing the clamp screw, It is possible to use the inserts listed page E046 for details.

| S-STUP-C                                                                            |  | NEW   | Steel shank<br>with coolant hole                                                     |               | TP $\odot$ inserts |                 |    |       |    |      |      | Finish     | Finish                                                                                |                                                                                       |                                                                                       |        |
|-------------------------------------------------------------------------------------|--|-------|--------------------------------------------------------------------------------------|---------------|--------------------|-----------------|----|-------|----|------|------|------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|  |  |       |  |               |                    |                 |    |       |    |      |      |            | FS                                                                                    | FV                                                                                    |                                                                                       |        |
|                                                                                     |  |       |                                                                                      |               |                    |                 |    |       |    |      |      |            |  |  |                                                                                       |        |
|                                                                                     |  |       |                                                                                      |               |                    |                 |    |       |    |      |      |            | Light                                                                                 | PCBN/PCD                                                                              |                                                                                       |        |
|                                                                                     |  |       |                                                                                      |               |                    |                 |    |       |    |      |      |            | LP                                                                                    |  |  |        |
| Right hand tool holder shown.                                                       |  |       |                                                                                      |               |                    |                 |    |       |    |      |      | (08,09,11) | (09,11)                                                                               |                                                                                       |                                                                                       |        |
| Order Number                                                                        |  | Stock |                                                                                      | Insert Number |                    | Dimensions (mm) |    |       |    |      |      |            |                                                                                       |  |  |        |
|                                                                                     |  | R     | L                                                                                    |               |                    | DCONMS          | LF | LDRED | WF | H    | GAMF | GAMP       | DMIN                                                                                  | Clamp Screw                                                                           | Wrench                                                                                |        |
| S14-12STUPR/L09-090-C                                                               |  | ●     | ●                                                                                    | TP $\odot$    |                    | 0902 $\odot$    | 12 | 90    | 24 | 7.2  | 11   | 7°         | 5°                                                                                    | 14                                                                                    | TS25D                                                                                 | TKY08F |
| S18-16STUPR/L11-150-C                                                               |  | ●     | ●                                                                                    |               |                    | 1103 $\odot$    | 16 | 150   | 30 | 9.2  | 15   | 3.5°       | 5°                                                                                    | 18                                                                                    | TS31D                                                                                 | TKY10F |
| S22-20STUPR/L11-150-C                                                               |  | ★     | ★                                                                                    |               |                    | 1103 $\odot$    | 20 | 150   | 36 | 11.2 | 19   | 2°         | 5°                                                                                    | 22                                                                                    | TS31D                                                                                 | TKY10F |
| S27-25STUPR/L11-150-C                                                               |  | ★     | ★                                                                                    |               |                    | 1103 $\odot$    | 25 | 150   | 46 | 13.7 | 24   | 0°         | 5°                                                                                    | 27                                                                                    | TS31D                                                                                 | TKY10F |
| S34-25STUPR/L11-150-C                                                               |  | ★     | ★                                                                                    |               |                    | 1103 $\odot$    | 25 | 150   | 46 | 17.2 | 24   | 0°         | 5°                                                                                    | 34                                                                                    | TS31D                                                                                 | TKY10F |

\*1 Clamp Torque (N · m) : TS25D=1.6, TS31D=2.5

\*2 By changing the clamp screw, It is possible to use the inserts listed page E046 for details.

## BORING BARS

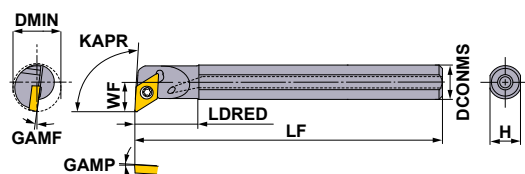
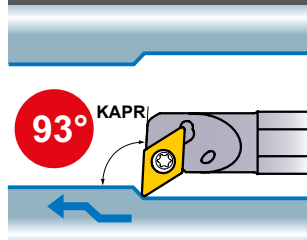
**C-SDUC-C** **NEW**Carbide shank  
with coolant hole **DC** inserts

Right hand tool holder shown.

| Finish                                                                              | Finish                                                                              | Light                                                                               | Light                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| FS                                                                                  | FS-P                                                                                | LS                                                                                  | LS-P                                                                                |
|  |  |  |  |
| (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             |
| Medium                                                                              | Medium                                                                              | Medium                                                                              | Flat Top                                                                            |
| MP                                                                                  | MM                                                                                  | Standard                                                                            |                                                                                     |
|  |  |  |  |
| (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             | (07,11)                                                                             |

| Order Number          | Stock |   | Insert Number                                                                        |                                                                                        | Dimensions (mm) |     |       |      |    |      |      |  |  |        |
|-----------------------|-------|---|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------|-----|-------|------|----|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                       | R     | L |                                                                                      |                                                                                        | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                     |                                                                                     | DMIN   |
|                       |       |   |                                                                                      |                                                                                        |                 |     |       |      |    |      |      |                                                                                     |                                                                                     |        |
| C14-10SDUCR/L07-140-C | ●     | ● | DC  | 0702  | 10              | 140 | 18    | 8.7  | 9  | 7.5° | 3°   | 14                                                                                  | TS25                                                                                | TKY08F |
| C16-12SDUCR/L07-180-C | ●     | ● |                                                                                      | 0702  | 12              | 180 | 23    | 9.7  | 11 | 6.5° | 3°   | 16                                                                                  | TS25                                                                                | TKY08F |
| C20-16SDUCR/L07-180-C | ●     | ● |                                                                                      | 0702  | 16              | 180 | 28    | 11.7 | 15 | 5°   | 3°   | 20                                                                                  | TS25                                                                                | TKY08F |
| C23-16SDUCR/L07-180-C | ●     | ● |                                                                                      | 0702  | 16              | 180 | 28    | 14.5 | 15 | 5°   | 3°   | 23                                                                                  | TS25                                                                                | TKY08F |
| C27-20SDUCR/L11-180-C | ●     | ● |                                                                                      | 11T3  | 20              | 180 | 32    | 16.5 | 19 | 5°   | 3°   | 27                                                                                  | TS4                                                                                 | TKY15F |
| C32-25SDUCR/L11-180-C | ●     | ★ |                                                                                      | 11T3  | 25              | 180 | 38    | 19.0 | 24 | 5°   | 3°   | 32                                                                                  | TS4                                                                                 | TKY15F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

**S-SDUC-C** **NEW**Steel shank  
with coolant hole **DC** inserts

Right hand tool holder shown.

| Finish                                                                                | Finish                                                                                | Light                                                                                 | Light                                                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FS                                                                                    | FS-P                                                                                  | LS                                                                                    | LS-P                                                                                  |
|  |  |  |  |
| (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               |
| Medium                                                                                | Medium                                                                                | Medium                                                                                | Flat Top                                                                              |
| MP                                                                                    | MM                                                                                    | Standard                                                                              |                                                                                       |
|  |  |  |  |
| (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               | (07,11)                                                                               |

| Order Number          | Stock |   | Insert Number |      | Dimensions (mm) |     |       |      |    |      |      |  |  |        |
|-----------------------|-------|---|---------------|------|-----------------|-----|-------|------|----|------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
|                       | R     | L |               |      | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                       |                                                                                       | DMIN   |
|                       |       |   |               |      |                 |     |       |      |    |      |      |                                                                                       |                                                                                       |        |
| S16-12SDUCR/L07-150-C | ●     | ● | DC            | 0702 | 12              | 150 | 21    | 9.7  | 11 | 6.5° | 3°   | 16                                                                                    | TS25                                                                                  | TKY08F |
| S20-16SDUCR/L07-150-C | ●     | ● |               | 0702 | 16              | 150 | 21    | 11.7 | 15 | 5°   | 3°   | 20                                                                                    | TS25                                                                                  | TKY08F |
| S23-16SDUCR/L07-150-C | ●     | ● |               | 0702 | 16              | 150 | 21    | 14.5 | 15 | 5°   | 3°   | 23                                                                                    | TS25                                                                                  | TKY08F |
| S27-20SDUCR/L11-150-C | ●     | ● |               | 11T3 | 20              | 150 | 23    | 16.5 | 19 | 5°   | 3°   | 27                                                                                    | TS4                                                                                   | TKY15F |
| S32-25SDUCR/L11-150-C | ●     | ● |               | 11T3 | 25              | 150 | 24    | 19.0 | 24 | 5°   | 3°   | 32                                                                                    | TS4                                                                                   | TKY15F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

| C-SDQC-C              |       |   | NEW           | Carbide shank<br>with coolant hole | DC $\odot$ inserts |     |       |                               |    |      |      | Finish  |             | Finish  |  | Light    |  | Light    |  |
|-----------------------|-------|---|---------------|------------------------------------|--------------------|-----|-------|-------------------------------|----|------|------|---------|-------------|---------|--|----------|--|----------|--|
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      | FS      |             | FS-P    |  | LS       |  | LS-P     |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      |         |             |         |  |          |  |          |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      | (07,11) |             | (07,11) |  | (07,11)  |  | (07,11)  |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      | Medium  |             | Medium  |  | Medium   |  | Flat Top |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      | MP      |             | MM      |  | Standard |  |          |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      |         |             |         |  |          |  |          |  |
|                       |       |   |               |                                    |                    |     |       |                               |    |      |      | (07,11) |             | (07,11) |  | (07,11)  |  | (07,11)  |  |
|                       |       |   |               |                                    |                    |     |       | Right hand tool holder shown. |    |      |      |         |             |         |  |          |  |          |  |
| Order Number          | Stock |   | Insert Number |                                    | Dimensions (mm)    |     |       |                               |    |      |      |         |             |         |  |          |  |          |  |
|                       | R     | L |               |                                    | DCONMS             | LF  | LDRED | WF                            | H  | GAMF | GAMP | DMIN    | Clamp Screw | Wrench  |  |          |  |          |  |
| C13-10SDQCR/L07-140-C | ●     | ● | DC $\odot$    | 0702 $\odot$                       | 10                 | 140 | 18    | 7.5                           | 9  | 10°  | 0°   | 13      | TS25        | TKY08F  |  |          |  |          |  |
| C16-12SDQCR/L07-140-C | ●     | ● |               | 0702 $\odot$                       | 12                 | 140 | 23    | 9.25                          | 11 | 8°   | 0°   | 16      | TS25        | TKY08F  |  |          |  |          |  |
| C20-16SDQCR/L07-180-C | ●     | ● |               | 0702 $\odot$                       | 16                 | 180 | 28    | 11.3                          | 15 | 6°   | 0°   | 20      | TS25        | TKY08F  |  |          |  |          |  |
| C23-16SDQCR/L07-180-C | ●     | ● |               | 0702 $\odot$                       | 16                 | 180 | 28    | 12.8                          | 15 | 5°   | 0°   | 23      | TS25        | TKY08F  |  |          |  |          |  |
| C25-20SDQCR/L11-180-C | ●     | ● |               | 11T3 $\odot$                       | 20                 | 180 | 32    | 14.4                          | 19 | 5°   | 0°   | 25      | TS4         | TKY15F  |  |          |  |          |  |
| C30-25SDQCR/L11-180-C | ★     | ★ |               | 11T3 $\odot$                       | 25                 | 180 | 38    | 16.9                          | 24 | 4°   | 0°   | 30      | TS4         | TKY15F  |  |          |  |          |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

| S-SDQC-C              |       |   | NEW           | Steel shank<br>with coolant hole | DC $\odot$ inserts | Finish |    | Finish  |      | Light   |      | Light       |        |         |  |                 |  |
|-----------------------|-------|---|---------------|----------------------------------|--------------------|--------|----|---------|------|---------|------|-------------|--------|---------|--|-----------------|--|
|                       |       |   |               |                                  |                    |        |    |         |      | FS      |      | FS-P        |        | LS      |  | LS-P            |  |
|                       |       |   |               |                                  |                    |        |    |         |      |         |      |             |        |         |  |                 |  |
|                       |       |   |               |                                  |                    |        |    |         |      | (07,11) |      | (07,11)     |        | (07,11) |  | (07,11)         |  |
|                       |       |   |               |                                  |                    |        |    |         |      | Medium  |      | Medium      |        | Medium  |  | Flat Top        |  |
|                       |       |   |               |                                  |                    |        |    | MP      |      | MM      |      | Standard    |        |         |  |                 |  |
|                       |       |   |               |                                  |                    |        |    |         |      |         |      |             |        |         |  |                 |  |
|                       |       |   |               |                                  |                    |        |    | (07,11) |      | (07,11) |      | (07,11)     |        | (07,11) |  |                 |  |
|                       |       |   |               | Right hand tool holder shown.    |                    |        |    |         |      |         |      |             |        |         |  |                 |  |
| Order Number          | Stock |   | Insert Number |                                  |                    |        |    |         |      |         |      |             |        |         |  | Dimensions (mm) |  |
|                       | R     | L |               | DCONMS                           | LF                 | LDRED  | WF | H       | GAMF | GAMP    | DMIN | Clamp Screw | Wrench |         |  |                 |  |
| S16-12SDQCR/L07-090-C | ●     | ● | DC $\odot$    | 0702 $\odot$                     | 12                 | 90     | 22 | 9.25    | 11   | 8°      | 0°   | 16          | TS25   | TKY08F  |  |                 |  |
| S20-16SDQCR/L07-150-C | ●     | ● |               | 0702 $\odot$                     | 16                 | 150    | 25 | 11.3    | 15   | 6°      | 0°   | 20          | TS25   | TKY08F  |  |                 |  |
| S23-16SDQCR/L07-150-C | ●     | ● |               | 0702 $\odot$                     | 16                 | 150    | 25 | 12.8    | 15   | 5°      | 0°   | 23          | TS25   | TKY08F  |  |                 |  |
| S25-20SDQCR/L11-150-C | ●     | ● |               | 11T3 $\odot$                     | 20                 | 150    | 31 | 14.4    | 19   | 5°      | 0°   | 25          | TS4    | TKY15F  |  |                 |  |
| S30-25SDQCR/L11-150-C | ●     | ● |               | 11T3 $\odot$                     | 25                 | 150    | 38 | 16.9    | 24   | 4°      | 0°   | 30          | TS4    | TKY15F  |  |                 |  |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

## BORING BARS

## C-SWUC

NEW

Carbide shank  
without coolant holeWC $\circ\circ$ inserts

Finish

FV



PCBN/PCD



(L3)

Right hand tool holder shown.

| Order Number        | Stock |   | Insert Number                                                                        | Dimensions (mm)                                                                        |    |       |    |     |      |      |      |  | *      |  |
|---------------------|-------|---|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----|-------|----|-----|------|------|------|-------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------|
|                     | R     | L |                                                                                      | DCONMS                                                                                 | LF | LDRED | WF | H   | GAMF | GAMP | DMIN | Clamp Screw                                                                         | Wrench |                                                                                     |
|                     |       |   |                                                                                      |                                                                                        |    |       |    |     |      |      |      |                                                                                     |        |                                                                                     |
| C06-05SWUCR/L02-080 | ●     | ● | WC  | 0201  | 5  | 80    | 9  | 3.0 | 4.7  | 17°  | 0°   | 6                                                                                   | TS21   | TKY06F                                                                              |
| C08-07SWUCR/LL3-090 | ●     | ● |                                                                                      | L302  | 7  | 90    | 10 | 4.0 | 6.7  | 15°  | 0°   | 8                                                                                   | TS2    | TKY06F                                                                              |

\* Clamp Torque (N · m) : TS21=0.6, TS2=0.6

## C-SWUC-C

NEW

Carbide shank  
with coolant holeWC $\circ\circ$ inserts

Finish

FV



Medium

MP



(04,06)

Right hand tool holder shown.

| Order Number          | Stock |   | Insert Number |      | Dimensions (mm) |     |       |      |    |      |      |  | *<br> |        |
|-----------------------|-------|---|---------------|------|-----------------|-----|-------|------|----|------|------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
|                       | R     | L |               |      | DCONMS          | LF  | LDRED | WF   | H  | GAMF | GAMP |                                                                                       |                                                                                            | DMIN   |
|                       |       |   |               |      |                 |     |       |      |    |      |      | Clamp Screw                                                                           | Wrench                                                                                     |        |
| C10-08SWUCR/L04-090-C | ●     | ● | WC            | 0402 | 8               | 90  | 14    | 5.0  | 7  | 15°  | 0°   | 10                                                                                    | TS25                                                                                       | TKY08F |
| C12-10SWUCR/L04-090-C | ●     | ● |               | 0402 | 10              | 90  | 18    | 6.0  | 9  | 12°  | 0°   | 12                                                                                    | TS25                                                                                       | TKY08F |
| C14-12SWUCR/L04-140-C | ●     | ● |               | 0402 | 12              | 140 | 23    | 7.0  | 11 | 10°  | 0°   | 14                                                                                    | TS25                                                                                       | TKY08F |
| C16-12SWUCR/L06-140-C | ●     | ● |               | 06T3 | 12              | 140 | 23    | 8.0  | 11 | 12°  | 0°   | 16                                                                                    | TS4                                                                                        | TKY15F |
| C18-16SWUCR/L06-140-C | ●     | ● |               | 06T3 | 16              | 140 | 28    | 9.0  | 15 | 10°  | 0°   | 18                                                                                    | TS4                                                                                        | TKY15F |
| C22-20SWUCR/L06-180-C | ●     | ● |               | 06T3 | 20              | 180 | 32    | 11.0 | 19 | 7°   | 0°   | 22                                                                                    | TS4                                                                                        | TKY15F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

## S-SWUC-C

NEW

Steel shank  
with coolant holeWC $\circ\circ$ inserts

Finish

FV



Medium

MP



(04,06)

Right hand tool holder shown.

| Order Number          | Stock |   | Insert Number | Dimensions (mm) |    |       |    |      |      |      |      |  | *<br> |        |
|-----------------------|-------|---|---------------|-----------------|----|-------|----|------|------|------|------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
|                       | R     | L |               | DCONMS          | LF | LDRED | WF | H    | GAMF | GAMP | DMIN |                                                                                       |                                                                                            |        |
|                       |       |   |               |                 |    |       |    |      |      |      |      | Clamp Screw                                                                           | Wrench                                                                                     |        |
| S14-12SWUCR/L04-090-C | ●     | ● | WC            | 0402            | 12 | 90    | 24 | 7.0  | 11   | 10°  | 0°   | 14                                                                                    | TS25                                                                                       | TKY08F |
| S16-12SWUCR/L06-090-C | ●     | ● |               | 06T3            | 12 | 90    | 24 | 8.0  | 11   | 12°  | 0°   | 16                                                                                    | TS4                                                                                        | TKY15F |
| S18-16SWUCR/L06-090-C | ●     | ● |               | 06T3            | 16 | 90    | 30 | 9.0  | 15   | 10°  | 0°   | 18                                                                                    | TS4                                                                                        | TKY15F |
| S22-20SWUCR/L06-150-C | ●     | ● |               | 06T3            | 20 | 150   | 36 | 11.0 | 19   | 7°   | 0°   | 22                                                                                    | TS4                                                                                        | TKY15F |

\* Clamp Torque (N · m) : TS25=1.0, TS4=3.5

● : Inventory maintained.

WC $\circ\circ$  type inserts

&gt; A184

SPARE PARTS

&gt; N001

PCBN &amp; PCD inserts

&gt; B058

TECHNICAL DATA

&gt; P001



## RECOMMENDED CUTTING CONDITIONS

|   | Material                                                                                                             | Properties                  | Cutting Mode | Chipbreaker | Grade  | Cutting Speed<br>V <sub>c</sub> (m/min) | Feed<br>f (mm/rev) | Depth of Cut<br>a <sub>p</sub> (mm) |
|---|----------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------|-------------|--------|-----------------------------------------|--------------------|-------------------------------------|
| P | Pure Iron<br>Free Cutting Steel                                                                                      | —                           | Finish       | R/L-F       | MS6015 | 150 (50–250)                            | 0.01–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS6015 | 150 (50–250)                            | 0.01–0.15          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Light        | R/L-SS      | MS6015 | 150 (50–250)                            | 0.01–0.15          | 0.2–0.8                             |
|   |                                                                                                                      |                             | Medium       | R/L-SN      | MS6015 | 150 (50–250)                            | 0.01–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Medium       | SMG         | MS6015 | 150 (50–250)                            | 0.01–0.15          | 0.1–1.5                             |
|   | Carbon Steel<br>Alloy Steel                                                                                          | Hardness<br>180–280HB       | Finish       | R/L-F       | MS6015 | 100 (50–150)                            | 0.01–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS6015 | 100 (50–150)                            | 0.01–0.15          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Light        | R/L-SS      | MS6015 | 100 (50–150)                            | 0.01–0.15          | 0.2–0.8                             |
|   |                                                                                                                      |                             | Medium       | R/L-SN      | MS6015 | 100 (50–150)                            | 0.01–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Medium       | SMG         | MS6015 | 100 (50–150)                            | 0.01–0.15          | 0.1–1.5                             |
| M | Austenitic<br>Stainless Steel                                                                                        | —                           | Finish       | FS-P        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.2–0.5                             |
|   |                                                                                                                      |                             | Finish       | FS-P        | MS9025 | 100 (60–150)                            | 0.04–0.15          | 0.2–0.5                             |
|   |                                                                                                                      |                             | Finish       | R/L-F       | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS9025 | 100 (60–150)                            | 0.04–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS9025 | 100 (60–150)                            | 0.05–0.15          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.1–3.8                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS9025 | 100 (60–150)                            | 0.05–0.15          | 0.1–3.8                             |
|   | Ferritic and Martensitic<br>Stainless Steel                                                                          | —                           | Finish       | FS-P        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.2–0.5                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Light        | R-SN        | MS7025 | 60 (40–100)                             | 0.01–0.08          | 0.1–3.8                             |
|   | Soft magnetic stainless steel<br>(X105CrMo17 / 1.4125,<br>X42Cr13 / 1.2083, etc.)                                    | Hardness<br>230HBW          | Finish       | FS-P        | MS7025 | 80 (40–160)                             | 0.02–0.08          | 0.2–1.4                             |
|   |                                                                                                                      |                             | Finish       | FS-P        | MS9025 | 100 (50–180)                            | 0.04–0.12          | 0.2–1.4                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS7025 | 80 (40–160)                             | 0.03–0.08          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS9025 | 100 (50–180)                            | 0.05–0.12          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS7025 | 80 (40–160)                             | 0.02–0.10          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS9025 | 100 (50–180)                            | 0.04–0.15          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS7025 | 80 (40–160)                             | 0.01–0.10          | 0.1–3.8                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS9025 | 100 (50–180)                            | 0.01–0.10          | 0.1–3.8                             |
|   | Precipitation hardened<br>stainless steel<br>(17-4PH / 1.4542,<br>17-7PH / X7CrNi-A117-7 /<br>X5CrNi-CuNb17-4, etc.) | Hardness<br><450HB          | Finish       | FS-P        | MS7025 | 60 (40–80)                              | 0.01–0.10          | 0.1–1.0                             |
|   |                                                                                                                      |                             | Finish       | FS-P        | MS9025 | 70 (50–100)                             | 0.03–0.15          | 0.1–1.0                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS7025 | 60 (40–80)                              | 0.01–0.10          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS9025 | 70 (50–100)                             | 0.03–0.15          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS7025 | 60 (40–80)                              | 0.04–0.10          | 0.2–2.2                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS9025 | 70 (50–100)                             | 0.04–0.15          | 0.2–2.2                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS7025 | 60 (40–80)                              | 0.03–0.10          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS9025 | 70 (50–100)                             | 0.04–0.15          | 0.2–2.2                             |
| K | Grey Cast Iron                                                                                                       | Tensile Strength<br>≤350MPa | Finish       | Flat Top    | MC5115 | 225 (150–300)                           | 0.04–0.15          | 0.1–0.5                             |
|   |                                                                                                                      |                             | Finish       | Flat Top    | HTi10  | 100 (50–150)                            | 0.04–0.15          | 0.1–0.5                             |
|   |                                                                                                                      |                             | Light        | Flat Top    | MC5115 | 225 (150–300)                           | 0.04–0.15          | 0.2–1.0                             |
|   |                                                                                                                      |                             | Light        | Flat Top    | HTi10  | 100 (50–150)                            | 0.04–0.15          | 0.2–1.0                             |
|   |                                                                                                                      |                             | Medium       | Flat Top    | MC5115 | 225 (150–300)                           | 0.04–0.15          | 0.1–2.0                             |
|   |                                                                                                                      |                             | Medium       | Flat Top    | HTi10  | 100 (50–150)                            | 0.04–0.15          | 0.1–2.0                             |
| S | Heat resistant alloy<br>(Heat resistant stainless steel,<br>etc.)                                                    | —                           | Finish       | FS-P        | MS9025 | 80 (40–140)                             | 0.04–0.12          | 0.2–1.0                             |
|   |                                                                                                                      |                             | Finish       | R-SRF       | MS9025 | 80 (40–140)                             | 0.05–0.12          | 0.1–0.4                             |
|   |                                                                                                                      |                             | Light        | LS-P        | MS9025 | 80 (40–140)                             | 0.04–0.15          | 0.3–2.2                             |
|   |                                                                                                                      |                             | Medium       | R-SN        | MS9025 | 80 (40–140)                             | 0.01–0.10          | 0.1–3.8                             |

Note 1) If chatter or vibrations occur, adjust the cutting conditions accordingly.

Note 2) If the tool overhang amount is L/D = 5 or more for a carbide shank or L/D = 3 or more for a steel shank, please reduce the cutting speed by 10% to 20%.

Note 3) Regarding the feed rate and depth of cut for breakers not listed in the table, please refer to page A056 of for 7° positive and page A064 for 11° positive types. For cutting speed, please refer to the grade introduction page A030.

E

BORING BARS



# HOW TO READ THE STANDARD OF GROOVING AND CUTTING OFF

## ●How this section page is organised

- ① Classified according to external or internal applications.
- ② Sub-classified according to product series.  
(Refer to the index on the next page.)

### FIGURE SHOWING THE TOOLING APPLICATION

Uses illustrations and arrows to depict available machining applications such as cutting off, grooving, and copying.

### INDICATION OF HOLDER TYPE ACCORDING TO APPLICATION

Indicates the holder types, such as the 00° type or the 90° type, according to machining application.

### TITLE OF PRODUCT

### PRODUCT SECTION

### INDICATION OF EXTERNAL/ FACE/INTERNAL APPLICATION

### GEOMETRY

### SPARE PARTS FOR HOLDER

# GROOVING / CUTTING OFF

## GY SERIES (EXTERNAL)

### 1 00° type holder

Note ① For modular blades and modular holders, please order separately.  
 Note ② Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.

# TURNING TOOLS

## GROOVING AND CUTTING OFF

CLASSIFICATION (EXTERNAL)..... F002

CLASSIFICATION (INTERNAL)..... F003

### STANDARD OF GROOVING AND CUTTING OFF TOOLS

#### EXTERNAL

FEATURES OF THE GY SERIES ..... F004

GY SERIES ORDER NUMBER..... F008

GY SERIES INSERTS ..... F011

GY SERIES REFERENCE MATERIAL ..... F016

GY SERIES..... F018

GW SERIES..... F118

GW SERIES ORDER NUMBER..... F121

MG HOLDER..... F132

#### INTERNAL

GY SERIES..... F086

MICRO-MINI TWIN..... F134

\*Arranged by Alphabetical order

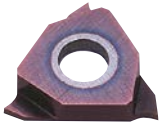
F134 CG  
F122 GWS  
F124 GWB  
F125 GWTB  
F126 GW1  
F011 GY  
F132 MGH  
F133 MGT  
F137 RBH  
F138 SBH  
F136 SLV



F001

# CLASSIFICATION

## EXTERNAL CUTTING

| Name of Tool Holder                                                                                                                                                                                    | Insert Shape                                                                                                                                                                                                | Features                                                                                                                                                                                                                                         | Groove Width According to Cutting Mode (mm)                                                                                     |                                                                                                                                 |                                                                                                                                 |                                                                     |                                                                     |                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                        |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                  | Shallow Grooving                                                                                                                | Deep Grooving                                                                                                                   | Cutting Off                                                                                                                     | Copying                                                             | Recessing                                                           | Face Grooving                                                                                                |
| <b>GY Series</b><br><br><br>F018     |                                                                                                                                                                                                             | Modular blade type<br>● Clamp-on type.<br>● The modular blade allows for high rigidity and accuracy. (Triforce System)<br>● Various insert types.<br>Monoblock type<br>● Spring clamp type.<br>● Maximum cut off diameter 50mm.                  | 1.2<br>1.5<br>2<br>2.24<br>2.39<br>2.5<br>2.74<br>3<br>3.18<br>3.24<br>4<br>4.24<br>4.75<br>5<br>5.24<br>6<br>6.31<br>6.35<br>8 | 1.2<br>1.5<br>2<br>2.24<br>2.39<br>2.5<br>2.74<br>3<br>3.18<br>3.24<br>4<br>4.24<br>4.75<br>5<br>5.24<br>6<br>6.31<br>6.35<br>8 | 1.2<br>1.5<br>2<br>2.24<br>2.39<br>2.5<br>2.74<br>3<br>3.18<br>3.24<br>4<br>4.24<br>4.75<br>5<br>5.24<br>6<br>6.31<br>6.35<br>8 | 2<br><br><br><br><br>2.5<br>3<br>3.18<br><br>4<br><br><br>6<br>6.35 | 2<br><br><br><br><br>2.5<br>3<br>3.18<br><br>4<br><br><br>6<br>6.35 | 2<br>2.24<br>2.39<br>2.5<br>2.74<br>3<br>3.18<br>3.24<br>4<br>4.24<br>4.75<br>5<br>5.24<br>6<br>6.31<br>6.35 |
| <b>GW Series</b><br><br><br>F122   |                                                                                                                                                                                                             | ● Spring clamp type.<br>● Simple insert clamping method.<br>● Possible to use the blade with both external or through coolant.<br>● Chipbreaker system offering excellent chip disposal properties.<br>● Maximum cut off diameter : 120mm.       | 2.0<br>3.0<br>4.0<br>5.0                                                                                                        | 2.0<br>3.0<br>4.0<br>5.0                                                                                                        | 2.0<br>3.0<br>4.0<br>5.0                                                                                                        |                                                                     |                                                                     |                                                                                                              |
| <b>MG Holder</b><br><br><br>F132 |                                                                                                                                                                                                             | ● Clamp-on type.<br>● Precision class insert.<br>● Positive insert suffers from negligible chattering and thus produces a good finished surface.                                                                                                 | 1.25<br>—<br>6                                                                                                                  |                                                                                                                                 |                                                                                                                                 |                                                                     |                                                                     |                                                                                                              |
| SMALL TOOLS                                                                                                                                                                                            | <b>GTAH GTBH GTCH</b><br><br><br>D018 | ● For gang type tool posts.<br>● Small Shank : 8 mm—16 mm<br>● Possible to control the back clamping.<br>● High rigidity due to design of vertical insert.<br>● Economical due to the design of three-corner inserts.                            | 0.3<br>—<br>3.0                                                                                                                 |                                                                                                                                 |                                                                                                                                 |                                                                     |                                                                     |                                                                                                              |
|                                                                                                                                                                                                        | <b>CTAH</b><br><br><br>D020           | ● For gang type tool posts.<br>● Small Shank : 8 mm—16 mm<br>● Due to the design of handed tool holders, able to minimize accumulation of workpieces.<br>● High rigidity due to design of vertical insert.<br>● Maximum cut off diameter : 12 mm | 0.7<br>1.0<br>1.5<br>2.0                                                                                                        | 0.7<br>1.0<br>1.5<br>2.0                                                                                                        | 0.7<br>1.0<br>1.5<br>2.0                                                                                                        |                                                                     |                                                                     |                                                                                                              |
|                                                                                                                                                                                                        | <b>CTBH</b><br><br><br>D015           | ● For gang type tool posts.<br>● Small Shank : 10 mm—16 mm<br>● Single holder for inserts for back turning and cutting off.<br>● High rigidity due to design of vertical insert.<br>● Maximum cut off diameter: 16 mm                            | 1.5<br>2.0                                                                                                                      | 1.5<br>2.0                                                                                                                      | 1.5<br>2.0                                                                                                                      |                                                                     |                                                                     |                                                                                                              |

## INTERNAL CUTTING

| Name of Tool Holder                                                                                                                                                                                      | Insert Shape                                                                      | Features                                                                                                                                                                                                                                                                                                 | Min. Cutting Diameter<br>(mm) | Groove Width<br>(mm) | Max. Groove Depth<br>(mm) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------|---------------------------|
| <b>MICRO-MINI TWIN CG TYPE</b><br><br> | —                                                                                 | <ul style="list-style-type: none"> <li>● Solid carbide type.</li> <li>● Economical due to single holder with two cutting edges.</li> </ul>                                                                                                                                                               | 3.0                           | 1.0<br>—<br>2.0      | 1.0<br>—<br>2.0           |
| <b>GY Series</b><br><br>               |  | Modular blade type<br><ul style="list-style-type: none"> <li>● Clamp-on type.</li> <li>● The modular blade allows for high rigidity and accuracy. (Triforce System)</li> <li>● Various insert types.</li> </ul> Monoblock type<br><ul style="list-style-type: none"> <li>● Spring clamp type.</li> </ul> | 25                            | 2<br>—<br>6.35       | 4<br>—<br>13              |

## GY SERIES

**A wide selection of holders and inserts available for a diverse range of grooving and cutting off applications**

### External • Face holders

Corresponding blades to a variety of modular holders with different shank sizes.



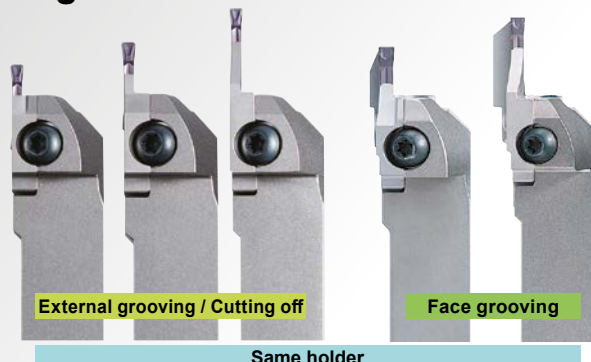
**Monoblock type**



**Modular type**

GROOVING / CUTTING OFF

Various depths of groove possible with a single tool, by using different modular blades.



Various sizes of face grooves from a wide array of modular blades.



### Internal holders

A wide range of holders available from minimum diameter of 25 mm.

**Monoblock type**  
Min. cutting diameter  
Ø25, Ø32



**Modular type**  
Min. cutting diameter  
Ø40, Ø50,  
Ø60, Ø70



Short shank types are stock standard.

**Monoblock type**

**Modular type**



Short Standard

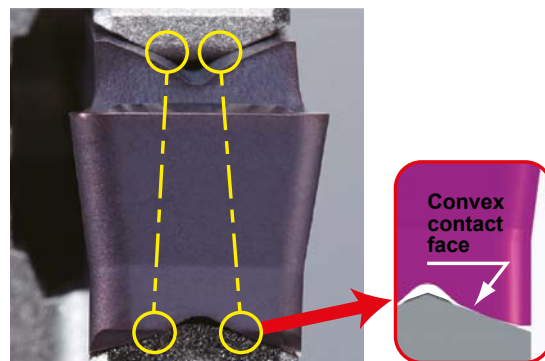
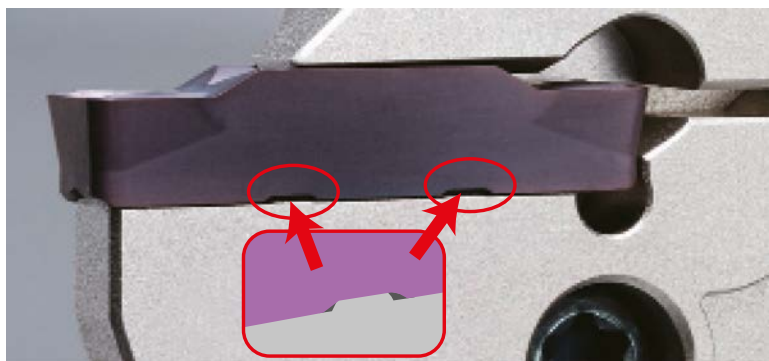
Short Standard

# Original insert design leading the way to new grooving and cutting off applications

Highly reliable insert clamping

Safety keys prevent insert movement.

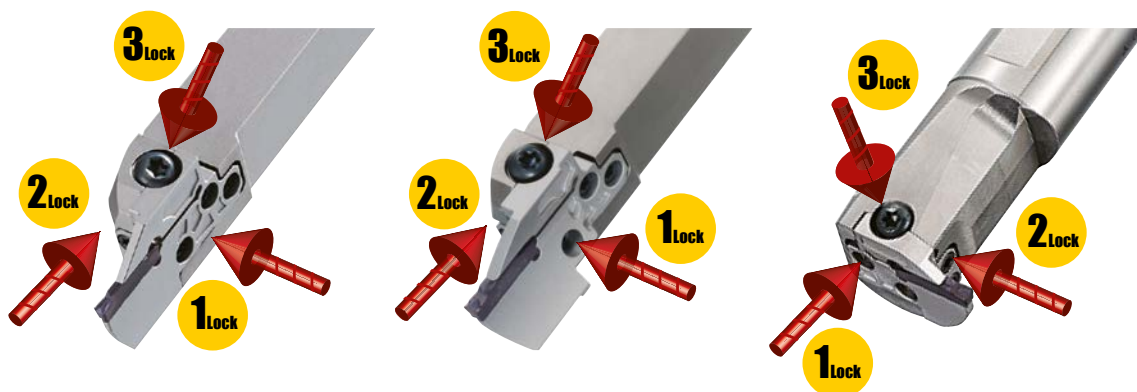
The convex geometry ensures high precision clamping.



## TRIFORCE System for increased stability and performance!

### TRIFORCE System

The TRIFORCE system ensures the blade is securely fixed in 3 directions (side, front and top), giving high rigidity for a stable grooving and cutting performance.



### A WIDE SELECTION OF INSERTS

- Selection of groove widths



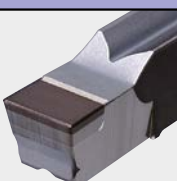
- Different corner radii available

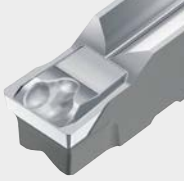




## INSERT

### ● Chipbreaker system

| Grooving                                                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| <b>GU</b> Chipbreaker<br>(For Gummy Steel)                                        | <b>GS</b> Chipbreaker<br>(Low feeds)                                              | <b>GM</b> Chipbreaker<br>(Medium feeds)                                           | <b>GFGS</b><br>(For hardened steel)                                               | <b>GL</b> Chipbreaker<br>(For Aluminium Alloy)                                      |

| For Multifunctional Grooving                                                      |                                                                                   |                                                                                   | Copying/For recessing                                                             |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  |  |  |  |
| <b>MF</b> Chipbreaker<br>(G class)                                                | <b>MS</b> Chipbreaker<br>(Low feeds)                                              | <b>MM</b> Chipbreaker<br>(Medium feeds)                                           | <b>BM</b> Chipbreaker                                                             |

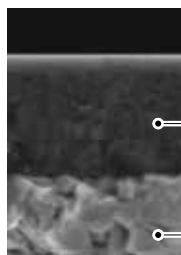
| Cutting Off                                                                        |                                                                                    |                                                                                    |                                                                                    |                                                                                     |                                                                                      |                                                                                      |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |
| <b>GU</b> Chipbreaker<br>(For Gummy Steel)                                         | <b>GS</b> Chipbreaker<br>(Low feeds)                                               | <b>GM</b> Chipbreaker<br>(Medium feeds)                                            | <b>R/L05-GM</b><br>Chipbreaker<br>(Medium feeds)                                   | <b>R08-GS</b><br>Chipbreaker<br>(Low feeds)                                         | <b>R15-GS</b><br>Chipbreaker<br>(Low feeds)                                          | <b>GL</b> Chipbreaker<br>(For Aluminium Alloy)                                       |

## INSERT GRADE

| Machining Condition                                                                                                                                                                                                     | Material | P<br>Steel    | M<br>Stainless Steel | K<br>Cast Iron | N<br>Aluminium Alloy | S<br>Heat resistant Alloy / Titanium Alloy | H<br>Hardened Steel |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|----------------------|----------------|----------------------|--------------------------------------------|---------------------|
|                                                                                                                                                                                                                         |          |               |                      |                |                      |                                            |                     |
| Stable<br><br>Machining Condition<br><br>Unstable |          | <b>NX2525</b> |                      |                |                      |                                            | <b>BC8110</b>       |
|                                                                                                                                                                                                                         |          | <b>MY5015</b> |                      | <b>MY5015</b>  | <b>RT9010</b>        | <b>MP9015</b>                              |                     |
|                                                                                                                                                                                                                         |          | <b>VP10RT</b> | <b>VP10RT</b>        | <b>VP10RT</b>  |                      | <b>RT9010</b>                              |                     |
|                                                                                                                                                                                                                         |          | <b>VP20RT</b> | <b>VP20RT</b>        | <b>VP20RT</b>  |                      | <b>MP9025</b>                              |                     |



## MP9000 Series



- The high Al-rich (Al, Ti)N single layer coating provides stabilization of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.

High Al-rich (Al, Ti)N Single Layer Coating

Special Cemented Carbide Substrate

## MY5015

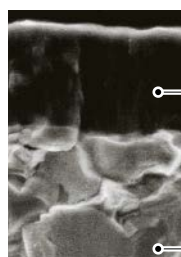


- MY5015 is a CVD coated grade with excellent wear resistance even at high temperatures. It provides longer tool life when machining cast and ductile cast irons. Also suitable for high speed continuous cutting of steels.

CVD Coated Carbide

Carbide substrate

## VP20RT (1st Recommendation)



- PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

MIRACLE Coating

Carbide substrate (90.5HRA)

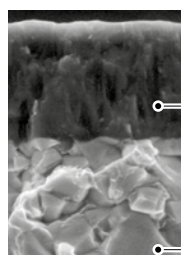
## RT9010

- First recommended grade for titanium alloys. It is recommended for use on non-ferrous alloys.

## NX2525

- NX2525, a cermet grade for finish machining of steels and for good surface finishes at lower cutting speeds.

## VP10RT (2nd Recommendation)



- PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

MIRACLE Coating

Carbide substrate (HRA92.0)

## BC8110

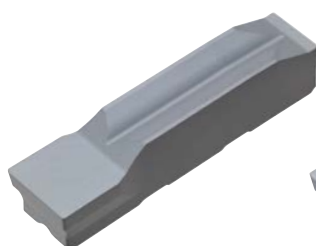
- A coated PCBN grade for continuous cutting, which provides longer life when machining hardened steel.

F

GROOVING / CUTTING OFF

## BLANK INSERTS

- Blank inserts for custom grinding



1 Edge Type



2 Edge Type

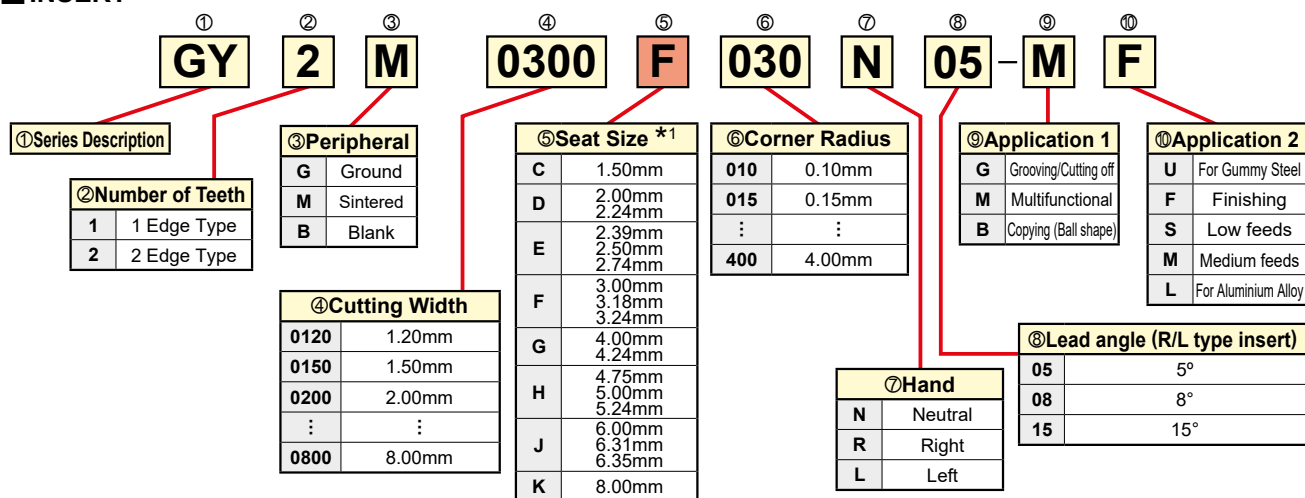
## RT9010/RT9020 for blank insert

- First recommendation for blanks inserts is RT9020 due to the tougher carbide substrate that is suitable for a wider range of applications. RT9010 has a harder substrate than RT9020 and is ideal for longer tool life on stable cutting applications. Both grades are recommended to have a coating applied that is suitable for the required application.

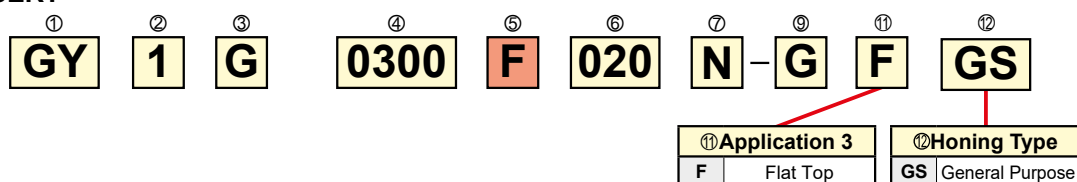
\* Blank inserts to be ground by customers.

# GY SERIES ORDER NUMBER

## ■ INSERT



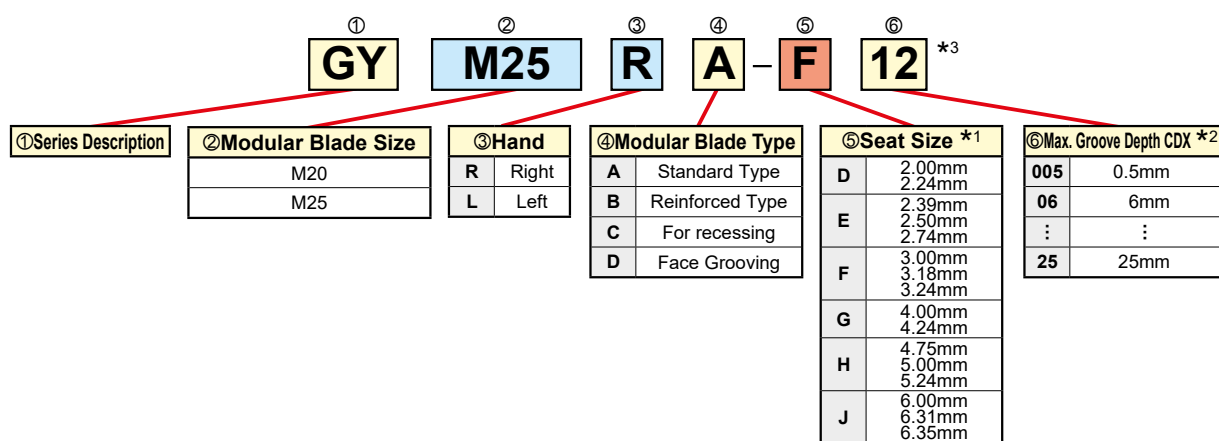
## ■ PCBN INSERT



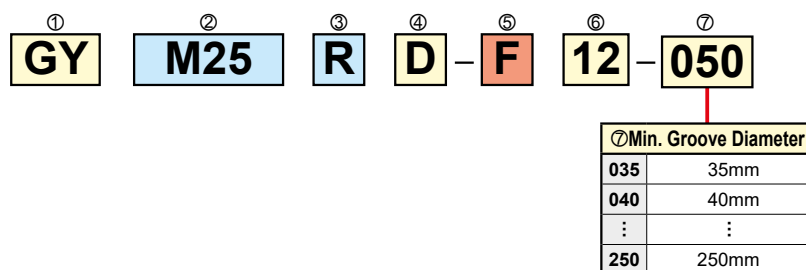
\*1 Select a seat size with the same symbol as that of modular blade and monoblock holder.

## ■ MODULAR BLADE

### ● EXTERNAL/INTERNAL/FOR RECESSING



### ● FACE GROOVING



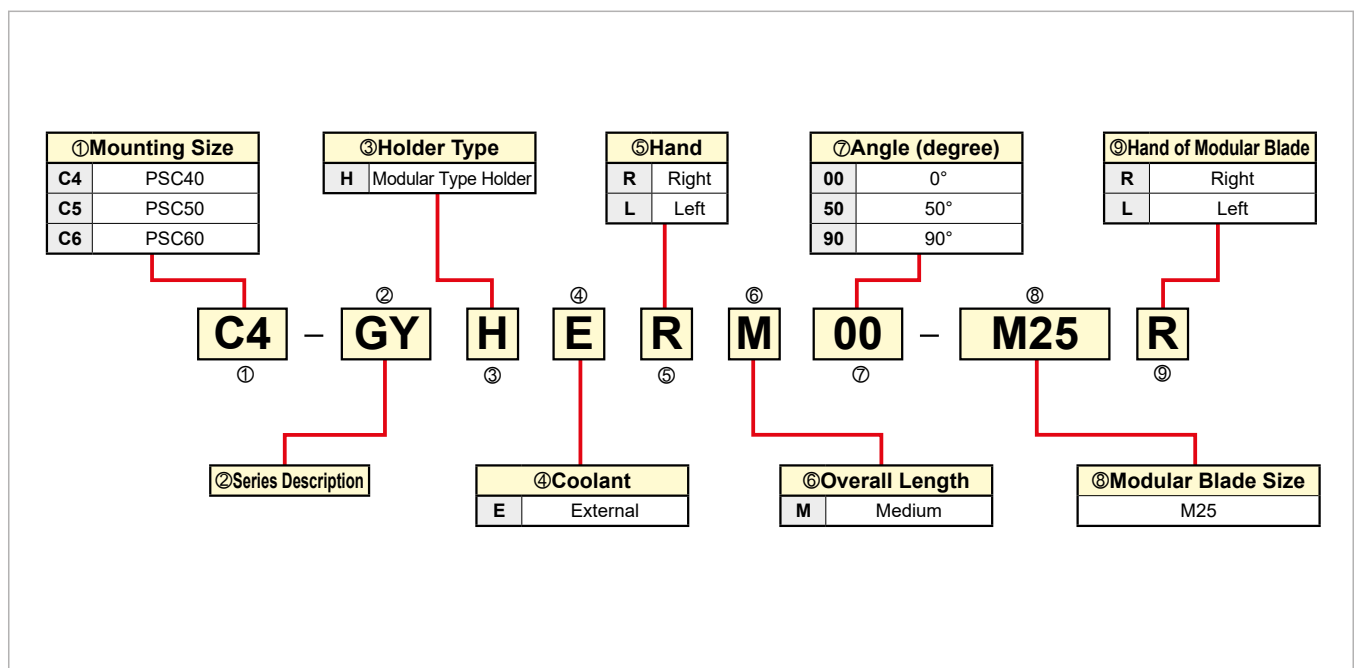
\*1 Select a seat size with the same symbol as that of the insert.

\*2 The maximum groove depth is a value when used for external grooving and changes according to the insert used. For internal grooving, refer to the maximum groove depth on pages F086—F092.

\*3 GYM20R/LA-○10, GYM20R/LA-○12, GYM25R/LA-○12 and GYM25R/LA-○14 can be used for both external and internal grooving.

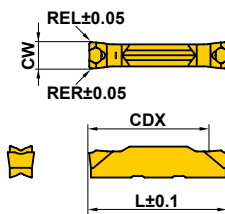
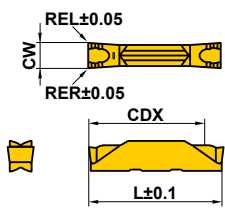
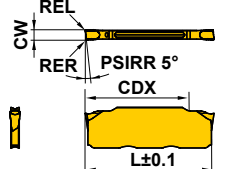
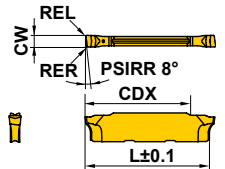
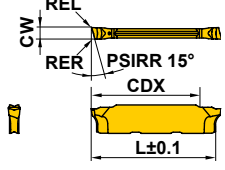


# PSC HOLDER ORDER NUMBER



# GY SERIES INSERTS

## INSERTS

| Applications               | Geometry                                                                                                                                      | Order Number                                                                                                                                  | Stock              |        |        |        |        |        |         |        | Seat Size | Dimensions (mm) |               |       |          |       |           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|--------|--------|--------|--------|---------|--------|-----------|-----------------|---------------|-------|----------|-------|-----------|
|                            |                                                                                                                                               |                                                                                                                                               | Coated             |        |        |        | Cermet |        | Carbide |        |           | CW              |               | RER/L | CDX      | *2    |           |
|                            |                                                                                                                                               |                                                                                                                                               | MP9015             | MP9025 | VP10RT | VP20RT | MY5015 | NX2525 |         | RT9010 |           | RT9020          | Cutting Width |       |          |       | Tolerance |
| For Grooving / Cutting Off | <b>GU Chipbreaker</b><br>(For gummy steel)<br>               | GY2M0200D020N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | D         | 2.00            | ±0.03         | 0.2   | 19.7     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0239E020N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | E         | 2.39            | ±0.03         | 0.2   | 19.8     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0250E020N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | E         | 2.50            | ±0.03         | 0.2   | 19.5     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0300F030N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | F         | 3.00            | ±0.03         | 0.3   | 19.3     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0318F030N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | F         | 3.18            | ±0.03         | 0.3   | 19.3     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0400G030N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | G         | 4.00            | ±0.04         | 0.3   | 24.2     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0475H040N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | H         | 4.75            | ±0.04         | 0.4   | 24.2     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0500H040N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | H         | 5.00            | ±0.04         | 0.4   | 24.2     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0600J040N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | J         | 6.00            | ±0.04         | 0.4   | 24.2     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0635J040N-GU                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | J         | 6.35            | ±0.04         | 0.4   | 24.2     | 25.65 |           |
| For Grooving / Cutting Off | <b>GS Chipbreaker</b><br>(Low feeds)<br>                    | <b>NEW</b> GY2M0120B010N-GS                                                                                                                   |                    |        | ●      | ●      |        |        |         |        | B         | 1.20            | ±0.03         | 0.1   | 12.2     | 14.70 |           |
|                            |                                                                                                                                               | GY2M0150C010N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | C         | 1.50            | ±0.03         | 0.1   | 13.4     | 14.70 |           |
|                            |                                                                                                                                               | GY2M0200D020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | D         | 2.00            | ±0.03         | 0.2   | 18.7     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0239E020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | E         | 2.39            | ±0.03         | 0.2   | 18.5     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0250E020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | E         | 2.50            | ±0.03         | 0.2   | 18.5     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0300F020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | F         | 3.00            | ±0.03         | 0.2   | 18.5     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0318F020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | F         | 3.18            | ±0.03         | 0.2   | 18.5     | 20.70 |           |
|                            |                                                                                                                                               | GY2M0400G020N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | G         | 4.00            | ±0.04         | 0.2   | 23.9     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0475H030N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | H         | 4.75            | ±0.04         | 0.3   | 23.9     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0500H030N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | H         | 5.00            | ±0.04         | 0.3   | 24.0     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0600J030N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | J         | 6.00            | ±0.04         | 0.3   | 24.1     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0635J030N-GS                                                                                                                              |                    |        | ●      | ●      | ●      |        |         |        | J         | 6.35            | ±0.04         | 0.3   | 24.1     | 25.65 |           |
|                            |                                                                                                                                               | GY2M0800K030N-GS                                                                                                                              |                    |        | ●      | ●      |        |        |         |        | K         | 8.00            | ±0.04         | 0.3   | 29.1     | 30.50 |           |
| For Cutting off            | <b>R05-GS Chipbreaker</b><br>(Low feeds)<br><b>NEW</b><br> | GY2M0120B010R05-GS                                                                                                                            |                    |        | ★      | ★      |        |        |         |        | B         | 1.20            | ±0.03         | 0.1   | 12.22    | 14.70 |           |
|                            |                                                                                                                                               | <b>R08-GS Chipbreaker</b><br>(Low feeds)<br><b>NEW</b><br> | GY2G0150C010R08-GS |        |        | ●      | ●      |        |         |        |           | C               | 1.50          | ±0.02 | 0.1      | 13.17 | 15.20     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0200D020R08-GS |        |        | ●      | ●      |        |         |        |           | D               | 2.00          | ±0.03 | 0.2      | 18.85 | 21.30     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0250E020R08-GS |        |        | ●      | ●      |        |         |        |           | E               | 2.50          | ±0.03 | 0.2      | 19.04 | 21.50     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0300F020R08-GS |        |        | ●      | ●      |        |         |        |           | F               | 3.00          | ±0.03 | 0.2      | 18.62 | 21.50     |
|                            |                                                                                                                                               | <b>R15-GS Chipbreaker</b><br>(Low feeds)<br><b>NEW</b><br> | GY2G0150C003R15-GS |        |        | ●      | ●      |        |         |        |           | C               | 1.50          | ±0.02 | 0.1/0.03 | 13.17 | 15.20     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0150C010R15-GS |        |        | ●      | ●      |        |         |        |           | C               | 1.50          | ±0.02 | 0.1      | 13.17 | 15.20     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0200D003R15-GS |        |        | ●      | ●      |        |         |        |           | D               | 2.00          | ±0.03 | 0.1/0.03 | 18.85 | 21.30     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0200D010R15-GS |        |        | ●      | ●      |        |         |        |           | D               | 2.00          | ±0.03 | 0.1      | 18.85 | 21.30     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0250E003R15-GS |        |        | ●      | ●      |        |         |        |           | E               | 2.50          | ±0.03 | 0.1/0.03 | 19.04 | 21.50     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0250E020R15-GS |        |        | ●      | ●      |        |         |        |           | E               | 2.50          | ±0.03 | 0.1/0.2  | 19.04 | 21.50     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0300F003R15-GS |        |        | ●      | ●      |        |         |        |           | F               | 3.00          | ±0.03 | 0.1/0.03 | 18.62 | 21.50     |
|                            |                                                                                                                                               |                                                                                                                                               | GY2G0300F020R15-GS |        |        | ●      | ●      |        |         |        |           | F               | 3.00          | ±0.03 | 0.1/0.2  | 18.62 | 21.50     |

\*2 The dimension depends on the chipbreaker. Refer to the F017 "L dimension tolerance conversion table".

GROOVING / CUTTING OFF

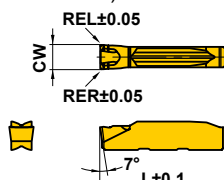
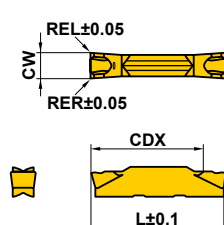
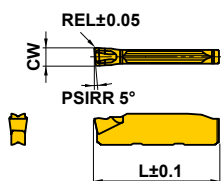
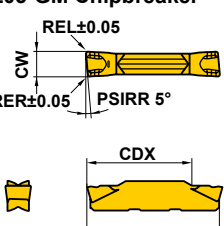
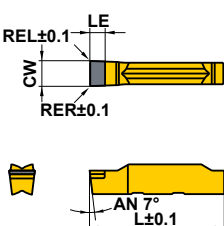
F

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(10 inserts in one case)

F011

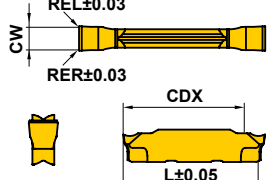
# GY SERIES INSERTS

## INSERTS

| Applications               | Geometry                                                                                                                                       | Order Number                                                                                                                  | Stock            |        |        |        |        |         |        |        | Seat Size | Dimensions (mm) |       |               |           |       |        |       |       |   |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------|--------|--------|--------|--------|---------|--------|--------|-----------|-----------------|-------|---------------|-----------|-------|--------|-------|-------|---|
|                            |                                                                                                                                                |                                                                                                                               | Coated           |        |        |        | Cermet | Carbide | CBN    | CW     |           | RER/L           | CDX   | *2            |           |       |        |       |       |   |
|                            |                                                                                                                                                |                                                                                                                               | MP9015           | MP9025 | VP10RT | VP20RT | MY5015 | NX2525  | RT9010 | BC8110 |           |                 |       | Cutting Width | Tolerance | L     | LE     |       |       |   |
| For Grooving / Cutting Off | <b>GM Chipbreaker</b><br>(Medium feeds)<br>                   | GY1M0200D020N-GM                                                                                                              | ●                | ●      | ●      | ●      | ●      |         |        |        |           | D               | 2.00  | ±0.03         | 0.2       | —     | 20.70  | —     |       |   |
|                            |                                                                                                                                                | GY1M0250E020N-GM                                                                                                              | ●                | ●      | ●      | ●      | ★      |         |        |        |           | E               | 2.50  | ±0.03         | 0.2       | —     | 20.70  | —     |       |   |
|                            |                                                                                                                                                | GY1M0300F030N-GM                                                                                                              | ●                | ●      | ●      | ●      | ●      |         |        |        |           | F               | 3.00  | ±0.03         | 0.3       | —     | 20.70  | —     |       |   |
|                            |                                                                                                                                                | GY1M0400G030N-GM                                                                                                              | ●                | ●      | ●      | ●      | ●      |         |        |        |           | G               | 4.00  | ±0.04         | 0.3       | —     | 25.65  | —     |       |   |
|                            |                                                                                                                                                | GY1M0500H040N-GM                                                                                                              | ●                | ●      | ●      | ●      | ●      |         |        |        |           | H               | 5.00  | ±0.04         | 0.4       | —     | 25.65  | —     |       |   |
|                            |                                                                                                                                                |                                                                                                                               |                  |        |        |        |        |         |        |        |           |                 |       |               |           |       |        |       |       |   |
|                            |                                                                                                                                                | <b>GM Chipbreaker</b><br>(Medium feeds)<br> | GY2M0150C020N-GM | ●      | ●      | ●      | ●      | ●       |        |        |           |                 | C     | 1.50          | ±0.03     | 0.2   | 13.9   | 14.70 | —     |   |
|                            |                                                                                                                                                |                                                                                                                               | GY2M0200D020N-GM | ●      | ●      | ●      | ●      | ●       | ●      |        |           |                 |       | D             | 2.00      | ±0.03 | 0.2    | 19.4  | 20.70 | — |
|                            |                                                                                                                                                |                                                                                                                               | GY2M0239E020N-GM | ●      | ●      | ●      | ●      | ●       | ●      |        |           |                 |       | E             | 2.39      | ±0.03 | 0.2    | 19.4  | 20.70 | — |
|                            |                                                                                                                                                |                                                                                                                               | GY2M0250E020N-GM | ●      | ●      | ●      | ●      | ●       | ●      |        |           |                 |       | E             | 2.50      | ±0.03 | 0.2    | 19.4  | 20.70 | — |
| GY2M0300F030N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | F               | 3.00  | ±0.03         | 0.3       | 19.4  | 20.70  | —     |       |   |
| GY2M0318F030N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | F               | 3.18  | ±0.03         | 0.3       | 19.4  | 20.70  | —     |       |   |
| GY2M0400G030N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | G               | 4.00  | ±0.04         | 0.3       | 24.4  | 25.65  | —     |       |   |
| GY2M0475H040N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | H               | 4.75  | ±0.04         | 0.4       | 24.3  | 25.65  | —     |       |   |
| GY2M0500H040N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | H               | 5.00  | ±0.04         | 0.4       | 24.3  | 25.65  | —     |       |   |
| GY2M0600J040N-GM           | ●                                                                                                                                              |                                                                                                                               | ●                | ●      | ●      | ●      | ●      |         |        |        |           | J               | 6.00  | ±0.04         | 0.4       | 24.3  | 25.65  | —     |       |   |
| GY2M0635J040N-GM           | ●                                                                                                                                              | ●                                                                                                                             | ●                | ●      | ●      | ●      |        |         |        |        | J         | 6.35            | ±0.04 | 0.4           | 24.3      | 25.65 | —      |       |       |   |
| GY2M0800K050N-GM           | ●                                                                                                                                              | ●                                                                                                                             | ●                | ●      | ●      |        |        |         |        |        | K         | 8.00            | ±0.04 | 0.5           | 29.3      | 30.50 | —      |       |       |   |
| For Cutting Off            | <b>R/L05-GM Chipbreaker</b><br><br>Right hand insert shown. | GY1M0200D020R05-GM                                                                                                            |                  |        | ●      | ●      |        |         |        |        |           | D               | 2.00  | ±0.03         | 0.2       | —     | 20.80  | —     |       |   |
|                            |                                                                                                                                                | GY1M0200D020L05-GM                                                                                                            |                  |        | ★      | ●      |        |         |        |        |           |                 | D     | 2.00          | ±0.03     | 0.2   | —      | 20.80 | —     |   |
|                            |                                                                                                                                                | GY1M0300F030R05-GM                                                                                                            |                  |        | ●      | ●      |        |         |        |        |           |                 | F     | 3.00          | ±0.03     | 0.3   | —      | 20.85 | —     |   |
|                            |                                                                                                                                                | GY1M0300F030L05-GM                                                                                                            |                  |        | ●      | ●      |        |         |        |        |           |                 | F     | 3.00          | ±0.03     | 0.3   | —      | 20.85 | —     |   |
|                            | <b>R/L05-GM Chipbreaker</b><br><br>Right hand insert shown. | GY2M0200D020R05-GM                                                                                                            |                  |        | ●      | ●      |        |         |        |        |           |                 | D     | 2.00          | ±0.03     | 0.2   | 19.5   | 20.80 | —     |   |
| GY2M0200D020L05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | D               | 2.00  | ±0.03         | 0.2       | 19.5  | 20.80  | —     |       |   |
| GY2M0250E020R05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | E               | 2.50  | ±0.03         | 0.2       | 19.5  | 20.825 | —     |       |   |
| GY2M0250E020L05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | E               | 2.50  | ±0.03         | 0.2       | 19.5  | 20.825 | —     |       |   |
| GY2M0300F030R05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | F               | 3.00  | ±0.03         | 0.3       | 19.5  | 20.85  | —     |       |   |
| GY2M0300F030L05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | F               | 3.00  | ±0.03         | 0.3       | 19.5  | 20.85  | —     |       |   |
| GY2M0400G030R05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | G               | 4.00  | ±0.04         | 0.3       | 24.5  | 25.85  | —     |       |   |
| GY2M0400G030L05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | G               | 4.00  | ±0.04         | 0.3       | 24.5  | 25.85  | —     |       |   |
| GY2M0500H040R05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | H               | 5.00  | ±0.04         | 0.4       | 24.5  | 25.95  | —     |       |   |
| GY2M0500H040L05-GM         |                                                                                                                                                |                                                                                                                               |                  | ●      | ●      |        |        |         |        |        |           | H               | 5.00  | ±0.04         | 0.4       | 24.5  | 25.95  | —     |       |   |
| For Grooving               | <b>Flat Top</b> (For hardened steel)<br>                    | GY1G0200D020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | D               | 2.00  | ±0.03         | 0.2       | —     | 20.70  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0239E020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | E               | 2.39  | ±0.03         | 0.2       | —     | 20.70  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0250E020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | E               | 2.50  | ±0.03         | 0.2       | —     | 20.70  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0300F020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | F               | 3.00  | ±0.03         | 0.2       | —     | 20.70  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0318F020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | F               | 3.18  | ±0.03         | 0.2       | —     | 20.70  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0400G020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | G               | 4.00  | ±0.03         | 0.2       | —     | 25.65  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0475H020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | H               | 4.75  | ±0.03         | 0.2       | —     | 25.65  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0500H020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | H               | 5.00  | ±0.03         | 0.2       | —     | 25.65  | 2.7   |       |   |
|                            |                                                                                                                                                | GY1G0600J020N-GFGS                                                                                                            |                  |        |        |        |        |         |        |        | ●         | J               | 6.00  | ±0.03         | 0.2       | —     | 25.65  | 2.7   |       |   |

● : Inventory maintained. ★ : Inventory maintained in Japan.

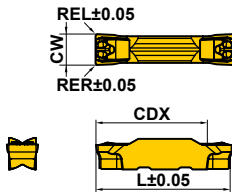
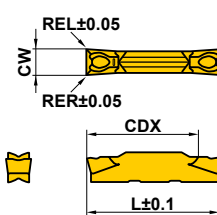
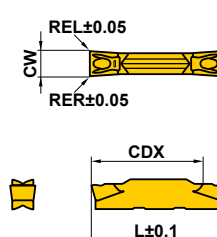
(10 inserts in one case) (CBN inserts are available in 1 piece in one case.)

| Applications               | Geometry                                                                                                                                         | Order Number     | Stock  |        |        |        |        |         |        |        | Seat Size | Dimensions (mm) |       |         |      |               |           |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------|--------|--------|--------|--------|---------|--------|--------|-----------|-----------------|-------|---------|------|---------------|-----------|
|                            |                                                                                                                                                  |                  | Coated |        |        |        | Cermet | Carbide | CBN    | CW     |           | RER/L           | CDX   | *2<br>L | LE   |               |           |
|                            |                                                                                                                                                  |                  | MP9015 | MP9025 | VP10RT | VP20RT | MY5015 | NX2525  | RT9010 | BC8110 |           |                 |       |         |      | Cutting Width | Tolerance |
|                            |                                                                                                                                                  |                  |        |        |        |        |        |         |        |        |           |                 |       |         |      |               |           |
| For Grooving / Cutting Off | <div>GL Chipbreaker<br/>(For Aluminium Alloy)</div> <div></div> | GY2G0200D005N-GL |        |        |        |        |        |         | ●      |        | D         | 2.00            | ±0.02 | 0.05    | 19.5 | 21.05         | —         |
|                            |                                                                                                                                                  | GY2G0250E005N-GL |        |        |        |        |        |         | ●      |        | E         | 2.50            | ±0.02 | 0.05    | 19.1 | 21.05         | —         |
|                            |                                                                                                                                                  | GY2G0300F005N-GL |        |        |        |        |        |         | ●      |        | F         | 3.00            | ±0.02 | 0.05    | 18.9 | 21.05         | —         |
|                            |                                                                                                                                                  |                  |        |        |        |        |        |         |        |        |           |                 |       |         |      |               |           |



# GY SERIES INSERTS

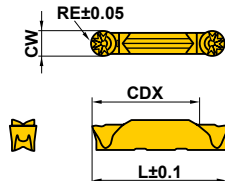
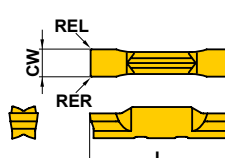
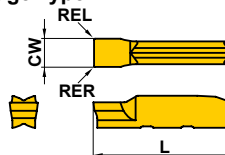
## INSERTS

| Applications                 | Geometry                                                                                                                           | Order Number                                                                                                                    | Stock            |        |        |        |        |        |         |        | Seat Size | Dimensions (mm) |           |          |       |       |       |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------|--------|--------|--------|--------|--------|---------|--------|-----------|-----------------|-----------|----------|-------|-------|-------|
|                              |                                                                                                                                    |                                                                                                                                 | Coated           |        |        |        | Cermet |        | Carbide |        |           | CW              |           | RE RER/L | CDX   | *2 L  |       |
|                              |                                                                                                                                    |                                                                                                                                 | MP9015           | MP9025 | VP10RT | VP20RT | MY5015 | NX2525 | RT9010  | RT9020 |           | Cutting Width   | Tolerance |          |       |       |       |
|                              |                                                                                                                                    |                                                                                                                                 |                  |        |        |        |        |        |         |        |           |                 |           |          |       |       |       |
| For Multifunctional Grooving | <b>MF Chipbreaker</b><br>(Finishing)<br><br>      | GY2G0200D020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | D         | 2.00            | ±0.02     | 0.2      | 19.5  | 21.05 |       |
|                              |                                                                                                                                    | *1 GY2G0224D015N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | D         | 2.24            | ±0.02     | 0.15     | 19.8  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0239E020N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | E         | 2.39            | ±0.02     | 0.2      | 19.2  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0250E020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | E         | 2.50            | ±0.02     | 0.2      | 19.4  | 21.05 |       |
|                              |                                                                                                                                    | *1 GY2G0274E020N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | E         | 2.74            | ±0.02     | 0.2      | 19.7  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0300F020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | F         | 3.00            | ±0.02     | 0.2      | 19.5  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0300F040N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | F         | 3.00            | ±0.02     | 0.4      | 19.3  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0318F020N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | F         | 3.18            | ±0.02     | 0.2      | 19.5  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0318F040N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | F         | 3.18            | ±0.02     | 0.4      | 19.3  | 21.05 |       |
|                              |                                                                                                                                    | *1 GY2G0324F020N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | F         | 3.24            | ±0.02     | 0.2      | 19.5  | 21.05 |       |
|                              |                                                                                                                                    | GY2G0400G020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | G         | 4.00            | ±0.02     | 0.2      | 24.9  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0400G040N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | G         | 4.00            | ±0.02     | 0.4      | 24.7  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0400G080N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | G         | 4.00            | ±0.02     | 0.8      | 24.3  | 25.95 |       |
|                              |                                                                                                                                    | *1 GY2G0424G020N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | G         | 4.24            | ±0.02     | 0.2      | 24.9  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0475H020N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | H         | 4.75            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0475H040N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | H         | 4.75            | ±0.02     | 0.4      | 24.2  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0475H080N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | H         | 4.75            | ±0.02     | 0.8      | 23.8  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0500H020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | H         | 5.00            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0500H040N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | H         | 5.00            | ±0.02     | 0.4      | 24.2  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0500H080N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | H         | 5.00            | ±0.02     | 0.8      | 23.8  | 25.95 |       |
|                              |                                                                                                                                    | *1 GY2G0524H020N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | H         | 5.24            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0600J020N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | J         | 6.00            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0600J040N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | J         | 6.00            | ±0.02     | 0.4      | 24.2  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0600J080N-MF                                                                                                                |                  |        | ●      | ●      | ●      | ●      | ●       |        | J         | 6.00            | ±0.02     | 0.8      | 23.8  | 25.95 |       |
|                              |                                                                                                                                    | *1 GY2G0631J020N-MF                                                                                                             |                  |        | ●      | ●      | ●      | ●      | ●       |        | J         | 6.31            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0635J020N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | J         | 6.35            | ±0.02     | 0.2      | 24.4  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0635J040N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | J         | 6.35            | ±0.02     | 0.4      | 24.2  | 25.95 |       |
|                              |                                                                                                                                    | GY2G0635J080N-MF                                                                                                                |                  |        | ★      | ★      | ★      | ★      | ★       |        | J         | 6.35            | ±0.02     | 0.8      | 23.8  | 25.95 |       |
|                              |                                                                                                                                    | <b>MS Chipbreaker</b><br>(Low feeds)<br><br> | GY2M0200D020N-MS |        |        | ●      | ●      | ●      | ●       |        |           | D               | 2.00      | ±0.03    | 0.2   | 19.1  | 20.70 |
|                              |                                                                                                                                    |                                                                                                                                 | GY2M0250E020N-MS |        |        | ●      | ●      | ●      | ●       |        |           | E               | 2.50      | ±0.03    | 0.2   | 19.1  | 20.70 |
|                              |                                                                                                                                    |                                                                                                                                 | GY2M0300F020N-MS |        |        | ●      | ●      | ●      | ●       |        |           | F               | 3.00      | ±0.03    | 0.2   | 19.2  | 20.70 |
|                              |                                                                                                                                    |                                                                                                                                 | GY2M0300F040N-MS |        |        | ●      | ●      | ●      | ●       |        |           | F               | 3.00      | ±0.03    | 0.4   | 18.9  | 20.70 |
|                              |                                                                                                                                    |                                                                                                                                 | GY2M0400G020N-MS |        |        | ●      | ●      | ●      | ●       |        |           | G               | 4.00      | ±0.04    | 0.2   | 24.2  | 25.65 |
|                              | GY2M0400G040N-MS                                                                                                                   |                                                                                                                                 |                  |        | ●      | ●      | ●      | ●      |         |        | G         | 4.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              | GY2M0500H040N-MS                                                                                                                   |                                                                                                                                 |                  |        | ●      | ●      | ●      | ●      |         |        | H         | 5.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              | GY2M0500H080N-MS                                                                                                                   |                                                                                                                                 |                  |        | ●      | ●      | ●      | ●      |         |        | H         | 5.00            | ±0.04     | 0.8      | 23.5  | 25.65 |       |
|                              | GY2M0600J040N-MS                                                                                                                   |                                                                                                                                 |                  |        | ●      | ●      | ●      | ●      |         |        | J         | 6.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              | GY2M0600J080N-MS                                                                                                                   |                                                                                                                                 |                  |        | ●      | ●      | ●      | ●      |         |        | J         | 6.00            | ±0.04     | 0.8      | 23.5  | 25.65 |       |
|                              | GY2M0800K080N-MS                                                                                                                   |                                                                                                                                 |                  | ●      | ●      | ●      |        |        |         | K      | 8.00      | ±0.04           | 0.8       | 28.5     | 30.50 |       |       |
|                              | <b>MM Chipbreaker</b><br>(Medium feeds)<br><br> | GY2M0200D020N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | D         | 2.00            | ±0.03     | 0.2      | 19.1  | 20.70 |       |
|                              |                                                                                                                                    | GY2M0250E020N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | E         | 2.50            | ±0.03     | 0.2      | 19.1  | 20.70 |       |
|                              |                                                                                                                                    | GY2M0300F020N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | F         | 3.00            | ±0.03     | 0.2      | 19.1  | 20.70 |       |
|                              |                                                                                                                                    | GY2M0300F040N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | F         | 3.00            | ±0.03     | 0.4      | 18.9  | 20.70 |       |
|                              |                                                                                                                                    | GY2M0300F080N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | F         | 3.00            | ±0.03     | 0.8      | 18.5  | 20.70 |       |
|                              |                                                                                                                                    | GY2M0400G020N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | G         | 4.00            | ±0.04     | 0.2      | 24.1  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0400G040N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | G         | 4.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0400G080N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | G         | 4.00            | ±0.04     | 0.8      | 23.5  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0500H040N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | H         | 5.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0500H080N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | H         | 5.00            | ±0.04     | 0.8      | 23.5  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0600J040N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | J         | 6.00            | ±0.04     | 0.4      | 23.9  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0600J080N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      | ●      |         |        | J         | 6.00            | ±0.04     | 0.8      | 23.5  | 25.65 |       |
|                              |                                                                                                                                    | GY2M0800K080N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      |        |         |        | K         | 8.00            | ±0.04     | 0.8      | 28.5  | 30.50 |       |
|                              |                                                                                                                                    | GY2M0800K120N-MM                                                                                                                | ●                | ●      | ●      | ●      | ●      |        |         |        | K         | 8.00            | ±0.04     | 1.2      | 28.1  | 30.50 |       |

\*1 Groove width corresponding to the circlip.

\*2 The dimension depends on the chipbreaker. Refer to the F017 "L dimension tolerance conversion table".

● : Inventory maintained. ★ : Inventory maintained in Japan.

| Applications                | Geometry                                                                                                   | Order Number     | Stock  |        |        |        |        |        |         |        | Seat Size | Dimensions (mm) |           |             |      |      |       |
|-----------------------------|------------------------------------------------------------------------------------------------------------|------------------|--------|--------|--------|--------|--------|--------|---------|--------|-----------|-----------------|-----------|-------------|------|------|-------|
|                             |                                                                                                            |                  | Coated |        |        |        | Cermet |        | Carbide |        |           | CW              |           | RE<br>RER/L | CDX  | *2   |       |
|                             |                                                                                                            |                  | MP9015 | MP9025 | VP10RT | VP20RT | MY5015 | NX2525 | RT9010  | RT9020 |           | Cutting Width   | Tolerance |             |      | L    |       |
|                             |                                                                                                            |                  |        |        |        |        |        |        |         |        |           |                 |           |             |      |      |       |
| For Copying / For Recessing | <b>BM Chipbreaker</b><br> | GY2M0200D100N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | D               | 2.00      | ±0.03       | 1.00 | 19.5 | 20.90 |
|                             |                                                                                                            | GY2M0250E125N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | E               | 2.50      | ±0.03       | 1.25 | 19.3 | 20.90 |
|                             |                                                                                                            | GY2M0300F150N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | F               | 3.00      | ±0.03       | 1.50 | 19.0 | 20.90 |
|                             |                                                                                                            | GY2M0318F159N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | F               | 3.18      | ±0.03       | 1.59 | 18.9 | 20.90 |
|                             |                                                                                                            | GY2M0400G200N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | G               | 4.00      | ±0.04       | 2.00 | 23.4 | 25.80 |
|                             |                                                                                                            | GY2M0475H238N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | H               | 4.75      | ±0.04       | 2.38 | 22.9 | 25.80 |
|                             |                                                                                                            | GY2M0500H250N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | H               | 5.00      | ±0.04       | 2.50 | 22.8 | 25.80 |
|                             |                                                                                                            | GY2M0600J300N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | J               | 6.00      | ±0.04       | 3.00 | 22.5 | 25.90 |
|                             |                                                                                                            | GY2M0635J318N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | J               | 6.35      | ±0.04       | 3.18 | 22.3 | 25.90 |
|                             |                                                                                                            | GY2M0800K400N-BM | ●      | ●      | ●      | ●      | ●      | ●      |         |        |           | K               | 8.00      | ±0.04       | 4.00 | 26.5 | 30.80 |
| ★1<br><br>Blank             | <b>2 Edge Type</b><br>   | GY2B0220D020N    |        |        |        |        |        | ●      |         | ●      | ●         | D               | 2.20      | ±0.10       | 0.2  | —    | 21.05 |
|                             |                                                                                                            | GY2B0250D020N    |        |        |        |        |        | ●      |         | ●      | ●         | D               | 2.55      | ±0.10       | 0.2  | —    | 21.28 |
|                             |                                                                                                            | GY2B0270E020N    |        |        |        |        |        | ●      |         | ●      | ●         | E               | 2.70      | ±0.10       | 0.2  | —    | 21.05 |
|                             |                                                                                                            | GY2B0300E020N    |        |        |        |        |        | ●      |         | ●      | ●         | E               | 3.05      | ±0.10       | 0.2  | —    | 21.28 |
|                             |                                                                                                            | GY2B0340F020N    |        |        |        |        |        | ●      |         | ●      | ●         | F               | 3.40      | ±0.10       | 0.2  | —    | 21.05 |
|                             |                                                                                                            | GY2B0360F020N    |        |        |        |        |        | ●      |         | ●      | ●         | F               | 3.65      | ±0.10       | 0.2  | —    | 21.28 |
|                             |                                                                                                            | GY2B0420G020N    |        |        |        |        |        | ●      |         | ●      | ●         | G               | 4.20      | ±0.10       | 0.2  | —    | 26.00 |
|                             |                                                                                                            | GY2B0460G020N    |        |        |        |        |        | ●      |         | ●      | ●         | G               | 4.65      | ±0.10       | 0.2  | —    | 26.18 |
|                             |                                                                                                            | GY2B0520H020N    |        |        |        |        |        | ●      |         | ●      | ●         | H               | 5.20      | ±0.10       | 0.2  | —    | 26.00 |
|                             |                                                                                                            | GY2B0560H020N    |        |        |        |        |        | ●      |         | ●      | ●         | H               | 5.65      | ±0.10       | 0.2  | —    | 26.18 |
|                             |                                                                                                            | GY2B0655J020N    |        |        |        |        |        | ●      |         | ●      | ●         | J               | 6.55      | ±0.10       | 0.2  | —    | 26.03 |
|                             |                                                                                                            | GY2B0680J020N    |        |        |        |        |        | ●      |         | ●      | ●         | J               | 6.85      | ±0.10       | 0.2  | —    | 26.18 |
|                             |                                                                                                            | GY2B0880K020N    |        |        |        |        |        |        |         | ●      | ●         | K               | 8.85      | ±0.10       | 0.2  | —    | 30.88 |
|                             | <b>1 Edge Type</b><br>  | GY1B0220D020N    |        |        |        |        |        | ●      |         | ●      | ●         | D               | 2.20      | ±0.10       | 0.2  | —    | 21.07 |
|                             |                                                                                                            | GY1B0270E020N    |        |        |        |        |        | ●      |         | ●      | ●         | E               | 2.70      | ±0.10       | 0.2  | —    | 21.10 |
|                             |                                                                                                            | GY1B0340F020N    |        |        |        |        |        | ●      |         | ●      | ●         | F               | 3.40      | ±0.10       | 0.2  | —    | 21.00 |
|                             |                                                                                                            | GY1B0420G020N    |        |        |        |        |        | ●      |         | ●      | ●         | G               | 4.20      | ±0.10       | 0.2  | —    | 25.86 |
|                             |                                                                                                            | GY1B0520H020N    |        |        |        |        |        | ●      |         | ●      | ●         | H               | 5.20      | ±0.10       | 0.2  | —    | 25.90 |
|                             |                                                                                                            | GY1B0655J020N    |        |        |        |        |        | ●      |         | ●      | ●         | J               | 6.55      | ±0.10       | 0.2  | —    | 25.90 |

\*1 Groove width corresponding to the circlip.

\*2 The dimension depends on the chipbreaker. Refer to the F017 "L dimension tolerance conversion table".

## Reference Material

### C-TYPE CIRCLIP STANDARDS LIST

| Category                                                                                                         | Application |          | Standard                                                                                           | Width (Tolerance) |            |       |             |      |            |      |            |       |             |
|------------------------------------------------------------------------------------------------------------------|-------------|----------|----------------------------------------------------------------------------------------------------|-------------------|------------|-------|-------------|------|------------|------|------------|-------|-------------|
|                                                                                                                  |             |          |                                                                                                    | For shaft         |            |       |             |      | For hole   |      |            |       |             |
| C-type stop ring<br>            | For shaft   | For hole |                                                                                                    | 0.5               | +0.14<br>0 | 0.305 | +0.051<br>0 | 1.15 | +0.14<br>0 | 9    | +0.14<br>0 | 0.457 | +0.051<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 0.7               |            | 0.457 | 0           | 1.35 |            | 1.1  |            | 0.737 | +0.076<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 0.8               |            | 0.737 | +0.076<br>0 | 1.75 |            | 1.3  |            | 0.991 | +0.102<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 0.9               |            | 0.991 |             | 1.95 |            | 1.6  |            | 1.168 | +0.127<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 1.1               |            | 1.168 | +0.102<br>0 | 2.2  |            | 1.85 |            | 1.422 | +0.152<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 1.3               |            | 1.422 |             | 2.7  |            | 2.15 |            | 1.727 | +0.180<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 1.6               |            | 1.727 | +0.127<br>0 | 3.2  |            | 2.65 |            | 2.184 | +0.220<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 1.85              |            | 2.184 |             | 4.2  |            | 3.15 |            | 3.048 | +0.220<br>0 |
|                                                                                                                  |             |          |                                                                                                    | 2.15              |            | 2.616 | +0.152<br>0 |      |            | 4.15 |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 2.65              |            | 3.048 |             |      |            | 5.15 |            |       |             |
| C-type concentric stop ring<br> | For shaft   | For hole | ANSI B27.7/27.8 (US)<br>BS 3673 (UK)<br>DIN 471/472 (De)<br>NF E 22 163 (Fr)<br>UNI 7435/7438 (It) | 3.15              | +0.18<br>0 | 3.531 | +0.152<br>0 |      | +0.18<br>0 | 6.2  | +0.22<br>0 |       |             |
|                                                                                                                  |             |          |                                                                                                    | 4.15              |            |       |             |      |            |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 5.15              |            |       |             |      |            |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 6.2               |            |       |             |      |            |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    |                   |            |       |             |      |            |      |            |       |             |
| E-type stop ring<br>            | For shaft   |          | N1*** American                                                                                     | 0.32              | +0.05<br>0 | 0.305 | +0.051<br>0 | 0.3  | +0.05<br>0 |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 0.5               |            | 0.457 | 0           | 0.4  | 0          |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 0.7               | +0.10<br>0 | 0.584 | +0.076<br>0 | 0.5  | +0.10<br>0 |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 1.0               |            | 0.737 |             | 0.7  | +0.10<br>0 |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 1.2               | +0.14<br>0 | 0.991 | +0.102<br>0 | 0.9  | +0.14<br>0 |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    | 1.4               |            | 1.168 |             | 1.15 |            |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    |                   |            | 1.422 | +0.127<br>0 | 1.75 |            |      |            |       |             |
|                                                                                                                  |             |          |                                                                                                    |                   |            | 1.727 |             | 2.2  |            |      |            |       |             |

### O-RING STANDARDS

| Category    | Standard                                | Width (Tolerance) |            |      |                  |            |     |                  |     |           |     |
|-------------|-----------------------------------------|-------------------|------------|------|------------------|------------|-----|------------------|-----|-----------|-----|
|             |                                         | General           |            |      | For oil pressure |            |     | For air pressure |     |           |     |
| For stable  | DIN 3770/3771 (De)                      | 2.54              | +0.13<br>0 |      | 1.9              | +0.1<br>0  |     |                  |     |           |     |
|             |                                         | 3.18              |            |      | 2.3              | 0          |     |                  |     |           |     |
|             |                                         | 4.32              |            |      |                  |            | 2.3 |                  |     |           |     |
|             |                                         | 6.1               |            |      | 2.9              | +0.15<br>0 | 3.1 |                  |     |           |     |
|             |                                         | 8.0               |            |      |                  |            | 3.7 | +0.2<br>0        |     |           |     |
| For dynamic | JIS B 2401 (JP)<br>ISO 3601             | 3.2               | +0.2<br>0  | 2.5  | 3.6              | +0.2<br>0  | 6.4 | +0.25<br>0       |     |           |     |
|             |                                         | 4.0               |            | 3.2  | 4.5              | 0          | 9.0 |                  |     |           |     |
|             |                                         | 7.5               |            | 4.7  | 5.5              | +0.3<br>0  | 2.4 |                  |     |           |     |
|             |                                         | 11.0              |            | 7.5  | 7.0              | 0          | 3.6 |                  |     |           |     |
|             |                                         |                   |            | 11.1 | 8.6              | +0.4<br>0  | 4.8 |                  |     |           |     |
|             | SMS 1586/1588 (Se)<br>BS 1806/4518 (UK) | 2.39              | +0.25<br>0 |      | 10.7             | +0.5<br>0  | 7.1 |                  | 2.3 |           |     |
|             |                                         | 3.58              |            |      |                  |            | 9.5 |                  | 3.1 | +0.2<br>0 | 2.2 |
|             |                                         | 4.78              |            |      |                  |            |     |                  | 3.4 |           |     |
|             |                                         | 7.14              |            |      |                  |            |     |                  | 4.6 |           |     |
|             |                                         | 9.58              |            |      |                  |            |     |                  | 6.9 |           |     |
|             | SAE AS-568 (US)                         |                   |            |      |                  |            |     |                  | 9.3 |           |     |
|             |                                         |                   |            |      |                  |            |     |                  |     |           |     |

  G-class insert with MF chipbreaker is available for single-step machining.

  Conventional GY series insert is available for single-step machining.

  Machined in multiple steps or by cross feed machining.

## L DIMENSION TOLERANCE CONVERSION TABLE

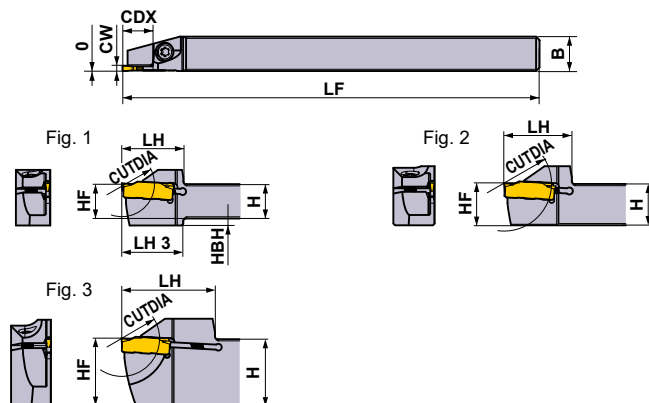
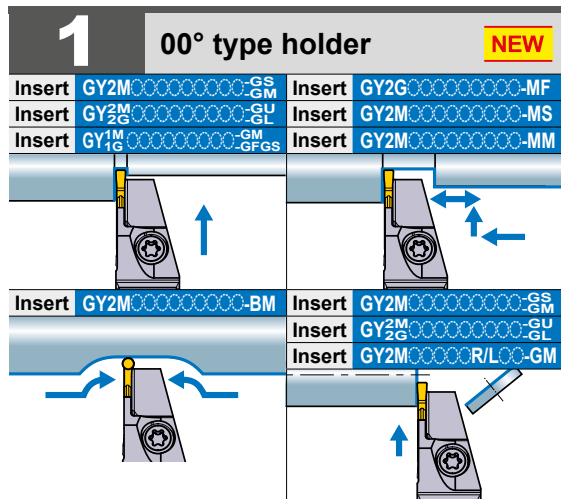
| Cutting Width<br>CW<br>(mm) | *1 Dimensions<br>L (mm) | *2 Dimensional tolerance (mm) versus standard dimension (L) of each chipbreaker |       |       |        |           |        |          |      |      |      |
|-----------------------------|-------------------------|---------------------------------------------------------------------------------|-------|-------|--------|-----------|--------|----------|------|------|------|
|                             |                         | GU                                                                              | GS/GM | MS/MM | R05-GS | R08/15-GS | R/L-GM | Flat Top | MF   | BM   | GL   |
| 1.20                        | 14.70                   |                                                                                 | 0     |       | 0      |           |        |          |      |      |      |
| 1.50                        | 14.70                   |                                                                                 | 0     |       |        | 0.50      |        |          |      |      |      |
| 2.00                        | 20.70                   | 0                                                                               | 0     | 0     |        | 0.60      | 0.10   | 0        | 0.35 | 0.20 | 0.35 |
| 2.24                        | *3 (20.7)               |                                                                                 |       |       |        |           |        |          | 0.35 |      |      |
| 2.39                        | 20.70                   | 0                                                                               | 0     |       |        |           |        | 0        | 0.35 |      |      |
| 2.50                        | 20.70                   | 0                                                                               | 0     | 0     |        | 0.80      | 0.125  | 0        | 0.35 | 0.20 | 0.35 |
| 2.74                        | *3 (20.7)               |                                                                                 |       |       |        |           |        |          | 0.35 |      |      |
| 3.00                        | 20.70                   | 0                                                                               | 0     | 0     |        | 0.80      | 0.15   | 0        | 0.35 | 0.20 | 0.35 |
| 3.18                        | 20.70                   | 0                                                                               | 0     |       |        |           |        | 0        | 0.35 | 0.20 |      |
| 3.24                        | *3 (20.7)               |                                                                                 |       |       |        |           |        |          | 0.35 |      |      |
| 4.00                        | 25.65                   | 0                                                                               | 0     | 0     |        |           | 0.20   | 0        | 0.30 | 0.15 |      |
| 4.24                        | *3 (25.65)              |                                                                                 |       |       |        |           |        |          | 0.30 |      |      |
| 4.75                        | 25.65                   | 0                                                                               | 0     |       |        |           |        | 0        | 0.30 | 0.15 |      |
| 5.00                        | 25.65                   | 0                                                                               | 0     | 0     |        |           | 0.30   | 0        | 0.30 | 0.15 |      |
| 5.24                        | *3 (25.65)              |                                                                                 |       |       |        |           |        |          | 0.30 |      |      |
| 6.00                        | 25.65                   | 0                                                                               | 0     | 0     |        |           |        | 0        | 0.30 | 0.25 |      |
| 6.31                        | *3 (25.65)              |                                                                                 |       |       |        |           |        |          | 0.30 |      |      |
| 6.35                        | 25.65                   | 0                                                                               | 0     |       |        |           |        |          | 0.30 | 0.25 |      |
| 8.00                        | 30.50                   |                                                                                 | 0     | 0     |        |           |        |          |      | 0.30 |      |

\*1 This value is used at the described holder dimension.

\*2  when there is no applicable chipbreaker.

\*3 The standard dimensions shown here use an approximate insert width.

# GY SERIES (External for Swiss style lathes)



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |       |        | Type      | Hand (R/L) | Order Number     |       | Fig. |  |
|-----------|----------------------|-------|--------|-----------|------------|------------------|-------|------|--|
|           | CW                   | CDX*4 | CUTDIA |           |            | Holder           | Stock |      |  |
| <b>B</b>  | <b>1.20</b>          | 8     | 16     | Monoblock | R          | GYSR1010JX00-B08 | ●     | 1    |  |
|           |                      | 8     | 16     |           | L          | GYSL1010JX00-B08 | ●     | 1    |  |
|           |                      | 8     | 16     | Monoblock | R          | GYSR1212JX00-B08 | ●     | 2    |  |
|           |                      | 8     | 16     |           | L          | GYSL1212JX00-B08 | ●     | 2    |  |
|           |                      | 12    | 24     | Monoblock | R          | GYSR1212JX00-B12 | ●     | 1    |  |
|           |                      | 12    | 24     |           | L          | GYSL1212JX00-B12 | ●     | 1    |  |
|           |                      | 8     | 16     | Monoblock | R          | GYSR1616JX00-B08 | ●     | 2    |  |
|           |                      | 8     | 16     |           | L          | GYSL1616JX00-B08 | ●     | 2    |  |
| <b>C</b>  | <b>1.50</b>          | 13    | 26     | Monoblock | R          | GYSR1616JX00-B13 | ●     | 2    |  |
|           |                      | 13    | 26     |           | L          | GYSL1616JX00-B13 | ●     | 2    |  |
|           |                      | 8     | 16     | Monoblock | R          | GYSR1010JX00-C08 | ●     | 1    |  |
|           |                      | 8     | 16     |           | L          | GYSL1010JX00-C08 | ●     | 1    |  |
|           |                      | 8     | 16     | Monoblock | R          | GYSR1212JX00-C08 | ●     | 2    |  |
|           |                      | 8     | 16     |           | L          | GYSL1212JX00-C08 | ●     | 2    |  |
|           |                      | 12    | 24     | Monoblock | R          | GYSR1212JX00-C12 | ●     | 1    |  |
|           |                      | 12    | 24     |           | L          | GYSL1212JX00-C12 | ●     | 1    |  |
| <b>D</b>  | <b>2.00<br/>2.24</b> | 13    | 26     | Monoblock | R          | GYSR1616JX00-C13 | ●     | 2    |  |
|           |                      | 13    | 26     |           | L          | GYSL1616JX00-C13 | ●     | 2    |  |
|           |                      | 13    | 26     | Monoblock | R          | GYSR2012JX00-C13 | ★     | 3    |  |
|           |                      | 13    | 26     |           | L          | GYSL2012JX00-C13 | ★     | 3    |  |
|           |                      | 10    | 20     | Monoblock | R          | GYSR1010JX00-D10 | ★     | 1    |  |
|           |                      | 10    | 20     |           | L          | GYSL1010JX00-D10 | ★     | 1    |  |
|           |                      | 12    | 24     | Monoblock | R          | GYSR1212JX00-D12 | ●     | 1    |  |
|           |                      | 12    | 24     |           | L          | GYSL1212JX00-D12 | ●     | 1    |  |
|           |                      | 13    | 26     | Monoblock | R          | GYSR1616JX00-D13 | ●     | 2    |  |
|           |                      | 13    | 26     |           | L          | GYSL1616JX00-D13 | ●     | 2    |  |
|           |                      | 16    | 32     | Monoblock | R          | GYSR1616JX00-D16 | ★     | 2    |  |
|           |                      | 16    | 32     |           | L          | GYSL1616JX00-D16 | ●     | 2    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR1915K00-D17  | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL1915K00-D17  | ★     | 3    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2012JX00-D17 | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL2012JX00-D17 | ★     | 3    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2020K00-D17  | ★     | 2    |  |
|           |                      | 17    | 34     |           | L          | GYSL2020K00-D17  | ★     | 2    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2525M00-D17  | ★     | 2    |  |
|           |                      | 17    | 34     |           | L          | GYSL2525M00-D17  | ★     | 2    |  |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F012—F015.

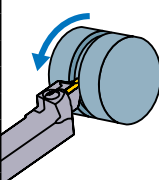
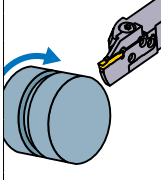
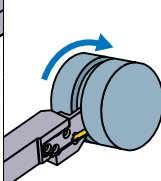
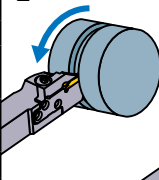
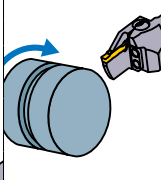
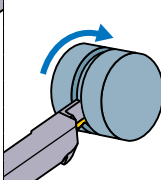
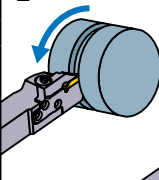
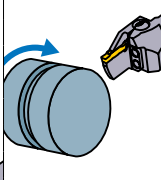
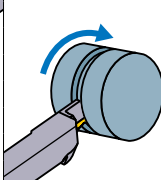
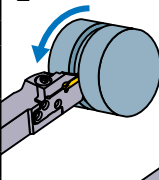
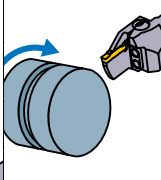
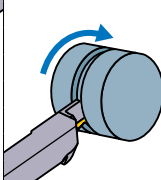
\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used. The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F012—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH and LH 3 values may vary.

\*4 The maximum groove depth (CDX) is limited by the workpiece diameter. For details, please refer to page F102.

## SPARE PARTS

| Holder                |  |  |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                       | Clamp Screw                                                                         | Wrench                                                                              |
| <b>GYSR/L1010JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L1212JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L1616JX00</b> | TS4SBL                                                                              | TKY15R                                                                              |
| <b>GYSR/L1915K00</b>  | TS4SBL                                                                              | TKY15R                                                                              |
| <b>GYSR/L2012JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L2020K00</b>  | HSC05018                                                                            | HKY40R                                                                              |
| <b>GYSR/L2525M00</b>  | HSC05018                                                                            | HKY40R                                                                              |

| Dimensions (mm) *3 |        |     |      |      |       |     |                                                                                     | Cutting Mode                                                                        |                                                                                     |
|--------------------|--------|-----|------|------|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B      | LF  | LH   | LH 3 | HF    | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise                                                                       |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |   |   |  |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | —    | 12    | —   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | —    | 12    | —   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |  |  |  |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | —    | 12    | —   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | —    | 12    | —   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |  |  |  |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |  |  |  |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20     | 125 | 35   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20     | 125 | 35   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25     | 150 | 40   | —    | 25    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25     | 150 | 40   | —    | 25    | —   |                                                                                     |                                                                                     |                                                                                     |

### Insert selection

| Seat Size | Geometry name                             |
|-----------|-------------------------------------------|
| B         | GY00120B0000—Chipbreaker shown below      |
| C         | GY00150C0000—Chipbreaker shown below      |
| D         | GY00200/0224D0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                        |                          |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|--------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminum alloy) | GFGS<br>(Hardened steel) |
|                                                  |             | Neutral                 | Neutral     | Neutral        | Neutral                | Neutral                  |
| B                                                | 1.20mm      |                         | ●           |                |                        |                          |
| C                                                | 1.50mm      |                         | ●           | ●              |                        |                          |
| D                                                | 2.00mm      | ●                       | ●           | ●              | ●                      | ●                        |

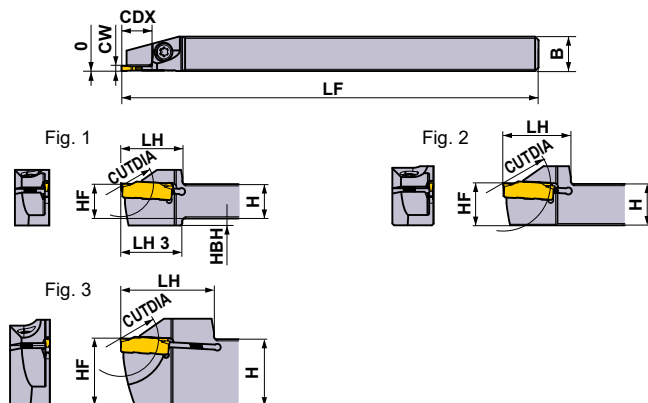
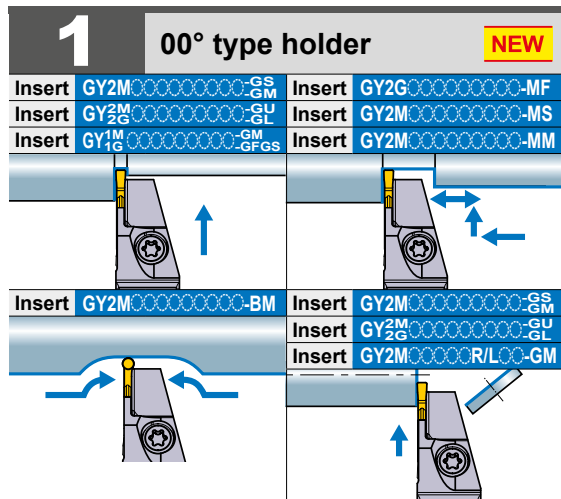
| For cutting off chipbreaker > F011, F012 |             |                |                |                |
|------------------------------------------|-------------|----------------|----------------|----------------|
| Seat Size                                | Chipbreaker | 05-GS<br>(Low) | 08-GS<br>(Low) | 15-GS<br>(Low) |
|                                          |             | R              | R              | R              |
| B                                        | 1.20mm      | ●              |                |                |
| C                                        | 1.50mm      |                | ●              | ●              |
| D                                        | 2.00mm      |                | ●              | ●              |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
|                                                       |             |                |             | BM<br>(Copying, Recessing) |
| D                                                     | 2.00mm      | ●              | ●           | ●                          |
|                                                       | 2.24mm      | ●              |             | ●                          |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

# GY SERIES (External for Swiss style lathes)



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |       |        | Type      | Hand (R/L) | Order Number     |       | Fig. |  |
|-----------|----------------------|-------|--------|-----------|------------|------------------|-------|------|--|
|           | CW                   | CDX*4 | CUTDIA |           |            | Holder           | Stock |      |  |
| E         | 2.39<br>2.50<br>2.74 | 10    | 20     | Monoblock | R          | GYSR1010JX00-E10 | ★     | 1    |  |
|           |                      | 10    | 20     |           | L          | GYSL1010JX00-E10 | ★     | 1    |  |
|           |                      | 12    | 24     | Monoblock | R          | GYSR1212JX00-E12 | ★     | 1    |  |
|           |                      | 12    | 24     |           | L          | GYSL1212JX00-E12 | ★     | 1    |  |
|           |                      | 13    | 26     | Monoblock | R          | GYSR1616JX00-E13 | ★     | 2    |  |
|           |                      | 13    | 26     |           | L          | GYSL1616JX00-E13 | ★     | 2    |  |
|           |                      | 16    | 32     | Monoblock | R          | GYSR1616JX00-E16 | ★     | 2    |  |
|           |                      | 16    | 32     |           | L          | GYSL1616JX00-E16 | ★     | 2    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR1915K00-E17  | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL1915K00-E17  | ★     | 3    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2012JX00-E17 | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL2012JX00-E17 | ★     | 3    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2020K00-E17  | ★     | 2    |  |
|           |                      | 17    | 34     |           | L          | GYSL2020K00-E17  | ★     | 2    |  |
| F         | 3.00<br>3.18<br>3.24 | 12    | 24     | Monoblock | R          | GYSR1212JX00-F12 | ★     | 1    |  |
|           |                      | 12    | 24     |           | L          | GYSL1212JX00-F12 | ●     | 1    |  |
|           |                      | 13    | 26     | Monoblock | R          | GYSR1616JX00-F13 | ★     | 2    |  |
|           |                      | 13    | 26     |           | L          | GYSL1616JX00-F13 | ★     | 2    |  |
|           |                      | 16    | 32     | Monoblock | R          | GYSR1616JX00-F16 | ●     | 2    |  |
|           |                      | 16    | 32     |           | L          | GYSL1616JX00-F16 | ★     | 2    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR1915K00-F17  | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL1915K00-F17  | ★     | 3    |  |
|           |                      | 17    | 34     | Monoblock | R          | GYSR2012JX00-F17 | ★     | 3    |  |
|           |                      | 17    | 34     |           | L          | GYSL2012JX00-F17 | ★     | 3    |  |
|           |                      |       |        |           |            |                  |       |      |  |
|           |                      |       |        |           |            |                  |       |      |  |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F012—F015.

\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used. The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F012—F015.

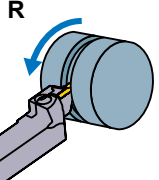
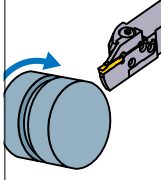
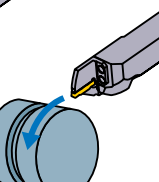
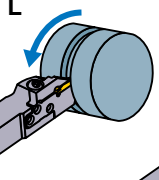
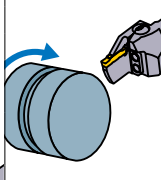
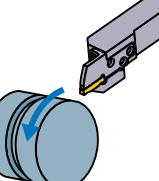
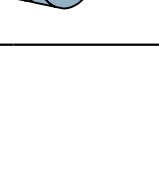
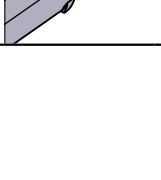
\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH and LH 3 values may vary.

\*4 The maximum groove depth (CDX) is limited by the workpiece diameter. For details, please refer to page F102.



## SPARE PARTS

| Holder                |  |  |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                       | Clamp Screw                                                                         | Wrench                                                                              |
| <b>GYSR/L1010JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L1212JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L1616JX00</b> | TS4SBL                                                                              | TKY15R                                                                              |
| <b>GYSR/L1915K00</b>  | TS4SBL                                                                              | TKY15R                                                                              |
| <b>GYSR/L2012JX00</b> | CS350990T                                                                           | TKY10R                                                                              |
| <b>GYSR/L2020K00</b>  | HSC05018                                                                            | HKY40R                                                                              |
| <b>GYSR/L2525M00</b>  | HSC05018                                                                            | HKY40R                                                                              |

| Dimensions (mm) *3 |        |     |      |      |       |     |                                                                                     | Cutting Mode                                                                        |                                                                                     |
|--------------------|--------|-----|------|------|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B      | LF  | LH   | LH 3 | HF    | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise                                                                       |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |    |    |   |
| 10                 | 10     | 120 | 17.5 | 17.5 | 10    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |  |  |  |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |                                                                                     |                                                                                     |                                                                                     |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20     | 125 | 35   | —    | 20    | —   |  |  |  |
| 20                 | 20     | 125 | 35   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25     | 150 | 40   | —    | 25    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25     | 150 | 40   | —    | 25    | —   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 12                 | 12     | 120 | 19.5 | 19.5 | 12    | 2   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |  |  |  |
| 16                 | 16     | 120 | 25   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16     | 120 | 28   | —    | 16    | —   |                                                                                     |                                                                                     |                                                                                     |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |                                                                                     |                                                                                     |                                                                                     |
| 19.05              | 15.875 | 125 | 28   | —    | 19.05 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |  |  |  |
| 20                 | 12     | 120 | 28   | —    | 20    | —   |                                                                                     |                                                                                     |                                                                                     |

### Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| E         | GY00239/0250/0274E0000—Chipbreaker shown below |
| F         | GY00300/0318/0324F0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                         |                          |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|--------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | GFGS<br>(Hardened steel) |
| E                                                | CW          | Neutral                 | Neutral     | Neutral        | Neutral                 | Neutral                  |
|                                                  | 2.39mm      | ●                       | ●           | ●              | ●                       | ●                        |
| F                                                | 2.50mm      | ●                       | ●           | ●              | ●                       | ●                        |
|                                                  | 3.00mm      | ●                       | ●           | ●              | ●                       | ●                        |
|                                                  | 3.18mm      | ●                       | ●           | ●              | ●                       | ●                        |

| For cutting off chipbreaker > F011, F012 |             |                |                |                |
|------------------------------------------|-------------|----------------|----------------|----------------|
| Seat Size                                | Chipbreaker | 05-GS<br>(Low) | 08-GS<br>(Low) | 15-GS<br>(Low) |
| E                                        | CW          | R              | R              | R              |
|                                          | 2.39mm      | ●              | ●              | ●              |
| F                                        | 2.50mm      | ●              | ●              | ●              |
|                                          | 3.00mm      | ●              | ●              | ●              |
|                                          | 3.18mm      | ●              | ●              | ●              |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) |
| E                                                     | CW          | Ball shape     |             |                |
|                                                       | 2.39mm      | ●              | ●           | ●              |
| F                                                     | 2.50mm      | ●              | ●           | ●              |
|                                                       | 2.74mm      | ●              | ●           | ●              |
|                                                       | 3.00mm      | ●              | ●           | ●              |
| F                                                     | RE 0.2      | ●              | ●           | ●              |
|                                                       | RE 0.4      | ●              | ●           | ●              |
|                                                       | RE 0.8      | ●              | ●           | ●              |
|                                                       | 3.18mm      | ●              | ●           | ●              |
|                                                       | RE 0.2      | ●              | ●           | ●              |
|                                                       | RE 0.4      | ●              | ●           | ●              |

● : Standard insert with dimensions

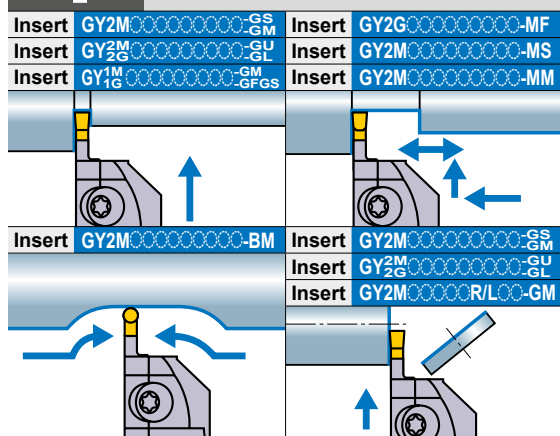
IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

F  
GROOVING / CUTTING OFF

# GY SERIES (EXTERNAL)

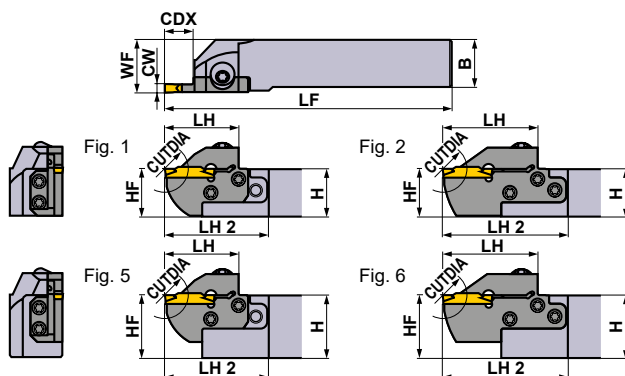
1

### 00° type holder



**Note 1) For modular blades and modular holders, please order separately.**

**Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.**



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |       |        | Type             | Hand (R/L) | Order Number     |       |               |       | Fig. |  |
|-----------|-----------------|-------|--------|------------------|------------|------------------|-------|---------------|-------|------|--|
|           | CW              | CDX   | CUTDIA |                  |            | Holder           | Stock | Modular Blade | Stock |      |  |
| D         | 2.00<br>2.24    | 6     | 12     | Modular          | R          | GYHR1616J00-M20R | ●     | GYM20RA-D06   | ●     | 3    |  |
|           |                 |       |        |                  | L          | GYHL1616J00-M20L | ●     | GYM20LA-D06   | ●     | 3    |  |
|           |                 |       |        | Monoblock        | R          | GYQR2020K00-D06  | ●     | —             | —     | 7    |  |
|           |                 |       |        |                  | L          | GYQL2020K00-D06  | ●     | —             | —     | 7    |  |
|           |                 |       |        | Modular          | R          | GYHR2020K00-M20R | ●     | GYM20RA-D06   | ●     | 1    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M20L | ●     | GYM20LA-D06   | ●     | 1    |  |
|           |                 |       |        | Modular          | R          | GYHR2020K00-M25R | ●     | GYM25RA-D06   | ●     | 3    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M25L | ●     | GYM25LA-D06   | ●     | 3    |  |
|           |                 |       |        | Monoblock        | R          | GYQR2525M00-D06  | ●     | —             | —     | 7    |  |
|           |                 |       |        |                  | L          | GYQL2525M00-D06  | ●     | —             | —     | 7    |  |
|           |                 |       |        | Modular          | R          | GYHR2525M00-M25R | ●     | GYM25RA-D06   | ●     | 1    |  |
|           |                 |       |        |                  | L          | GYHL2525M00-M25L | ●     | GYM25LA-D06   | ●     | 1    |  |
|           |                 |       |        | Modular          | R          | GYHR3225P00-M25R | ●     | GYM25RA-D06   | ●     | 5    |  |
|           |                 |       |        |                  | L          | GYHL3225P00-M25L | ●     | GYM25LA-D06   | ●     | 5    |  |
|           |                 |       |        | Modular          | R          | GYHR3232P00-M25R | ●     | GYM25RA-D06   | ●     | 5    |  |
|           |                 |       |        |                  | L          | GYHL3232P00-M25L | ●     | GYM25LA-D06   | ●     | 5    |  |
|           |                 | 10    | 20     | Modular          | R          | GYHR1616J00-M20R | ●     | GYM20RA-D10   | ●     | 3    |  |
|           |                 |       |        |                  | L          | GYHL1616J00-M20L | ●     | GYM20LA-D10   | ●     | 3    |  |
|           |                 |       |        | Modular          | R          | GYHR2020K00-M20R | ●     | GYM20RA-D10   | ●     | 1    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M20L | ●     | GYM20LA-D10   | ●     | 1    |  |
|           |                 | 12    | 24     | Modular          | R          | GYHR2020K00-M25R | ●     | GYM25RA-D12   | ●     | 3    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M25L | ●     | GYM25LA-D12   | ●     | 3    |  |
|           |                 |       |        | Modular          | R          | GYHR2525M00-M25R | ●     | GYM25RA-D12   | ●     | 1    |  |
|           |                 |       |        |                  | L          | GYHL2525M00-M25L | ●     | GYM25LA-D12   | ●     | 1    |  |
|           |                 |       |        | Modular          | R          | GYHR3225P00-M25R | ●     | GYM25RA-D12   | ●     | 5    |  |
|           |                 |       |        |                  | L          | GYHL3225P00-M25L | ●     | GYM25LA-D12   | ●     | 5    |  |
|           |                 | 12    | 24     | Modular          | R          | GYHR3232P00-M25R | ●     | GYM25RA-D12   | ●     | 5    |  |
|           |                 |       |        |                  | L          | GYHL3232P00-M25L | ●     | GYM25LA-D12   | ●     | 5    |  |
|           |                 |       |        | Modular          | R          | GYHR1616J00-M20R | ●     | GYM20RB-D18   | ●     | 4    |  |
|           |                 |       |        |                  | L          | GYHL1616J00-M20L | ●     | GYM20LB-D18   | ●     | 4    |  |
|           |                 | 18 *4 | 36     | Modular          | R          | GYHR1616J00-M20R | ●     | GYM20RB-D18   | ●     | 2    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M20L | ●     | GYM20LB-D18   | ●     | 2    |  |
|           |                 |       |        | Monoblock        | R          | GYQR2020K00-D18  | ●     | —             | —     | 7    |  |
|           |                 |       |        |                  | L          | GYQL2020K00-D18  | ●     | —             | —     | 7    |  |
|           |                 | 20 *1 | 40 *2  | Modular          | R          | GYHR2020K00-M25R | ●     | GYM25RA-D20   | ●     | 4    |  |
|           |                 |       |        |                  | L          | GYHL2020K00-M25L | ●     | GYM25LA-D20   | ●     | 4    |  |
| Monoblock | R               |       |        | GYQR2525M00-D20  | ●          | —                | —     | 7             |       |      |  |
|           | L               |       |        | GYQL2525M00-D20  | ●          | —                | —     | 7             |       |      |  |
| Modular   | R               |       |        | GYHR2525M00-M25R | ●          | GYM25RA-D20      | ●     | 2             |       |      |  |
|           | L               |       |        | GYHL2525M00-M25L | ●          | GYM25LA-D20      | ●     | 2             |       |      |  |
| Modular   | R               |       |        | GYHR3225P00-M25R | ●          | GYM25RA-D20      | ●     | 6             |       |      |  |
|           | L               |       |        | GYHL3225P00-M25L | ●          | GYM25LA-D20      | ●     | 6             |       |      |  |
| Modular   | R               |       |        | GYHR3232P00-M25R | ●          | GYM25RA-D20      | ●     | 6             |       |      |  |
|           | L               |       |        | GYHL3232P00-M25L | ●          | GYM25LA-D20      | ●     | 6             |       |      |  |

\*1 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.

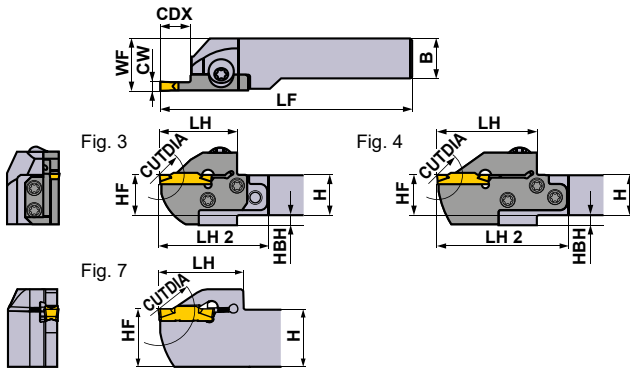
The cut off diameter is double the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then **LF**, **LH**, **LH2** and **WF** values may vary.

\*4 The maximum groove depth (**CDX**) is limited by the workpiece diameter. For details, please refer to page F102.

● : Inventory maintained.

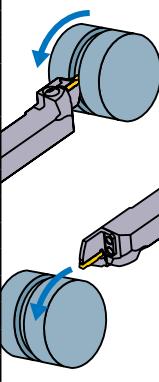
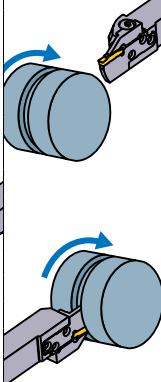
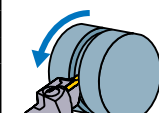
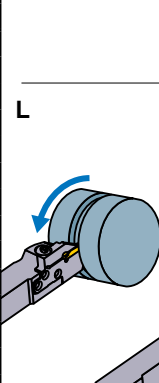
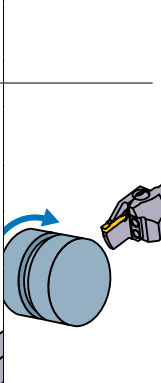
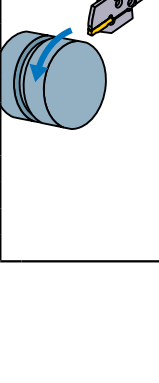
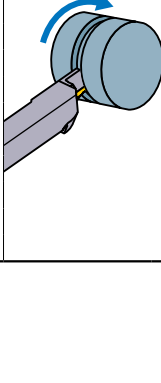
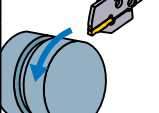
★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

| Dimensions (mm) ★3 |    |     |    |      |    |       |     |                                                                                     | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF    | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise                                                                       |
| 16                 | 16 | 104 | 28 | 44   | 16 | 20    | 4   |   |   |   |
| 16                 | 16 | 104 | 28 | 44   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 36 | —    | 20 | 20.15 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 36 | —    | 20 | 20.15 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 28 | 43   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 28 | 43   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 117 | 31 | 52   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 117 | 31 | 52   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 36 | —    | 25 | 25.15 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 36 | —    | 25 | 25.15 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 142 | 31 | 49   | 25 | 28    | —   |  |  |  |
| 25                 | 25 | 142 | 31 | 49   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 162 | 31 | 49   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 162 | 31 | 49   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 162 | 31 | 49   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 162 | 31 | 49   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |  |  |  |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 116 | 40 | 56   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 116 | 40 | 56   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | —    | 20 | 20.1  | —   |  |  |  |
| 20                 | 20 | 125 | 39 | —    | 20 | 20.1  | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 40 | 55   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 40 | 55   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 45 | 66   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 45 | 66   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.1  | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.1  | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 156 | 45 | 63   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 156 | 45 | 63   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 176 | 45 | 63   | 32 | 28    | —   |  |  |  |
| 32                 | 25 | 176 | 45 | 63   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |  |  |  |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                         |
|-----------|---------------------------------------|
| D         | GY00200/0224D—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                         |                        |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | 05-GM<br>(Cutting off) |
| CW                                               |             | Neutral                 | Neutral     | Neutral        | Neutral                 | With hand              |
| D                                                | 2.00mm      | ●                       | ●           | ●              | ●                       | ●                      |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
| CW                                                    |             |                |             | BM<br>(Copying, Recessing) |
| D                                                     | 2.00mm      | ●              | ●           | ●                          |
|                                                       | 2.24mm      | ●              | ●           | ●                          |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

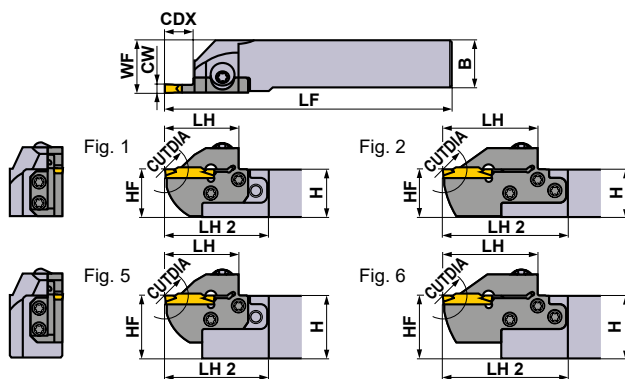
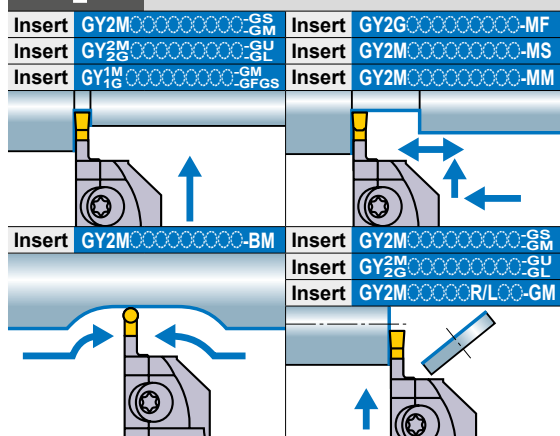
# GY SERIES (EXTERNAL)

1

### 00° type holder

**Note 1) For modular blades and modular holders, please order separately.**

**Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.**



Right hand tool holder shown.

| Seat<br>Size | Dimensions (mm)      |         |                  | Type             | Hand<br>(R/L)    | Order Number     |             |               |       | Fig. |  |
|--------------|----------------------|---------|------------------|------------------|------------------|------------------|-------------|---------------|-------|------|--|
|              | CW                   | CDX     | CUTDIA           |                  |                  | Holder           | Stock       | Modular Blade | Stock |      |  |
| E            | 2.39<br>2.50<br>2.74 | 6       | 12               | Modular          | R                | GYHR1616J00-M20R | ●           | GYM20RA-E06   | ●     | 3    |  |
|              |                      |         |                  | L                | GYHL1616J00-M20L | ●                | GYM20LA-E06 | ●             | 3     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR2020K00-M20R | ●           | GYM20RA-E06   | ●     | 1    |  |
|              |                      |         |                  | L                | GYHL2020K00-M20L | ●                | GYM20LA-E06 | ●             | 1     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR2020K00-M25R | ●           | GYM25RA-E06   | ●     | 3    |  |
|              |                      |         |                  | L                | GYHL2020K00-M25L | ●                | GYM25LA-E06 | ●             | 3     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR2525M00-M25R | ●           | GYM25RA-E06   | ●     | 1    |  |
|              |                      |         |                  | L                | GYHL2525M00-M25L | ●                | GYM25LA-E06 | ●             | 1     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR3225P00-M25R | ●           | GYM25RA-E06   | ●     | 5    |  |
|              |                      |         |                  | L                | GYHL3225P00-M25L | ●                | GYM25LA-E06 | ●             | 5     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR3232P00-M25R | ●           | GYM25RA-E06   | ●     | 5    |  |
|              |                      |         |                  | L                | GYHL3232P00-M25L | ●                | GYM25LA-E06 | ●             | 5     |      |  |
|              |                      | 10      | 20               | Modular          | R                | GYHR1616J00-M20R | ●           | GYM20RA-E10   | ●     | 3    |  |
|              |                      |         |                  | L                | GYHL1616J00-M20L | ●                | GYM20LA-E10 | ●             | 3     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR2020K00-M20R | ●           | GYM20RA-E10   | ●     | 1    |  |
|              |                      |         |                  | L                | GYHL2020K00-M20L | ●                | GYM20LA-E10 | ●             | 1     |      |  |
|              |                      | 12      | 24               | Modular          | R                | GYHR2020K00-M25R | ●           | GYM25RA-E12   | ●     | 3    |  |
|              |                      |         |                  | L                | GYHL2020K00-M25L | ●                | GYM25LA-E12 | ●             | 3     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR2525M00-M25R | ●           | GYM25RA-E12   | ●     | 1    |  |
|              |                      |         |                  | L                | GYHL2525M00-M25L | ●                | GYM25LA-E12 | ●             | 1     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR3225P00-M25R | ●           | GYM25RA-E12   | ●     | 5    |  |
|              |                      |         |                  | L                | GYHL3225P00-M25L | ●                | GYM25LA-E12 | ●             | 5     |      |  |
|              |                      |         |                  | Modular          | R                | GYHR3232P00-M25R | ●           | GYM25RA-E12   | ●     | 5    |  |
|              |                      |         |                  | L                | GYHL3232P00-M25L | ●                | GYM25LA-E12 | ●             | 5     |      |  |
| 18 *4        | 36                   | Modular | R                | GYHR1616J00-M20R | ●                | GYM20RB-E18      | ●           | 4             |       |      |  |
|              |                      | L       | GYHL1616J00-M20L | ●                | GYM20LB-E18      | ●                | 4           |               |       |      |  |
|              |                      | Modular | R                | GYHR2020K00-M20R | ●                | GYM20RB-E18      | ●           | 2             |       |      |  |
|              |                      | L       | GYHL2020K00-M20L | ●                | GYM20LB-E18      | ●                | 2           |               |       |      |  |
| 20 *1        | 40 *2                | Modular | R                | GYHR2020K00-M25R | ●                | GYM25RA-E20      | ●           | 4             |       |      |  |
|              |                      | L       | GYHL2020K00-M25L | ●                | GYM25LA-E20      | ●                | 4           |               |       |      |  |
|              |                      | Modular | R                | GYHR2525M00-M25R | ●                | GYM25RA-E20      | ●           | 2             |       |      |  |
|              |                      | L       | GYHL2525M00-M25L | ●                | GYM25LA-E20      | ●                | 2           |               |       |      |  |
|              |                      | Modular | R                | GYHR3225P00-M25R | ●                | GYM25RA-E20      | ●           | 6             |       |      |  |
|              |                      | L       | GYHL3225P00-M25L | ●                | GYM25LA-E20      | ●                | 6           |               |       |      |  |
|              |                      | Modular | R                | GYHR3232P00-M25R | ●                | GYM25RA-E20      | ●           | 6             |       |      |  |
|              |                      | L       | GYHL3232P00-M25L | ●                | GYM25LA-E20      | ●                | 6           |               |       |      |  |

\*1 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.

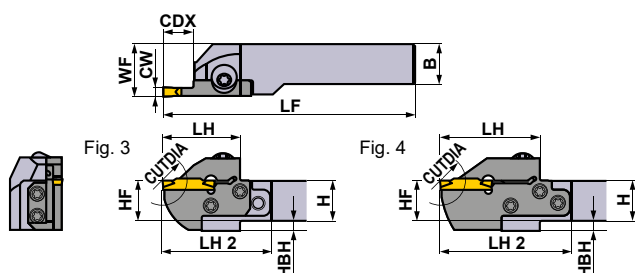
The cut off diameter is double the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then **LF**, **LH**, **LH2** and **WF** values may vary.

\*4 The maximum groove depth (**CDX**) is limited by the workpiece diameter. For details, please refer to page F102.

● : Inventory maintained.

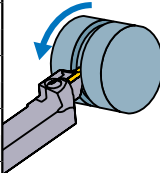
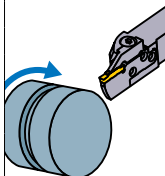
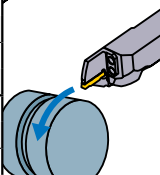
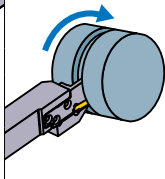
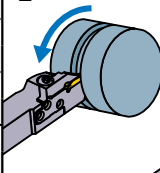
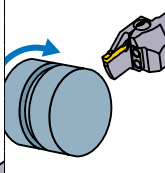
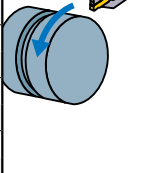
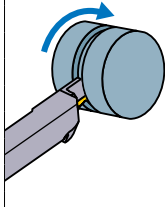
★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| GYHR/L |                                                                                     | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

|   | Dimensions (mm) |    |     |    |      |    |    |     | *3                                                                                  | Cutting Mode                                                                        |               |
|---|-----------------|----|-----|----|------|----|----|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|
|   | H               | B  | LF  | LH | LH 2 | HF | WF | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise |
| R | 16              | 16 | 104 | 28 | 44   | 16 | 20 | 4   |   |   |               |
|   | 16              | 16 | 104 | 28 | 44   | 16 | 20 | 4   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 119 | 28 | 43   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 119 | 28 | 43   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 117 | 31 | 52   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 117 | 31 | 52   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 25              | 25 | 142 | 31 | 49   | 25 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 25              | 25 | 142 | 31 | 49   | 25 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 25 | 162 | 31 | 49   | 32 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 25 | 162 | 31 | 49   | 32 | 28 | —   |                                                                                     |                                                                                     |               |
| L | 32              | 32 | 162 | 31 | 49   | 32 | 35 | —   |  |  |               |
|   | 32              | 32 | 162 | 31 | 49   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 16              | 16 | 110 | 34 | 50   | 16 | 20 | 4   |                                                                                     |                                                                                     |               |
|   | 16              | 16 | 110 | 34 | 50   | 16 | 20 | 4   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 125 | 34 | 49   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 125 | 34 | 49   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 125 | 39 | 60   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 125 | 39 | 60   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 25              | 25 | 150 | 39 | 57   | 25 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 25              | 25 | 150 | 39 | 57   | 25 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 25 | 170 | 39 | 57   | 32 | 28 | —   |  |  |               |
|   | 32              | 25 | 170 | 39 | 57   | 32 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 170 | 39 | 57   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 170 | 39 | 57   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 16              | 16 | 116 | 40 | 56   | 16 | 20 | 4   |                                                                                     |                                                                                     |               |
|   | 16              | 16 | 116 | 40 | 56   | 16 | 20 | 4   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 131 | 40 | 55   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 131 | 40 | 55   | 20 | 23 | —   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 131 | 45 | 66   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 20              | 20 | 131 | 45 | 66   | 20 | 26 | 5   |                                                                                     |                                                                                     |               |
|   | 25              | 25 | 156 | 45 | 63   | 25 | 28 | —   |  |  |               |
|   | 25              | 25 | 156 | 45 | 63   | 25 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 25 | 176 | 45 | 63   | 32 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 25 | 176 | 45 | 63   | 32 | 28 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 176 | 45 | 63   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 176 | 45 | 63   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 176 | 45 | 63   | 32 | 35 | —   |                                                                                     |                                                                                     |               |
|   | 32              | 32 | 176 | 45 | 63   | 32 | 35 | —   |                                                                                     |                                                                                     |               |

## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| E         | GY00239/0250/0274E0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                         |                        |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | G5-GM<br>(Cutting off) |
| CW                                               |             | Neutral                 | Neutral     | Neutral        | Neutral                 | With hand              |
| E                                                | 2.39mm      | ●                       | ●           | ●              | ●                       | ●                      |
|                                                  | 2.50mm      | ●                       | ●           | ●              | ●                       | ●                      |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
| CW                                                    |             |                |             | BM<br>(Copying, Recessing) |
| E                                                     | 2.39mm      | ●              |             |                            |
|                                                       | 2.50mm      | ●              | ●           | ●                          |
|                                                       | 2.74mm      | ●              |             |                            |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

F025

GROOVING / CUTTING OFF



# GY SERIES (EXTERNAL)

1

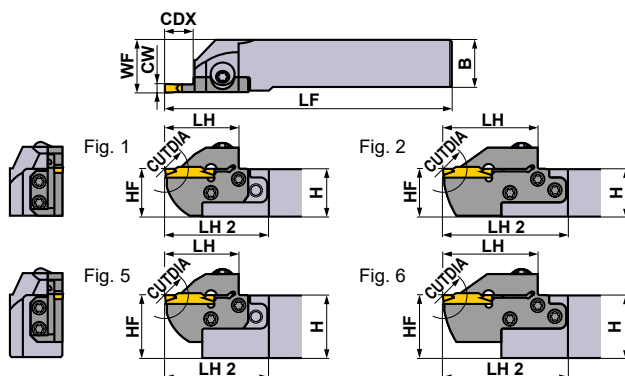
### 00° type holder

Diagram illustrating the correct insertion of GY2M cables into cable glands. The glands are labeled with their part numbers: GS-GM, GU-GL, MS-MM, BM, and R/L-L-GM. The diagrams show the cable being inserted into the gland and the resulting position of the cable within the gland.

- Insert GY2M<sup>GS</sup> -GS-GM**: Cable is inserted into the gland and the gland is closed.
- Insert GY2M<sup>GU</sup> -GU-GL**: Cable is inserted into the gland and the gland is closed.
- Insert GY2M<sup>MS</sup> -MS-MM**: Cable is inserted into the gland and the gland is closed.
- Insert GY2M<sup>BM</sup> -BM**: Cable is inserted into the gland and the gland is closed.
- Insert GY2M<sup>R/L-L-GM</sup> -R/L-L-GM**: Cable is inserted into the gland and the gland is closed.

**Note 1) For modular blades and modular holders, please order separately.**

**Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.**



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |                  |                  | Type             | Hand (R/L)  | Order Number     |       |               |       | Fig. |  |
|-----------|----------------------|------------------|------------------|------------------|-------------|------------------|-------|---------------|-------|------|--|
|           | CW                   | CDX              | CUTDIA           |                  |             | Holder           | Stock | Modular Blade | Stock |      |  |
| F         | 3.00<br>3.18<br>3.24 | 6                | 12               | Modular          | R           | GYHR1616J00-M20R | ●     | GYM20RA-F06   | ●     | 3    |  |
|           |                      |                  |                  |                  | L           | GYHL1616J00-M20L | ●     | GYM20LA-F06   | ●     | 3    |  |
|           |                      |                  |                  | Monoblock        | R           | GYQR2020K00-F06  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  |                  | L           | GYQL2020K00-F06  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2020K00-M20R | ●     | GYM20RA-F06   | ●     | 1    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M20L | ●     | GYM20LA-F06   | ●     | 1    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2020K00-M25R | ●     | GYM25RA-F06   | ●     | 3    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M25L | ●     | GYM25LA-F06   | ●     | 3    |  |
|           |                      |                  |                  | Monoblock        | R           | GYQR2525M00-F06  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  |                  | L           | GYQL2525M00-F06  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2525M00-M25R | ●     | GYM25RA-F06   | ●     | 1    |  |
|           |                      |                  |                  |                  | L           | GYHL2525M00-M25L | ●     | GYM25LA-F06   | ●     | 1    |  |
|           |                      | Modular          | R                | GYHR3225P00-M25R | ●           | GYM25RA-F06      | ●     | 5             |       |      |  |
|           |                      |                  | L                | GYHL3225P00-M25L | ●           | GYM25LA-F06      | ●     | 5             |       |      |  |
|           |                      | Modular          | R                | GYHR3232P00-M25R | ●           | GYM25RA-F06      | ●     | 5             |       |      |  |
|           |                      |                  | L                | GYHL3232P00-M25L | ●           | GYM25LA-F06      | ●     | 5             |       |      |  |
|           |                      | 10               | 20               | Modular          | R           | GYHR1616J00-M20R | ●     | GYM20RA-F10   | ●     | 3    |  |
|           |                      |                  |                  |                  | L           | GYHL1616J00-M20L | ●     | GYM20LA-F10   | ●     | 3    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2020K00-M20R | ●     | GYM20RA-F10   | ●     | 1    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M20L | ●     | GYM20LA-F10   | ●     | 1    |  |
|           |                      | 12               | 24               | Modular          | R           | GYHR2020K00-M25R | ●     | GYM25RA-F12   | ●     | 3    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M25L | ●     | GYM25LA-F12   | ●     | 3    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2525M00-M25R | ●     | GYM25RA-F12   | ●     | 1    |  |
|           |                      |                  |                  |                  | L           | GYHL2525M00-M25L | ●     | GYM25LA-F12   | ●     | 1    |  |
|           |                      |                  |                  | Modular          | R           | GYHR3225P00-M25R | ●     | GYM25RA-F12   | ●     | 5    |  |
|           |                      |                  |                  |                  | L           | GYHL3225P00-M25L | ●     | GYM25LA-F12   | ●     | 5    |  |
|           |                      | 18 *4            | 36               | Modular          | R           | GYHR1616J00-M20R | ●     | GYM20RB-F18   | ●     | 4    |  |
|           |                      |                  |                  |                  | L           | GYHL1616J00-M20L | ●     | GYM20LB-F18   | ●     | 4    |  |
|           |                      |                  |                  | Monoblock        | R           | GYQR2020K00-F18  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  |                  | L           | GYQL2020K00-F18  | ●     | —             | —     | 7    |  |
|           |                      | 20 *1            | 40 *2            | Modular          | R           | GYHR2020K00-M20R | ●     | GYM20RB-F18   | ●     | 2    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M20L | ●     | GYM20LB-F18   | ●     | 2    |  |
|           |                      |                  |                  | Modular          | R           | GYHR2020K00-M25R | ●     | GYM25RA-F20   | ●     | 4    |  |
|           |                      |                  |                  |                  | L           | GYHL2020K00-M25L | ●     | GYM25LA-F20   | ●     | 4    |  |
|           |                      |                  |                  | Monoblock        | R           | GYQR2525M00-F20  | ●     | —             | —     | 7    |  |
|           |                      |                  |                  |                  | L           | GYQL2525M00-F20  | ●     | —             | —     | 7    |  |
| Modular   | R                    |                  |                  | GYHR2525M00-M25R | ●           | GYM25RA-F20      | ●     | 2             |       |      |  |
|           | L                    |                  |                  | GYHL2525M00-M25L | ●           | GYM25LA-F20      | ●     | 2             |       |      |  |
| Modular   | R                    | GYHR3225P00-M25R | ●                | GYM25RA-F20      | ●           | 6                |       |               |       |      |  |
|           |                      | L                | GYHL3225P00-M25L | ●                | GYM25LA-F20 | ●                | 6     |               |       |      |  |
|           | Modular              | R                | GYHR3232P00-M25R | ●                | GYM25RA-F20 | ●                | 6     |               |       |      |  |
|           |                      | L                | GYHL3232P00-M25L | ●                | GYM25LA-F20 | ●                | 6     |               |       |      |  |

\*1 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.

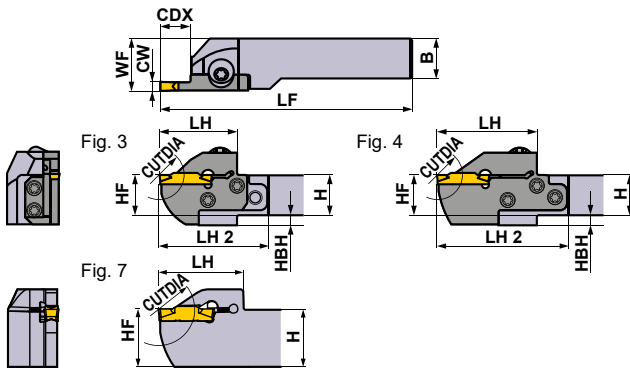
The cut off diameter is double the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then **LF**, **LH**, **LH2** and **WF** values may vary.

\*4 The maximum groove depth (**CDX**) is limited by the workpiece diameter. For details, please refer to page F102.

● : Inventory maintained.

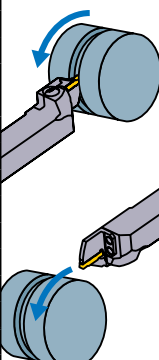
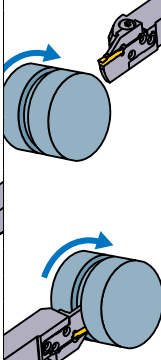
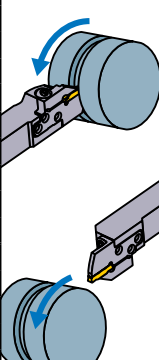
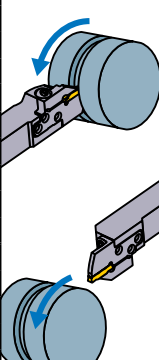
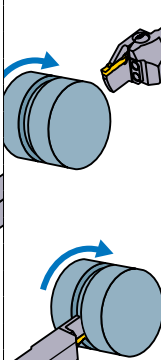
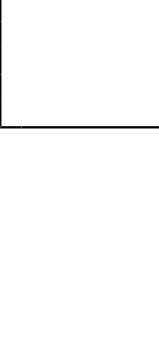
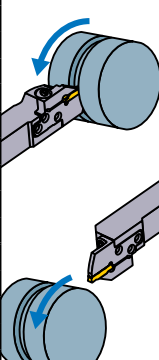
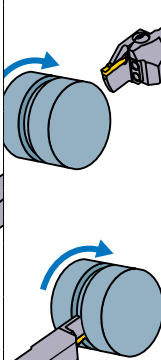
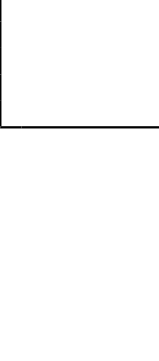
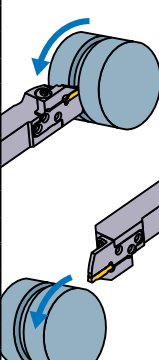
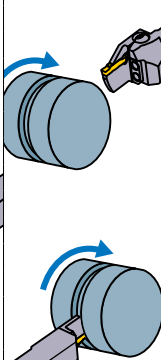
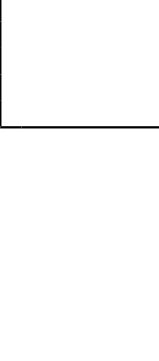
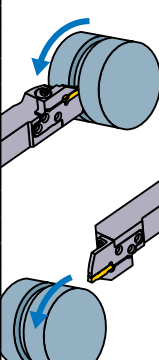
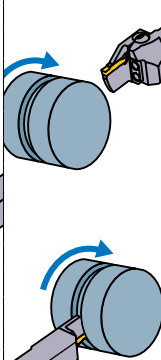
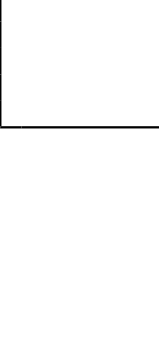
★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

| Dimensions (mm) ★3 |    |     |    |      |    |       |     |                                                                                     | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF    | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise                                                                       |
| 16                 | 16 | 104 | 28 | 44   | 16 | 20    | 4   |   |   |  |
| 16                 | 16 | 104 | 28 | 44   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 36 | —    | 20 | 20.3  | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 36 | —    | 20 | 20.3  | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 28 | 43   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 28 | 43   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 117 | 31 | 52   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 117 | 31 | 52   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 36 | —    | 25 | 25.3  | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 36 | —    | 25 | 25.3  | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 142 | 31 | 49   | 25 | 28    | —   |  |  |  |
| 25                 | 25 | 142 | 31 | 49   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 162 | 31 | 49   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 162 | 31 | 49   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 162 | 31 | 49   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 162 | 31 | 49   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |  |  |  |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 116 | 40 | 56   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 16                 | 16 | 116 | 40 | 56   | 16 | 20    | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | —    | 20 | 20.25 | —   |  |  |  |
| 20                 | 20 | 125 | 39 | —    | 20 | 20.25 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 40 | 55   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 40 | 55   | 20 | 23    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 45 | 66   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 131 | 45 | 66   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.25 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.25 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 156 | 45 | 63   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 156 | 45 | 63   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 176 | 45 | 63   | 32 | 28    | —   |  |  |  |
| 32                 | 25 | 176 | 45 | 63   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 176 | 45 | 63   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| F         | GY00300/0318/0324E—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                        |                        |                          |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|------------------------|--------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminum alloy) | 05-GM<br>(Cutting off) | GFGS<br>(Hardened steel) |
| CW                                               |             | Neutral                 | Neutral     | Neutral        | Neutral                | With hand              | Neutral                  |
|                                                  |             |                         |             |                |                        |                        |                          |
| F                                                | 3.00mm      | ●                       | ●           | ●              | ●                      | ●                      | ●                        |
|                                                  | 3.18mm      | ●                       | ●           | ●              | ●                      | ●                      | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying, Recessing) |
| F                                                     |             |                |             |                | Ball shape                 |
|                                                       | 3.00mm      |                |             |                | ●                          |
|                                                       | RE 0.2      | ●              | ●           | ●              |                            |
|                                                       | RE 0.4      | ●              | ●           | ●              |                            |
|                                                       | RE 0.8      |                |             | ●              |                            |
|                                                       | 3.18mm      |                |             |                | ●                          |
|                                                       | RE 0.2      | ●              |             |                |                            |
|                                                       | RE 0.4      | ●              |             |                |                            |
|                                                       | 3.24mm      | ●              |             |                |                            |
|                                                       |             |                |             |                |                            |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105



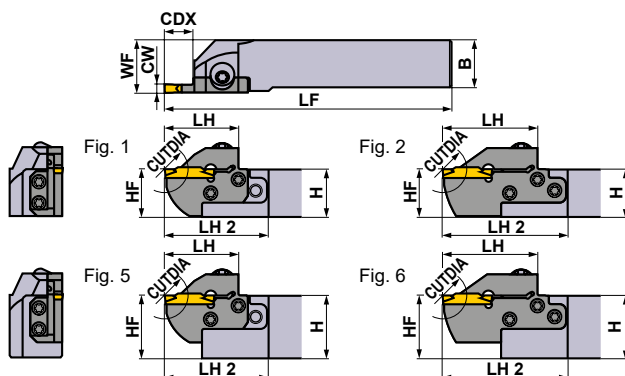
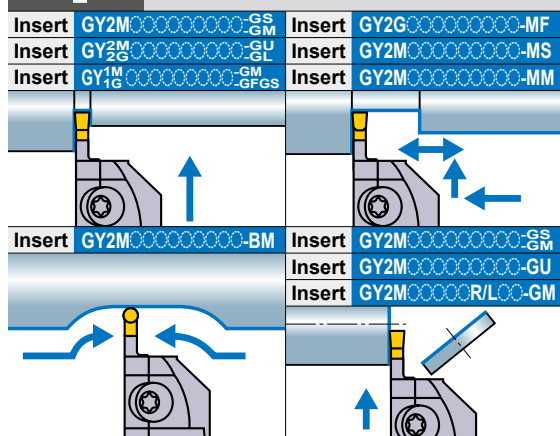
# GY SERIES (EXTERNAL)

1

### 00° type holder

**Note 1) For modular blades and modular holders, please order separately.**

**Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.**



Right hand tool holder shown.

| Seat Size | Dimensions (mm)  |       |        | Type             | Hand (R/L)       | Order Number     |             |               |       | Fig. |  |
|-----------|------------------|-------|--------|------------------|------------------|------------------|-------------|---------------|-------|------|--|
|           | CW               | CDX   | CUTDIA |                  |                  | Holder           | Stock       | Modular Blade | Stock |      |  |
| G         | 4.00<br>4.24     | 8     | 16     | Monoblock        | R                | GYQR2020K00-G08  | ●           | —             | —     | 7    |  |
|           |                  |       |        | L                | GYQL2020K00-G08  | ●                | —           | —             | 7     |      |  |
|           |                  |       |        | Modular          | R                | GYHR2020K00-M25R | ●           | GYM25RA-G08   | ●     | 3    |  |
|           |                  |       |        | L                | GYHL2020K00-M25L | ●                | GYM25LA-G08 | ●             | 3     |      |  |
|           |                  |       |        | Monoblock        | R                | GYQR2525M00-G08  | ●           | —             | —     | 7    |  |
|           |                  |       |        | L                | GYQL2525M00-G08  | ●                | —           | —             | 7     |      |  |
|           |                  |       |        | Modular          | R                | GYHR2525M00-M25R | ●           | GYM25RA-G08   | ●     | 1    |  |
|           |                  |       |        | L                | GYHL2525M00-M25L | ●                | GYM25LA-G08 | ●             | 1     |      |  |
|           |                  |       |        | Modular          | R                | GYHR3225P00-M25R | ●           | GYM25RA-G08   | ●     | 5    |  |
|           |                  |       |        | L                | GYHL3225P00-M25L | ●                | GYM25LA-G08 | ●             | 5     |      |  |
|           |                  |       |        | Modular          | R                | GYHR3232P00-M25R | ●           | GYM25RA-G08   | ●     | 5    |  |
|           |                  |       |        | L                | GYHL3232P00-M25L | ●                | GYM25LA-G08 | ●             | 5     |      |  |
|           |                  | 12    | 24     | Modular          | R                | GYHR1616J00-M20R | ●           | GYM20RA-G12   | ●     | 3    |  |
|           |                  |       |        | L                | GYHL1616J00-M20L | ●                | GYM20LA-G12 | ●             | 3     |      |  |
|           |                  |       |        | Modular          | R                | GYHR2020K00-M20R | ●           | GYM20RA-G12   | ●     | 1    |  |
|           |                  |       |        | L                | GYHL2020K00-M20L | ●                | GYM20LA-G12 | ●             | 1     |      |  |
|           |                  | 14    | 28     | Modular          | R                | GYHR2020K00-M25R | ●           | GYM25RA-G14   | ●     | 3    |  |
|           |                  |       |        | L                | GYHL2020K00-M25L | ●                | GYM25LA-G14 | ●             | 3     |      |  |
|           |                  |       |        | Modular          | R                | GYHR2525M00-M25R | ●           | GYM25RA-G14   | ●     | 1    |  |
|           |                  |       |        | L                | GYHL2525M00-M25L | ●                | GYM25LA-G14 | ●             | 1     |      |  |
|           |                  |       |        | Modular          | R                | GYHR3225P00-M25R | ●           | GYM25RA-G14   | ●     | 5    |  |
|           |                  |       |        | L                | GYHL3225P00-M25L | ●                | GYM25LA-G14 | ●             | 5     |      |  |
|           |                  |       |        | Modular          | R                | GYHR3232P00-M25R | ●           | GYM25RA-G14   | ●     | 5    |  |
|           |                  |       |        | L                | GYHL3232P00-M25L | ●                | GYM25LA-G14 | ●             | 5     |      |  |
|           |                  | 25 *1 | 50 *2  | Monoblock        | R                | GYQR2020K00-G25  | ●           | —             | —     | 8    |  |
|           |                  |       |        | L                | GYQL2020K00-G25  | ●                | —           | —             | 8     |      |  |
|           |                  |       |        | Modular          | R                | GYHR2020K00-M25R | ●           | GYM25RA-G25   | ●     | 4    |  |
|           |                  |       |        | L                | GYHL2020K00-M25L | ●                | GYM25LA-G25 | ●             | 4     |      |  |
| Monoblock | R                |       |        | GYQR2525M00-G25  | ●                | —                | —           | 7             |       |      |  |
| L         | GYQL2525M00-G25  |       |        | ●                | —                | —                | 7           |               |       |      |  |
| Modular   | R                |       |        | GYHR2525M00-M25R | ●                | GYM25RA-G25      | ●           | 2             |       |      |  |
| L         | GYHL2525M00-M25L |       |        | ●                | GYM25LA-G25      | ●                | 2           |               |       |      |  |
| Modular   | R                |       |        | GYHR3225P00-M25R | ●                | GYM25RA-G25      | ●           | 6             |       |      |  |
| L         | GYHL3225P00-M25L |       |        | ●                | GYM25LA-G25      | ●                | 6           |               |       |      |  |
| Modular   | R                |       |        | GYHR3232P00-M25R | ●                | GYM25RA-G25      | ●           | 6             |       |      |  |
| L         | GYHL3232P00-M25L |       |        | ●                | GYM25LA-G25      | ●                | 6           |               |       |      |  |

\*1 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

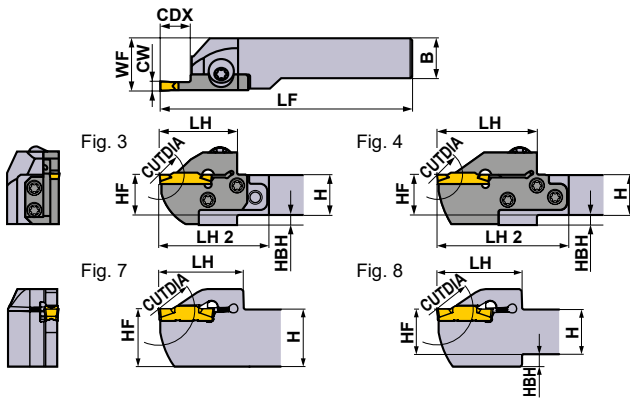
\*2 The maximum cut off diameter (**CUTDIA**) varies according to the insert used.

The cut off diameter is double the maximum groove depth (**CDX**) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then **LF**, **LH**, **LH2** and **WF** values may vary.

● : Inventory maintained.

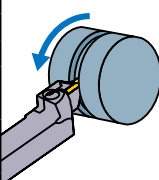
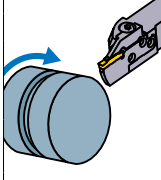
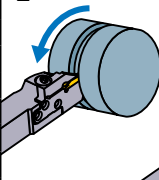
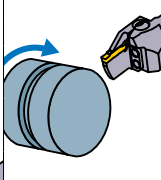
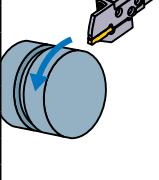
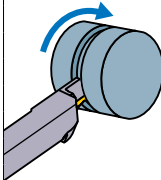
★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

| Dimensions (mm) ★3 |    |     |    |      |    |       |     | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF    | HBH | Clockwise                                                                           | Anticlockwise                                                                       |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |   |   |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |  |  |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |  |  |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |  |  |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| G         | GY000400/0424E0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                        |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | 05-GM<br>(Cutting off) | GFGS<br>(hardened steel) |
|                                                   | CW          | Neutral                 | Neutral     | Neutral        | With hand              | Neutral                  |
| G                                                 | 4.00mm      | ●                       | ●           | ●              | ●                      | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |                   |                |             |                |                            |
|-------------------------------------------------------|-------------------|----------------|-------------|----------------|----------------------------|
| Seat Size                                             | Chipbreaker<br>CW | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying, Recessing) |
|                                                       |                   |                |             |                | Ball shape                 |
| G                                                     | 4.00mm            | ●              | ●           | ●              | ●                          |
|                                                       | RE 0.2            | ●              | ●           | ●              |                            |
|                                                       | RE 0.4            | ●              | ●           | ●              |                            |
|                                                       | RE 0.8            | ●              |             | ●              |                            |
|                                                       | 4.24mm            | ●              |             |                |                            |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

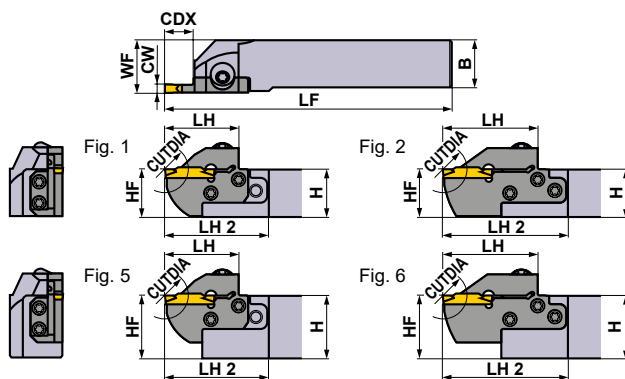
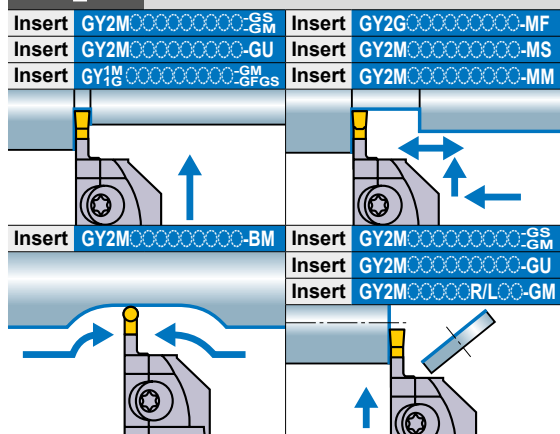
# GY SERIES (EXTERNAL)

1

00° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |       |        | Type      | Hand (R/L) | Order Number     |       |               |       | Fig. |
|-----------|----------------------|-------|--------|-----------|------------|------------------|-------|---------------|-------|------|
|           | CW                   | CDX   | CUTDIA |           |            | Holder           | Stock | Modular Blade | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 8     | 16     | Monoblock | R          | GYQR2020K00-H08  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2020K00-H08  | ●     | —             | —     | 7    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-H08   | ●     | 3    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-H08   | ●     | 3    |
|           |                      |       |        | Monoblock | R          | GYQR2525M00-H08  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2525M00-H08  | ●     | —             | —     | 7    |
|           |                      | 12    | 24     | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-H08   | ●     | 1    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-H08   | ●     | 1    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-H08   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-H08   | ●     | 5    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-H08   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-H08   | ●     | 5    |
|           |                      | 14    | 28     | Modular   | R          | GYHR1616J00-M20R | ●     | GYM20RA-H12   | ●     | 3    |
|           |                      |       |        |           | L          | GYHL1616J00-M20L | ●     | GYM20LA-H12   | ●     | 3    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M20R | ●     | GYM20RA-H12   | ●     | 1    |
|           |                      |       |        |           | L          | GYHL2020K00-M20L | ●     | GYM20LA-H12   | ●     | 1    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-H14   | ●     | 3    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-H14   | ●     | 3    |
|           |                      | 25 *1 | 50 *2  | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-H14   | ●     | 1    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-H14   | ●     | 1    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-H14   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-H14   | ●     | 5    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-H14   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-H14   | ●     | 5    |
|           |                      |       |        | Monoblock | R          | GYQR2020K00-H25  | ●     | —             | —     | 8    |
|           |                      |       |        |           | L          | GYQL2020K00-H25  | ●     | —             | —     | 8    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-H25   | ●     | 4    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-H25   | ●     | 4    |
|           |                      |       |        | Monoblock | R          | GYQR2525M00-H25  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2525M00-H25  | ●     | —             | —     | 7    |
|           |                      |       |        | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-H25   | ●     | 2    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-H25   | ●     | 2    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-H25   | ●     | 6    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-H25   | ●     | 6    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-H25   | ●     | 6    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-H25   | ●     | 6    |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

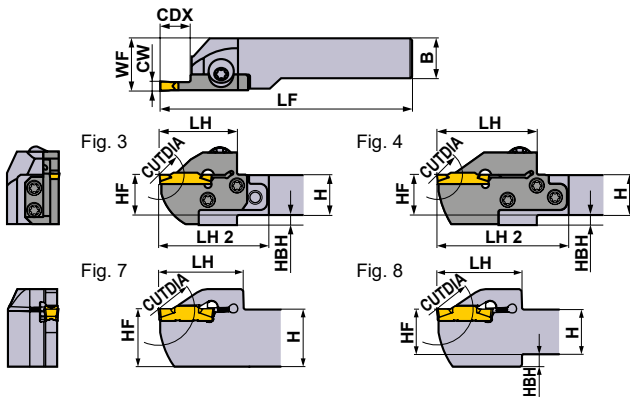
\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used.

The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH, LH2 and WF values may vary.

● : Inventory maintained.

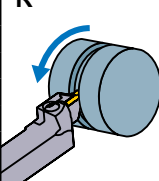
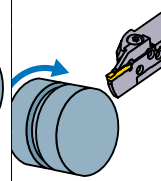
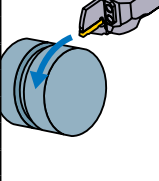
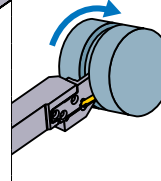
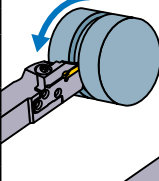
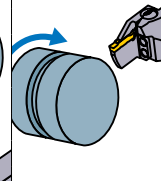
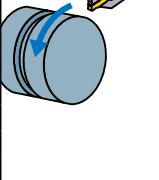
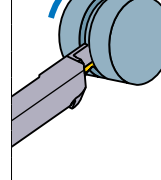
★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

| Dimensions (mm) ★3 |    |     |    |      |    |       |     | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF    | HBH | Clockwise                                                                           | Anticlockwise                                                                       |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |   |   |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |  |  |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |
| 16                 | 16 | 110 | 34 | 50   | 16 | 20    | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 34 | 49   | 20 | 23    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |  |  |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |  |  |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| H         | GY00475/0500/0524H0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |                       |                   |         |          |               |                  |
|---------------------------------------------------|-----------------------|-------------------|---------|----------|---------------|------------------|
| Seat Size                                         | Chipbreaker<br><br>CW | GU                | GS      | GM       | 05-GM         | GFGS             |
|                                                   |                       | (For gummy steel) | (Low)   | (Medium) | (Cutting off) | (Hardened steel) |
|                                                   |                       | Neutral           | Neutral | Neutral  | With hand     | Neutral          |
| H                                                 | 4.75mm                | ●                 | ●       | ●        |               | ●                |
|                                                   | 5.00mm                | ●                 | ●       | ●        | ●             | ●                |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying, Recessing) |
|                                                       | CW          |                |             |                | Ball shape                 |
| H                                                     | 4.75mm      |                |             |                | ●                          |
|                                                       | RE 0.2      | ●              |             |                |                            |
|                                                       | RE 0.4      | ●              |             |                |                            |
|                                                       | RE 0.8      | ●              |             |                |                            |
|                                                       | 5.00mm      |                |             |                | ●                          |
|                                                       | RE 0.2      | ●              |             |                |                            |
|                                                       | RE 0.4      | ●              | ●           | ●              |                            |
|                                                       | RE 0.8      | ●              | ●           | ●              |                            |
|                                                       | 5.24mm      | ●              |             |                |                            |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

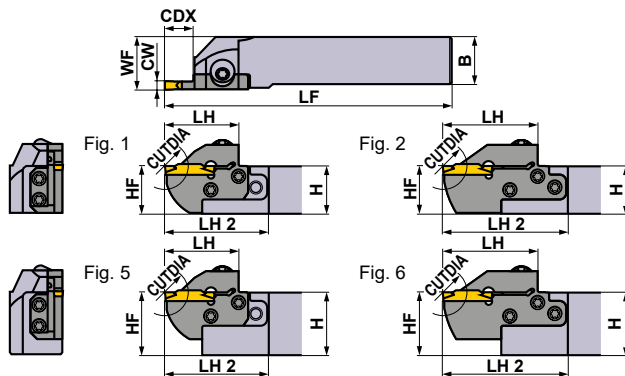
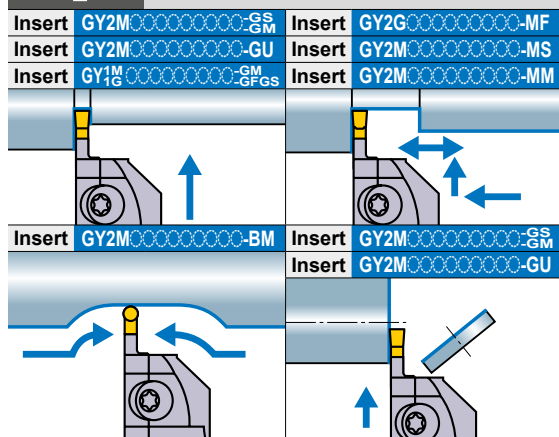
# GY SERIES (EXTERNAL)

1

00° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

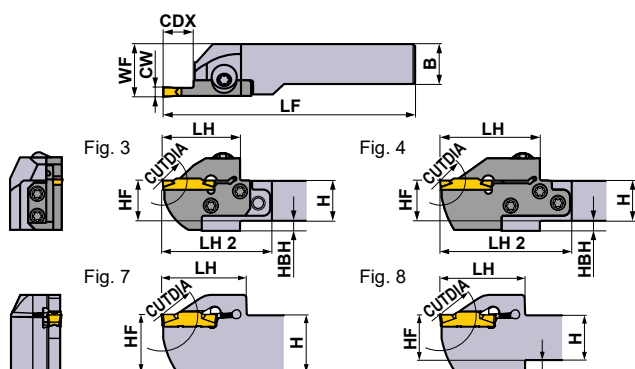
| Seat Size | Dimensions (mm)      |       |        | Type      | Hand (R/L) | Order Number     |       |               |       | Fig. |
|-----------|----------------------|-------|--------|-----------|------------|------------------|-------|---------------|-------|------|
|           | CW                   | CDX   | CUTDIA |           |            | Holder           | Stock | Modular Blade | Stock |      |
| J         | 6.00<br>6.31<br>6.35 | 8     | 16     | Monoblock | R          | GYQR2020K00-J08  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2020K00-J08  | ●     | —             | —     | 7    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-J08   | ●     | 3    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-J08   | ●     | 3    |
|           |                      |       |        | Monoblock | R          | GYQR2525M00-J08  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2525M00-J08  | ●     | —             | —     | 7    |
|           |                      | 14    | 28     | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-J08   | ●     | 1    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-J08   | ●     | 1    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-J08   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-J08   | ●     | 5    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-J08   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-J08   | ●     | 5    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-J14   | ●     | 3    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-J14   | ●     | 3    |
|           |                      |       |        | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-J14   | ●     | 1    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-J14   | ●     | 1    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-J14   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-J14   | ●     | 5    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-J14   | ●     | 5    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-J14   | ●     | 5    |
|           |                      | 25 *1 | 50 *2  | Monoblock | R          | GYQR2020K00-J25  | ●     | —             | —     | 8    |
|           |                      |       |        |           | L          | GYQL2020K00-J25  | ●     | —             | —     | 8    |
|           |                      |       |        | Modular   | R          | GYHR2020K00-M25R | ●     | GYM25RA-J25   | ●     | 4    |
|           |                      |       |        |           | L          | GYHL2020K00-M25L | ●     | GYM25LA-J25   | ●     | 4    |
|           |                      |       |        | Monoblock | R          | GYQR2525M00-J25  | ●     | —             | —     | 7    |
|           |                      |       |        |           | L          | GYQL2525M00-J25  | ●     | —             | —     | 7    |
|           |                      |       |        | Modular   | R          | GYHR2525M00-M25R | ●     | GYM25RA-J25   | ●     | 2    |
|           |                      |       |        |           | L          | GYHL2525M00-M25L | ●     | GYM25LA-J25   | ●     | 2    |
|           |                      |       |        | Modular   | R          | GYHR3225P00-M25R | ●     | GYM25RA-J25   | ●     | 6    |
|           |                      |       |        |           | L          | GYHL3225P00-M25L | ●     | GYM25LA-J25   | ●     | 6    |
|           |                      |       |        | Modular   | R          | GYHR3232P00-M25R | ●     | GYM25RA-J25   | ●     | 6    |
|           |                      |       |        |           | L          | GYHL3232P00-M25L | ●     | GYM25LA-J25   | ●     | 6    |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used.

The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH, LH2 and WF values may vary.

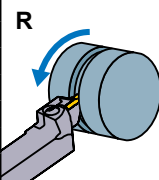
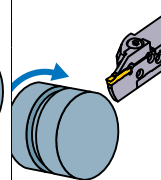
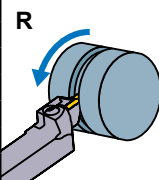
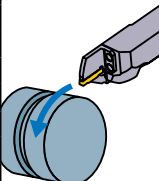
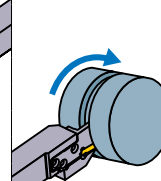
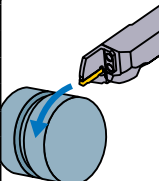
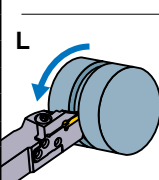
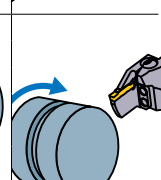
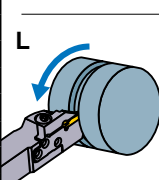
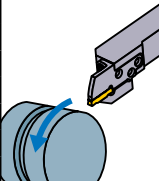
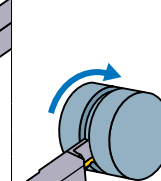
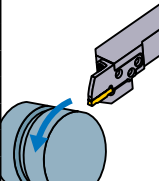
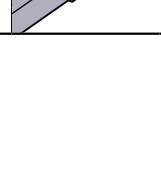


Right hand tool holder shown.

\* Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder |  |  5 pcs. |  |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Holder | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench *                                                                            |
| GYQR/L | HSC05020<br>(Clamp Torque : 7.0N·m)                                                 | —                                                                                          | HKY40R                                                                              |
| GYHR/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

| Dimensions (mm) *3 |    |     |    |      |    |       |     |                                                                                     | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|-------|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF    | HBH |                                                                                     | Clockwise                                                                           | Anticlockwise                                                                       |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |    |    |    |
| 20                 | 20 | 125 | 41 | —    | 20 | 20.35 | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 119 | 33 | 54   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |  |  |  |
| 25                 | 25 | 150 | 41 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 144 | 33 | 51   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |  |  |  |
| 32                 | 25 | 164 | 33 | 51   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 164 | 33 | 51   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |  |  |  |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |  |  |  |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |  |  |  |
| 20                 | 20 | 125 | 46 | —    | 20 | 20.35 | 4   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 20                 | 20 | 136 | 50 | 71   | 20 | 26    | 5   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |  |  |  |
| 25                 | 25 | 150 | 46 | —    | 25 | 25.35 | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 25                 | 25 | 161 | 50 | 68   | 25 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |  |  |  |
| 32                 | 25 | 181 | 50 | 68   | 32 | 28    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |
| 32                 | 32 | 181 | 50 | 68   | 32 | 35    | —   |                                                                                     |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                                |
|-----------|----------------------------------------------|
| J         | GY 0600/0631/0635J — Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                                              |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|----------------------------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | 05-GM/GFGS<br>(Cutting off) (Hardened steel) |
| CW                                                |             | Neutral                 | Neutral     | Neutral        | With hand                                    |
| J                                                 | 6.00mm      | ●                       | ●           | ●              | ●                                            |
|                                                   | 6.35mm      | ●                       | ●           | ●              | ●                                            |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
|                                                       |             |                |             | BM<br>(Copying, Recessing) |
|                                                       | 6.00mm      |                |             | Ball shape                 |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              | ●           |                            |
|                                                       | RE 0.8      | ●              | ●           |                            |
| J                                                     | 6.31mm      | ●              |             |                            |
|                                                       | 6.35mm      |                |             | ●                          |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              |             |                            |
|                                                       | RE 0.8      | ●              |             |                            |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

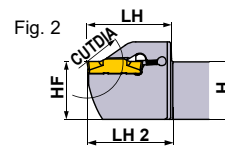
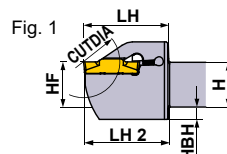
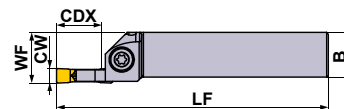
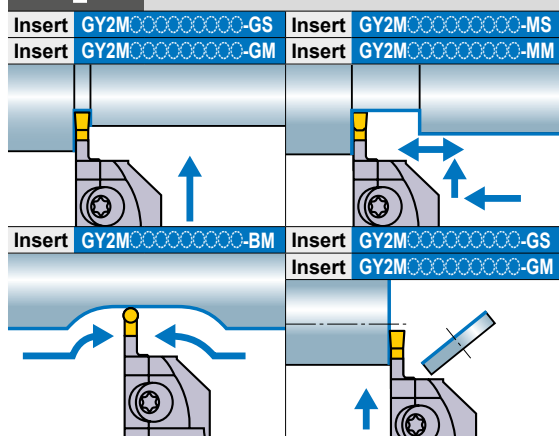
F033



# GY SERIES (EXTERNAL)

1

00° type holder



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |       |        | Type      | Hand (R/L) | Order Number    |       |               |       | Fig. |
|-----------|-----------------|-------|--------|-----------|------------|-----------------|-------|---------------|-------|------|
|           | CW              | CDX   | CUTDIA |           |            | Holder          | Stock | Modular Blade | Stock |      |
| K         | 8.00            | 25 *1 | 50 *2  | Monoblock | R          | GYPR2525M00-K25 | ●     | —             | —     | 1    |
|           |                 |       |        | Monoblock | L          | GYPL2525M00-K25 | ●     | —             | —     | 1    |
|           |                 |       |        | Monoblock | R          | GYPR3225P00-K25 | ●     | —             | —     | 2    |
|           |                 |       |        | Monoblock | L          | GYPL3225P00-K25 | ●     | —             | —     | 2    |
|           |                 |       |        | Monoblock | R          | GYPR3232P00-K25 | ●     | —             | —     | 3    |
|           |                 |       |        | Monoblock | L          | GYPL3232P00-K25 | ●     | —             | —     | 3    |

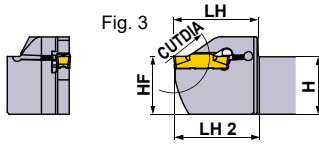
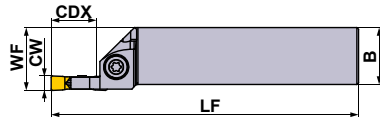
\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used.

The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F011—F015.

\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH, LH2 and WF values may vary.

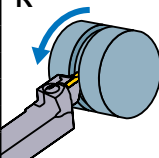
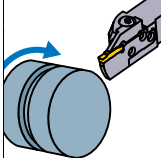
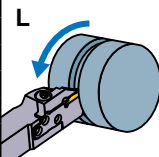
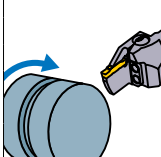




Right hand tool holder shown.

## SPARE PARTS

| Holder             |  |  |
|--------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                    | Clamp Screw                                                                         | Wrench                                                                              |
| GYPR/L○○○○○○00-K25 |                                                                                     | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 |
|                    |                                                                                     | TKY30R                                                                              |

| Dimensions (mm) *3 |    |     |    |      |    |    |     |   | Cutting Mode                                                                        |                                                                                     |
|--------------------|----|-----|----|------|----|----|-----|---|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |   | Clockwise                                                                           | Anticlockwise                                                                       |
| 25                 | 25 | 150 | 47 | 48   | 25 | 28 | 7   | R |    |    |
| 25                 | 25 | 150 | 47 | 48   | 25 | 28 | 7   |   |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 47 | 48   | 32 | 28 | —   |   |                                                                                     |                                                                                     |
| 32                 | 25 | 170 | 47 | 48   | 32 | 28 | —   |   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 47 | 48   | 32 | 35 | —   |   |                                                                                     |                                                                                     |
| 32                 | 32 | 170 | 47 | 48   | 32 | 35 | —   |   |                                                                                     |                                                                                     |
|                    |    |     |    |      |    |    |     | L |  |  |
|                    |    |     |    |      |    |    |     |   |                                                                                     |                                                                                     |
|                    |    |     |    |      |    |    |     |   |                                                                                     |                                                                                     |
|                    |    |     |    |      |    |    |     |   |                                                                                     |                                                                                     |
|                    |    |     |    |      |    |    |     |   |                                                                                     |                                                                                     |
|                    |    |     |    |      |    |    |     |   |                                                                                     |                                                                                     |

## Insert selection

| Seat Size | Geometry name                         |
|-----------|---------------------------------------|
| K         | GY○○0800K○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                        |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | 05-GM<br>(Cutting off) |
| CW                                                |             | Neutral                 | Neutral     | Neutral        | With hand              |
| K                                                 | 8.00mm      |                         | ●           | ●              |                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
| CW                                                    |             |                |             | BM<br>(Copying, Recessing) |
| K                                                     | 8.00mm      |                | ●           | ●                          |
|                                                       | RE 0.8      |                | ●           | ●                          |
|                                                       | RE 1.2      |                | ●           | ●                          |

● : Standard insert with dimensions

F

GROOVING / CUTTING OFF

|                    |              |
|--------------------|--------------|
| IDENTIFICATION     | > F008, F009 |
| CUTTING CONDITIONS | > F100       |
| CAUTION FOR USE    | > F105       |

F035

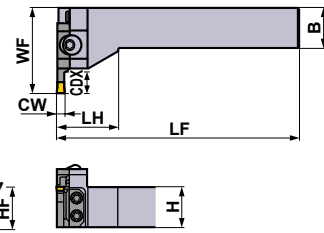
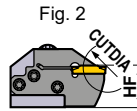
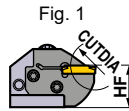
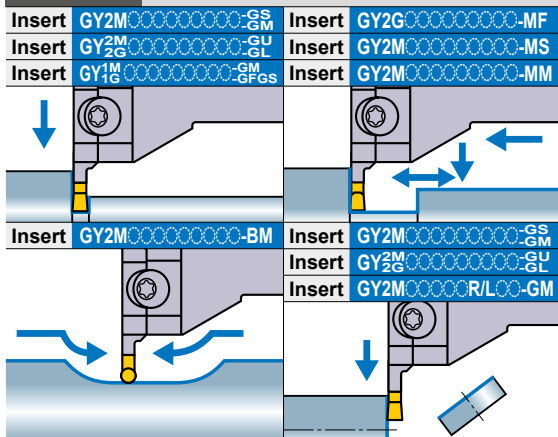
# GY SERIES (EXTERNAL)

2

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |       |        | Type    | Hand (R/L) | Order Number     |       |               |       | Fig. |
|-----------|----------------------|-------|--------|---------|------------|------------------|-------|---------------|-------|------|
|           | CW                   | CDX   | CUTDIA |         |            | Holder           | Stock | Modular Blade | Stock |      |
| D         | 2.00<br>2.24         | 6     | 12     | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LA-D06   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RA-D06   | ●     | 1    |
|           |                      | 10    | 20     | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-D06   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-D06   | ●     | 1    |
|           |                      | 12    | 24     | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LA-D10   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RA-D10   | ●     | 1    |
| E         | 2.39<br>2.50<br>2.74 | 6     | 12     | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-D12   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-D12   | ●     | 1    |
|           |                      | 18 *4 | 36     | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LB-D18   | ●     | 2    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RB-D18   | ●     | 2    |
|           |                      | 20 *1 | 40 *2  | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-D20   | ●     | 2    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-D20   | ●     | 2    |
|           |                      | 6     | 12     | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LA-E06   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RA-E06   | ●     | 1    |
|           |                      | 10    | 20     | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-E06   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-E06   | ●     | 1    |
|           |                      | 12    | 24     | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LA-E10   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RA-E10   | ●     | 1    |
|           |                      | 18 *4 | 36     | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-E12   | ●     | 1    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-E12   | ●     | 1    |
|           |                      | 20 *1 | 40 *2  | Modular | R          | GYHR2020K90-M20L | ●     | GYM20LB-E18   | ●     | 2    |
|           |                      |       |        | Modular | L          | GYHL2020K90-M20R | ●     | GYM20RB-E18   | ●     | 2    |
|           |                      | 20 *1 | 40 *2  | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LA-E20   | ●     | 2    |
|           |                      |       |        | Modular | L          | GYHL2525M90-M25R | ●     | GYM25RA-E20   | ●     | 2    |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used.

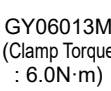
The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F011—F015.

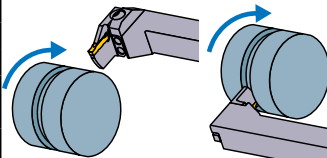
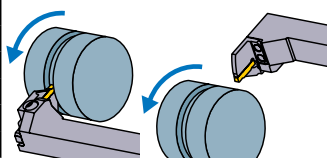
\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH and WF values may vary.

\*4 The maximum groove depth (CDX) is limited by the workpiece diameter. For details, please refer to page F102.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |                                         |  5 pcs. |  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                                                                | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2020K90-M20L</b> | <br>GY06013M<br>(Clamp Torque : 6.0N·m) | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| <b>GYHL2020K90-M20R</b> |                                                                                                                            |                                                                                            |                                                                                     |
| <b>GYHR2525M90-M25L</b> |                                                                                                                            | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                                                            |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★3 |    |     |    |    |    | Cutting Mode                                                                                    |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 39 | <b>R</b><br>  |
|  | 20                 | 20 | 125 | 35 | 20 | 39 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 39 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 39 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |

### Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| <b>D</b>  | GY○○0200/0224D○○○○○-Chipbreaker shown below      |
| <b>E</b>  | GY○○0239/0250/0274E○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011-F013 |             |                         |             |                |                         |                        |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | 05-GM<br>(Cutting off) |
|                                                  |             | Neutral                 | Neutral     | Neutral        | Neutral                 | With hand              |
| <b>D</b>                                         | 2.00mm      | ●                       | ●           | ●              | ●                       | ●                      |
|                                                  | 2.39mm      | ●                       | ●           | ●              | ●                       | ●                      |
|                                                  | 2.50mm      | ●                       | ●           | ●              | ●                       | ●                      |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
|                                                       |             |                |             | BM<br>(Copying, Recessing) |
| <b>D</b>                                              | 2.00mm      | ●              | ●           | ●                          |
|                                                       | 2.24mm      | ●              | ●           | ●                          |
|                                                       | 2.39mm      | ●              | ●           | ●                          |
| <b>E</b>                                              | 2.50mm      | ●              | ●           | ●                          |
|                                                       | 2.74mm      | ●              | ●           | ●                          |

● : Standard insert with dimensions

F

GROOVING / CUTTING OFF

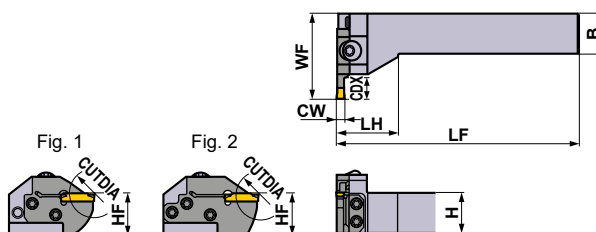
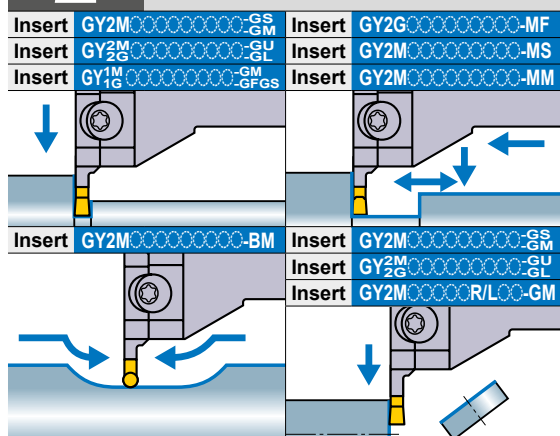
IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

F037

# 2

**Note 1) For modular blades and modular holders, please order separately.**

**Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.**



Right hand tool holder shown.

[illegible]

The cut off diameter is double the maximum groove depth (**CDX**) of inserts on pages F011—F015.

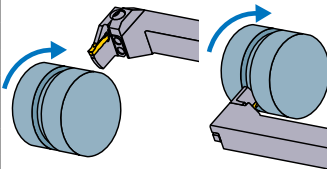
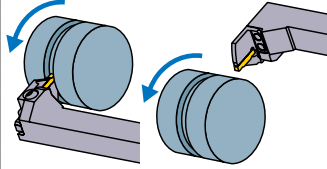
\*4 The maximum groove depth (**CDX**) is limited by the workpiece diameter. For details, please refer to page F102.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2020K90-M20L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| <b>GYHL2020K90-M20R</b> |                                                                                     |                                                                                            |                                                                                     |
| <b>GYHR2525M90-M25L</b> |                                                                                     | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★3 |    |     |    |    |    | Cutting Mode                                                                                    |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 39 | <b>R</b><br>  |
|  | 20                 | 20 | 125 | 35 | 20 | 39 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 51 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                                 |

### Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| <b>F</b>  | GY○○0300/0318/0324F○○○○○-Chipbreaker shown below |
| <b>G</b>  | GY○○0400/0424G○○○○○-Chipbreaker shown below      |

| For grooving/cutting off chipbreaker > F011~F013 |             |                         |             |                |                         |                        |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | 05-GM<br>(Cutting off) |
|                                                  |             | Neutral                 | Neutral     | Neutral        | Neutral                 | With hand              |
| <b>F</b>                                         | <b>CW</b>   |                         |             |                |                         |                        |
|                                                  | 3.00mm      | ●                       | ●           | ●              | ●                       | ●                      |
|                                                  | 3.18mm      | ●                       | ●           | ●              | ●                       | ●                      |
| <b>G</b>                                         | 4.00mm      | ●                       | ●           | ●              | ●                       | ●                      |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
|                                                       |             |                |             | BM<br>(Copying, Recessing) |
| <b>F</b>                                              | <b>CW</b>   |                |             |                            |
|                                                       | 3.00mm      |                |             | ●                          |
|                                                       | RE 0.2      | ●              | ●           | ●                          |
|                                                       | RE 0.4      | ●              | ●           | ●                          |
|                                                       | RE 0.8      |                |             | ●                          |
|                                                       | 3.18mm      |                |             | ●                          |
| <b>G</b>                                              | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              |             |                            |
|                                                       | RE 0.8      | ●              |             |                            |
|                                                       | 4.00mm      | ●              |             |                            |
|                                                       | RE 0.2      | ●              | ●           | ●                          |
|                                                       | RE 0.4      | ●              | ●           | ●                          |

● : Standard insert with dimensions

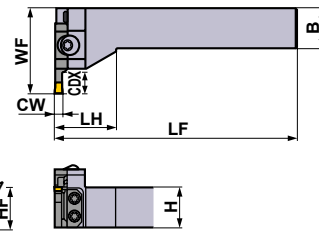
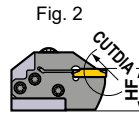
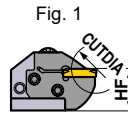
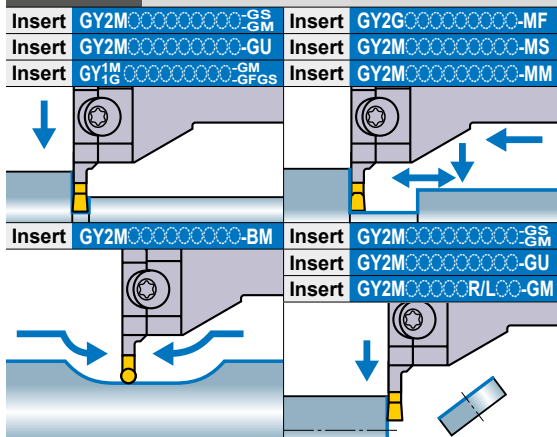
# GY SERIES (EXTERNAL)

2

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |       |        | Type    | Hand (R/L) | Order Number                         |        |                            |        | Fig.   |  |
|-----------|----------------------|-------|--------|---------|------------|--------------------------------------|--------|----------------------------|--------|--------|--|
|           | CW                   | CDX   | CUTDIA |         |            | Holder                               | Stock  | Modular Blade              | Stock  |        |  |
| H         | 4.75<br>5.00<br>5.24 | 8     | 16     | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-H08<br>GYM25RA-H08 | ●<br>● | 1<br>1 |  |
|           |                      | 12    | 24     | Modular | R<br>L     | GYHR2020K90-M20L<br>GYHL2020K90-M20R | ●<br>● | GYM20LA-H12<br>GYM20RA-H12 | ●<br>● | 1<br>1 |  |
|           |                      | 14    | 28     | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-H14<br>GYM25RA-H14 | ●<br>● | 1<br>1 |  |
|           |                      | 25 *1 | 50 *2  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-H25<br>GYM25RA-H25 | ●<br>● | 2<br>2 |  |
|           |                      |       |        |         |            |                                      |        |                            |        |        |  |
| J         | 6.00<br>6.31<br>6.35 | 8     | 16     | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-J08<br>GYM25RA-J08 | ●<br>● | 1<br>1 |  |
|           |                      | 14    | 28     | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-J14<br>GYM25RA-J14 | ●<br>● | 1<br>1 |  |
|           |                      | 25 *1 | 50 *2  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LA-J25<br>GYM25RA-J25 | ●<br>● | 2<br>2 |  |
|           |                      |       |        |         |            |                                      |        |                            |        |        |  |
|           |                      |       |        |         |            |                                      |        |                            |        |        |  |

\*1 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

\*2 The maximum cut off diameter (CUTDIA) varies according to the insert used.

The cut off diameter is double the maximum groove depth (CDX) of inserts on pages F011—F015.

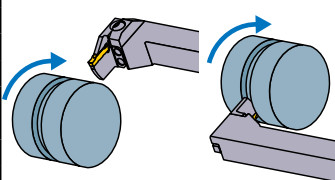
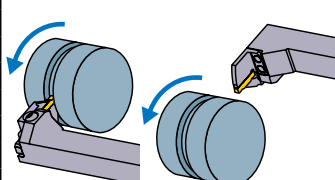
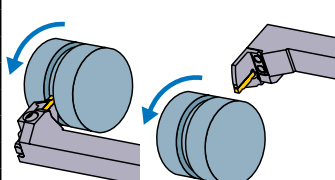
\*3 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH and WF values may vary.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder Number           |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2020K90-M20L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY15D                                                                  |
| <b>GYHL2020K90-M20R</b> |                                                                                     |                                                                                            |                                                                                     |
| <b>GYHR2525M90-M25L</b> |                                                                                     | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★3 |    |     |    |    |    | Cutting Mode                                                                                    |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 | <b>R</b><br>  |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 20                 | 20 | 125 | 35 | 20 | 45 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 64 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 64 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 47 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |

### Insert selection

| Seat Size | Geometry name                                     |
|-----------|---------------------------------------------------|
| <b>H</b>  | GY○○○0475/0500/0524H○○○○○-Chipbreaker shown below |
| <b>J</b>  | GY○○○0600/0631/0635J○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                        |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | 05-GM<br>(Cutting off) | GFGS<br>(Hardened steel) |
|                                                   |             | Neutral                 | Neutral     | Neutral        | With hand              | Neutral                  |
| <b>H</b>                                          | <b>CW</b>   |                         |             |                |                        |                          |
|                                                   | 4.75mm      | ●                       | ●           | ●              | ●                      | ●                        |
|                                                   | 5.00mm      | ●                       | ●           | ●              | ●                      | ●                        |
| <b>J</b>                                          | 6.00mm      | ●                       | ●           | ●              | ●                      | ●                        |
|                                                   | 6.35mm      | ●                       | ●           | ●              | ●                      | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                            |
|-------------------------------------------------------|-------------|----------------|-------------|----------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium)             |
|                                                       |             |                |             | BM<br>(Copying, Recessing) |
| <b>H</b>                                              | <b>CW</b>   |                |             | Ball shape                 |
|                                                       | 4.75mm      | ●              |             | ●                          |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              |             |                            |
|                                                       | RE 0.8      | ●              |             |                            |
|                                                       | 5.00mm      | ●              |             | ●                          |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              | ●           | ●                          |
|                                                       | RE 0.8      | ●              | ●           | ●                          |
|                                                       | 5.24mm      | ●              |             |                            |
| <b>J</b>                                              | 6.00mm      | ●              |             | ●                          |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              | ●           | ●                          |
|                                                       | RE 0.8      | ●              | ●           | ●                          |
|                                                       | 6.31mm      | ●              |             |                            |
|                                                       | 6.35mm      | ●              |             | ●                          |
|                                                       | RE 0.2      | ●              |             |                            |
|                                                       | RE 0.4      | ●              |             |                            |
|                                                       | RE 0.8      | ●              |             |                            |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F100  
CAUTION FOR USE > F105

F041



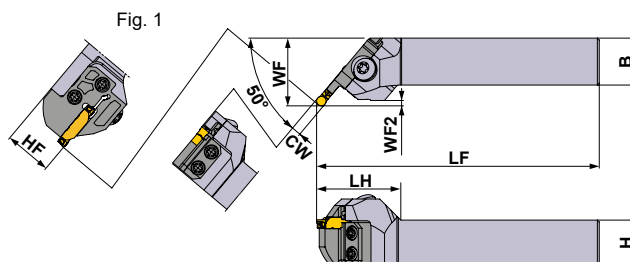
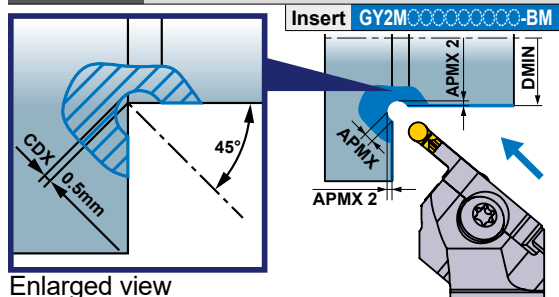
# GY SERIES (FOR EXTERNAL RECESSING)

3

For 50° recessing holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |                  |                  |                  |                  | Type         | Hand (R/L)       | Order Number     |              |               |       | Fig. |  |
|-----------|-----------------|------------------|------------------|------------------|------------------|--------------|------------------|------------------|--------------|---------------|-------|------|--|
|           | CW              | CDX              | DMIN             | APMX             | APMX 2           |              |                  | Holder           | Stock        | Modular Blade | Stock |      |  |
| D         | 2.00            | 0.5              | 30               | 1.5              | 0.646            | Modular      | R                | GYHR2020K50-M20L | ●            | GYM20LC-D005  | ●     | 1    |  |
|           |                 |                  |                  |                  |                  |              | L                | GYHL2020K50-M20R | ●            | GYM20RC-D005  | ●     | 1    |  |
| Modular   | R               |                  |                  | GYHR2525M50-M25L | ●                | GYM25LC-D005 | ●                | 1                |              |               |       |      |  |
|           | L               |                  |                  | GYHL2525M50-M25R | ●                | GYM25RC-D005 | ●                | 1                |              |               |       |      |  |
| E         | 2.50            |                  |                  | 1.75             | 0.72             | Modular      | R                | GYHR2020K50-M20L | ●            | GYM20LC-E005  | ●     | 1    |  |
|           |                 |                  |                  |                  |                  |              | L                | GYHL2020K50-M20R | ●            | GYM20RC-E005  | ●     | 1    |  |
| Modular   | R               |                  |                  | GYHR2525M50-M25L | ●                | GYM25LC-E005 | ●                | 1                |              |               |       |      |  |
|           | L               |                  |                  | GYHL2525M50-M25R | ●                | GYM25RC-E005 | ●                | 1                |              |               |       |      |  |
| F         | 3.00<br>3.18    |                  | 2                | 0.793            | Modular          | R            | GYHR2020K50-M20L | ●                | GYM20LC-F005 | ●             | 1     |      |  |
|           |                 |                  |                  |                  |                  | L            | GYHL2020K50-M20R | ●                | GYM20RC-F005 | ●             | 1     |      |  |
| Modular   | R               | GYHR2525M50-M25L | ●                | GYM25LC-F005     | ●                | 1            |                  |                  |              |               |       |      |  |
|           | L               | GYHL2525M50-M25R | ●                | GYM25RC-F005     | ●                | 1            |                  |                  |              |               |       |      |  |
| G         | 4.00            | 20               | 2.5              | 0.939            | Modular          | R            | GYHR2020K50-M20L | ●                | GYM20LC-G005 | ●             | 1     |      |  |
|           |                 |                  |                  |                  |                  | L            | GYHL2020K50-M20R | ●                | GYM20RC-G005 | ●             | 1     |      |  |
| Modular   | R               |                  |                  |                  | GYHR2525M50-M25L | ●            | GYM25LC-G005     | ●                | 1            |               |       |      |  |
|           | L               |                  |                  |                  | GYHL2525M50-M25R | ●            | GYM25RC-G005     | ●                | 1            |               |       |      |  |
| H         | 4.75<br>5.00    |                  | 2.88             | 1.049            | Modular          | R            | GYHR2020K50-M20L | ●                | GYM20LC-H005 | ●             | 1     |      |  |
|           |                 |                  |                  |                  |                  | L            | GYHL2020K50-M20R | ●                | GYM20RC-H005 | ●             | 1     |      |  |
| Modular   | R               |                  | GYHR2525M50-M25L | ●                | GYM25LC-H005     | ●            | 1                |                  |              |               |       |      |  |
|           | L               |                  | GYHL2525M50-M25R | ●                | GYM25RC-H005     | ●            | 1                |                  |              |               |       |      |  |
| J         | 6.00<br>6.35    |                  | 3.5              | 1.232            | Modular          | R            | GYHR2525M50-M25L | ●                | GYM25LC-J005 | ●             | 1     |      |  |
|           |                 |                  |                  |                  |                  | L            | GYHL2525M50-M25R | ●                | GYM25RC-J005 | ●             | 1     |      |  |
|           |                 |                  |                  |                  |                  |              |                  |                  |              |               |       |      |  |

\*1 The blade for external grooving and face grooving cannot be used due to interference with the workpiece.

\*2 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LH, WF and WF2 values may vary.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                      |  |  4 pcs. |  |
|-----------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                             | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR/L2020K50-M20R/L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS407<br>(Clamp Torque : 3.5N·m)                                                           | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHR/L2525M50-M25R/L</b> |                                                                                     | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |

|  | Dimensions (mm) ★2 |    |     |    |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | HF | WF | WF2 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 1.6 | R            |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 1.6 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 1.6 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 1.6 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 1.8 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 1.8 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 1.8 | L            |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 1.8 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 2.0 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 2.0 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 2.0 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 2.0 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 2.4 | L            |
|  | 20                 | 20 | 125 | 40 | 20 | 32 | 2.4 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 2.4 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 35 | 2.4 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 33 | 2.8 |              |
|  | 20                 | 20 | 125 | 40 | 20 | 33 | 2.8 |              |
|  | 25                 | 25 | 150 | 45 | 25 | 36 | 2.8 | L            |
|  | 25                 | 25 | 150 | 45 | 25 | 36 | 2.8 |              |
|  | 25                 | 25 | 150 | 44 | 25 | 36 | 3.4 |              |
|  | 25                 | 25 | 150 | 44 | 25 | 36 | 3.4 |              |

## Insert selection

### Geometry name

GY2M:○○○○○○○○○N-BM

### For multifunctional grooving chipbreaker > F015

| Seat Size | Chipbreaker<br>CW | BM<br>(Copying, Recessing)<br>Ball shape |   |
|-----------|-------------------|------------------------------------------|---|
|           |                   |                                          |   |
| D         | 2.00mm            |                                          | ● |
| E         | 2.50mm            |                                          | ● |
| F         | 3.00mm            |                                          | ● |
|           | 3.18mm            |                                          | ● |
| G         | 4.00mm            |                                          | ● |
| H         | 4.75mm            |                                          | ● |
|           | 5.00mm            |                                          | ● |
| J         | 6.00mm            |                                          | ● |
|           | 6.35mm            |                                          | ● |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F104  
CAUTION FOR USE > F104

F043

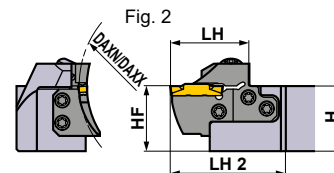
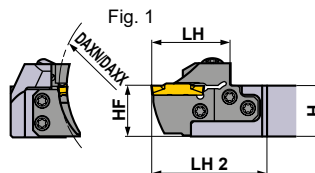
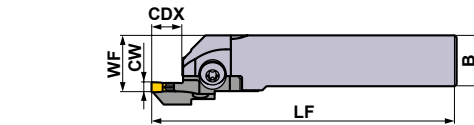
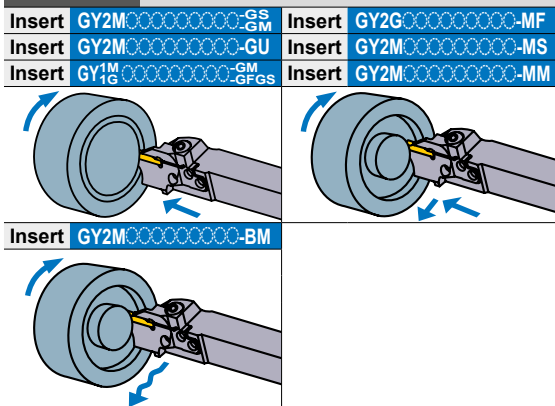
# GY SERIES (FACE GROOVING)

4

00° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |      |      |     | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-----|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| D         | 2.00<br>2.24    | 40   | 50   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-040 | ●     | 3    |
|           |                 |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-040 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-040 | ●     | 1    |
|           |                 |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-040 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-040 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-040 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-040 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-040 | ●     | 2    |
|           |                 | 50   | 60   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-050 | ●     | 3    |
|           |                 |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-050 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-050 | ●     | 1    |
|           |                 |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-050 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-050 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-050 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-050 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-050 | ●     | 2    |
|           |                 | 60   | 75   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-060 | ●     | 3    |
|           |                 |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-060 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-060 | ●     | 1    |
|           |                 |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-060 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-060 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-060 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-060 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-060 | ●     | 2    |
|           |                 | 75   | 100  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-075 | ●     | 3    |
|           |                 |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-075 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-075 | ●     | 1    |
|           |                 |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-075 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-075 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-075 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-075 | ●     | 2    |
|           |                 |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-075 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

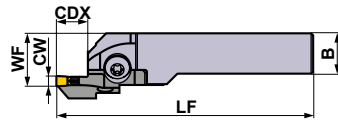
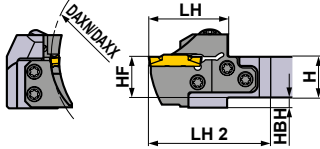


Fig. 3

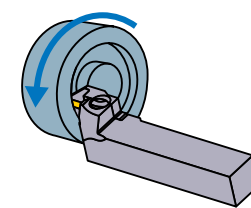
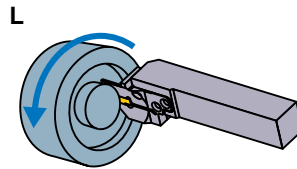
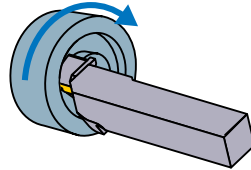
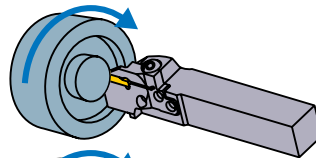


Right hand tool holder shown.

## SPARE PARTS

| Holder               |  |  5 pcs. |  |
|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| GYHR/L2525M00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3225P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3232P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |



## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| D         | GY○○0200/0224D○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| D                                                 | 2.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| CW                                                    |             |                |             |                | Ball shape      |
| D                                                     | 2.00mm      | ●              | ●           | ●              | ●               |
|                                                       | 2.24mm      | ●              | ●           | ●              | ●               |

● : Standard insert with dimensions

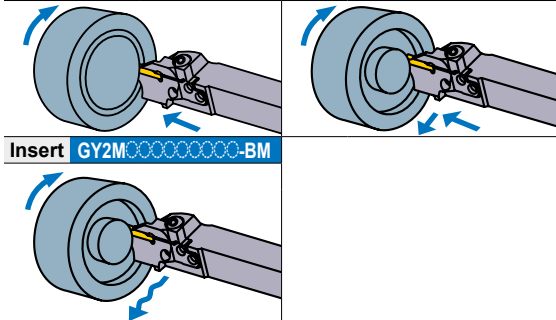
IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

# GY SERIES (FACE GROOVING)

4

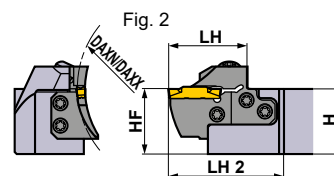
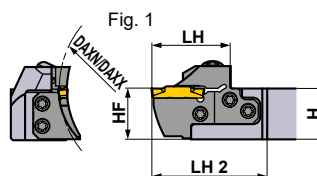
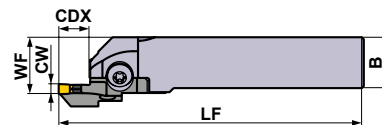
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |      |      |     | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-----|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| D         | 2.00<br>2.24    | 100  | 150  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-100 | ●     | 3    |
|           |                 |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-100 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-100 | ●     | 1    |
|           |                 |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-100 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-100 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-100 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-100 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-100 | ●     | 2    |
|           |                 | 135  | 200  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-135 | ●     | 3    |
|           |                 |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-135 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-135 | ●     | 1    |
|           |                 |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-135 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-135 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-135 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-135 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-135 | ●     | 2    |
|           |                 | 180  | 250  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-D12-180 | ●     | 3    |
|           |                 |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-D12-180 | ●     | 3    |
|           |                 |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-D12-180 | ●     | 1    |
|           |                 |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-D12-180 | ●     | 1    |
|           |                 |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-D12-180 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-D12-180 | ●     | 2    |
|           |                 |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-D12-180 | ●     | 2    |
|           |                 |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-D12-180 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

● : Inventory maintained.

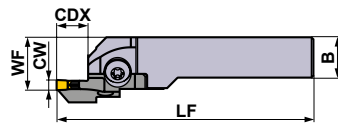
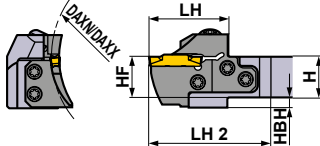


Fig. 3



Right hand tool holder shown.

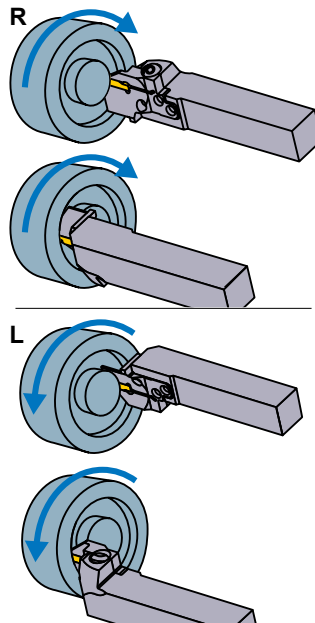
★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |  |  5 pcs. |  |
|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| GYHR/L3225P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3232P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     |
|--|--------------------|----|-----|----|------|----|----|-----|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |

### Cutting Mode



### Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| D         | GY○○0200/0224D○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| D                                                 | 2.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) |
| CW                                                    |             |                |             |                |
| D                                                     | 2.00mm      | ●              | ●           | ●              |
|                                                       | 2.24mm      | ●              | ●           | ●              |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

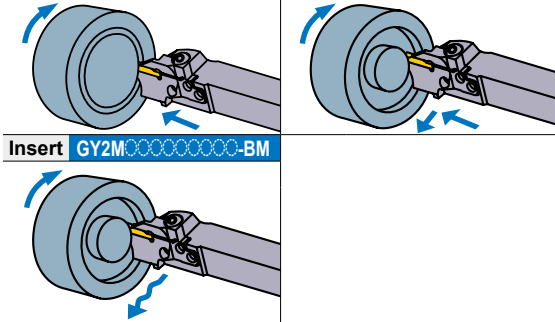
F047

# GY SERIES (FACE GROOVING)

4

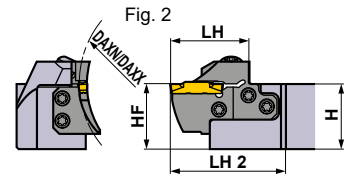
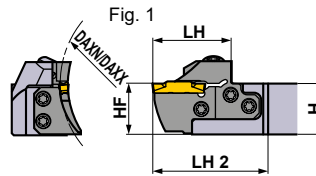
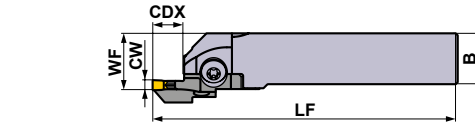
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |     | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-----|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| E         | 2.39<br>2.50<br>2.74 | 40   | 50   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-040 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-040 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-040 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-040 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-040 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-040 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-040 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-040 | ●     | 2    |
|           |                      | 50   | 60   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-050 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-050 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-050 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-050 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-050 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-050 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-050 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-050 | ●     | 2    |
|           |                      | 60   | 75   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-060 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-060 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-060 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-060 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-060 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-060 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-060 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-060 | ●     | 2    |
|           |                      | 75   | 100  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-075 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-075 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-075 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-075 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-075 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-075 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-075 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-075 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

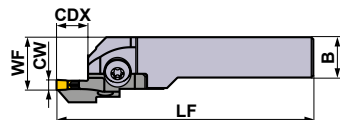
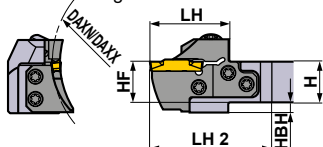


Fig. 3



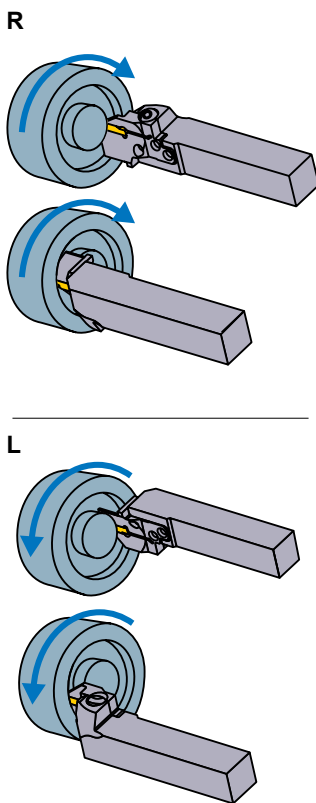
Right hand tool holder shown.

## SPARE PARTS

| Holder Number        |  |  5 pcs. |  |
|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| GYHR/L2525M00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3225P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3232P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |

| Dimensions (mm) ★1 |    |     |    |      |    |    |     |   |
|--------------------|----|-----|----|------|----|----|-----|---|
| H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | R |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   | L |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | L |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | L |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |   |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L |
| 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |
| 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |   |

Cutting Mode



## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| E         | GY○○0239/0250/0274E○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| E                                                 | CW          | ●                       | ●           | ●              | ●                        |
|                                                   | E           | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| E                                                     | CW          | ●              | ●           | ●              | ●               |
|                                                       | 2.39mm      | ●              | ●           | ●              | ●               |
|                                                       | 2.50mm      | ●              | ●           | ●              | ●               |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F049

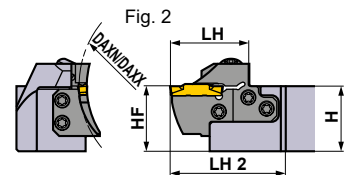
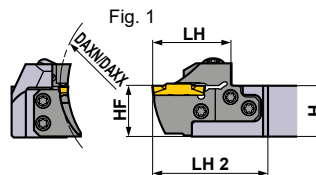
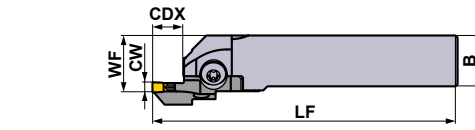
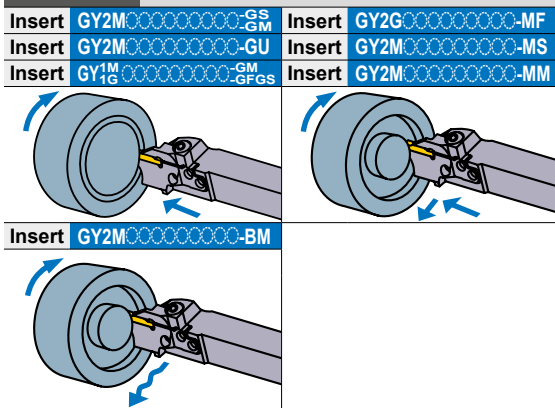
# GY SERIES (FACE GROOVING)

4

00° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



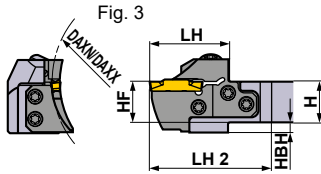
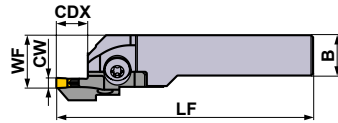
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |     | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-----|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| E         | 2.39<br>2.50<br>2.74 | 100  | 150  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-100 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-100 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-100 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-100 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-100 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-100 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-100 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-100 | ●     | 2    |
|           |                      | 135  | 200  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-135 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-135 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-135 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-135 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-135 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-135 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-135 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-135 | ●     | 2    |
|           |                      | 180  | 250  | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-E12-180 | ●     | 3    |
|           |                      |      |      |     | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-E12-180 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-E12-180 | ●     | 1    |
|           |                      |      |      |     | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-E12-180 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-E12-180 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-E12-180 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-E12-180 | ●     | 2    |
|           |                      |      |      |     | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-E12-180 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw



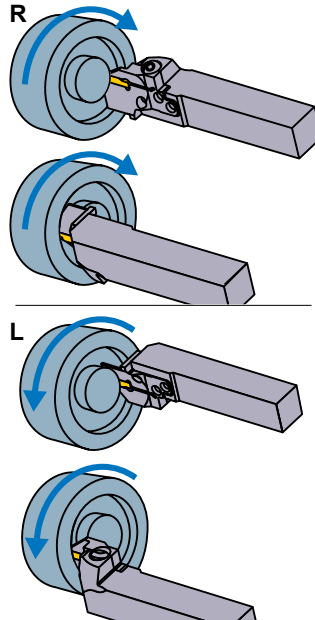
Right hand tool holder shown.

## SPARE PARTS

| Holder               |  |  5 pcs. |  |
|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| GYHR/L3225P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |
| GYHR/L3232P00-M25R/L |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     |
|--|--------------------|----|-----|----|------|----|----|-----|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |

### Cutting Mode



### Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| E         | GY○○0239/0250/0274E○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| E                                                 | CW          | ●                       | ●           | ●              | ●                        |
|                                                   | 2.39mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 2.50mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                               |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-------------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying)<br>Ball shape |
| E                                                     | CW          | ●              | ●           | ●              | ●                             |
|                                                       | 2.39mm      | ●              | ●           | ●              | ●                             |
|                                                       | 2.50mm      | ●              | ●           | ●              | ●                             |
|                                                       | 2.74mm      | ●              | ●           | ●              | ●                             |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F051

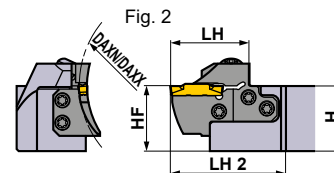
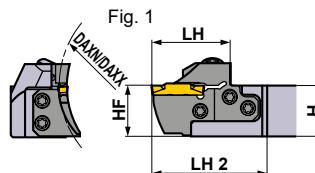
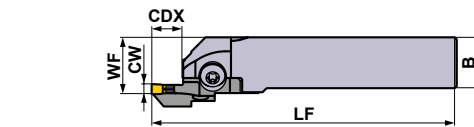
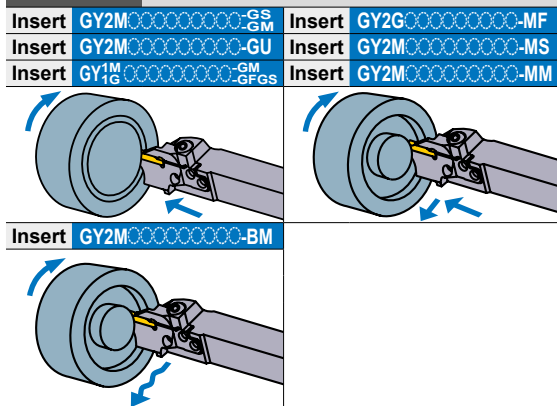
# GY SERIES (FACE GROOVING)

4

00° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



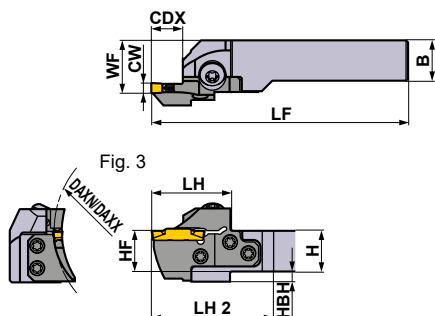
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |     | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-----|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| F         | 3.00<br>3.18<br>3.24 | 35   | 40   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-035 | ●     | 3    |
|           |                      |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-035 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-035 | ●     | 1    |
|           |                      |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-035 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-035 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-035 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-035 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-035 | ●     | 2    |
|           |                      | 40   | 50   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-040 | ●     | 3    |
|           |                      |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-040 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-040 | ●     | 1    |
|           |                      |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-040 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-040 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-040 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-040 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-040 | ●     | 2    |
|           |                      | 50   | 60   | 12  | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-050 | ●     | 3    |
|           |                      |      |      |     |         | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-050 | ●     | 3    |
|           |                      |      |      |     | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-050 | ●     | 1    |
|           |                      |      |      |     |         | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-050 | ●     | 1    |
|           |                      |      |      |     | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-050 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-050 | ●     | 2    |
|           |                      |      |      |     | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-050 | ●     | 2    |
|           |                      |      |      |     |         | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-050 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

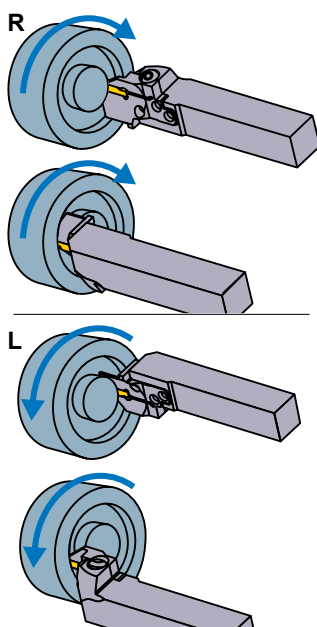


Right hand tool holder shown.

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          | ① ②                |
|----------------------|-------------------------------------|---------------------------------|--------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | L            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |



## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| F         | GY00300/0318/0324F0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| F                                                 | CW          |                         |             |                |                          |
|                                                   | 3.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 3.18mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 3.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      |                |             | ●              |                 |
|                                                       | 3.18mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | 3.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

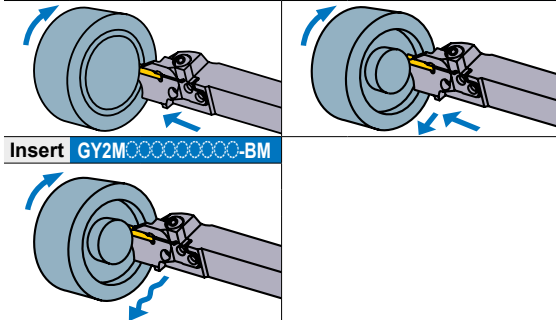
F053

# GY SERIES (FACE GROOVING)

4

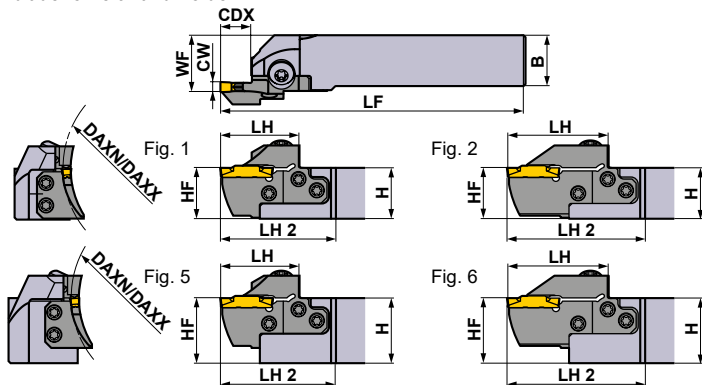
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



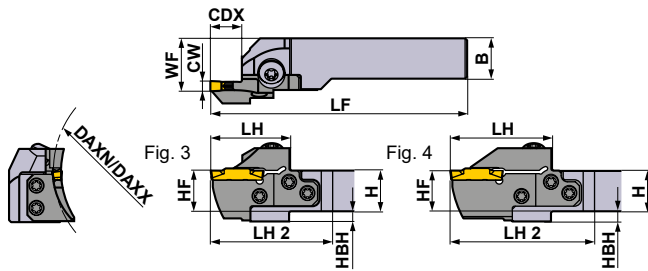
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| F         | 3.00<br>3.18<br>3.24 | 60   | 75   | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-060 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-060 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-060 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-060 | ●     | 1    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-060 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-060 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-060 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-060 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-060 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-060 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-060 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-060 | ●     | 2    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-060 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-060 | ●     | 6    |
|           |                      |      |      | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-075 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-075 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-075 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-075 | ●     | 1    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-075 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-075 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-075 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-075 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-075 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-075 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-075 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-075 | ●     | 2    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-075 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-075 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F20-075 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F20-075 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          |                    |
|----------------------|-------------------------------------|---------------------------------|--------------------|
|                      | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                     |                                 |                    |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| F         | GY○○0300/0318/0324F○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| F                                                 | CW          |                         |             |                |                          |
|                                                   | 3.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 3.18mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 3.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      |                |             | ●              |                 |
|                                                       | 3.18mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | 3.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F055

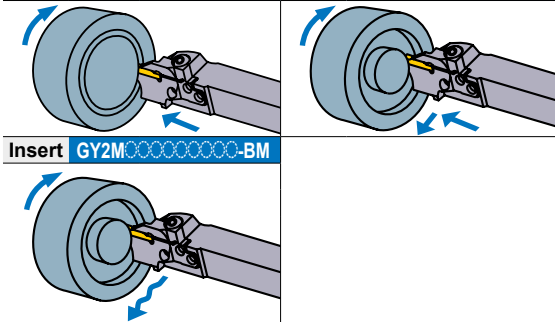


# GY SERIES (FACE GROOVING)

4

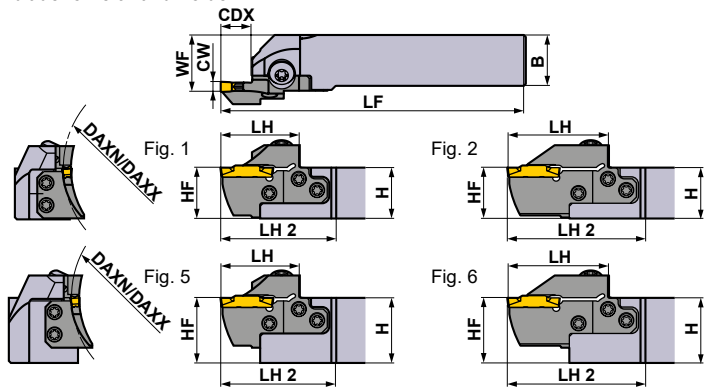
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



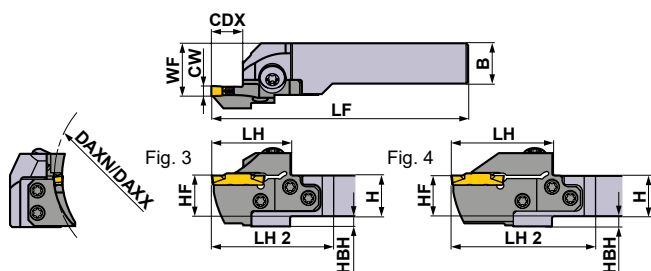
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| F         | 3.00<br>3.18<br>3.24 | 100  | 150  | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-100 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-100 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-100 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-100 | ●     | 1    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-100 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-100 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-100 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-100 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-100 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-100 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-100 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-100 | ●     | 2    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-100 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-100 | ●     | 6    |
|           |                      |      |      | 12    | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F20-100 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F20-100 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-135 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-135 | ●     | 3    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-135 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-135 | ●     | 1    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-135 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-135 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-135 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-135 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-135 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-135 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-135 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-135 | ●     | 2    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-135 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-135 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F20-135 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F20-135 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| F         | GY○○0300/0318/0324F○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| F                                                 | CW          |                         |             |                |                          |
|                                                   | 3.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 3.18mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 3.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      |                |             | ●              |                 |
|                                                       | 3.18mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | 3.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

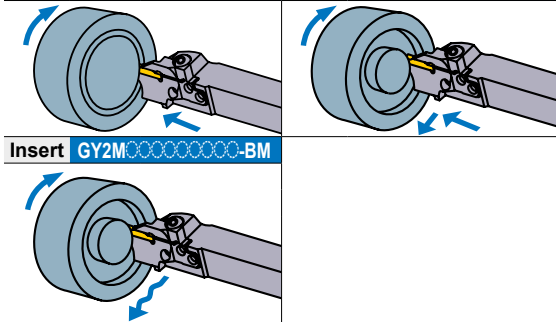
F057

# GY SERIES (FACE GROOVING)

4

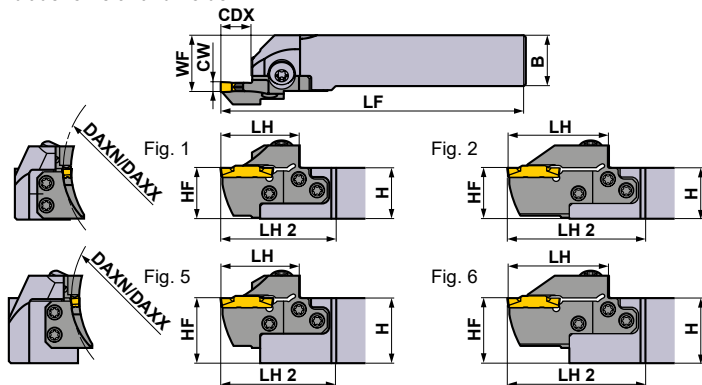
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



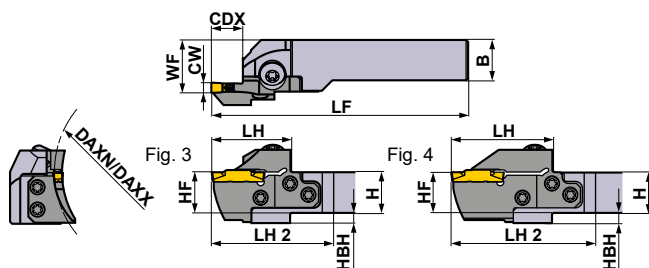
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| F         | 3.00<br>3.18<br>3.24 | 180  | 250  | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-180 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-180 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-180 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-180 | ●     | 1    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-180 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-180 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-180 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-180 | ●     | 5    |
|           |                      | 225  | 999  | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-180 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-180 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-180 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-180 | ●     | 2    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-180 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-180 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F20-180 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F20-180 | ●     | 6    |
|           |                      |      |      | 12    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F12-225 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F12-225 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F12-225 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F12-225 | ●     | 1    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F12-225 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F12-225 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F12-225 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F12-225 | ●     | 5    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-F20-225 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-F20-225 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-F20-225 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-F20-225 | ●     | 2    |
|           |                      |      |      | 20 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-F20-225 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-F20-225 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-F20-225 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-F20-225 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   | L            |
|  | 20                 | 20 | 131 | 45 | 66   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 25                 | 25 | 156 | 45 | 63   | 25 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 25 | 176 | 45 | 63   | 32 | 28 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 32                 | 32 | 176 | 45 | 63   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| F         | GY000300/0318/0324F0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| F                                                 | CW          |                         |             |                |                          |
|                                                   | 3.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 3.18mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 3.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      |                |             | ●              |                 |
|                                                       | 3.18mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | 3.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

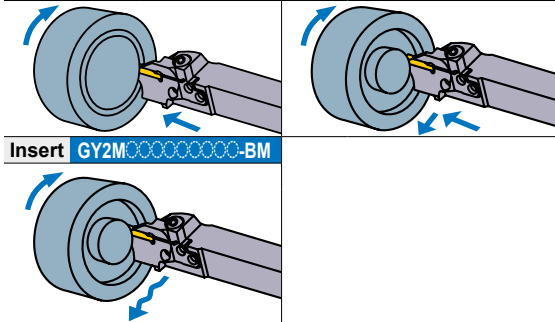
F059

# GY SERIES (FACE GROOVING)

4

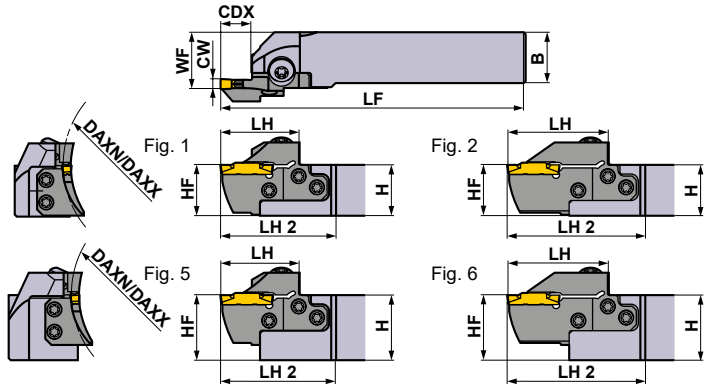
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



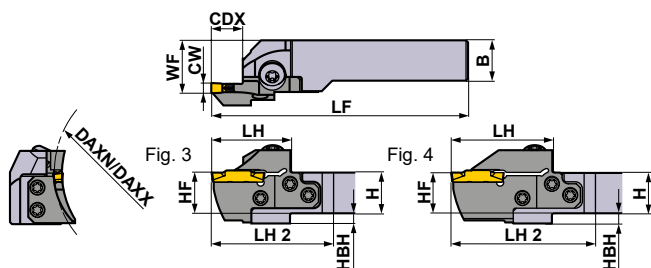
Right hand tool holder shown.

| Seat Size | Dimensions (mm) |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| G         | 4.00<br>4.24    | 40   | 50   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-040 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-040 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-040 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-040 | ●     | 1    |
|           |                 |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-040 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-040 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-040 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-040 | ●     | 5    |
|           |                 | 50   | 60   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-050 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-050 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-050 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-050 | ●     | 1    |
|           |                 |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-050 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-050 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-050 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-050 | ●     | 5    |
|           |                 | 60   | 85   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-060 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-060 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-060 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-060 | ●     | 1    |
|           |                 |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-060 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-060 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-060 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-060 | ●     | 5    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G25-060 | ●     | 4    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G25-060 | ●     | 4    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G25-060 | ●     | 2    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G25-060 | ●     | 2    |
|           |                 |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G25-060 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G25-060 | ●     | 6    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G25-060 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G25-060 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                |
|-----------|----------------------------------------------|
| G         | GY○○○0400/0424G○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| G                                                 | 4.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| CW                                                    |             |                |             |                | Ball shape      |
| G                                                     | 4.00mm      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.4      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.8      | ●              | ●           | ●              | ●               |
|                                                       | 4.24mm      | ●              | ●           | ●              | ●               |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F061

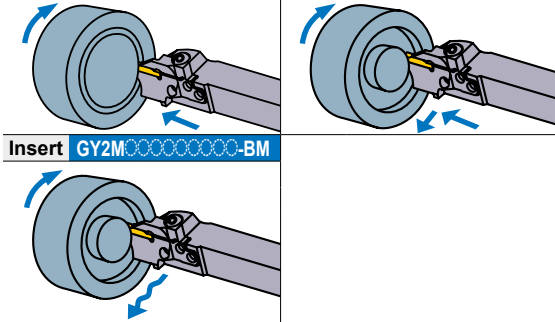


# GY SERIES (FACE GROOVING)

4

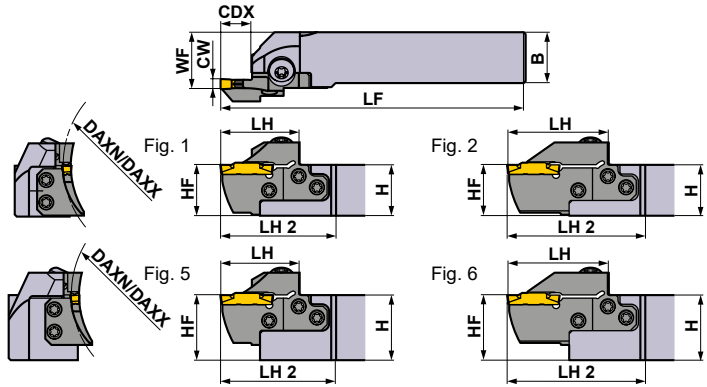
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

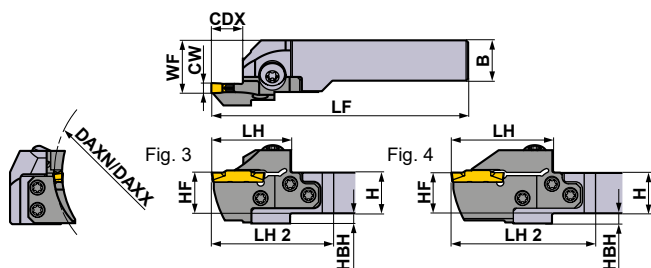
| Seat Size | Dimensions (mm) |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| G         | 4.00<br>4.24    | 85   | 125  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-085 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-085 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-085 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-085 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-085 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-085 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-085 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-085 | ●     | 5    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G25-085 | ●     | 4    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G25-085 | ●     | 4    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G25-085 | ●     | 2    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G25-085 | ●     | 2    |
|           |                 |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G25-085 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G25-085 | ●     | 6    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G25-085 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G25-085 | ●     | 6    |
|           |                 | 125  | 200  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-125 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-125 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-125 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-125 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-125 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-125 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-125 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-125 | ●     | 5    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G25-125 | ●     | 4    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G25-125 | ●     | 4    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G25-125 | ●     | 2    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G25-125 | ●     | 2    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G25-125 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G25-125 | ●     | 6    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G25-125 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G25-125 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.





★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          | ① ②                |
|----------------------|-------------------------------------|---------------------------------|--------------------|
|                      | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2020K00-M25R/L |                                     |                                 |                    |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                |
|-----------|----------------------------------------------|
| G         | GY○○○0400/0424G○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| G                                                 | 4.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| CW                                                    |             |                |             |                | Ball shape      |
| G                                                     | 4.00mm      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.4      | ●              | ●           | ●              | ●               |
|                                                       | RE 0.8      | ●              | ●           | ●              | ●               |
|                                                       | 4.24mm      | ●              | ●           | ●              | ●               |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

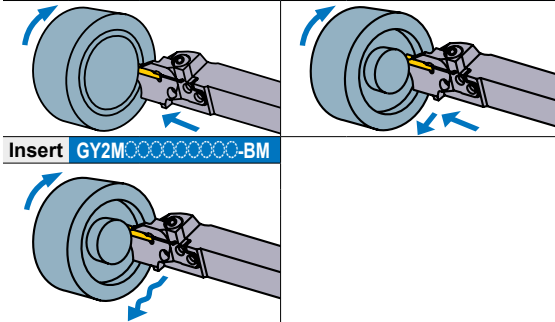
F063

# GY SERIES (FACE GROOVING)

4

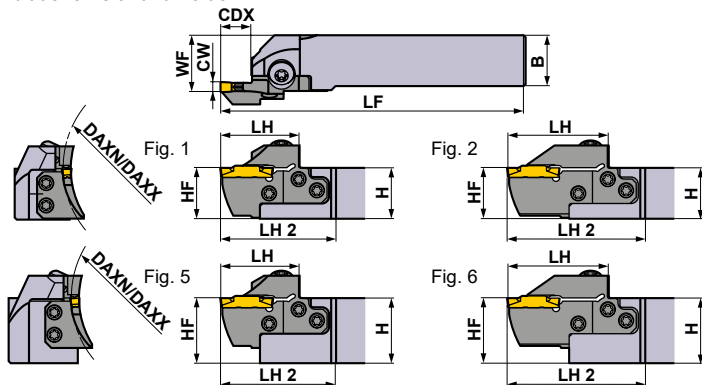
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



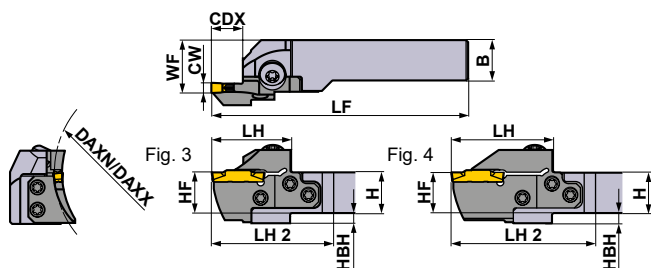
Right hand tool holder shown.

| Seat Size | Dimensions (mm) |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| G         | 4.00<br>4.24    | 180  | 280  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-180 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-180 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-180 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-180 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-180 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-180 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-180 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-180 | ●     | 5    |
|           | 250             | 999  |      | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G25-180 | ●     | 4    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G25-180 | ●     | 4    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G25-180 | ●     | 2    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G25-180 | ●     | 2    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G25-180 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G25-180 | ●     | 6    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G25-180 | ●     | 6    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G25-180 | ●     | 6    |
|           | 4.24            | 250  | 999  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-G14-250 | ●     | 3    |
|           |                 |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-G14-250 | ●     | 3    |
|           |                 |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-G14-250 | ●     | 1    |
|           |                 |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-G14-250 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-G14-250 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-G14-250 | ●     | 5    |
|           |                 |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-G14-250 | ●     | 5    |
|           |                 |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-G14-250 | ●     | 5    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | R            |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   | L            |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| G         | GY○○0400/0424G○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| G                                                 | 4.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                               |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-------------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying)<br>Ball shape |
| CW                                                    |             |                |             |                |                               |
| G                                                     | 4.00mm      | ●              | ●           | ●              | ●                             |
|                                                       | RE 0.2      | ●              | ●           | ●              | ●                             |
|                                                       | RE 0.4      | ●              | ●           | ●              | ●                             |
|                                                       | RE 0.8      | ●              | ●           | ●              | ●                             |
|                                                       | 4.24mm      | ●              | ●           | ●              | ●                             |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

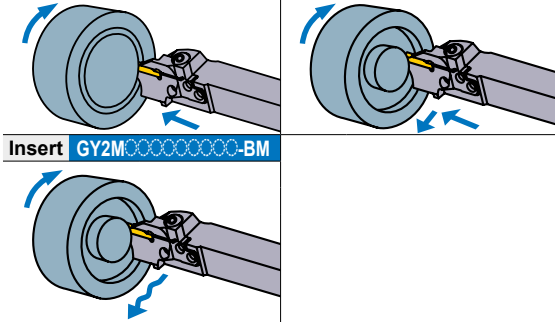
F065

## GY SERIES (FACE GROOVING)

### 4

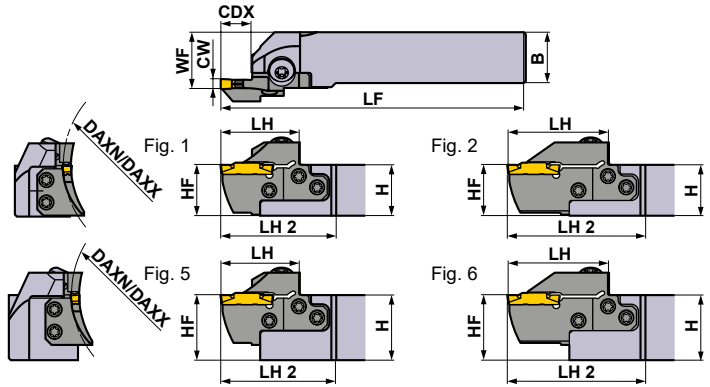
#### 00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.

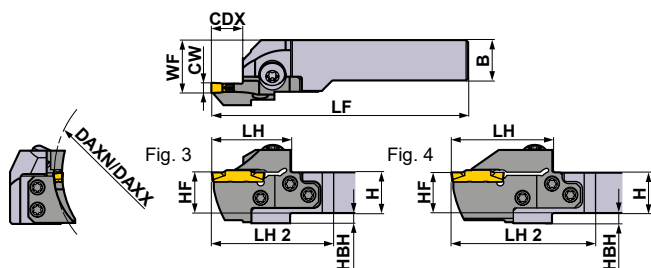


Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 50   | 60   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-050 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-050 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-050 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-050 | ●     | 1    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-050 | ●     | 5    |
|           |                      | 60   | 85   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-060 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-060 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-060 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-060 | ●     | 1    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-060 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-060 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-060 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-060 | ●     | 5    |
|           |                      | 60   | 85   | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H25-060 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H25-060 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H25-060 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H25-060 | ●     | 2    |
|           |                      |      |      |       | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H25-060 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H25-060 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H25-060 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H25-060 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| H         | GY000475/0500/0524H0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| H                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| H                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 4.75mm      |                |             |                |                 |
|                                                       | RE 0.2      | ●              |             |                | ●               |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |
|                                                       | 5.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
|                                                       | 5.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

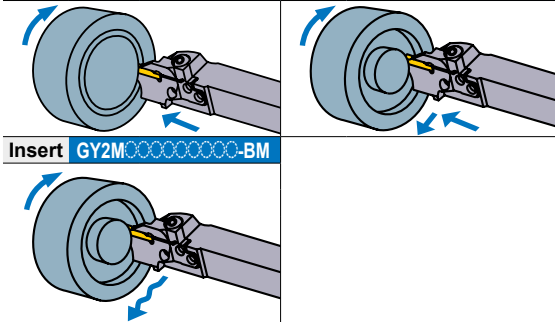
F067

# GY SERIES (FACE GROOVING)

4

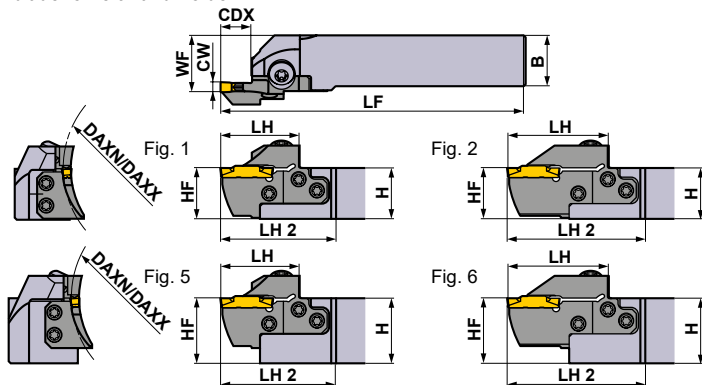
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



Right hand tool holder shown.

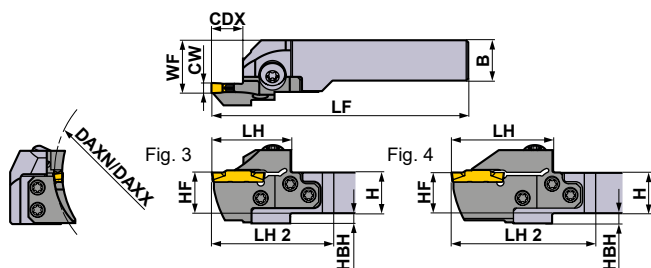
| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 85   | 125  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-085 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-085 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-085 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-085 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-085 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-085 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-085 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-085 | ●     | 5    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H25-085 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H25-085 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H25-085 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H25-085 | ●     | 2    |
|           |                      |      |      | 14    | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H25-085 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H25-085 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H25-085 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H25-085 | ●     | 6    |
|           |                      | 125  | 200  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-125 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-125 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-125 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-125 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-125 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-125 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-125 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-125 | ●     | 5    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H25-125 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H25-125 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H25-125 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H25-125 | ●     | 2    |
|           |                      |      |      | 14    | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H25-125 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H25-125 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H25-125 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H25-125 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.





★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          | ① ②                |
|----------------------|-------------------------------------|---------------------------------|--------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| H         | GY000475/0500/0524H0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| H                                                 | CW          |                         |             |                |                          |
|                                                   | H           | 4.75mm                  | ●           | ●              | ●                        |
|                                                   |             | 5.00mm                  | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| H                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 4.75mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |
|                                                       | 5.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
|                                                       | 5.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

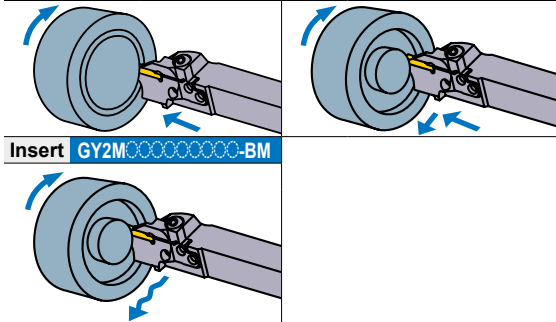


# GY SERIES (FACE GROOVING)

4

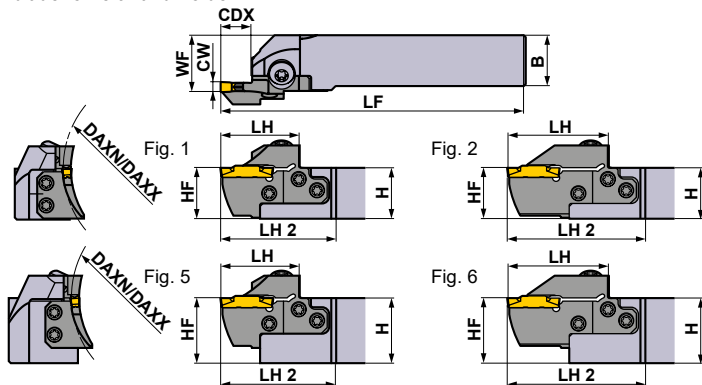
00° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



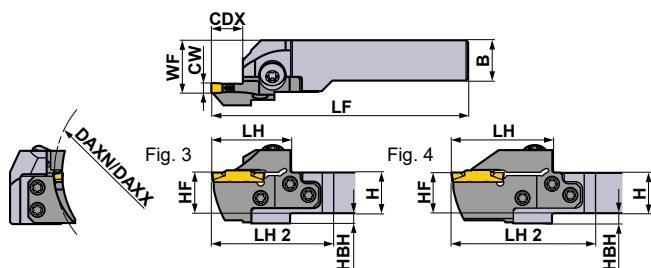
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 180  | 280  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-180 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-180 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-180 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-180 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-180 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-180 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-180 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-180 | ●     | 5    |
|           |                      | 250  | 999  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H25-180 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H25-180 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H25-180 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H25-180 | ●     | 2    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H25-180 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H25-180 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H25-180 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H25-180 | ●     | 6    |
|           |                      | 250  | 999  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-H14-250 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-H14-250 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-H14-250 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-H14-250 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-H14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-H14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-H14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-H14-250 | ●     | 5    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          | ① ②                |
|----------------------|-------------------------------------|---------------------------------|--------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| H         | GY000475/0500/0524H0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| H                                                 | CW          |                         |             |                |                          |
|                                                   | 4.75mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 5.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| H                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 4.75mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |
|                                                       | 5.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
|                                                       | 5.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

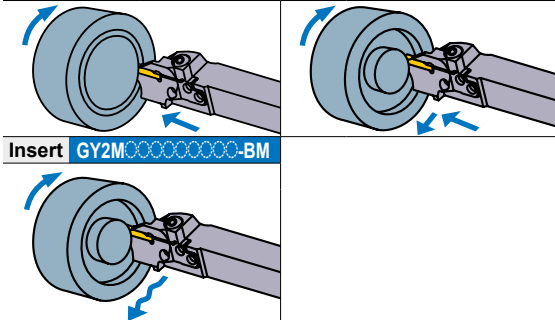
F071

# GY SERIES (FACE GROOVING)

4

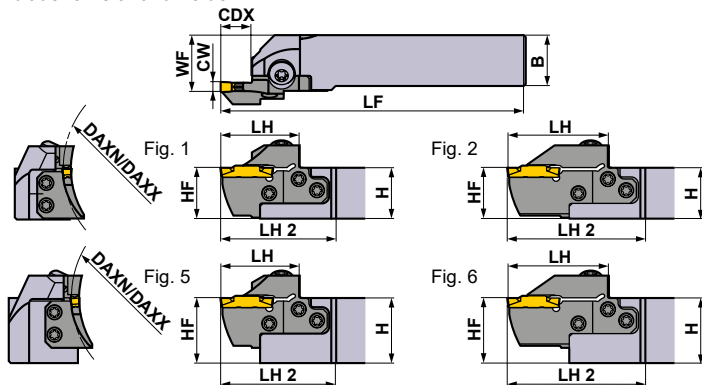
00° type holder

|        |                                                                                               |        |                                                                                             |
|--------|-----------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------|
| Insert | GY2M-  -GS   | Insert | GY2G-  -MF |
| Insert | GY2M-  -GU   | Insert | GY2M-  -MS |
| Insert | GY1G-  -GFGS | Insert | GY2M-  -MM |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



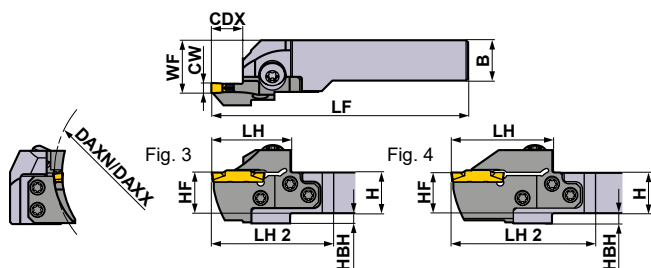
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| J         | 6.00<br>6.31<br>6.35 | 50   | 70   | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J14-050 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J14-050 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J14-050 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J14-050 | ●     | 1    |
|           |                      |      |      | 14    | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J14-050 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J14-050 | ●     | 5    |
|           |                      | 70   | 110  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J14-070 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J14-070 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J14-070 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J14-070 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J14-070 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J14-070 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J14-070 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J14-070 | ●     | 5    |
|           |                      | 110  | 200  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J25-070 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J25-070 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J25-070 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J25-070 | ●     | 2    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J25-070 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J25-070 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J25-070 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J25-070 | ●     | 6    |
|           |                      | 110  | 200  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J14-110 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J14-110 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J14-110 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J14-110 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J14-110 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J14-110 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J14-110 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J14-110 | ●     | 5    |
|           |                      | 110  | 200  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J25-110 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J25-110 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J25-110 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J25-110 | ●     | 2    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J25-110 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J25-110 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J25-110 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J25-110 | ●     | 6    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



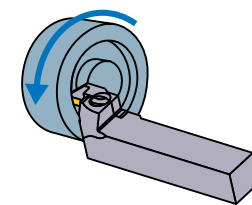
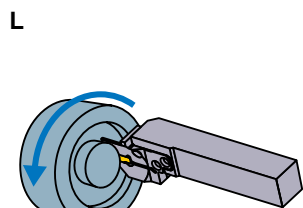
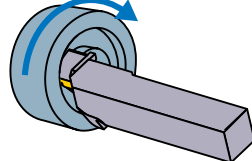
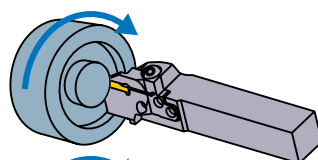
★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                     | 5 pcs.                          | ① ②                |
|----------------------|-------------------------------------|---------------------------------|--------------------|
| GYHR/L2020K00-M25R/L | Clamp Screw                         | Blade Screw                     | Wrench ★           |
| GYHR/L2525M00-M25R/L | GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L3225P00-M25R/L |                                     |                                 |                    |
| GYHR/L3232P00-M25R/L |                                     |                                 |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |



## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| J         | GY00600/0631/0635J0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| J                                                 | CW          |                         |             |                |                          |
|                                                   | 6.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 6.35mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| J                                                     | 6.00mm      |                |             |                | Ball shape      |
|                                                       |             | RE 0.2         | ●           | ●              | ●               |
|                                                       |             | RE 0.4         | ●           | ●              | ●               |
|                                                       |             | RE 0.8         | ●           | ●              | ●               |
|                                                       | 6.31mm      | ●              | ●           | ●              | ●               |
|                                                       |             | ●              | ●           | ●              | ●               |
|                                                       | 6.35mm      | ●              | ●           | ●              | ●               |
|                                                       |             | RE 0.2         | ●           | ●              | ●               |
|                                                       |             | RE 0.4         | ●           | ●              | ●               |
|                                                       |             | RE 0.8         | ●           | ●              | ●               |

● : Standard insert with dimensions

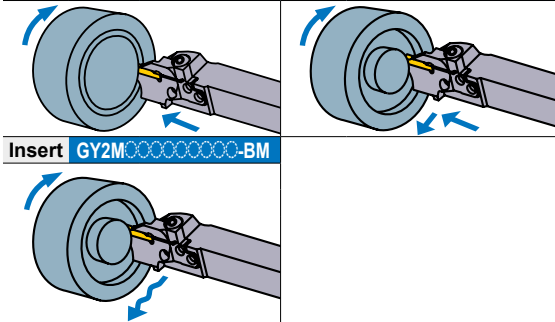
IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

# GY SERIES (FACE GROOVING)

4

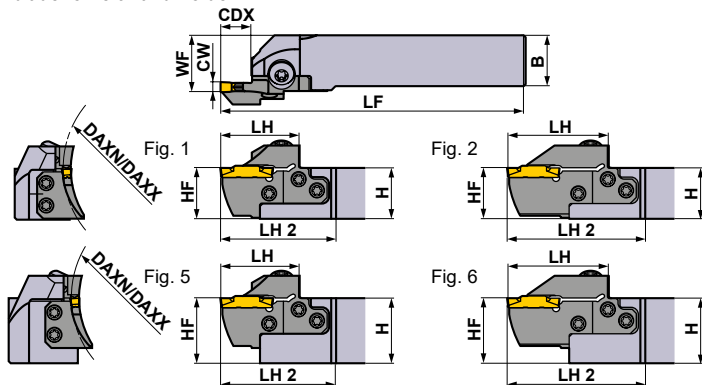
00° type holder

|        |                      |        |                    |
|--------|----------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup>   | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup>   | Insert | GY2M <sup>MS</sup> |
| Insert | GY1G <sup>GFGS</sup> | Insert | GY2M <sup>MM</sup> |



Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use right hand modular blade for right hand holder and left hand modular blade for left hand holder.



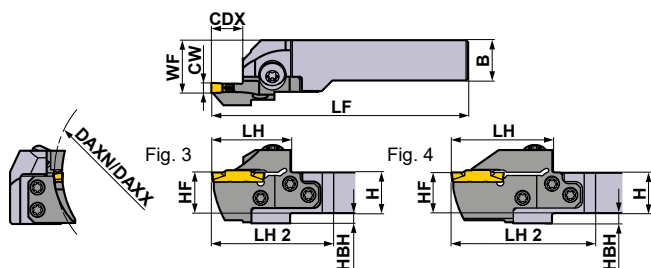
Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| J         | 6.00<br>6.31<br>6.35 | 170  | 280  | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J14-170 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J14-170 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J14-170 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J14-170 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J14-170 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J14-170 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J14-170 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J14-170 | ●     | 5    |
|           | 250                  | 999  |      | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J25-170 | ●     | 4    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J25-170 | ●     | 4    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J25-170 | ●     | 2    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J25-170 | ●     | 2    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J25-170 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J25-170 | ●     | 6    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J25-170 | ●     | 6    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J25-170 | ●     | 6    |
|           |                      |      |      | 14    | Modular | R          | GYHR2020K00-M25R | ●     | GYM25RD-J14-250 | ●     | 3    |
|           |                      |      |      |       | Modular | L          | GYHL2020K00-M25L | ●     | GYM25LD-J14-250 | ●     | 3    |
|           |                      |      |      |       | Modular | R          | GYHR2525M00-M25R | ●     | GYM25RD-J14-250 | ●     | 1    |
|           |                      |      |      |       | Modular | L          | GYHL2525M00-M25L | ●     | GYM25LD-J14-250 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR3225P00-M25R | ●     | GYM25RD-J14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3225P00-M25L | ●     | GYM25LD-J14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | R          | GYHR3232P00-M25R | ●     | GYM25RD-J14-250 | ●     | 5    |
|           |                      |      |      |       | Modular | L          | GYHL3232P00-M25L | ●     | GYM25LD-J14-250 | ●     | 5    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH, LH2, and WF values may vary.

\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder               |                                        | 5 pcs.                             | ① ②                |
|----------------------|----------------------------------------|------------------------------------|--------------------|
|                      | Clamp Screw                            | Blade Screw                        | Wrench ★           |
| GYHR/L2020K00-M25R/L | GY06013M<br>(Clamp Torque<br>: 6.0N·m) | TS55<br>(Clamp Torque<br>: 5.0N·m) | ①TKY30R<br>②TKY25D |
| GYHR/L2525M00-M25R/L |                                        |                                    |                    |
| GYHR/L3225P00-M25R/L |                                        |                                    |                    |
| GYHR/L3232P00-M25R/L |                                        |                                    |                    |

Right hand tool holder shown.

|  | Dimensions (mm) ★1 |    |     |    |      |    |    |     | Cutting Mode |
|--|--------------------|----|-----|----|------|----|----|-----|--------------|
|  | H                  | B  | LF  | LH | LH 2 | HF | WF | HBH |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   | R            |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   | L            |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 125 | 39 | 60   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 25                 | 25 | 150 | 39 | 57   | 25 | 28 | —   |              |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   | L            |
|  | 32                 | 25 | 170 | 39 | 57   | 32 | 28 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 32                 | 32 | 170 | 39 | 57   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   | L            |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 20                 | 20 | 136 | 50 | 71   | 20 | 26 | 5   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 25                 | 25 | 161 | 50 | 68   | 25 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 25 | 181 | 50 | 68   | 32 | 28 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |
|  | 32                 | 32 | 181 | 50 | 68   | 32 | 35 | —   |              |

## Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| J         | GY00600/0631/0635J0000—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| J                                                 | CW          |                         |             |                |                          |
|                                                   | 6.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 6.35mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| J                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 6.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
|                                                       | 6.31mm      | ●              |             |                |                 |
|                                                       | 6.35mm      | ●              |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F075



# GY SERIES (FACE GROOVING)

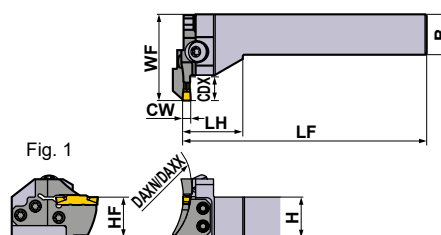
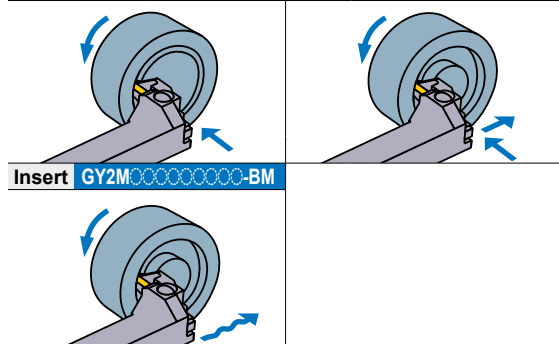
5

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |
|        | GM                 |        | MM                 |



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |     | Type    | Hand (R/L) | Order Number                         |        |                                    |        | Fig.   |
|-----------|----------------------|------|------|-----|---------|------------|--------------------------------------|--------|------------------------------------|--------|--------|
|           | CW                   | DAXN | DAXX | CDX |         |            | Holder                               | Stock  | Modular Blade                      | Stock  |        |
| D         | 2.00<br>2.24         | 40   | 50   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-040<br>GYM25RD-D12-040 | ●<br>● | 1<br>1 |
|           |                      | 50   | 60   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-050<br>GYM25RD-D12-050 | ●<br>● | 1<br>1 |
|           |                      | 60   | 75   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-060<br>GYM25RD-D12-060 | ●<br>● | 1<br>1 |
|           |                      | 75   | 100  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-075<br>GYM25RD-D12-075 | ●<br>● | 1<br>1 |
|           |                      | 100  | 150  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-100<br>GYM25RD-D12-100 | ●<br>● | 1<br>1 |
|           |                      | 135  | 200  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-135<br>GYM25RD-D12-135 | ●<br>● | 1<br>1 |
|           |                      | 180  | 250  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-D12-180<br>GYM25RD-D12-180 | ●<br>● | 1<br>1 |
|           |                      | 40   | 50   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-040<br>GYM25RD-E12-040 | ●<br>● | 1<br>1 |
| E         | 2.39<br>2.50<br>2.74 | 50   | 60   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-050<br>GYM25RD-E12-050 | ●<br>● | 1<br>1 |
|           |                      | 60   | 75   | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-060<br>GYM25RD-E12-060 | ●<br>● | 1<br>1 |
|           |                      | 75   | 100  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-075<br>GYM25RD-E12-075 | ●<br>● | 1<br>1 |
|           |                      | 100  | 150  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-100<br>GYM25RD-E12-100 | ●<br>● | 1<br>1 |
|           |                      | 135  | 200  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-135<br>GYM25RD-E12-135 | ●<br>● | 1<br>1 |
|           |                      | 180  | 250  | 12  | Modular | R<br>L     | GYHR2525M90-M25L<br>GYHL2525M90-M25R | ●<br>● | GYM25LD-E12-180<br>GYM25RD-E12-180 | ●<br>● | 1<br>1 |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH and WF values may vary.

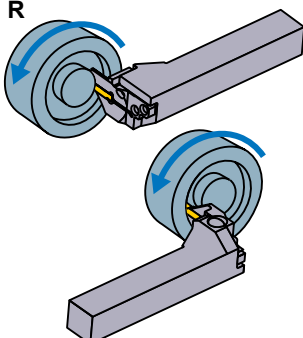
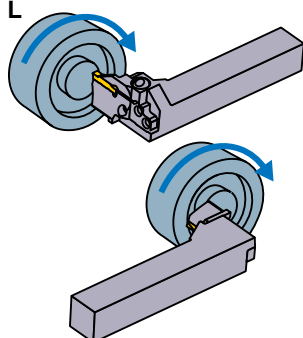
● : Inventory maintained.



★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2525M90-M25L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |    |    | Cutting Mode                                                                                    |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 | <b>R</b><br>  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |

### Insert selection

| Seat Size | Geometry name                                  |
|-----------|------------------------------------------------|
| D         | GY○○0200/0224D○○○-Chipbreaker shown below      |
| E         | GY○○0239/0250/0274E○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| D                                                 | CW          | ●                       | ●           | ●              | ●                        |
|                                                   | D           | 2.00mm                  | ●           | ●              | ●                        |
|                                                   | E           | 2.39mm                  | ●           | ●              | ●                        |
|                                                   | E           | 2.50mm                  | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| D                                                     | CW          | ●              | ●           | ●              | ●               |
|                                                       | D           | 2.00mm         | ●           | ●              | ●               |
|                                                       | D           | 2.24mm         | ●           | ●              | ●               |
|                                                       | E           | 2.39mm         | ●           | ●              | ●               |
|                                                       | E           | 2.50mm         | ●           | ●              | ●               |
|                                                       | E           | 2.74mm         | ●           | ●              | ●               |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F077

# GY SERIES (FACE GROOVING)

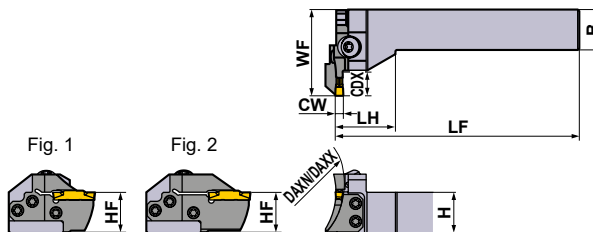
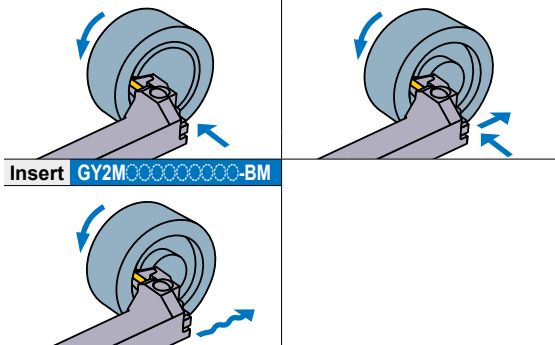
5

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Right hand tool holder shown.

| Seat<br>Size | Dimensions (mm)      |       |         |       | Type             | Hand<br>(R/L) | Order Number     |       |                 |       | Fig. |  |
|--------------|----------------------|-------|---------|-------|------------------|---------------|------------------|-------|-----------------|-------|------|--|
|              | CW                   | DAXN  | DAXX    | CDX   |                  |               | Holder           | Stock | Modular Blade   | Stock |      |  |
| F            | 3.00<br>3.18<br>3.24 | 35    | 40      | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-035 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-035 | ●     | 1    |  |
|              |                      | 40    | 50      | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-040 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-040 | ●     | 1    |  |
|              |                      | 50    | 60      | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-050 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-050 | ●     | 1    |  |
|              |                      | 60    | 75      | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-060 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-060 | ●     | 1    |  |
|              |                      |       |         | 20 *2 | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F20-060 | ●     | 2    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F20-060 | ●     | 2    |  |
|              |                      | 75    | 100     | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-075 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-075 | ●     | 1    |  |
|              |                      |       |         | 20 *2 | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F20-075 | ●     | 2    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F20-075 | ●     | 2    |  |
|              |                      | 100   | 150     | 12    | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F12-100 | ●     | 1    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F12-100 | ●     | 1    |  |
|              |                      |       |         | 20 *2 | Modular          | R             | GYHR2525M90-M25L | ●     | GYM25LD-F20-100 | ●     | 2    |  |
|              |                      |       |         |       |                  | L             | GYHL2525M90-M25R | ●     | GYM25RD-F20-100 | ●     | 2    |  |
| 135          | 200                  | 12    | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F12-135  | ●     | 1               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F12-135  | ●     | 1               |       |      |  |
|              |                      | 20 *2 | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F20-135  | ●     | 2               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F20-135  | ●     | 2               |       |      |  |
| 180          | 250                  | 12    | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F12-180  | ●     | 1               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F12-180  | ●     | 1               |       |      |  |
|              |                      | 20 *2 | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F20-180  | ●     | 2               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F20-180  | ●     | 2               |       |      |  |
| 225          | 999                  | 12    | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F12-225  | ●     | 1               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F12-225  | ●     | 1               |       |      |  |
|              |                      | 20 *2 | Modular | R     | GYHR2525M90-M25L | ●             | GYM25LD-F20-225  | ●     | 2               |       |      |  |
|              |                      |       |         | L     | GYHL2525M90-M25R | ●             | GYM25RD-F20-225  | ●     | 2               |       |      |  |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH and WF values may vary.

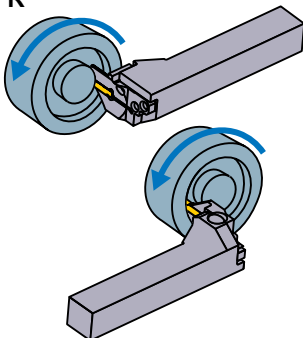
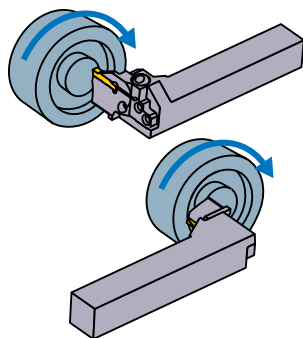
\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2525M90-M25L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |    |    | Cutting Mode                                                                                    |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 | <b>R</b><br>  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 | <b>L</b><br> |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 59 |                                                                                                 |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                                 |

## Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| F         | GY○○0300/0318/0324F○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| F                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |
|                                                   | 3.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 3.18mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 3.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              | ●           | ●              |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      |                |             | ●              |                 |
|                                                       | 3.18mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | 3.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F079

# GY SERIES (FACE GROOVING)

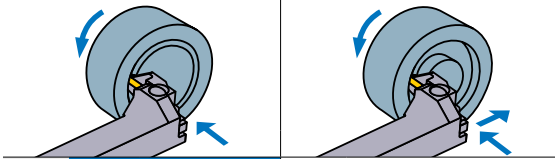
5

90° type holder

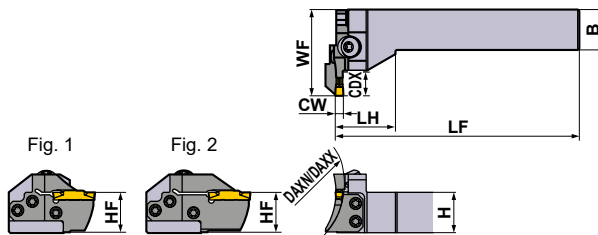
Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |
|        | GFGS               |        |                    |



Insert GY2M-BM



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|-----------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW              | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| G         | 4.00<br>4.24    | 40   | 50   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-040 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-040 | ●     | 1    |
|           |                 | 50   | 60   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-050 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-050 | ●     | 1    |
|           |                 | 60   | 85   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-060 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-060 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G25-060 | ●     | 2    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G25-060 | ●     | 2    |
|           |                 | 85   | 125  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-085 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-085 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G25-085 | ●     | 2    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G25-085 | ●     | 2    |
|           |                 | 125  | 200  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-125 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-125 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G25-125 | ●     | 2    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G25-125 | ●     | 2    |
|           |                 | 180  | 280  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-180 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-180 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G25-180 | ●     | 2    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G25-180 | ●     | 2    |
|           |                 | 250  | 999  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G14-250 | ●     | 1    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G14-250 | ●     | 1    |
|           |                 |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-G25-250 | ●     | 2    |
|           |                 |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-G25-250 | ●     | 2    |

\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then LF, LH and WF values may vary.

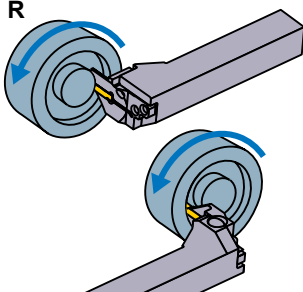
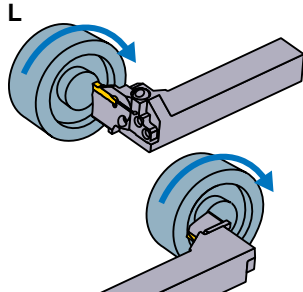
\*2 The maximum groove depth (CDX) varies according to the insert used. Please refer to the maximum groove depth (CDX) of inserts on pages F011—F015.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2525M90-M25L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |    |    | Cutting Mode                                                                        |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |   |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |

## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| G         | GY○○0400/0424G○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| CW                                                |             |                         |             |                |                          |
| G                                                 | 4.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                               |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-------------------------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying)<br>Ball shape |
| CW                                                    |             |                |             |                |                               |
| G                                                     | 4.00mm      | ●              | ●           | ●              | ●                             |
|                                                       | RE 0.2      | ●              | ●           | ●              |                               |
|                                                       | RE 0.4      | ●              | ●           | ●              |                               |
|                                                       | RE 0.8      | ●              | ●           | ●              |                               |
|                                                       | 4.24mm      | ●              |             |                |                               |

● : Standard insert with dimensions

# GY SERIES (FACE GROOVING)

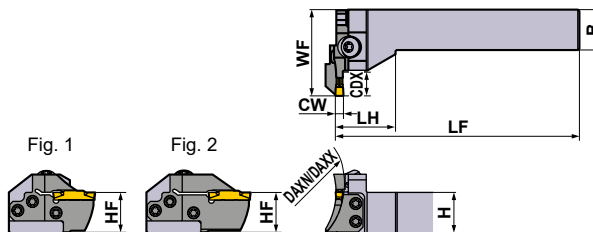
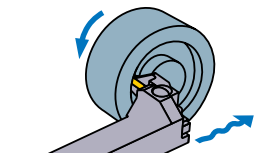
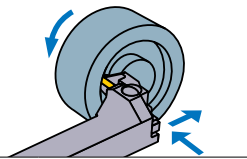
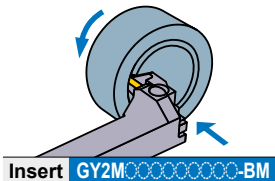
5

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 50   | 60   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-050 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-050 | ●     | 1    |
|           |                      | 60   | 85   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-060 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-060 | ●     | 1    |
|           |                      | 60   | 85   | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H25-060 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H25-060 | ●     | 2    |
|           |                      | 85   | 125  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-085 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-085 | ●     | 1    |
|           |                      | 85   | 125  | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H25-085 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H25-085 | ●     | 2    |
|           |                      | 125  | 200  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-125 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-125 | ●     | 1    |
|           |                      | 125  | 200  | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H25-125 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H25-125 | ●     | 2    |
|           |                      | 180  | 280  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-180 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-180 | ●     | 1    |
|           |                      | 180  | 280  | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H25-180 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H25-180 | ●     | 2    |
|           |                      | 250  | 999  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H14-250 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H14-250 | ●     | 1    |
|           |                      | 250  | 999  | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-H25-250 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-H25-250 | ●     | 2    |

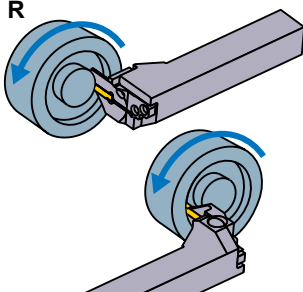
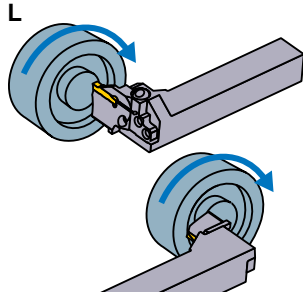
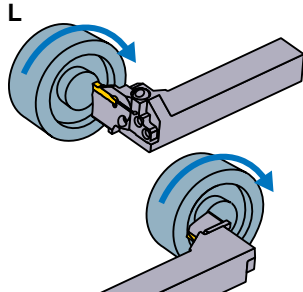
\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then **LF**, **LH** and **WF** values may vary.\*2 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2525M90-M25L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |    |    | Cutting Mode                                                                        |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |   |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |

## Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| H         | GY○○0475/0500/0524H○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| H                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |
| H                                                 | 4.75mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 5.00mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| H                                                     | CW          |                |             |                | Ball shape      |
|                                                       |             |                |             |                |                 |
| H                                                     | 4.75mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |
|                                                       | 5.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
| H                                                     | 5.24mm      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

F083



# GY SERIES (FACE GROOVING)

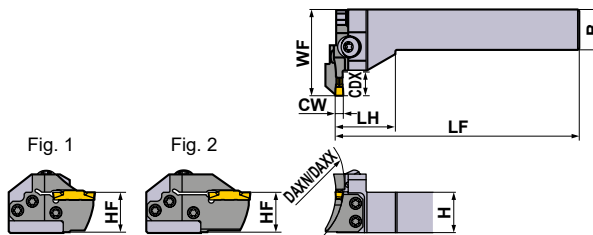
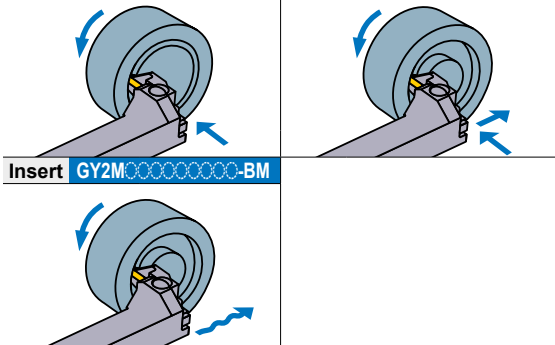
5

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1 <sup>GM</sup>  | Insert | GY2M <sup>MM</sup> |



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |      |      |       | Type    | Hand (R/L) | Order Number     |       |                 |       | Fig. |
|-----------|----------------------|------|------|-------|---------|------------|------------------|-------|-----------------|-------|------|
|           | CW                   | DAXN | DAXX | CDX   |         |            | Holder           | Stock | Modular Blade   | Stock |      |
| J         | 6.00<br>6.31<br>6.35 | 50   | 70   | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J14-050 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J14-050 | ●     | 1    |
|           |                      | 70   | 110  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J14-070 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J14-070 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J25-070 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J25-070 | ●     | 2    |
|           |                      | 110  | 200  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J14-110 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J14-110 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J25-110 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J25-110 | ●     | 2    |
|           |                      | 170  | 280  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J14-170 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J14-170 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J25-170 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J25-170 | ●     | 2    |
|           |                      | 250  | 999  | 14    | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J14-250 | ●     | 1    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J14-250 | ●     | 1    |
|           |                      |      |      | 25 *2 | Modular | R          | GYHR2525M90-M25L | ●     | GYM25LD-J25-250 | ●     | 2    |
|           |                      |      |      |       |         | L          | GYHL2525M90-M25R | ●     | GYM25RD-J25-250 | ●     | 2    |

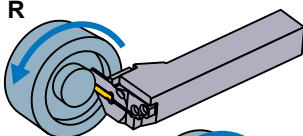
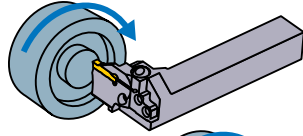
\*1 Dimensions shown are when standard insert is used. If other insert geometries are used then **LF**, **LH** and **WF** values may vary.\*2 The maximum groove depth (**CDX**) varies according to the insert used. Please refer to the maximum groove depth (**CDX**) of inserts on pages F011—F015.

● : Inventory maintained.

★ Wrench : ① : Clamp Screw, ② : Blade Screw

## SPARE PARTS

| Holder                  |  |  5 pcs. |  |
|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                         | Clamp Screw                                                                         | Blade Screw                                                                                | Wrench ★                                                                            |
| <b>GYHR2525M90-M25L</b> | GY06013M<br>(Clamp Torque : 6.0N·m)                                                 | TS55<br>(Clamp Torque : 5.0N·m)                                                            | ①TKY30R<br>②TKY25D                                                                  |
| <b>GYHL2525M90-M25R</b> |                                                                                     |                                                                                            |                                                                                     |

|  | Dimensions (mm) ★1 |    |     |    |    |    | Cutting Mode                                                                        |
|--|--------------------|----|-----|----|----|----|-------------------------------------------------------------------------------------|
|  | H                  | B  | LF  | LH | HF | WF |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |    |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |   |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |  |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 53 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |
|  | 25                 | 25 | 150 | 38 | 25 | 64 |                                                                                     |

## Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| J         | GY○○0600/0631/0635J○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| J                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |
|                                                   | 6.00mm      | ●                       | ●           | ●              | ●                        |
|                                                   | 6.35mm      | ●                       | ●           | ●              | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| J                                                     | CW          |                |             |                | Ball shape      |
|                                                       | 6.00mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              | ●           | ●              |                 |
|                                                       | RE 0.8      | ●              | ●           | ●              |                 |
|                                                       | 6.31mm      | ●              |             |                |                 |
|                                                       | 6.35mm      |                |             |                | ●               |
|                                                       | RE 0.2      | ●              |             |                |                 |
|                                                       | RE 0.4      | ●              |             |                |                 |
|                                                       | RE 0.8      | ●              |             |                |                 |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F108  
CAUTION FOR USE > F110

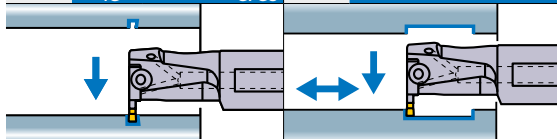
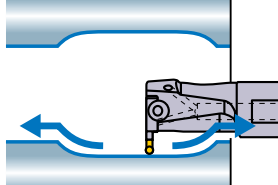
F085

# GY SERIES (INTERNAL GROOVING)

6

90° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1M <sup>GM</sup> | Insert | GY2M <sup>MM</sup> |

Insert GY2M<sup>BM</sup>

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

## ● Monoblock type (Air / coolant through)



Fig. 1

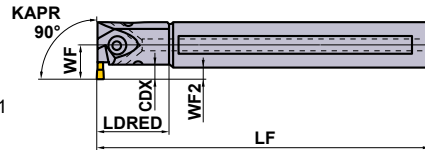
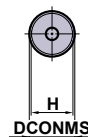


Fig. 2



Right hand tool holder shown.

| Seat Size | Dimensions (mm) |            |      | Type      | Hand (R/L) | Order Number    |       |               |       | Fig. |
|-----------|-----------------|------------|------|-----------|------------|-----------------|-------|---------------|-------|------|
|           | CW              | CDX *3     | DMIN |           |            | Holder          | Stock | Modular Blade | Stock |      |
| D         | 2.00<br>2.24    | 6          | 25   | Monoblock | R          | GYAR20K90A-D06  | ●     | —             | —     | 2    |
|           |                 |            |      | Monoblock | L          | GYAL20K90A-D06  | ●     | —             | —     | 2    |
|           |                 |            | 32   | Monoblock | R          | GYAR20Q90A-D06  | ●     | —             | —     | 1    |
|           |                 |            |      | Monoblock | L          | GYAL20Q90A-D06  | ●     | —             | —     | 1    |
|           |                 | 4—9.5 *1   | 40   | Monoblock | R          | GYAR25K90B-D06  | ●     | —             | —     | 2    |
|           |                 |            |      | Monoblock | L          | GYAL25K90B-D06  | ●     | —             | —     | 2    |
|           |                 |            |      | Monoblock | R          | GYAR25R90B-D06  | ●     | —             | —     | 1    |
|           |                 |            |      | Monoblock | L          | GYAL25R90B-D06  | ●     | —             | —     | 1    |
|           |                 | 5.5—9.5 *1 | 50   | Modular   | R          | GYDR32L90C-M20L | ●     | GYM20LA-D10   | ●     | 4    |
|           |                 |            |      | Modular   | L          | GYDL32L90C-M20R | ●     | GYM20RA-D10   | ●     | 4    |
|           |                 |            |      | Modular   | R          | GYDR32S90C-M20L | ●     | GYM20LA-D10   | ●     | 3    |
|           |                 |            |      | Modular   | L          | GYDL32S90C-M20R | ●     | GYM20RA-D10   | ●     | 3    |
|           |                 | 7—11.5 *1  | 60   | Modular   | R          | GYDR40M90D-M20L | ●     | GYM20LA-D10   | ●     | 4    |
|           |                 |            |      | Modular   | L          | GYDL40M90D-M20R | ●     | GYM20RA-D10   | ●     | 4    |
|           |                 |            |      | Modular   | R          | GYDR40T90D-M20L | ●     | GYM20LA-D10   | ●     | 3    |
|           |                 |            |      | Modular   | L          | GYDL40T90D-M20R | ●     | GYM20RA-D10   | ●     | 3    |
|           |                 |            | 70   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-D12   | ●     | 4    |
|           |                 |            |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-D12   | ●     | 4    |
|           |                 |            |      | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-D12   | ●     | 3    |
|           |                 |            |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-D12   | ●     | 3    |
|           |                 |            | 70   | Modular   | R          | GYDR50P90F-M25L | ●     | GYM25LA-D12   | ●     | 4    |
|           |                 |            |      | Modular   | L          | GYDL50P90F-M25R | ●     | GYM25RA-D12   | ●     | 4    |
|           |                 |            |      | Modular   | R          | GYDR50T90F-M25L | ●     | GYM25LA-D12   | ●     | 3    |
|           |                 |            |      | Modular   | L          | GYDL50T90F-M25R | ●     | GYM25RA-D12   | ●     | 3    |

\*1 The maximum groove depth (CDX) varies according to the cutting diameter (DMIN). For details, please refer to page F115.

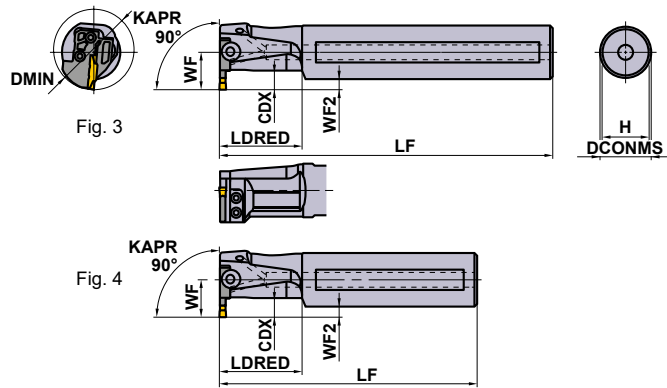
\*2 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LDRED, WF and WF2 values may vary.

\*3 The maximum groove depth (CDX) is a value within the dimension LDRED.

● : Inventory maintained.

●Modular blade type (Air / coolant through)

★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder              | ①<br>Clamp Screw                     | ②<br>Blade Screw<br>4 pcs.       | ①<br>Wrench ★      |
|---------------------|--------------------------------------|----------------------------------|--------------------|
| GYAR/L20○90A-○06    | ①GY05016S<br>(Clamp Torque : 5.0N·m) | —                                | ①TKY20R            |
| GYAR/L25○90B-○06    | —                                    | —                                | —                  |
| GYDR/L32○90C-M20L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS407<br>(Clamp Torque : 3.5N·m) | ①TKY30R<br>②TKY15D |
| GYDR/L40○90D-M20L/R | —                                    | —                                | —                  |
| GYDR/L40○90D-M25L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |
| GYDR/L50○90F-M25L/R | —                                    | —                                | —                  |

|  | Dimensions (mm) ★2 |     |       |      |     |    | Cutting Mode |
|--|--------------------|-----|-------|------|-----|----|--------------|
|  | DCONMS             | LF  | LDRED | WF   | WF2 | H  |              |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 | R            |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 | L            |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 170 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |

## Insert selection

| Seat Size | Geometry name                              |
|-----------|--------------------------------------------|
| D         | GY○○0200/0224D○○○○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011—F013 |             |                         |             |                |                         |                          |
|--------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|--------------------------|
| Seat Size                                        | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | GFGS<br>(Hardened steel) |
| CW                                               |             |                         |             |                |                         |                          |
| D                                                | 2.00mm      | ●                       | ●           | ●              | ●                       | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) |
| CW                                                    |             |                |             |                |
| D                                                     | 2.00mm      | ●              | ●           | ●              |
|                                                       | 2.24mm      | ●              | ●           | ●              |

● : Standard insert with dimensions

GROOVING / CUTTING OFF

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F114  
CAUTION FOR USE > F116

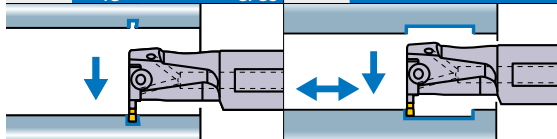
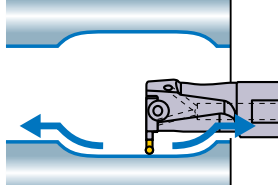
F087

# GY SERIES (INTERNAL GROOVING)

6

90° type holder

|        |                    |        |                    |
|--------|--------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup> | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup> | Insert | GY2M <sup>MS</sup> |
| Insert | GY1M <sup>GM</sup> | Insert | GY2M <sup>MM</sup> |

Insert GY2M<sup>BM</sup>

Note 1) For modular blades and modular holders, please order separately.

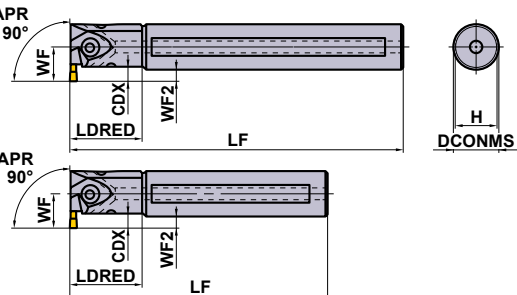
Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

## ● Monoblock type (Air / coolant through)



Fig. 1

Fig. 2



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |            |      | Type      | Hand (R/L) | Order Number    |       |               |       | Fig. |
|-----------|----------------------|------------|------|-----------|------------|-----------------|-------|---------------|-------|------|
|           | CW                   | CDX *3     | DMIN |           |            | Holder          | Stock | Modular Blade | Stock |      |
| E         | 2.39<br>2.50<br>2.74 | 6          | 25   | Monoblock | R          | GYAR20K90A-E06  | ●     | —             | —     | 2    |
|           |                      |            |      | Monoblock | L          | GYAL20K90A-E06  | ●     | —             | —     | 2    |
|           |                      |            | 32   | Monoblock | R          | GYAR20Q90A-E06  | ●     | —             | —     | 1    |
|           |                      |            |      | Monoblock | L          | GYAL20Q90A-E06  | ●     | —             | —     | 1    |
|           |                      | 4—9.5 *1   | 40   | Monoblock | R          | GYAR25K90B-E06  | ●     | —             | —     | 2    |
|           |                      |            |      | Monoblock | L          | GYAL25K90B-E06  | ●     | —             | —     | 2    |
|           |                      |            |      | Monoblock | R          | GYAR25R90B-E06  | ●     | —             | —     | 1    |
|           |                      |            |      | Monoblock | L          | GYAL25R90B-E06  | ●     | —             | —     | 1    |
|           |                      | 5.5—9.5 *1 | 50   | Modular   | R          | GYDR32L90C-M20L | ●     | GYM20LA-E10   | ●     | 4    |
|           |                      |            |      | Modular   | L          | GYDL32L90C-M20R | ●     | GYM20RA-E10   | ●     | 4    |
|           |                      |            |      | Modular   | R          | GYDR32S90C-M20L | ●     | GYM20LA-E10   | ●     | 3    |
|           |                      |            |      | Modular   | L          | GYDL32S90C-M20R | ●     | GYM20RA-E10   | ●     | 3    |
|           |                      | 7—11.5 *1  | 60   | Modular   | R          | GYDR40M90D-M20L | ●     | GYM20LA-E10   | ●     | 4    |
|           |                      |            |      | Modular   | L          | GYDL40M90D-M20R | ●     | GYM20RA-E10   | ●     | 4    |
|           |                      |            |      | Modular   | R          | GYDR40T90D-M20L | ●     | GYM20LA-E10   | ●     | 3    |
|           |                      |            |      | Modular   | L          | GYDL40T90D-M20R | ●     | GYM20RA-E10   | ●     | 3    |
|           |                      |            | 70   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-E12   | ●     | 4    |
|           |                      |            |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-E12   | ●     | 4    |
|           |                      |            |      | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-E12   | ●     | 3    |
|           |                      |            |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-E12   | ●     | 3    |
|           |                      |            | 70   | Modular   | R          | GYDR50P90F-M25L | ●     | GYM25LA-E12   | ●     | 4    |
|           |                      |            |      | Modular   | L          | GYDL50P90F-M25R | ●     | GYM25RA-E12   | ●     | 4    |
|           |                      |            |      | Modular   | R          | GYDR50T90F-M25L | ●     | GYM25LA-E12   | ●     | 3    |
|           |                      |            |      | Modular   | L          | GYDL50T90F-M25R | ●     | GYM25RA-E12   | ●     | 3    |

\*1 The maximum groove depth (CDX) varies according to the cutting diameter (DMIN). For details, please refer to page F115.

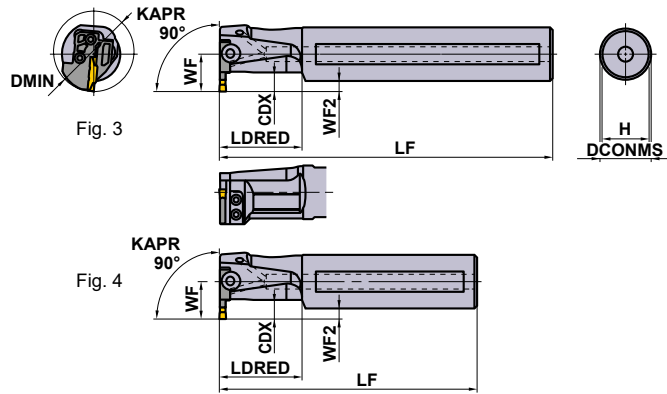
\*2 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LDRED, WF and WF2 values may vary.

\*3 The maximum groove depth (CDX) is a value within the dimension LDRED.

● : Inventory maintained.

●Modular blade type (Air / coolant through)

★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

## SPARE PARTS

| Holder              | ①<br>Clamp Screw                     | ②<br>Blade Screw<br>4 pcs.       | ①<br>Wrench ★      |
|---------------------|--------------------------------------|----------------------------------|--------------------|
| GYAR/L20○90A-○06    | ①GY05016S<br>(Clamp Torque : 5.0N·m) | —                                | ①TKY20R            |
| GYAR/L25○90B-○06    | —                                    | —                                | —                  |
| GYDR/L32○90C-M20L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS407<br>(Clamp Torque : 3.5N·m) | ①TKY30R<br>②TKY15D |
| GYDR/L40○90D-M20L/R | —                                    | —                                | —                  |
| GYDR/L40○90D-M25L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |
| GYDR/L50○90F-M25L/R | —                                    | —                                | —                  |

|  | Dimensions (mm) ★2 |     |       |      |     |    | Cutting Mode |
|--|--------------------|-----|-------|------|-----|----|--------------|
|  | DCONMS             | LF  | LDRED | WF   | WF2 | H  |              |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 | R            |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 | R            |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 | R            |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 | L            |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 | L            |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34   | 9   | 47 | L            |
|  | 50                 | 170 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |

## Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| E         | GY○0239/0250/0274E○000○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011 – F013 |             |                         |             |                |                         |                          |
|----------------------------------------------------|-------------|-------------------------|-------------|----------------|-------------------------|--------------------------|
| Seat Size                                          | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminium alloy) | GFGS<br>(Hardened steel) |
| E                                                  | CW          |                         |             |                |                         |                          |
|                                                    |             | 2.39mm                  | ●           | ●              | ●                       | ●                        |
|                                                    |             | 2.50mm                  | ●           | ●              | ●                       | ●                        |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) |
| E                                                     | CW          |                |             |                |
|                                                       |             | 2.39mm         | ●           | ●              |
|                                                       |             | 2.50mm         | ●           | ●              |
|                                                       |             | 2.74mm         | ●           | ●              |

● : Standard insert with dimensions

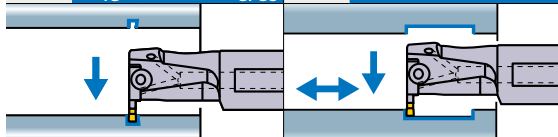
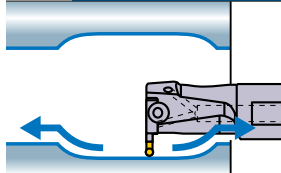
GROOVING / CUTTING OFF

# GY SERIES (INTERNAL GROOVING)

6

90° type holder

|        |                      |        |                    |
|--------|----------------------|--------|--------------------|
| Insert | GY2M <sup>GS</sup>   | Insert | GY2G <sup>MF</sup> |
| Insert | GY2M <sup>GU</sup>   | Insert | GY2M <sup>MS</sup> |
| Insert | GY1M <sup>GFGS</sup> | Insert | GY2M <sup>MM</sup> |

Insert GY2M<sup>BM</sup>

Note 1) For modular blades and modular holders, please order separately.

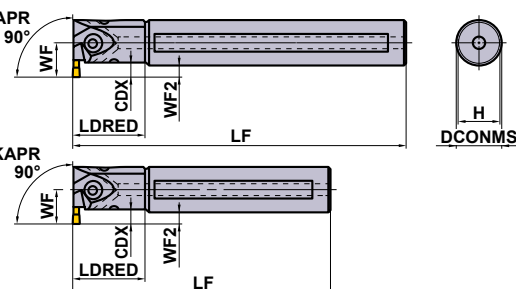
Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.

● Monoblock type (Air / coolant through)



Fig. 1

Fig. 2



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |             |      | Type      | Hand (R/L) | Order Number    |       |               |       | Fig. |
|-----------|----------------------|-------------|------|-----------|------------|-----------------|-------|---------------|-------|------|
|           | CW                   | CDX *3      | DMIN |           |            | Holder          | Stock | Modular Blade | Stock |      |
| F         | 3.00<br>3.18<br>3.24 | 6           | 25   | Monoblock | R          | GYAR20K90A-F06  | ●     | —             | —     | 2    |
|           |                      |             |      | Monoblock | L          | GYAL20K90A-F06  | ●     | —             | —     | 2    |
|           |                      |             | 32   | Monoblock | R          | GYAR20Q90A-F06  | ●     | —             | —     | 1    |
|           |                      |             |      | Monoblock | L          | GYAL20Q90A-F06  | ●     | —             | —     | 1    |
|           |                      | 4—9.5 *1    | 40   | Monoblock | R          | GYAR25K90B-F06  | ●     | —             | —     | 2    |
|           |                      |             |      | Monoblock | L          | GYAL25K90B-F06  | ●     | —             | —     | 2    |
|           |                      |             | 50   | Monoblock | R          | GYAR25R90B-F06  | ●     | —             | —     | 1    |
|           |                      |             |      | Monoblock | L          | GYAL25R90B-F06  | ●     | —             | —     | 1    |
|           |                      | 5.5—9.5 *1  | 40   | Modular   | R          | GYDR32L90C-M20L | ●     | GYM20LA-F10   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL32L90C-M20R | ●     | GYM20RA-F10   | ●     | 4    |
|           |                      |             | 50   | Modular   | R          | GYDR32S90C-M20L | ●     | GYM20LA-F10   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL32S90C-M20R | ●     | GYM20RA-F10   | ●     | 3    |
|           |                      | 7—11.5 *1   | 60   | Modular   | R          | GYDR40M90D-M20L | ●     | GYM20LA-F10   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M20R | ●     | GYM20RA-F10   | ●     | 4    |
|           |                      |             | 70   | Modular   | R          | GYDR40T90D-M20L | ●     | GYM20LA-F10   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M20R | ●     | GYM20RA-F10   | ●     | 3    |
|           |                      |             | 60   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-F12   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-F12   | ●     | 4    |
|           |                      |             | 70   | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-F12   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-F12   | ●     | 3    |
| G         | 4.00<br>4.24         | 7           | 32   | Monoblock | R          | GYAR25K90B-G07  | ●     | —             | —     | 2    |
|           |                      |             |      | Monoblock | L          | GYAL25K90B-G07  | ●     | —             | —     | 2    |
|           |                      |             | 40   | Monoblock | R          | GYAR25R90B-G07  | ●     | —             | —     | 1    |
|           |                      |             |      | Monoblock | L          | GYAL25R90B-G07  | ●     | —             | —     | 1    |
|           |                      | 4.5—11.5 *1 | 40   | Modular   | R          | GYDR32L90C-M20L | ●     | GYM20LA-G12   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL32L90C-M20R | ●     | GYM20RA-G12   | ●     | 4    |
|           |                      |             | 50   | Modular   | R          | GYDR32S90C-M20L | ●     | GYM20LA-G12   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL32S90C-M20R | ●     | GYM20RA-G12   | ●     | 3    |
|           |                      | 6—11.5 *1   | 50   | Modular   | R          | GYDR40M90D-M20L | ●     | GYM20LA-G12   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M20R | ●     | GYM20RA-G12   | ●     | 4    |
|           |                      |             | 60   | Modular   | R          | GYDR40T90D-M20L | ●     | GYM20LA-G12   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M20R | ●     | GYM20RA-G12   | ●     | 3    |
|           |                      | 7.5—13 *1   | 60   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-G14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-G14   | ●     | 4    |
|           |                      |             | 70   | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-G14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-G14   | ●     | 3    |
|           |                      |             | 70   | Modular   | R          | GYDR50P90F-M25L | ●     | GYM25LA-G14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL50P90F-M25R | ●     | GYM25RA-G14   | ●     | 4    |
|           |                      |             | 70   | Modular   | R          | GYDR50T90F-M25L | ●     | GYM25LA-G14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL50T90F-M25R | ●     | GYM25RA-G14   | ●     | 3    |

\*1 The maximum groove depth (CDX) varies according to the cutting diameter (DMIN). For details, please refer to page F115.

\*2 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LDRED, WF and WF2 values may vary.

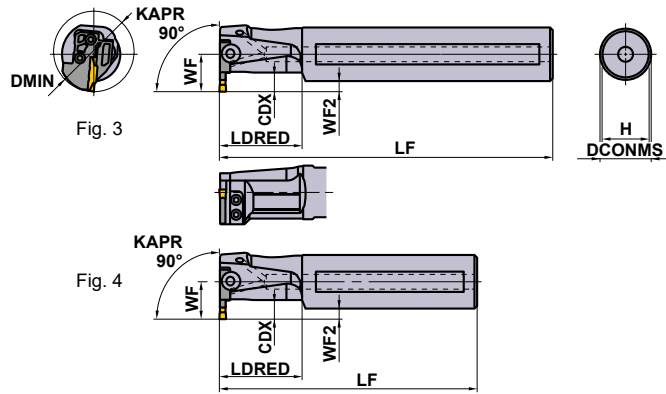
\*3 The maximum groove depth (CDX) is a value within the dimension LDRED.

● : Inventory maintained.



●Modular blade type (Air / coolant through)

★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

SPARE PARTS

| Holder              | ①<br>Clamp Screw                     | ②<br>Blade Screw<br>4 pcs.       | ①<br>Wrench *      |
|---------------------|--------------------------------------|----------------------------------|--------------------|
| GYAR/L20○90A-F06    | ①GY05016S<br>(Clamp Torque : 5.0N·m) | —                                | ①TKY20R            |
| GYAR/L25○90B-○○○    | —                                    | —                                | —                  |
| GYDR/L32○90C-M20L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS407<br>(Clamp Torque : 3.5N·m) | ①TKY30R<br>②TKY15D |
| GYDR/L40○90D-M20L/R | —                                    | —                                | —                  |
| GYDR/L40○90D-M25L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |
| GYDR/L50○90F-M25L/R | —                                    | —                                | —                  |

|  | Dimensions (mm) *2 |     |       |      |     |    | Cutting Mode |
|--|--------------------|-----|-------|------|-----|----|--------------|
|  | DCONMS             | LF  | LDRED | WF   | WF2 | H  |              |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 | R            |
|  | 20                 | 125 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 20                 | 180 | 30    | 14.5 | 4.5 | 18 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 | L            |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34   | 9   | 47 | L            |
|  | 50                 | 170 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 125 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19   | 6.5 | 23 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 140 | 50    | 22   | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22   | 6   | 30 | L            |
|  | 32                 | 250 | 50    | 22   | 6   | 30 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28   | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34   | 9   | 47 | L            |
|  | 50                 | 170 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34   | 9   | 47 |              |

Insert selection

| Seat Size | Geometry name                                    |
|-----------|--------------------------------------------------|
| F         | GY○○0300/0318/0324F○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011 - F013 |             |                         |             |                |                        |                          |
|----------------------------------------------------|-------------|-------------------------|-------------|----------------|------------------------|--------------------------|
| Seat Size                                          | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GL<br>(Aluminum alloy) | GFGS<br>(Hardened steel) |
| F                                                  | CW          |                         |             |                |                        |                          |
|                                                    |             |                         |             |                |                        |                          |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| F                                                     | CW          |                |             |                | Ball nose       |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |

| Seat Size | Geometry name                               |
|-----------|---------------------------------------------|
| G         | GY○○0400/0424G○○○○○-Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| G                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| G                                                     | CW          |                |             |                | Ball nose       |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F114  
CAUTION FOR USE > F116

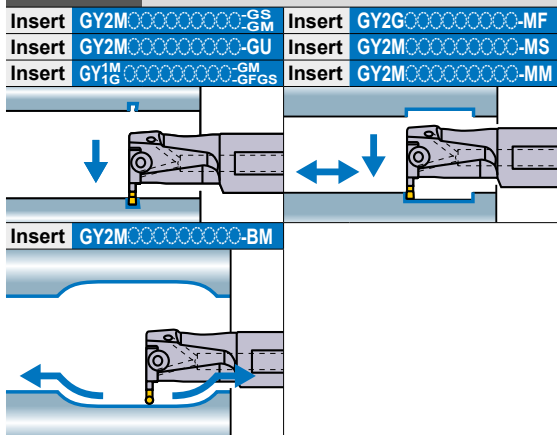
# GY SERIES (INTERNAL GROOVING)

6

90° type holder

Note 1) For modular blades and modular holders, please order separately.

Note 2) Please use left hand modular blade for right hand holder and right hand modular blade for left hand holder.



## ● Monoblock type (Air / coolant through)



Fig. 1

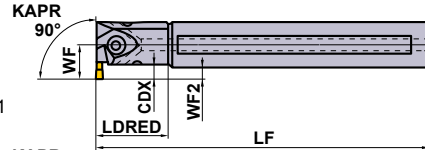
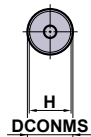


Fig. 2



Right hand tool holder shown.

| Seat Size | Dimensions (mm)      |             |      | Type      | Hand (R/L) | Order Number    |       |               |       | Fig. |
|-----------|----------------------|-------------|------|-----------|------------|-----------------|-------|---------------|-------|------|
|           | CW                   | CDX *3      | DMIN |           |            | Holder          | Stock | Modular Blade | Stock |      |
| H         | 4.75<br>5.00<br>5.24 | 7           | 32   | Monoblock | R          | GYAR25K90B-H07  | ●     | —             | —     | 2    |
|           |                      |             |      | Monoblock | L          | GYAL25K90B-H07  | ●     | —             | —     | 2    |
|           |                      |             |      | Monoblock | R          | GYAR25R90B-H07  | ●     | —             | —     | 1    |
|           |                      |             |      | Monoblock | L          | GYAL25R90B-H07  | ●     | —             | —     | 1    |
|           |                      | 4.5—11.5 *1 | 40   | Modular   | R          | GYDR32L90C-M20L | ●     | GYM20LA-H12   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL32L90C-M20R | ●     | GYM20RA-H12   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR32S90C-M20L | ●     | GYM20LA-H12   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL32S90C-M20R | ●     | GYM20RA-H12   | ●     | 3    |
|           |                      | 6—11.5 *1   | 50   | Modular   | R          | GYDR40M90D-M20L | ●     | GYM20LA-H12   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M20R | ●     | GYM20RA-H12   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR40T90D-M20L | ●     | GYM20LA-H12   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M20R | ●     | GYM20RA-H12   | ●     | 3    |
|           |                      | 7.5—13 *1   | 60   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-H14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-H14   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-H14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-H14   | ●     | 3    |
|           |                      |             | 70   | Modular   | R          | GYDR50P90F-M25L | ●     | GYM25LA-H14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL50P90F-M25R | ●     | GYM25RA-H14   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR50T90F-M25L | ●     | GYM25LA-H14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL50T90F-M25R | ●     | GYM25RA-H14   | ●     | 3    |
| J         | 6.00<br>6.31<br>6.35 | 7.5—13 *1   | 60   | Modular   | R          | GYDR40M90D-M25L | ●     | GYM25LA-J14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL40M90D-M25R | ●     | GYM25RA-J14   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR40T90D-M25L | ●     | GYM25LA-J14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL40T90D-M25R | ●     | GYM25RA-J14   | ●     | 3    |
|           |                      |             | 70   | Modular   | R          | GYDR50P90F-M25L | ●     | GYM25LA-J14   | ●     | 4    |
|           |                      |             |      | Modular   | L          | GYDL50P90F-M25R | ●     | GYM25RA-J14   | ●     | 4    |
|           |                      |             |      | Modular   | R          | GYDR50T90F-M25L | ●     | GYM25LA-J14   | ●     | 3    |
|           |                      |             |      | Modular   | L          | GYDL50T90F-M25R | ●     | GYM25RA-J14   | ●     | 3    |
|           |                      |             |      |           |            |                 |       |               |       |      |
|           |                      |             |      |           |            |                 |       |               |       |      |
|           |                      |             |      |           |            |                 |       |               |       |      |
|           |                      |             |      |           |            |                 |       |               |       |      |

\*1 The maximum groove depth (CDX) varies according to the cutting diameter (DMIN). For details, please refer to page F115.

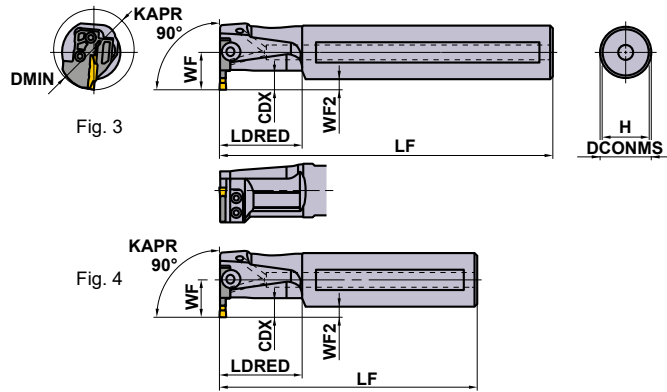
\*2 Dimensions shown are when the standard insert is used. If other insert geometries are used then LF, LDRED, WF and WF2 values may vary.

\*3 The maximum groove depth (CDX) is a value within the dimension LDRED.

● : Inventory maintained.

●Modular blade type (Air / coolant through)

★ Wrench : ① : Clamp Screw, ② : Blade Screw



Right hand tool holder shown.

SPARE PARTS

| Holder              | ①<br>Clamp Screw                     | ②<br>Blade Screw<br>4 pcs.       | ①<br>Wrench *      |
|---------------------|--------------------------------------|----------------------------------|--------------------|
| GYAR/L25○90B-○07    | ①GY05016S<br>(Clamp Torque : 5.0N·m) | —                                | ①TKY20R            |
| GYDR/L32○90C-M20L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS407<br>(Clamp Torque : 3.5N·m) | ①TKY30R<br>②TKY15D |
| GYDR/L40○90D-M20L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |
| GYDR/L40○90D-M25L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |
| GYDR/L50○90F-M25L/R | ②GY06013M<br>(Clamp Torque : 6.0N·m) | TS55<br>(Clamp Torque : 5.0N·m)  | ①TKY30R<br>②TKY25D |

|  | Dimensions (mm) *2 |     |       |    |     |    | Cutting Mode |
|--|--------------------|-----|-------|----|-----|----|--------------|
|  | DCONMS             | LF  | LDRED | WF | WF2 | H  |              |
|  | 25                 | 125 | 40    | 19 | 6.5 | 23 | R            |
|  | 25                 | 125 | 40    | 19 | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19 | 6.5 | 23 |              |
|  | 25                 | 200 | 40    | 19 | 6.5 | 23 |              |
|  | 32                 | 140 | 50    | 22 | 6   | 30 |              |
|  | 32                 | 140 | 50    | 22 | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22 | 6   | 30 |              |
|  | 32                 | 250 | 50    | 22 | 6   | 30 |              |
|  | 40                 | 150 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28 | 8   | 37 | L            |
|  | 40                 | 300 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 150 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28 | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34 | 9   | 47 |              |
|  | 40                 | 150 | 60    | 28 | 8   | 37 | L            |
|  | 40                 | 150 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28 | 8   | 37 |              |
|  | 40                 | 300 | 60    | 28 | 8   | 37 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 300 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |
|  | 50                 | 170 | 80    | 34 | 9   | 47 |              |

Insert selection

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| H         | GY○0475/0500/0524H○000○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| H                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| H                                                     | CW          |                |             |                | Ball nose       |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |

| Seat Size | Geometry name                                   |
|-----------|-------------------------------------------------|
| J         | GY○0600/0631/0635J○000○—Chipbreaker shown below |

| For grooving/cutting off chipbreaker > F011, F012 |             |                         |             |                |                          |
|---------------------------------------------------|-------------|-------------------------|-------------|----------------|--------------------------|
| Seat Size                                         | Chipbreaker | GU<br>(For gummy steel) | GS<br>(Low) | GM<br>(Medium) | GFGS<br>(Hardened steel) |
| J                                                 | CW          |                         |             |                |                          |
|                                                   |             |                         |             |                |                          |

| For multifunctional grooving chipbreaker > F014, F015 |             |                |             |                |                 |
|-------------------------------------------------------|-------------|----------------|-------------|----------------|-----------------|
| Seat Size                                             | Chipbreaker | MF<br>(Finish) | MS<br>(Low) | MM<br>(Medium) | BM<br>(Copying) |
| J                                                     | CW          |                |             |                | Ball nose       |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |
|                                                       |             |                |             |                |                 |

● : Standard insert with dimensions

IDENTIFICATION > F008, F009  
CUTTING CONDITIONS > F114  
CAUTION FOR USE > F116

# GY SERIES (EXTERNAL / FACE GROOVING)

**PSC** 00° type holder

Note 1) Please order the modular blade and modular holder separately.

Note 2) Please set the right hand modular blade at the right hand holder and the left hand modular blade at the left hand holder.

P

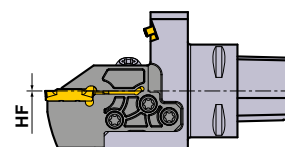
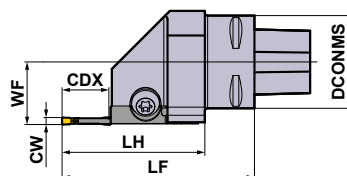
M

K

N

S

H



Right hand tool holder shown.

(mm)

| Order Number       | Stock | Hand (R/L) | Coolant  | Mounting Size | DCONMS | CW       |
|--------------------|-------|------------|----------|---------------|--------|----------|
| C4-GYHERM00-M25R   | ●     | R          | External | PSC40         | 40     | 2.0—6.35 |
| C4-GYHELM00-M25L   | ●     | L          | External | PSC40         | 40     | 2.0—6.35 |
| C5-GYHERM00-M25R   | ●     | R          | External | PSC50         | 50     | 2.0—6.35 |
| C5-GYHELM00-M25L   | ●     | L          | External | PSC50         | 50     | 2.0—6.35 |
| * C6-GYHERM00-M25R | ●     | R          | External | PSC60         | 60     | 2.0—6.35 |
| * C6-GYHELM00-M25L | ●     | L          | External | PSC60         | 60     | 2.0—6.35 |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j and e series.

GROOVING / CUTTING OFF

## Set Dimensions with Modular Blades

| Holder Type          | Modular Blade Type | Standard CW | CDX | WF   | HF | LF | LH   |
|----------------------|--------------------|-------------|-----|------|----|----|------|
| C4-GYHER/LM00-M25R/L | GYM25R/L-○D06      | 2.0         | 6   | 27.0 | 0  | 69 | 47.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○D12      | 2.0         | 12  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○D20      | 2.0         | 20  | 27.0 | 0  | 83 | 61.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○E06      | 2.5         | 6   | 27.0 | 0  | 69 | 47.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○E12      | 2.5         | 12  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○E20      | 2.5         | 20  | 27.0 | 0  | 83 | 61.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○F06      | 3.0         | 6   | 27.0 | 0  | 69 | 47.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○F12      | 3.0         | 12  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○F20      | 3.0         | 20  | 27.0 | 0  | 83 | 61.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○G08      | 4.0         | 8   | 27.0 | 0  | 71 | 49.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○G14      | 4.0         | 14  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○G25      | 4.0         | 25  | 27.0 | 0  | 88 | 66.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○H08      | 5.0         | 8   | 27.0 | 0  | 71 | 49.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○H14      | 5.0         | 14  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○H25      | 5.0         | 25  | 27.0 | 0  | 88 | 66.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○J08      | 6.0         | 8   | 27.0 | 0  | 71 | 49.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○J14      | 6.0         | 14  | 27.0 | 0  | 77 | 55.6 |
| C4-GYHER/LM00-M25R/L | GYM25R/L-○J25      | 6.0         | 25  | 27.0 | 0  | 88 | 66.6 |

\*Modular blade type: Blades for face machining indicate a code for the minimum face grooving diameter. Example: GYM25RD-D12-040

The "○" symbol is a position to insert the letter "A" for external diameter machining or "D" for face machining.

Note 1) The indicated dimensions are values for standard inserts (GM breakers). If other inserts are mounted, LF and LH may differ.

● : Inventory maintained.

(mm)

| Holder Type          | Modular Blade Type    | Standard CW | CDX | WF   | HF | LF | LH   |
|----------------------|-----------------------|-------------|-----|------|----|----|------|
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D06 | 2.0         | 6   | 35.0 | 0  | 69 | 47.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D12 | 2.0         | 12  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D20 | 2.0         | 20  | 35.0 | 0  | 83 | 61.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E06 | 2.5         | 6   | 35.0 | 0  | 69 | 47.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E12 | 2.5         | 12  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E20 | 2.5         | 20  | 35.0 | 0  | 83 | 61.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F06 | 3.0         | 6   | 35.0 | 0  | 69 | 47.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F12 | 3.0         | 12  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F20 | 3.0         | 20  | 35.0 | 0  | 83 | 61.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G08 | 4.0         | 8   | 35.0 | 0  | 71 | 49.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G14 | 4.0         | 14  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G25 | 4.0         | 25  | 35.0 | 0  | 88 | 66.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H08 | 5.0         | 8   | 35.0 | 0  | 71 | 49.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H14 | 5.0         | 14  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H25 | 5.0         | 25  | 35.0 | 0  | 88 | 66.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J08 | 6.0         | 8   | 35.0 | 0  | 71 | 49.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J14 | 6.0         | 14  | 35.0 | 0  | 77 | 55.6 |
| C5-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J25 | 6.0         | 25  | 35.0 | 0  | 88 | 66.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D06 | 2.0         | 6   | 45.0 | 0  | 71 | 47.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D12 | 2.0         | 12  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -D20 | 2.0         | 20  | 45.0 | 0  | 85 | 61.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E06 | 2.5         | 6   | 45.0 | 0  | 71 | 47.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E12 | 2.5         | 12  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -E20 | 2.5         | 20  | 45.0 | 0  | 85 | 61.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F06 | 3.0         | 6   | 45.0 | 0  | 71 | 47.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F12 | 3.0         | 12  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -F20 | 3.0         | 20  | 45.0 | 0  | 85 | 61.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G08 | 4.0         | 8   | 45.0 | 0  | 73 | 49.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G14 | 4.0         | 14  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -G25 | 4.0         | 25  | 45.0 | 0  | 90 | 66.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H08 | 5.0         | 8   | 45.0 | 0  | 73 | 49.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H14 | 5.0         | 14  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -H25 | 5.0         | 25  | 45.0 | 0  | 90 | 66.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J08 | 6.0         | 8   | 45.0 | 0  | 73 | 49.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J14 | 6.0         | 14  | 45.0 | 0  | 79 | 55.6 |
| C6-GYHER/LM00-M25R/L | GYM25R/L $\odot$ -J25 | 6.0         | 25  | 45.0 | 0  | 90 | 66.6 |

\*Modular blade type: Blades for face machining indicate a code for the minimum face grooving diameter. Example: GYM25RD-D12-040

The “ $\odot$ ” symbol is a position to insert the letter “A” for external diameter machining or “D” for face machining.

Note 1) The indicated dimensions are values for standard inserts (GM breakers). If other inserts are mounted, LF and LH may differ.

## SPARE PARTS

|                                                                                     |      |                                                                                     |      |                                                                                     |      |                                                                                     |      |                                                                                       |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |      |  |      |  |      |  |      |  |  |  |  |
| Clamp Screw                                                                         |      | Blade Screw                                                                         |      | Plug                                                                                |      | Nozzle                                                                              |      | Wrench 1                                                                              |  | Wrench 2                                                                              |  |
| Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                          |  | Order Number                                                                          |  |
| GY06013M                                                                            | 1    | TS55                                                                                | 5    | HSD05004S                                                                           | 1    | NZ22042080S                                                                         | 1    | TKY25D                                                                                |  | TKY30R                                                                                |  |

\* Clamp Torque (N • m) : GY06013M=6.0, TS55=5.0

Nozzle Exchange Key : NZKH050S

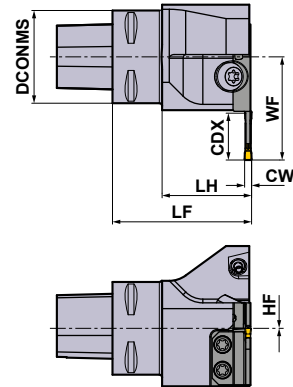
|                    |               |
|--------------------|---------------|
| IDENTIFICATION     | > F008, F010  |
| INSERTS            | > F011 – F015 |
| CUTTING CONDITIONS | > F100, F108  |
| CAUTION FOR USE    | > F105, F110  |

# GY SERIES (EXTERNAL / FACE GROOVING)

**PSC** 90° type holder

Note 1) Please order the modular blade and modular holder separately.

Note 2) Please set the left hand modular blade at the right hand holder and the right hand modular blade at the left hand holder.



Left hand tool holder shown.

(mm)

| Order Number     | Stock | Hand (R/L) | Coolant  | Mounting Size | DCONMS | CW       |
|------------------|-------|------------|----------|---------------|--------|----------|
| C4-GYHERM90-M25L | ●     | R          | External | PSC40         | 40     | 2.0—6.35 |
| C4-GYHELM90-M25R | ●     | L          | External | PSC40         | 40     | 2.0—6.35 |
| C5-GYHERM90-M25L | ●     | R          | External | PSC50         | 50     | 2.0—6.35 |
| C5-GYHELM90-M25R | ●     | L          | External | PSC50         | 50     | 2.0—6.35 |
| C6-GYHERM90-M25L | ●     | R          | External | PSC60         | 60     | 2.0—6.35 |
| C6-GYHELM90-M25R | ●     | L          | External | PSC60         | 60     | 2.0—6.35 |

## Set Dimensions with Modular Blades

| Holder Type          | Modular Blade Type | Standard CW | CDX | WF   | HF | LF | LH   |
|----------------------|--------------------|-------------|-----|------|----|----|------|
| C4-GYHER/LM90-M25L/R | GYM25L/R-D06       | 2.0         | 6   | 30.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-D12       | 2.0         | 12  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-D20       | 2.0         | 20  | 44.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-E06       | 2.5         | 6   | 30.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-E12       | 2.5         | 12  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-E20       | 2.5         | 20  | 44.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-F06       | 3.0         | 6   | 30.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-F12       | 3.0         | 12  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-F20       | 3.0         | 20  | 44.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-G08       | 4.0         | 8   | 32.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-G14       | 4.0         | 14  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-G25       | 4.0         | 25  | 49.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-H08       | 5.0         | 8   | 32.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-H14       | 5.0         | 14  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-H25       | 5.0         | 25  | 49.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-J08       | 6.0         | 8   | 32.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-J14       | 6.0         | 14  | 38.5 | 0  | 60 | 38.6 |
| C4-GYHER/LM90-M25L/R | GYM25L/R-J25       | 6.0         | 25  | 49.5 | 0  | 60 | 38.6 |

\*Modular blade type: Blades for face machining indicate a code for the minimum face grooving diameter. Example: GYM25RD-D12-040

The "○" symbol is a position to insert the letter "A" for external diameter machining or "D" for face machining.

Note 1) The indicated dimensions are values for standard inserts (GM breakers). If other inserts are mounted, LF and LH may differ.

● : Inventory maintained.



(mm)

| Holder Type          | Modular Blade Type                                                                                | Standard CW | CDX | WF   | HF | LF | LH   |
|----------------------|---------------------------------------------------------------------------------------------------|-------------|-----|------|----|----|------|
| C5-GYHER/LM90-M25L/R | GYM25L/R-  D06   | 2.0         | 6   | 33.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  D12   | 2.0         | 12  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  D20   | 2.0         | 20  | 47.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  E06   | 2.5         | 6   | 33.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  E12   | 2.5         | 12  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  E20   | 2.5         | 20  | 47.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  F06   | 3.0         | 6   | 33.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  F12   | 3.0         | 12  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  F20   | 3.0         | 20  | 47.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  G08   | 4.0         | 8   | 35.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  G14   | 4.0         | 14  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  G25   | 4.0         | 25  | 52.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  H08   | 5.0         | 8   | 35.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  H14   | 5.0         | 14  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  H25   | 5.0         | 25  | 52.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  J08   | 6.0         | 8   | 35.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  J14   | 6.0         | 14  | 41.0 | 0  | 60 | 38.6 |
| C5-GYHER/LM90-M25L/R | GYM25L/R-  J25   | 6.0         | 25  | 52.0 | 0  | 60 | 38.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  D06   | 2.0         | 6   | 40.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  D12   | 2.0         | 12  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  D20   | 2.0         | 20  | 54.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  E06   | 2.5         | 6   | 40.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  E12   | 2.5         | 12  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  E20   | 2.5         | 20  | 54.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  F06  | 3.0         | 6   | 40.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  F12 | 3.0         | 12  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  F20 | 3.0         | 20  | 54.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  G08 | 4.0         | 8   | 42.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  G14 | 4.0         | 14  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  G25 | 4.0         | 25  | 59.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  H08 | 5.0         | 8   | 42.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  H14 | 5.0         | 14  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  H25 | 5.0         | 25  | 59.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  J08 | 6.0         | 8   | 42.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  J14 | 6.0         | 14  | 48.0 | 0  | 70 | 46.6 |
| C6-GYHER/LM90-M25L/R | GYM25L/R-  J25 | 6.0         | 25  | 59.0 | 0  | 70 | 46.6 |

\*Modular blade type: Blades for face machining indicate a code for the minimum face grooving diameter. Example: GYM25RD-D12-040

The " symbol is a position to insert the letter "A" for external diameter machining or "D" for face machining.

Note 1) The indicated dimensions are values for standard inserts (GM breakers). If other inserts are mounted, LF and LH may differ.

## SPARE PARTS

|                                                                                     |      |                                                                                     |      |                                                                                     |      |                                                                                     |      |                                                                                       |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |      |  |      |  |      |  |      |  |  |  |  |
| Clamp Screw                                                                         |      | Blade Screw                                                                         |      | Plug                                                                                |      | Nozzle                                                                              |      | Wrench 1                                                                              |  | Wrench 2                                                                              |  |
| Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                        | Pcs. | Order Number                                                                          |  | Order Number                                                                          |  |
| GY06013M                                                                            | 1    | TS55                                                                                | 5    | HSD05004S                                                                           | 1    | NZ22042080S                                                                         | 1    | TKY25D                                                                                |  | TKY30R                                                                                |  |

\* Clamp Torque (N • m) : GY06013M=6.0, TS55=5.0

Nozzle Exchange Key : NZKH050S

|                    |               |
|--------------------|---------------|
| IDENTIFICATION     | > F008, F010  |
| INSERTS            | > F011 – F015 |
| CUTTING CONDITIONS | > F100, F108  |
| CAUTION FOR USE    | > F105, F110  |



# GY SERIES (FOR RECESSING)

**PSC** For 50° recessing holder

Note 1) Please order the modular blade and modular holder separately.

Note 2) Please set the left hand modular blade at the right hand holder and the right hand modular blade at the left hand holder.

P

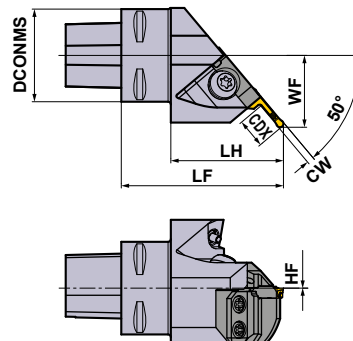
M

K

N

S

H



Left hand tool holder shown.

(mm)

| Order Number     | Stock | Hand (R/L) | Coolant  | Mounting Size | DCONMS | CW       |
|------------------|-------|------------|----------|---------------|--------|----------|
| C4-GYHERM50-M25L | ●     | R          | External | PSC40         | 40     | 2.0—6.35 |
| C4-GYHELM50-M25R | ●     | L          | External | PSC40         | 40     | 2.0—6.35 |
| C5-GYHERM50-M25L | ●     | R          | External | PSC50         | 50     | 2.0—6.35 |
| C5-GYHELM50-M25R | ●     | L          | External | PSC50         | 50     | 2.0—6.35 |
| C6-GYHERM50-M25L | ●     | R          | External | PSC60         | 60     | 2.0—6.35 |
| C6-GYHELM50-M25R | ●     | L          | External | PSC60         | 60     | 2.0—6.35 |

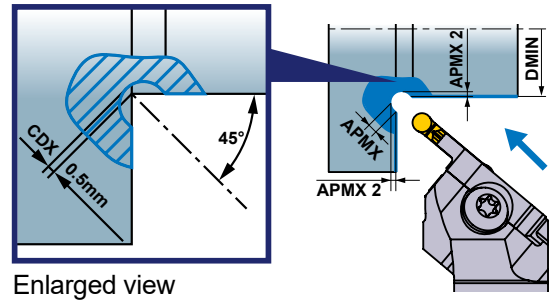
## SPARE PARTS

|              |      |              |      |              |      |              |      |              |  |              |  |
|--------------|------|--------------|------|--------------|------|--------------|------|--------------|--|--------------|--|
|              |      |              |      |              |      |              |      |              |  |              |  |
| Clamp Screw  |      | Blade Screw  |      | Plug         |      | Nozzle       |      | Wrench 1     |  | Wrench 2     |  |
| Order Number | Pcs. | Order Number | Pcs. | Order Number | Pcs. | Order Number | Pcs. | Order Number |  | Order Number |  |
| GY06013M     | 1    | TS55         | 4    | HSD05004S    | 1    | NZ22042080S  | 1    | TKY25D       |  | TKY30R       |  |

★ Clamp Torque (N • m) : GY06013M=6.0, TS55=5.0

Nozzle Exchange Key : NZKH050S

● : Inventory maintained.



## Set Dimensions with Modular Blades

| (mm)                 |                    |             |     |      |      |       |      |    |      |      |
|----------------------|--------------------|-------------|-----|------|------|-------|------|----|------|------|
| Holder Type          | Modular Blade Type | Standard CW | CDX | DMIN | APMX | APMX2 | WF   | HF | LF   | LH   |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-D005     | 2.0         | 0.5 | 30   | 1.50 | 0.646 | 30.6 | 0  | 70.2 | 48.8 |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-E005     | 2.5         | 0.5 | 30   | 1.75 | 0.720 | 30.8 | 0  | 70.1 | 48.7 |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-F005     | 3.0         | 0.5 | 30   | 2.00 | 0.793 | 31.0 | 0  | 70.0 | 48.6 |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-G005     | 4.0         | 0.5 | 20   | 2.50 | 0.939 | 31.4 | 0  | 69.8 | 48.4 |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-H005     | 5.0         | 0.5 | 20   | 2.88 | 1.049 | 31.8 | 0  | 69.6 | 48.2 |
| C4-GYHER/LM50-M25L/R | GYM25L/RC-J005     | 6.0         | 0.5 | 20   | 3.50 | 1.232 | 32.4 | 0  | 69.4 | 48.0 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-D005     | 2.0         | 0.5 | 30   | 1.50 | 0.646 | 32.6 | 0  | 70.2 | 48.8 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-E005     | 2.5         | 0.5 | 30   | 1.75 | 0.720 | 32.8 | 0  | 70.1 | 48.7 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-F005     | 3.0         | 0.5 | 30   | 2.00 | 0.793 | 33.0 | 0  | 70.0 | 48.6 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-G005     | 4.0         | 0.5 | 20   | 2.50 | 0.939 | 33.4 | 0  | 69.8 | 48.4 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-H005     | 5.0         | 0.5 | 20   | 2.88 | 1.049 | 33.8 | 0  | 69.6 | 48.2 |
| C5-GYHER/LM50-M25L/R | GYM25L/RC-J005     | 6.0         | 0.5 | 20   | 3.50 | 1.232 | 34.4 | 0  | 69.4 | 48.0 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-D005     | 2.0         | 0.5 | 30   | 1.50 | 0.646 | 39.6 | 0  | 70.2 | 46.8 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-E005     | 2.5         | 0.5 | 30   | 1.75 | 0.720 | 39.8 | 0  | 70.1 | 46.7 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-F005     | 3.0         | 0.5 | 30   | 2.00 | 0.793 | 40.0 | 0  | 70.0 | 46.6 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-G005     | 4.0         | 0.5 | 20   | 2.50 | 0.939 | 40.4 | 0  | 69.8 | 46.4 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-H005     | 5.0         | 0.5 | 20   | 2.88 | 1.049 | 40.8 | 0  | 69.6 | 46.2 |
| C6-GYHER/LM50-M25L/R | GYM25L/RC-J005     | 6.0         | 0.5 | 20   | 3.50 | 1.232 | 41.4 | 0  | 69.4 | 46.0 |

DMIN = Min. Cut Diameter

\*Modular blade type: Blades for face machining indicate a code for the minimum face grooving diameter. Example: GYM25RD-D12-040

The "○" symbol is a position to insert the letter "A" for external diameter machining or "D" for face machining.

Note 1) The indicated dimensions are values for standard inserts (BM breakers). If other inserts are mounted, LF and LH may differ.

F

GROOVING / CUTTING OFF

|                    |              |
|--------------------|--------------|
| IDENTIFICATION     | > F008, F010 |
| INSERTS            | > F015       |
| CUTTING CONDITIONS | > F104       |
| CAUTION FOR USE    | > F104       |

# GROOVING / CUTTING OFF

## RECOMMENDED CUTTING SPEED [For External Grooving / Cutting Off]

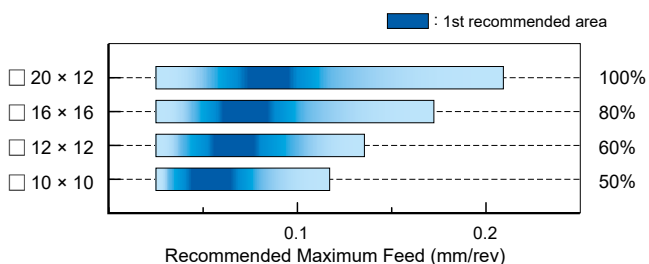
|   | Material                            | Hardness                 | Grade          | Cutting Speed (m/min) |     |     |     |     |         |
|---|-------------------------------------|--------------------------|----------------|-----------------------|-----|-----|-----|-----|---------|
|   |                                     |                          |                | 50                    | 100 | 150 | 200 | 250 | 300 500 |
| P | Mild Steel                          | ≤160HB                   | VP20RT         |                       | 100 | 220 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 110 | 230 |     |     |         |
|   |                                     |                          | NX2525         |                       | 90  | 210 |     |     |         |
|   | Carbon Steel Alloy Steel            | 160–280HB                | VP20RT         |                       | 80  | 180 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 90  | 190 |     |     |         |
|   |                                     |                          | MY5015         |                       | 110 | 250 |     |     |         |
|   |                                     |                          | NX2525         |                       | 70  | 170 |     |     |         |
|   |                                     | 280HB≤                   | VP20RT         |                       | 60  | 140 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 70  | 150 |     |     |         |
|   |                                     |                          | MY5015         |                       | 90  | 210 |     |     |         |
|   |                                     |                          | NX2525         |                       | 55  | 135 |     |     |         |
| M | Stainless Steel                     | ≤270HB                   | VP20RT         |                       | 60  | 140 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 70  | 150 |     |     |         |
| K | Gray Cast Iron                      | Tensile Strength ≤300MPa | VP20RT         |                       | 80  | 180 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 90  | 180 |     |     |         |
|   |                                     |                          | MY5015         |                       | 140 | 300 |     |     |         |
|   | Ductile Cast Iron                   | Tensile Strength ≤800MPa | VP20RT         |                       | 60  | 140 |     |     |         |
|   |                                     |                          | VP10RT         |                       | 70  | 150 |     |     |         |
|   |                                     |                          | MY5015         |                       | 90  | 210 |     |     |         |
| S | Heat Resistant Alloy Titanium Alloy | —                        | MP9015         |                       | 40  | 100 |     |     |         |
|   |                                     |                          | MP9025         |                       | 30  | 90  |     |     |         |
|   |                                     |                          | VP20RT         |                       | 30  | 60  |     |     |         |
|   |                                     |                          | VP10RT/ RT9010 |                       | 40  | 70  |     |     |         |
| H | Hardened steel                      | 50HRC≤                   | BC8110         |                       | 80  | 120 |     |     |         |
| N | Aluminium Alloy                     | Content Si<5%            | RT9010         |                       |     |     | 200 | 500 |         |
|   | Aluminium Alloy                     | Content 5%≤Si≤10%        | RT9010         |                       |     |     | 200 | 500 |         |
|   | Aluminium Alloy                     | Content Si>10%           | RT9010         |                       | 100 | 200 |     |     |         |

Note 1) For RT9010, VP10RT, VP20RT and MY5015, wet cutting is recommended.

## RECOMMENDED CUTTING CONDITIONS [For External Grooving / Cutting Off]

Recommended cutting conditions when combining a GYHR/L2525M00/90-M25R/L modular holder and GYM25R/LA-○○○ modular blade.

### ■ In the case of mono block type holder for Swiss style lathes



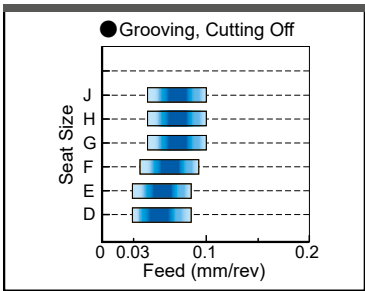
Please refer to the tables above on recommended cutting conditions for external grooving and cutting off.  
Apply the percentage ratio shown on each shank size with the values in the table.

RECOMMENDED CUTTING CONDITIONS [For External Grooving / Cutting Off]

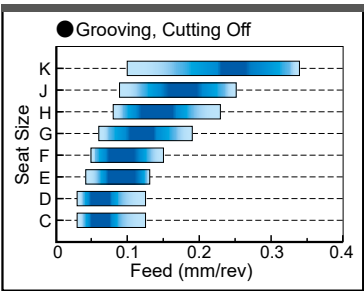
\*Below are the recommended cutting conditions when using the modular holder GYHR/L2525M00/90-M25R/L with the modular blade GYM25R/LA-○○○.

Recommended feed rate and depth of cut

GU BREAKER



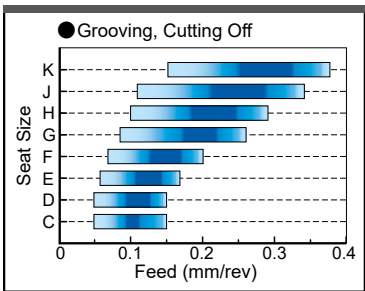
GS BREAKER



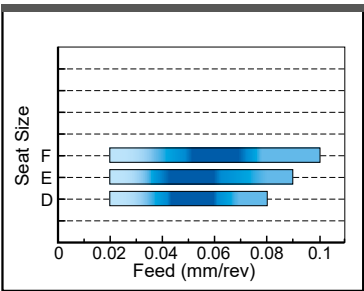
■ : 1st recommended area

| Seat Size         |      |                   |      |
|-------------------|------|-------------------|------|
| Insert Width (mm) |      | Insert Width (mm) |      |
| C                 | 1.50 | G                 | 4.00 |
|                   |      |                   | 4.24 |
| D                 | 2.00 | H                 | 4.75 |
|                   | 2.24 |                   | 5.00 |
| E                 | 2.39 | J                 | 6.00 |
|                   | 2.50 |                   | 6.31 |
|                   | 2.74 |                   | 6.35 |
| F                 | 3.00 | K                 | 8.00 |
|                   | 3.18 |                   |      |
|                   | 3.24 |                   |      |

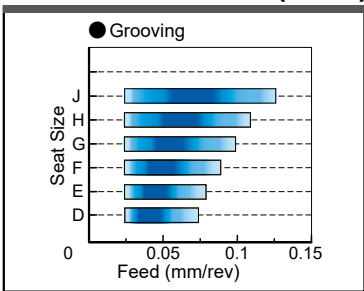
GM BREAKER



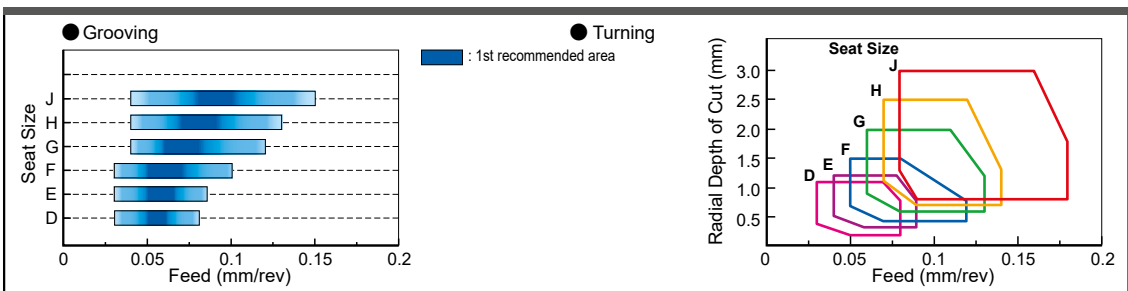
GL BREAKER



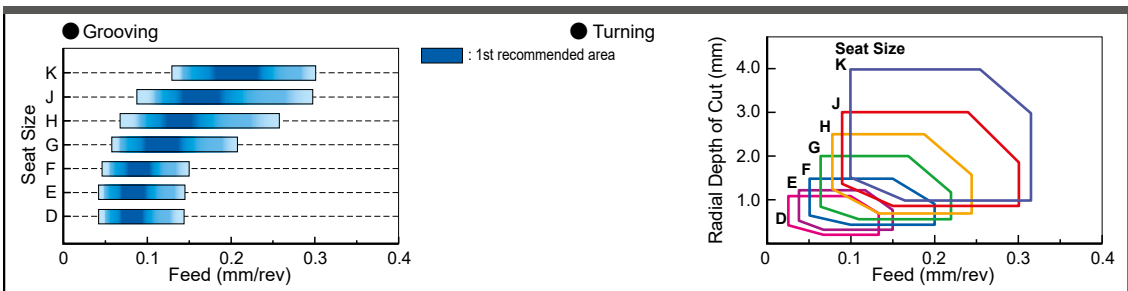
FLAT TOP GFGS (CBN)



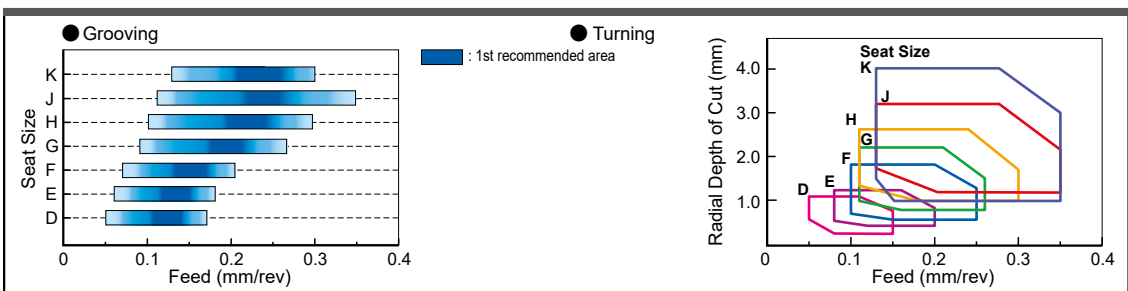
MF BREAKER



MS BREAKER

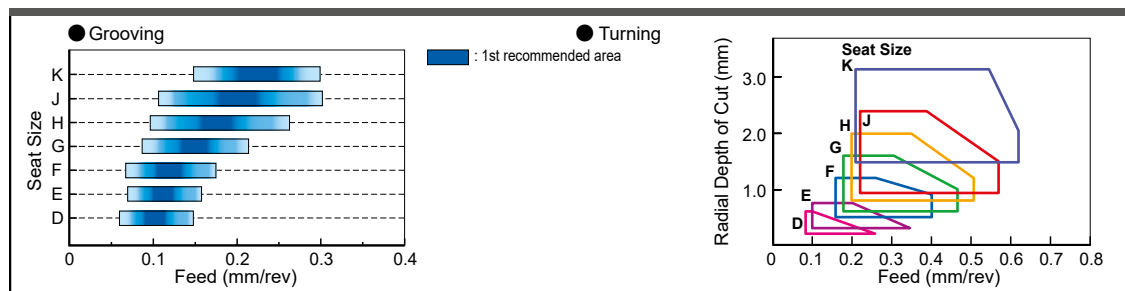


MM BREAKER



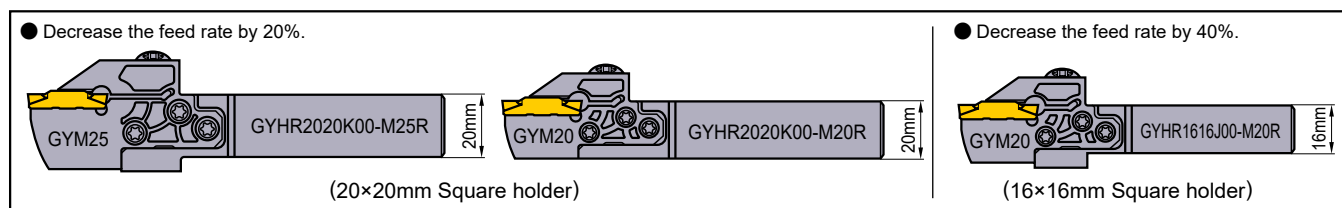
## Recommended feed rate and depth of cut

### BM BREAKER

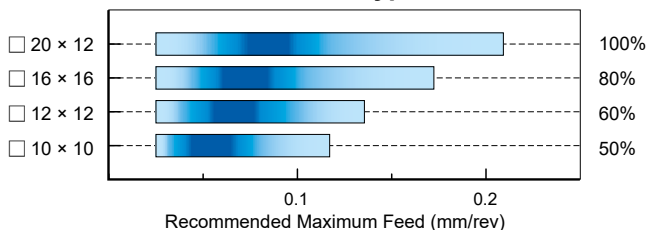


| Seat Size         |      |
|-------------------|------|
| Insert Width (mm) |      |
| C                 | 1.50 |
| D                 | 2.00 |
| E                 | 2.24 |
| F                 | 2.39 |
| G                 | 2.50 |
| H                 | 2.74 |
| J                 | 3.00 |
| K                 | 3.18 |
|                   | 3.24 |
|                   | 4.00 |
|                   | 4.24 |
|                   | 4.75 |
|                   | 5.00 |
|                   | 5.24 |
|                   | 6.00 |
|                   | 6.31 |
|                   | 6.35 |
|                   | 8.00 |

Note 1) When using a combination as shown below, decrease the recommended feed rate by 20% and 40% respectively.



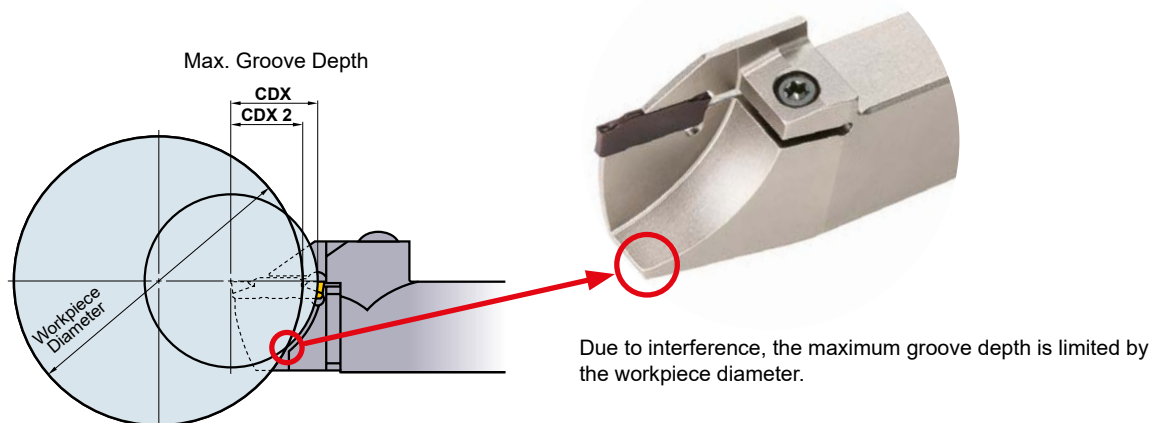
### In the case of monoblock type holder for Swiss style lathes

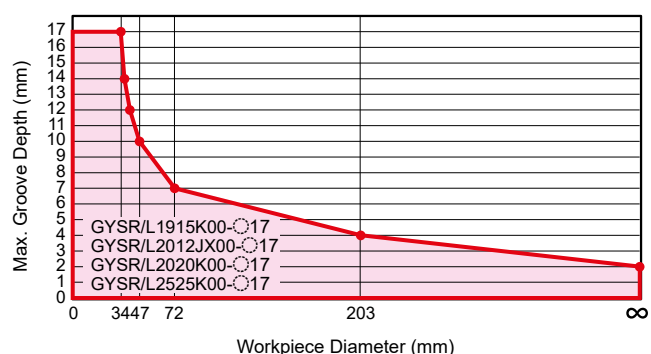
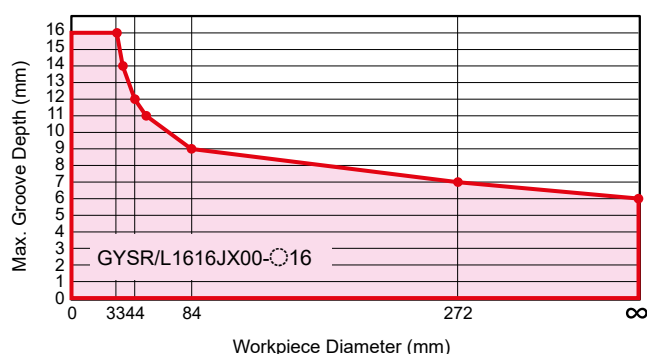
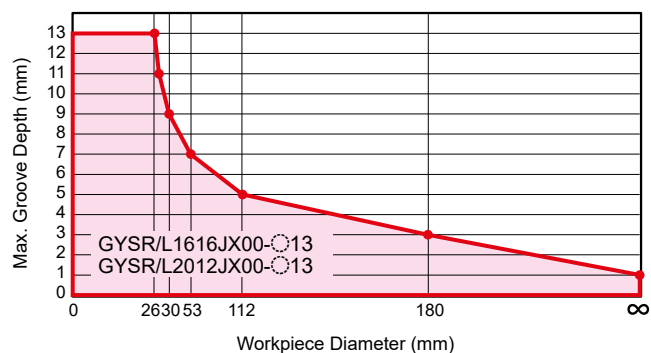
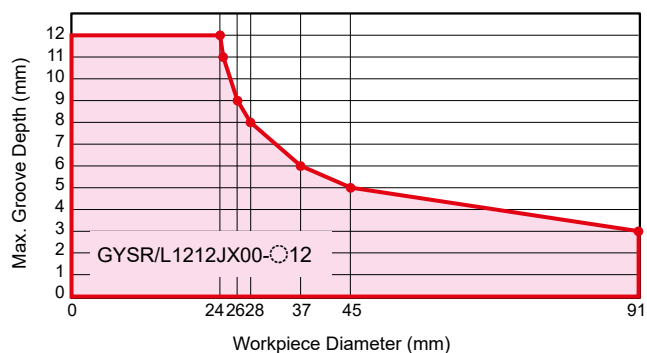
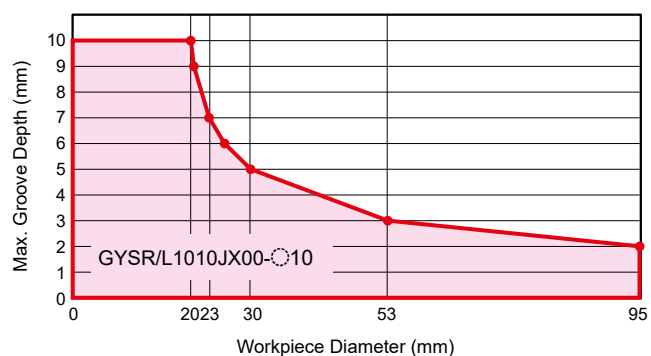
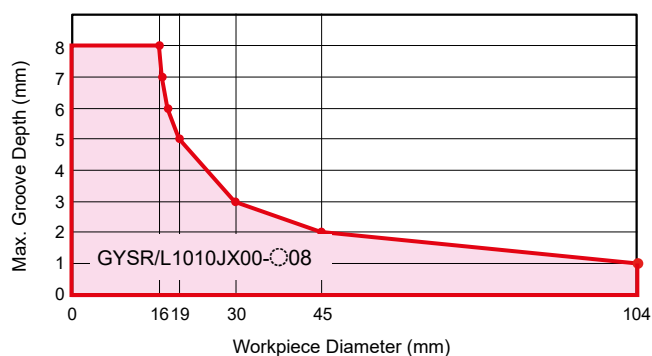


Please refer to the tables above on recommended cutting conditions for external grooving and cutting off. Apply the percentage ratio shown on each shank size with the values in the table.

## LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

The maximum groove depth is limited by the workpiece diameter.

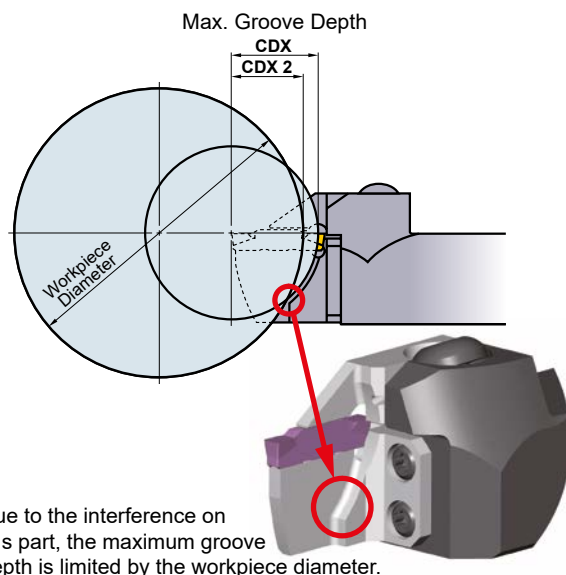
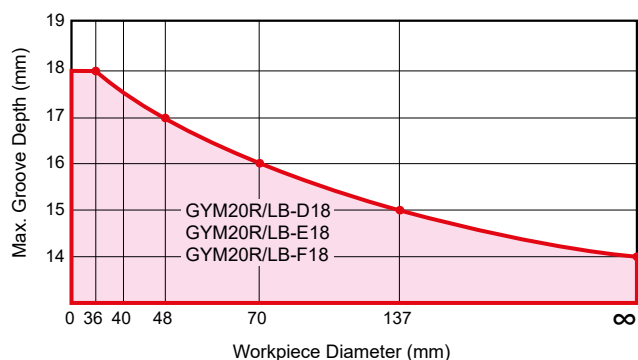




## LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

- When using the modular blade GYM $\odot$ R/LA- $\odot\odot\odot$   
The maximum groove depth is not limited by the workpiece diameter.

- When using the modular blade GYM $\odot$ R/LB- $\odot\odot\odot$   
The maximum groove depth is limited by the workpiece diameter.

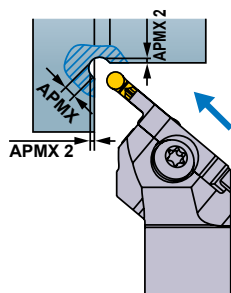


## RECOMMENDED CUTTING SPEED (m/min) [For External Recessing]

|   | Material                               | Hardness                    | Grade  | Cutting Speed (m/min) |     |     |     |     |
|---|----------------------------------------|-----------------------------|--------|-----------------------|-----|-----|-----|-----|
|   |                                        |                             |        | 50                    | 100 | 150 | 200 | 250 |
| P | Mild Steel                             | ≤180HB                      | VP20RT |                       | 80  | 180 |     |     |
|   |                                        |                             | VP10RT |                       | 90  | 190 |     |     |
|   | Carbon Steel<br>Alloy Steel            | 180—280HB                   | VP20RT | 60                    | 140 |     |     |     |
|   |                                        |                             | VP10RT | 70                    | 150 |     |     |     |
|   |                                        |                             | MY5015 |                       | 90  | 210 |     |     |
|   |                                        |                             | NX2525 | 55                    | 135 |     |     |     |
|   | Carbon Steel<br>Alloy Steel            | 280—350HB                   | VP20RT | 50                    | 110 |     |     |     |
|   |                                        |                             | VP10RT | 60                    | 120 |     |     |     |
|   |                                        |                             | MY5015 |                       | 80  | 160 |     |     |
|   |                                        |                             | NX2525 | 45                    | 105 |     |     |     |
| M | Stainless Steel                        | ≤350HB                      | VP20RT | 50                    | 110 |     |     |     |
|   |                                        |                             | VP10RT | 60                    | 120 |     |     |     |
| K | Gray Cast Iron                         | Tensile Strength<br>≤350MPa | VP20RT | 60                    | 140 |     |     |     |
|   |                                        |                             | VP10RT | 70                    | 150 |     |     |     |
|   |                                        |                             | MY5015 |                       | 90  | 210 |     |     |
|   | Ductile Cast Iron                      | Tensile Strength<br>≤800MPa | VP20RT | 50                    | 110 |     |     |     |
|   |                                        |                             | VP10RT | 60                    | 120 |     |     |     |
|   |                                        |                             | MY5015 |                       | 80  | 160 |     |     |
| S | Titanium Alloy<br>Heat Resistant Alloy | —                           | MP9015 | 40                    | 100 |     |     |     |
|   |                                        |                             | MP9025 | 30                    | 90  |     |     |     |
|   |                                        |                             | VP20RT | 30                    | 60  |     |     |     |
|   |                                        |                             | VP10RT | 40                    | 70  |     |     |     |

Note 1) For VP10RT, VP20RT and MY5015, wet cutting is recommended.

## DISTANCE FROM THE WORKPIECE TO THE RECESS DEPTH

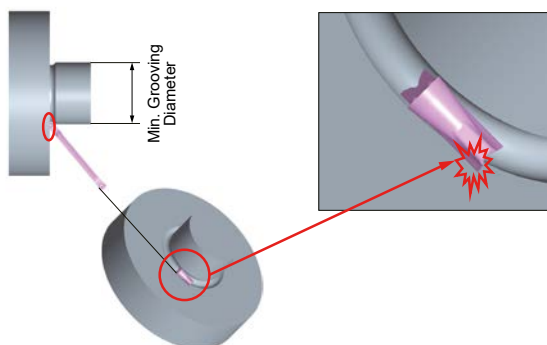


| Cutting Width<br>CW (mm) | Recessing Depth<br>APMX (mm) | Distance workpiece to the recess depth<br>APMX 2 (mm) |
|--------------------------|------------------------------|-------------------------------------------------------|
| 2.00                     | 1.50                         | 0.646                                                 |
| 2.50                     | 1.75                         | 0.720                                                 |
| 3.00                     | 2.00                         | 0.793                                                 |
| 3.18                     | 2.09                         | 0.819                                                 |
| 4.00                     | 2.50                         | 0.939                                                 |
| 4.75                     | 2.88                         | 1.049                                                 |
| 5.00                     | 3.00                         | 1.086                                                 |
| 6.00                     | 3.50                         | 1.232                                                 |
| 6.35                     | 3.68                         | 1.283                                                 |

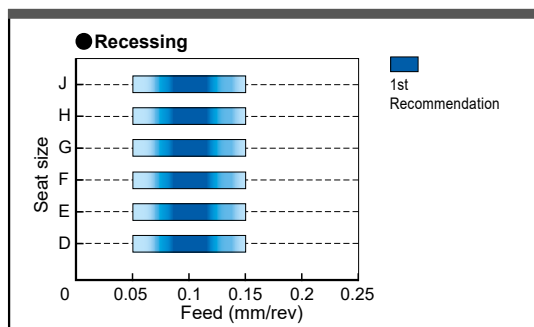
## BM BREAKER

### Minimum grooving diameter

Ensure the tool is suitable for the diameter being machined. Refer to the Min. Grooving Diameter DMIN as shown in the table on page F042, F099 to avoid a collision with the workpiece as shown below.



### Recommended feed rate and depth of cut





## TOOL SELECTION

### Notes when selecting the tool body

**Modular holder**

GYM25 GYHR2525M00-M25R 25mm ✓

GYM25 GYHR2020K00-M25R 20mm ✗

Modular Holder

- To ensure sufficient clamping rigidity, select a modular holder with the largest possible shank size.

**Modular blade (1)**

GYM25 GYHR2020K00-M25R 25mm ✓

GYM20 GYHR2020K00-M20R 20mm ✗

Modular Blade

- If there is no restriction for use, select the largest modular blade for the same shank size.

**Modular blade (2)**

✓ ✗

● Select the shortest possible blade suitable for the application.

**Modular blade (3)**

✓ ✗

● Select the shortest possible blade suitable for the application.

### Notes when setting the tool

**Setting of cutting edge height**

<Grooving/Cross-feed machining>  
Set the cutting edge height to  $\pm 0.1\text{mm}$  parallel to the central axis.

<Cutting off>  
Set the cutting edge height to  $0-+0.2\text{mm}$  parallel to the central axis.

**Tool body setting angle**

90° 90°

- Set the insert perpendicular to the central axis.

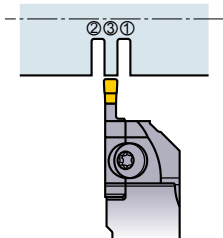
**Overhang**

- When setting the tool, ensure that the overhang is as short as possible and avoid contact of the tool post with the top clamp as shown in the figures above.

## MACHINING RECOMMENDATIONS

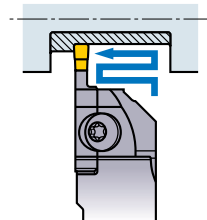
### Notes on multi-functional machining (MF, MS and MM breakers)

#### Machining narrow grooves



- It is recommended to carry out plunging in several passes. Following the steps above makes it difficult for chips to elongate. This also improves the accuracy of workpiece wall surface.

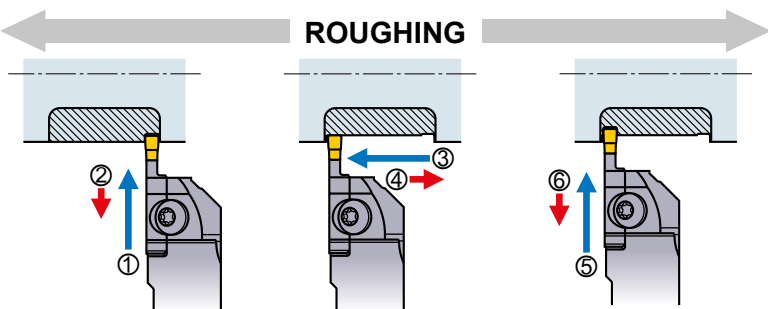
#### Machining wide grooves



- It is recommended that cross-feed machining is used.

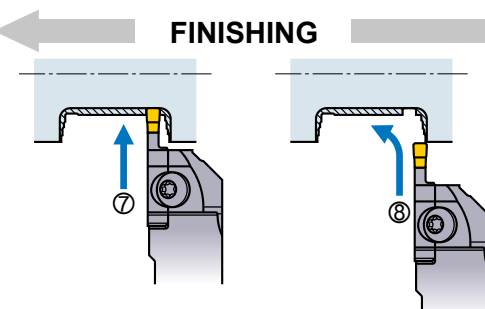
#### Machining wide grooves

##### ROUGHING



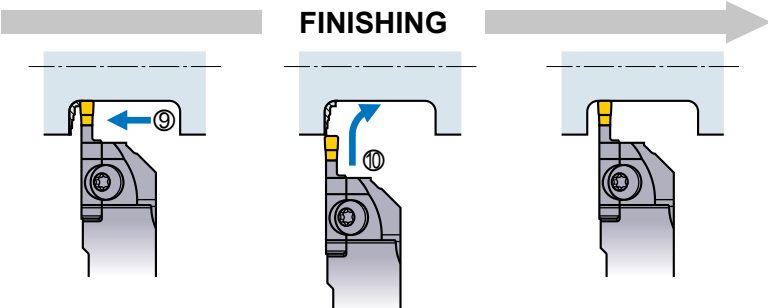
- ① Carry out grooving.
  - ② Retract the tool approx 0.1 mm.
  - ③ Carry out cross feed machining.
  - ④ Retract the tool approx 0.1 mm.
  - ⑤ Carry out grooving.
  - ⑥ Retract the tool approx 0.1 mm.
- \* Repeat the steps ①-⑥.

##### FINISHING



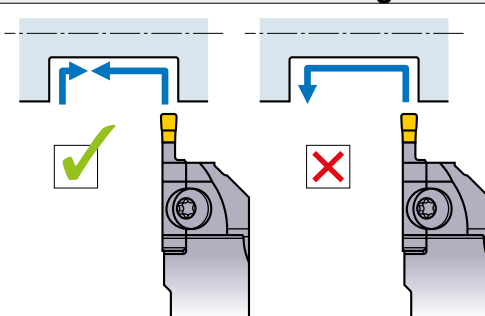
- ⑦ Carry out grooving to the end point of the corner radius.
- ⑧ Machining of the wall surface, corner radius and bottom face should be carried out in one process.

##### FINISHING



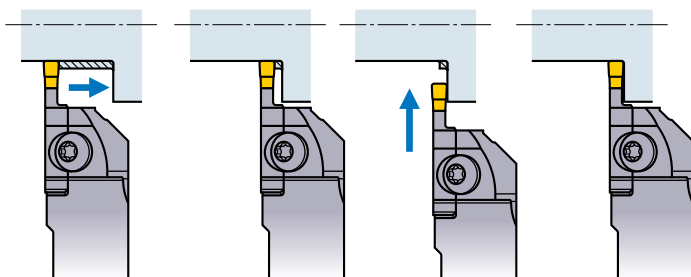
- ⑨ Stop at the bottom of the corner radius.
- ⑩ Machine the counter wall to the corner radius in one process.
- ⑪ Finish machining.

#### Precautions when finishing walls



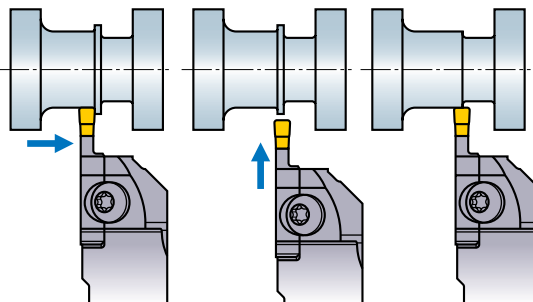
- To produce high accuracy walls using MS or MM chipbreaker insert, do not carry out back turning. Plunging is recommended.

#### Wall machining



- When machining a wall, chip jamming can occur. In this case, stop cross feed machining just before the wall (at a point less than the insert width) then remove the remaining material by plunging.

#### Machining of a ring section

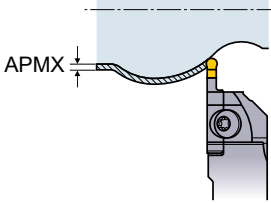


- When a ring remains in a cross feed end process, finish cross feed machining 1-1.5 mm short of the end point, then remove the ring by plunging.

MACHINING RECOMMENDATIONS

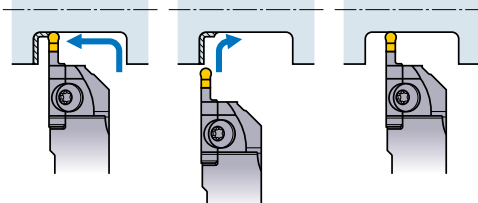
Notes on multi-functional machining (BM chipbreaker)

**Copying**



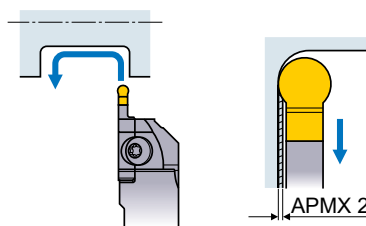
● With the BM chipbreaker insert, 3 dimensional copying is possible. Set the depth of cut (APMX) to 40% less than the insert width.

**Roughing**



● Use plunging and cross-feed machining. When machining the corner, vibration is likely to occur. To avoid this, reduce the feed by 50%.

**Finishing**



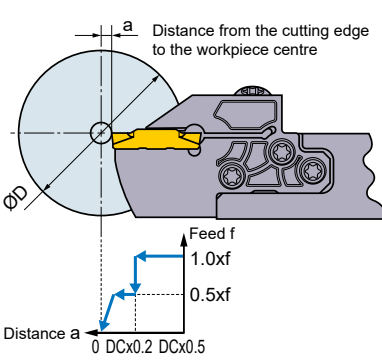
● Carry out finishing in one process. For the depth of cut (APMX 2) when back turning, refer to the table on the right.

| Insert           | APMX 2 (mm) |
|------------------|-------------|
| GY2M0200D100N-BM | 0.05        |
| GY2M0250E125N-BM | 0.10        |
| GY2M0300F150N-BM | 0.15        |
| GY2M0318F159N-BM | 0.15        |
| GY2M0400G200N-BM | 0.20        |
| GY2M0475H238N-BM | 0.24        |
| GY2M0500H250N-BM | 0.24        |
| GY2M0600J300N-BM | 0.30        |
| GY2M0635J318N-BM | 0.30        |
| GY2M0800K400N-BM | 0.40        |

Notes for cutting off

**Feed**

<Feed>

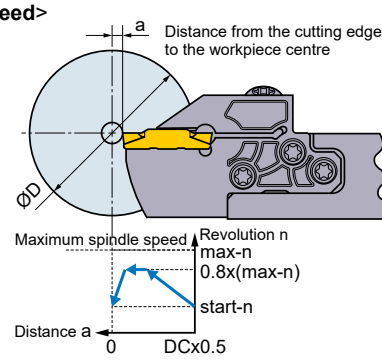


● When the cutting edge approaches the centre, reduce the feed by 50%.

● If necessary, stop the feed prior to reaching the centre of the workpiece to prevent it falling under its own weight.

**Revolution**

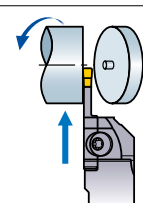
<Spindle speed>



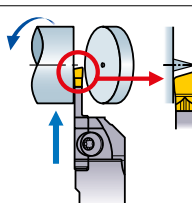
● When using constant cutting speed during a cutting off cycle, it is recommended to limit the spindle speed to 80% of maximum to ensure stability.

● To prevent the workpiece from being expelled, lower the spindle speed before finishing the grooving operation.

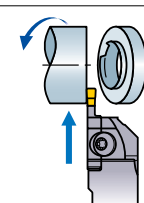
**Insert**



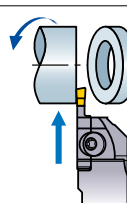
Neutral insert



Handed insert



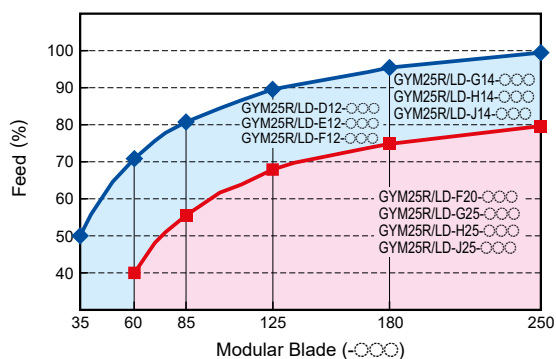
Neutral insert



Handed insert

● When there is a centre stub on solid bar work or burrs are formed on pipe material, it is possible to decrease them by using a handed insert. With a handed insert, machining tends to be less stable when compared to using a neutral insert. Pay special attention to avoid fracturing of the cutting edge and decrease the feed when necessary.

## RELATIONSHIP BETWEEN THE MODULAR BLADE AND FEED PER ROTATION [For Face Grooving]



Note 1) Adjust the feed per rotation in the cutting conditions to the percentage shown in the table above.

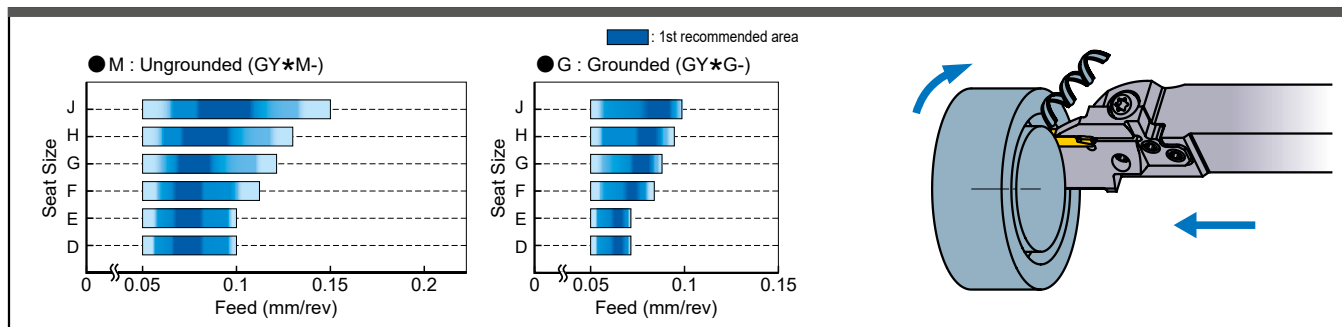
## RECOMMENDED CUTTING SPEED [For Face Grooving]

|   | Material                            | Hardness                 | Grade  | Cutting Speed (m/min) |     |     |     |     |     |
|---|-------------------------------------|--------------------------|--------|-----------------------|-----|-----|-----|-----|-----|
|   |                                     |                          |        | 50                    | 100 | 150 | 200 | 250 | 300 |
| P | Mild Steel                          | ≤160HB                   | VP20RT |                       | 80  | 180 |     |     |     |
|   |                                     |                          | VP10RT |                       | 90  | 190 |     |     |     |
|   |                                     |                          | NX2525 |                       | 70  | 170 |     |     |     |
|   | Carbon Steel Alloy Steel            | 160–280HB                | VP20RT | 60                    | 140 |     |     |     |     |
|   |                                     |                          | VP10RT | 70                    | 150 |     |     |     |     |
|   |                                     |                          | MY5015 |                       | 90  | 210 |     |     |     |
|   |                                     |                          | NX2525 | 55                    | 135 |     |     |     |     |
|   |                                     | 280HB≤                   | VP20RT | 50                    | 110 |     |     |     |     |
|   |                                     |                          | VP10RT | 60                    | 120 |     |     |     |     |
|   |                                     |                          | MY5015 |                       | 80  | 160 |     |     |     |
|   |                                     |                          | NX2525 | 45                    | 105 |     |     |     |     |
|   | Stainless Steel                     | ≤270HB                   | VP20RT | 50                    | 110 |     |     |     |     |
|   |                                     |                          | VP10RT | 60                    | 120 |     |     |     |     |
| K | Gray Cast Iron                      | Tensile Strength ≤300MPa | VP20RT | 60                    | 140 |     |     |     |     |
|   |                                     |                          | VP10RT | 70                    | 150 |     |     |     |     |
|   |                                     |                          | MY5015 |                       | 90  | 210 |     |     |     |
|   | Ductile Cast Iron                   | Tensile Strength ≤800MPa | VP20RT | 50                    | 110 |     |     |     |     |
|   |                                     |                          | VP10RT | 60                    | 120 |     |     |     |     |
|   |                                     |                          | MY5015 |                       | 80  | 160 |     |     |     |
| S | Heat Resistant Alloy Titanium Alloy | —                        | MP9015 | 40                    | 100 |     |     |     |     |
|   |                                     |                          | MP9025 | 30                    | 90  |     |     |     |     |
|   |                                     |                          | VP20RT | 30                    | 60  |     |     |     |     |
|   |                                     |                          | VP10RT | 40                    | 70  |     |     |     |     |
|   |                                     |                          | RT9010 | 40                    | 70  |     |     |     |     |
| H | Hardened Steel                      | 50HRC≤                   | BC8110 |                       | 60  | 120 |     |     |     |

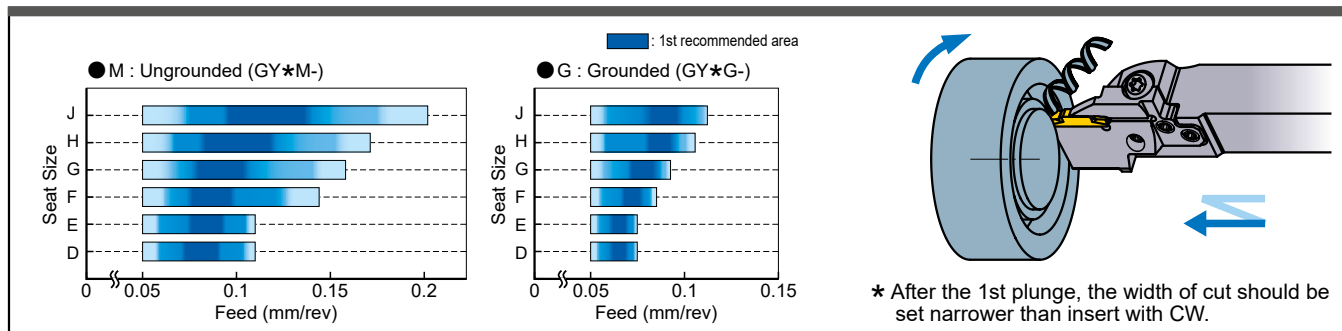
Note 1) For VP10RT, VP20RT and MY5015, wet cutting is recommended.

## RECOMMENDED CUTTING CONDITIONS [For Face Grooving]

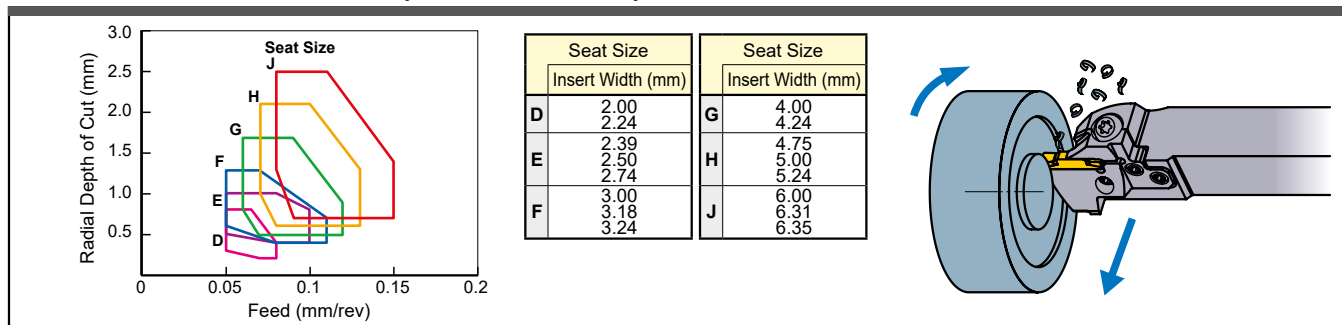
### GROOVING



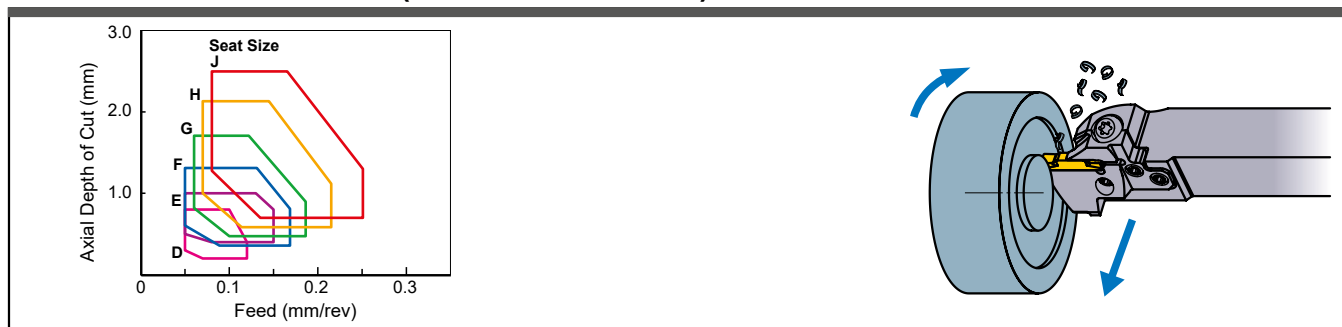
### PLUNGING



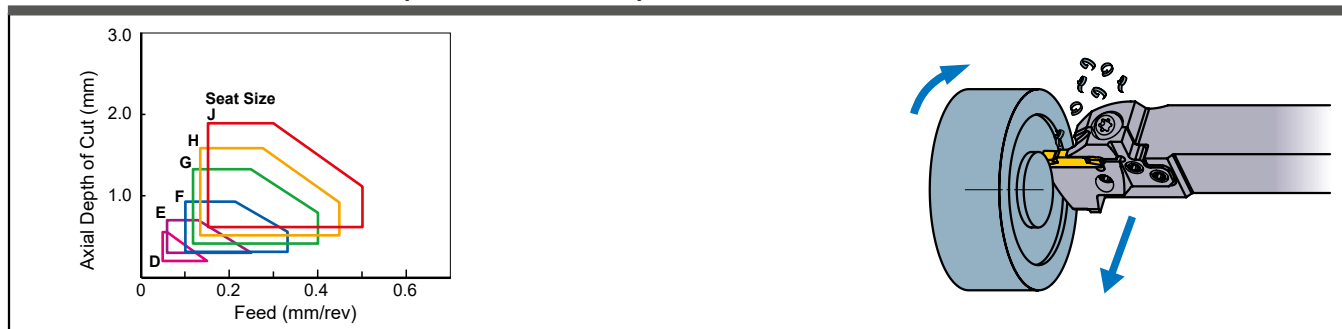
### TRAVERSE MACHINING (MF BREAKER)



### TRAVERSE MACHINING (MM/MS BREAKER)



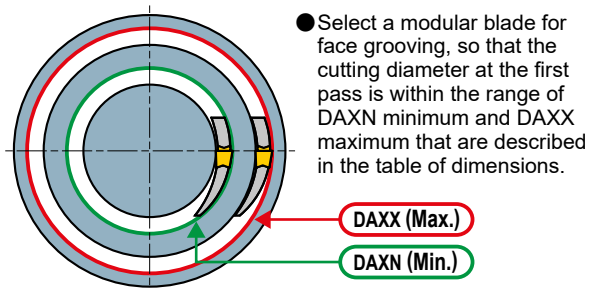
### TRAVERSE MACHINING (BM BREAKER)



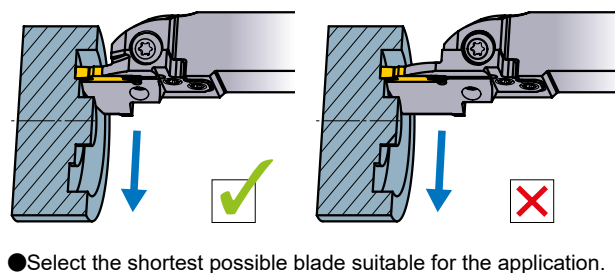
## TOOL SELECTION

### Notes when selecting the tool body

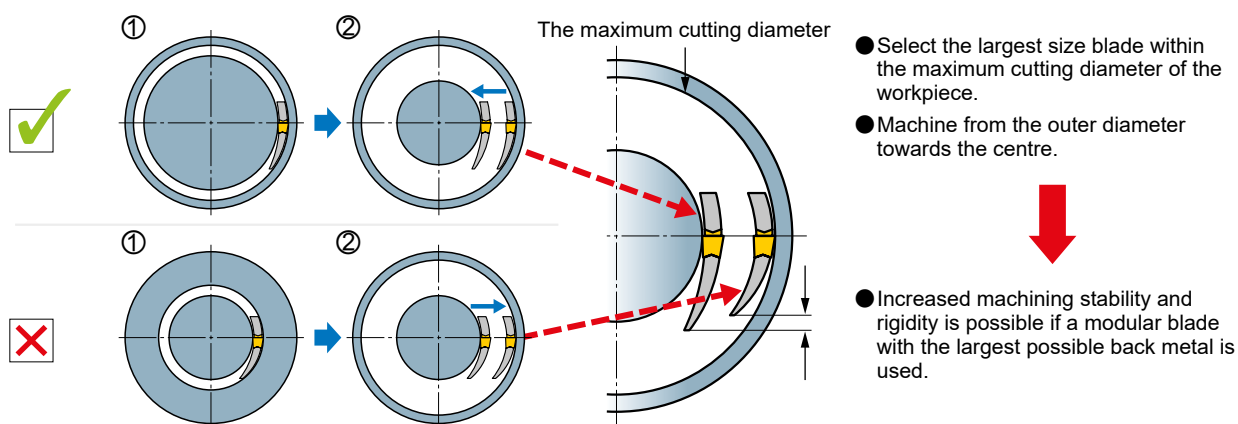
#### Modular blade (1)



#### Modular blade (2)

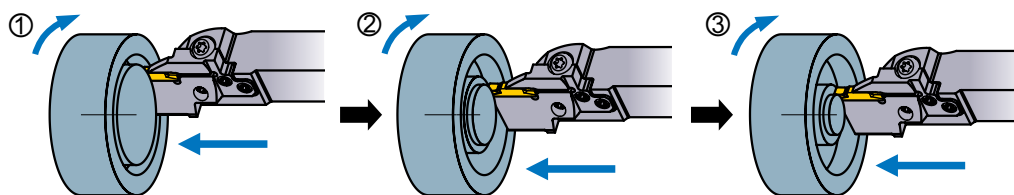


#### Modular blade (3)

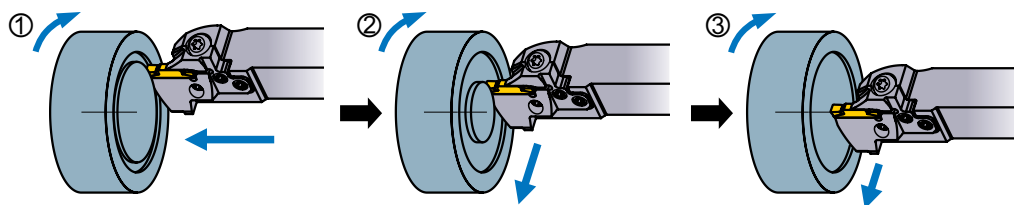


At first machine the maximum cutting diameter, there is no restriction in the cutting diameter on the remaining process.

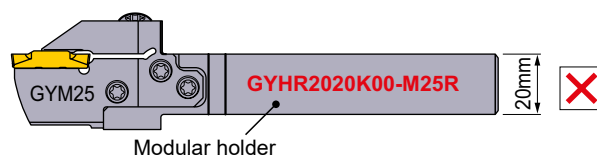
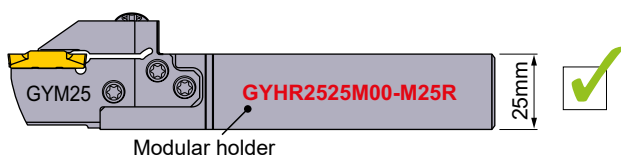
● When plunging in several passes.



● When combining plunging and infeed machining.



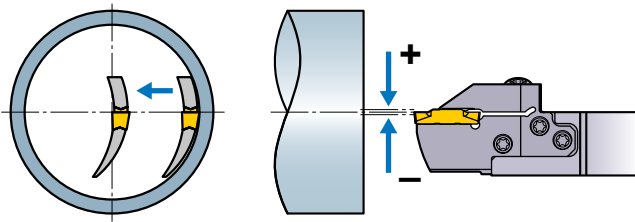
#### Modular holder



● Select a modular holder with the largest possible shank size to maintain mounting rigidity.

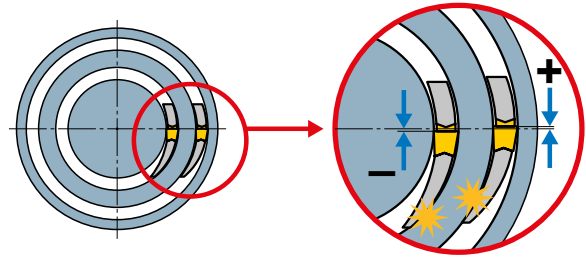
## Notes when setting the tool

### Setting the cutting edge height



- Set the cutting edge height to  $\pm 0.1\text{mm}$  parallel to the central axis.
- Cutting edge centre height check should be done by traverse machining towards the centre with a very small depth of cut and ensure that an even surface and no material remains at the centre point afterwards.

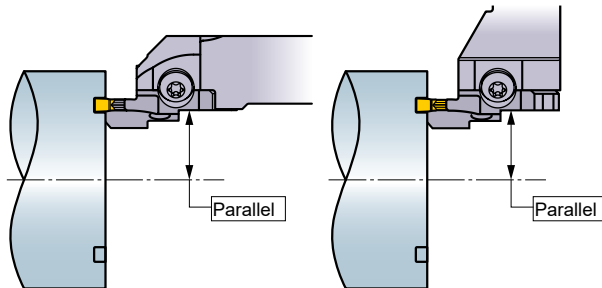
### When interfering the wall of groove and the modular blade



- If interference occurs even when the correct blade is used, the cutting edge height could be incorrect.

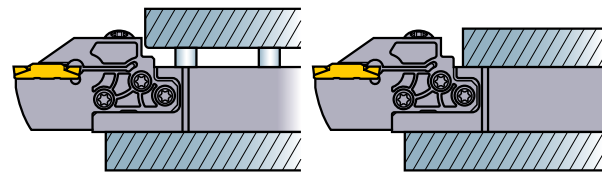
{ When interference occurs on the inner side of the blade, the cutting edge height is set too high.  
When interference occurs on the outer side of the blade, the cutting edge height is set too low.

### Setting the tool



- Set the insert parallel to the central axis.

### Tool overhang



- When setting the tool, ensure that the overhang is as short as possible and avoid contact of the tool post with the top clamp as shown in the figures above.

F

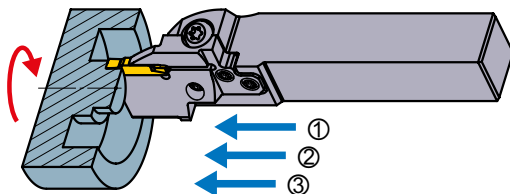
GROOVING / CUTTING OFF

## MACHINING RECOMMENDATIONS

### Notes when face grooving

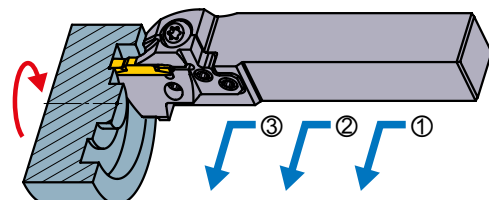
- Always machine from the outer diameter towards the centre.

#### Machining narrow grooves



- Plunging in several passes is recommended.

#### Machining wide grooves



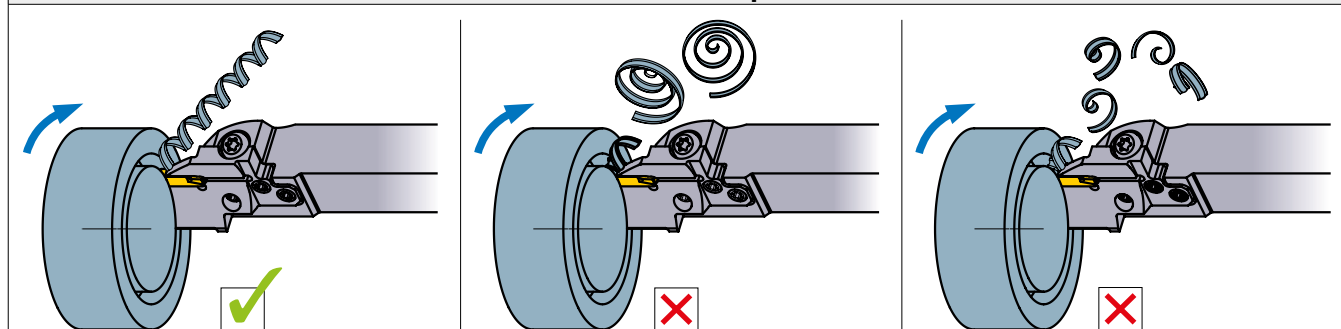
- Cross feed machining is recommended.



## MACHINING RECOMMENDATIONS

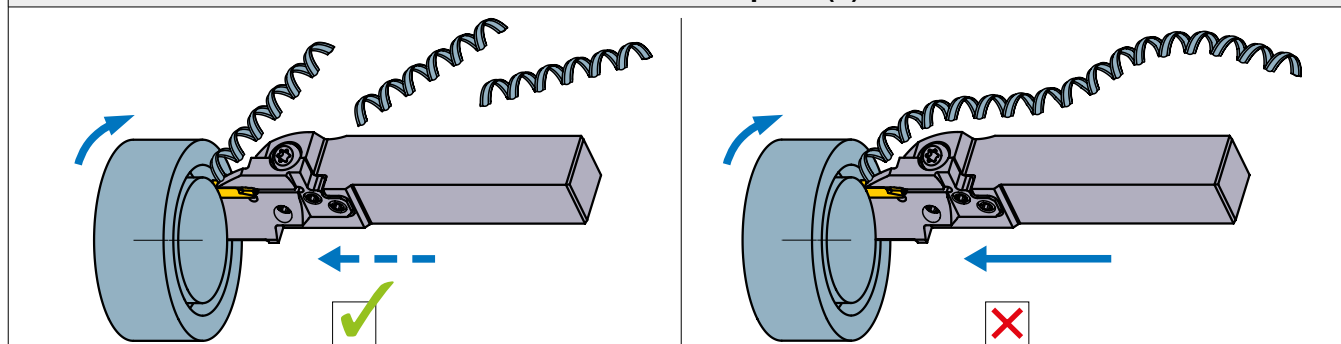
### Notes when face grooving

#### Notes on the first pass (1)



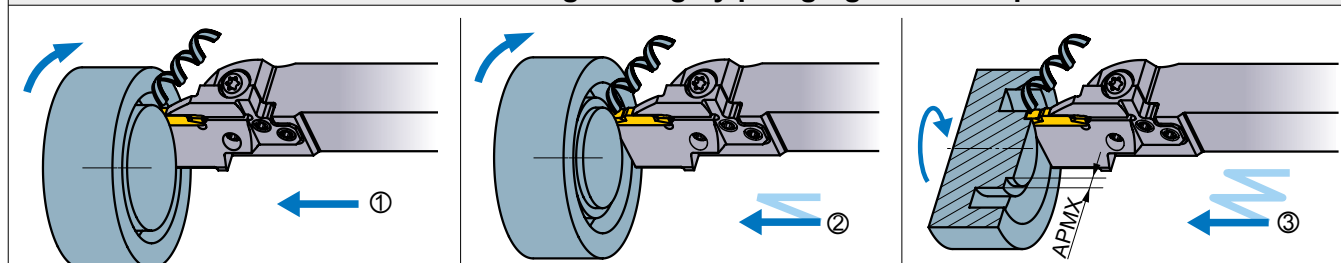
- During the first face grooving pass it is difficult to disperse broken chips and can lead to problems such as a chipped insert. Maintain longer chips that disperse easily by decreasing the feed per rotation.

#### Notes on the first pass (2)



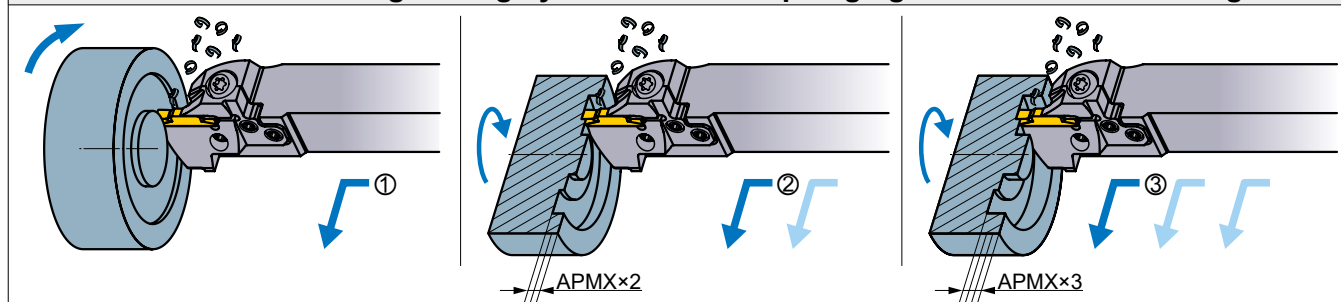
- When chips become too long, use peck feed to break them into a suitable length.

#### Notes when wide face grooving by plunging in several passes



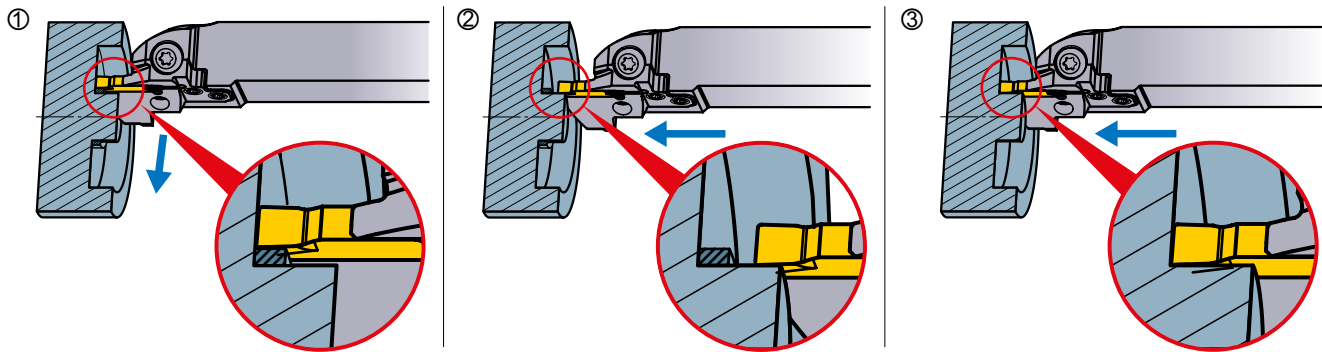
- When machining a face groove in several passes, machine from the outer diameter towards the centre so that space for discharging chips is created to prevent insert damage caused by chip jamming.
- Plunging width of cut is recommended to be set at 60 - 80% of the insert width. This enhances the effect of the chipbreaker by enlarging the width of the groove to improve chip dispersal.

#### Notes when wide face grooving by combination of plunging and traverse machining (1)



- When face groove machining by using plunge feed and traverse machining, always machine from the outer diameter towards the centre to disperse chips outward to avoid chip jamming problems.
- Set the depth of cut within 40% of the insert width.

## Notes when wide face grooving by combination of plunging and traverse machining (2)



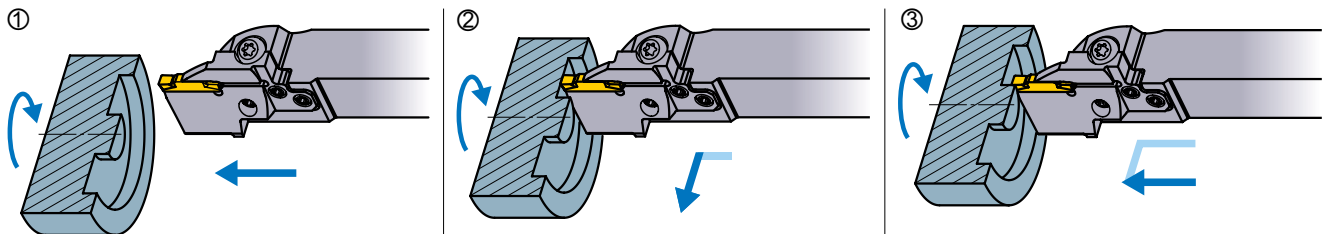
- When infeed machining at the bottom of a deep groove, chips may interfere on the cutting edge near the centre wall. In such cases, stop infeed machining just before the centre wall (at a point less than the insert width) then remove the remaining material by plunging.

## Notes when copying (BM Chipbreaker)



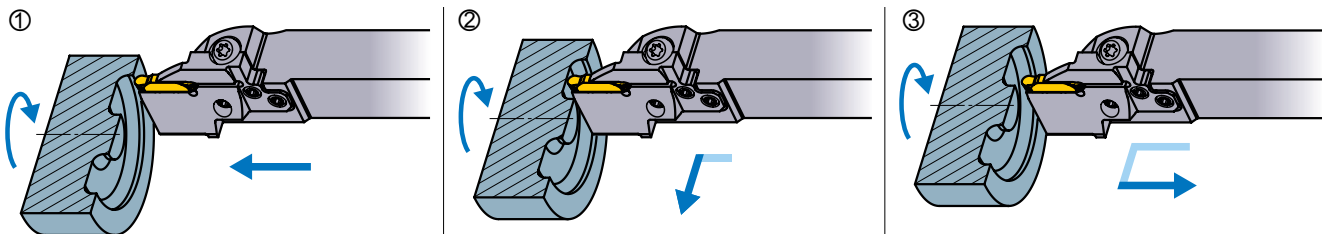
- With the BM chipbreaker insert, 3 dimensional copying is possible. Set the depth of cut (APMX 2) to 30% less than the insert width.

## Finishing (1)

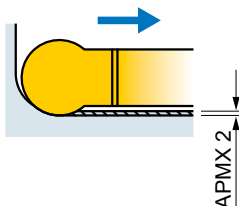


- When finish cutting, machine continuously from the outer wall to the bottom of the groove, then finally plunge cut the centre wall.

## Finishing (2) (BM Chipbreaker)



- Carry out finishing in one process. For the depth of cut (APMX 2) when back turning, refer to the table on the right.



| Insert           | APMX 2 (mm) |
|------------------|-------------|
| GY2M0200D100N-BM | 0.10        |
| GY2M0250E125N-BM |             |
| GY2M0300F150N-BM |             |
| GY2M0318F159N-BM |             |
| GY2M0400G200N-BM | 0.15        |
| GY2M0475H238N-BM |             |
| GY2M0500H250N-BM | 0.20        |
| GY2M0600J300N-BM |             |
| GY2M0635J318N-BM | 0.25        |
|                  |             |

# GROOVING / CUTTING OFF

## RECOMMENDED CUTTING SPEED [For Internal Grooving]

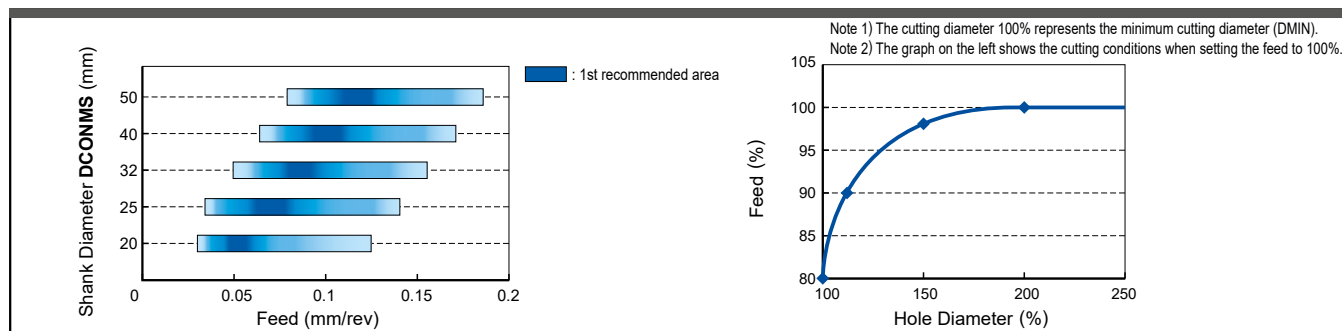
|   | Material                            | Hardness                    | Grade         | Cutting Speed (m/min) |     |     |     |     |     |     |
|---|-------------------------------------|-----------------------------|---------------|-----------------------|-----|-----|-----|-----|-----|-----|
|   |                                     |                             |               | 50                    | 100 | 150 | 200 | 250 | 300 | 400 |
| P | Mild Steel                          | ≤160HB                      | VP20RT        |                       | 80  |     | 180 |     |     |     |
|   |                                     |                             | VP10RT        |                       | 90  |     | 190 |     |     |     |
|   |                                     |                             | NX2525        |                       | 70  |     | 170 |     |     |     |
|   | Carbon Steel Alloy Steel            | 160–280HB                   | VP20RT        | 60                    |     | 140 |     |     |     |     |
|   |                                     |                             | VP10RT        | 70                    |     | 150 |     |     |     |     |
|   |                                     |                             | MY5015        |                       | 90  |     | 210 |     |     |     |
|   |                                     | 280HB≤                      | NX2525        | 55                    |     | 135 |     |     |     |     |
|   |                                     |                             | VP20RT        | 50                    |     | 110 |     |     |     |     |
|   |                                     |                             | VP10RT        | 60                    |     | 120 |     |     |     |     |
| M | Stainless Steel                     | ≤270HB                      | VP20RT        | 50                    |     | 110 |     |     |     |     |
|   |                                     |                             | VP10RT        | 60                    |     | 120 |     |     |     |     |
| K | Gray Cast Iron                      | Tensile Strength<br>≤300MPa | VP20RT        | 60                    |     | 140 |     |     |     |     |
|   |                                     |                             | VP10RT        | 70                    |     | 150 |     |     |     |     |
|   |                                     |                             | MY5015        |                       | 90  |     | 210 |     |     |     |
|   | Ductile Cast Iron                   | Tensile Strength<br>≤800MPa | VP20RT        | 50                    |     | 110 |     |     |     |     |
|   |                                     |                             | VP10RT        | 60                    |     | 120 |     |     |     |     |
|   |                                     |                             | MY5015        |                       | 80  |     | 160 |     |     |     |
| S | Heat Resistant Alloy Titanium Alloy | —                           | MP9015        | 40                    |     | 100 |     |     |     |     |
|   |                                     |                             | MP9025        | 30                    |     | 90  |     |     |     |     |
|   |                                     |                             | VP20RT        | 30                    |     | 60  |     |     |     |     |
|   |                                     |                             | VP10RT/RT9010 | 40                    |     | 70  |     |     |     |     |
| H | Hardened steel                      | 50HRC≤                      | BC8110        | 60                    |     | 100 |     |     |     |     |
| N | Aluminium Alloy                     | Content Si<5%               | RT9010        |                       |     |     | 150 |     |     | 400 |
|   | Aluminium Alloy                     | Content 5%≤Si≤10%           | RT9010        |                       |     |     | 150 |     |     | 400 |
|   | Aluminium Alloy                     | Content Si>10%              | RT9010        |                       | 80  |     | 160 |     |     |     |

Note 1) VP20RT is the first recommended grade for materials other than hardened steels.

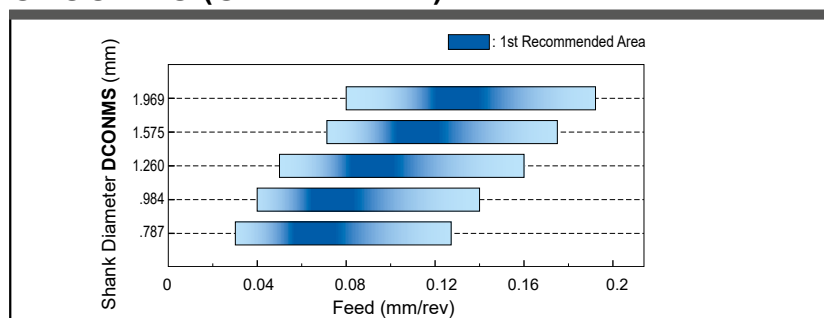
Note 2) For RT9010, VP10RT, VP20RT and MY5015, wet cutting is recommended.

## RECOMMENDED CUTTING CONDITIONS [For Internal Grooving]

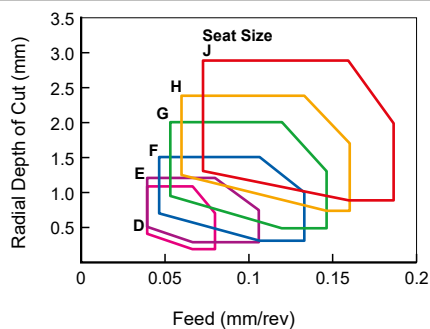
### GROOVING



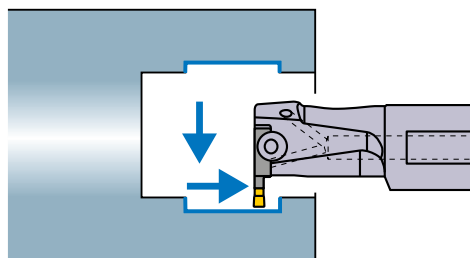
### GROOVING (GL BREAKER)



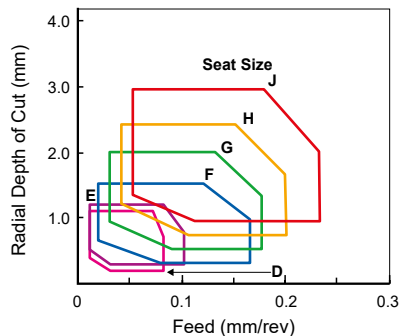
## TRAVERSE MACHINING (MF BREAKER)



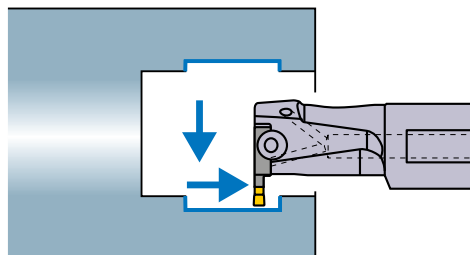
- When traverse machining a blind hole, it is recommended to carry out back turning considering chip disposal.



## TRAVERSE MACHINING (MM/MS BREAKER)

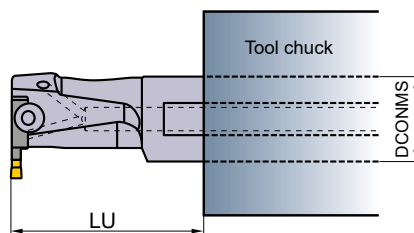


- When traverse machining a blind hole, it is recommended to carry out back turning considering chip disposal.



Note 1) The above cutting conditions are for when using the tool overhang (LU) 1.6-2.0 times larger than the shank diameter (DCONMS).  
(L/D=1.6-2.0) When using L/D larger than 2.0, reduce the cutting conditions.

| Seat Size |                   |   |      |
|-----------|-------------------|---|------|
|           | Insert Width (mm) |   |      |
| D         | 2.00              | G | 4.00 |
|           | 2.24              |   | 4.24 |
| E         | 2.39              | H | 4.75 |
|           | 2.50              |   | 5.00 |
|           | 2.74              |   | 5.24 |
| F         | 3.00              | J | 6.00 |
|           | 3.18              |   | 6.31 |
|           | 3.24              |   | 6.35 |



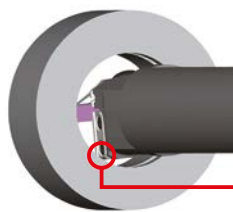
## LIMITATION OF THE MAXIMUM GROOVE DEPTH [For Internal Grooving]

### ●When using the monoblock type

The maximum groove depth is not limited by the cutting diameter.

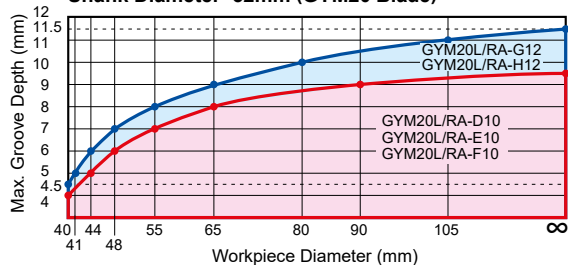
### ●When using the modular blade type

The maximum groove depth is limited by the cutting diameter.

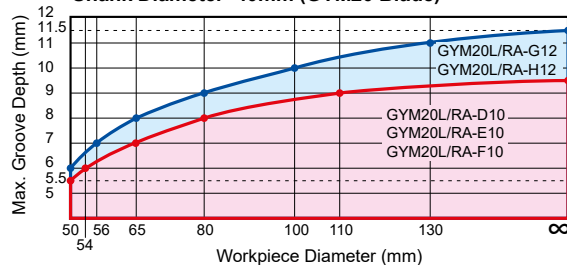


Due to interference of this part, the maximum groove depth is limited by the cutting diameter.

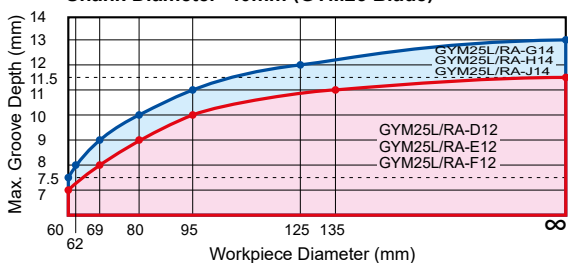
#### ●Shank Diameter=32mm (GYM20 Blade)



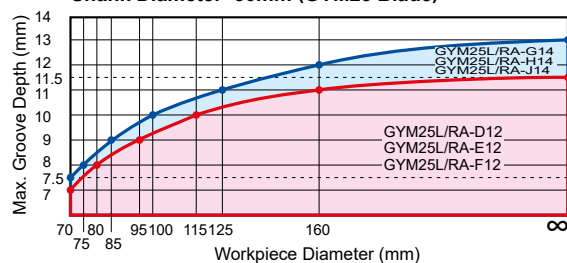
#### ●Shank Diameter=40mm (GYM20 Blade)



#### ●Shank Diameter=40mm (GYM25 Blade)



#### ●Shank Diameter=50mm (GYM25 Blade)



## TOOL SELECTION

### Notes when selecting the tool body

**Holder**

● When the overhang is the same, select a holder with the largest possible shank size to ensure sufficient clamping rigidity.

**Modular blade (1)**

**GYM20R/LA-0000**

GYM20R/LA-D10  
GYM20R/LA-E10  
GYM20R/LA-F10  
GYM20R/LA-G12  
GYM20R/LA-H12

**GYM25R/LA-0000**

GYM25R/LA-D12  
GYM25R/LA-E12  
GYM25R/LA-F12  
GYM25R/LA-G14  
GYM25R/LA-H14  
GYM25R/LA-J14

● For an internal holder, select a modular blade listed above.

**Modular blade (2)**

● For a Ø40 shank holder, if there is no restriction for use, select a holder suitable for GYM25 blade.

### Notes when setting the tool

**Overhang**

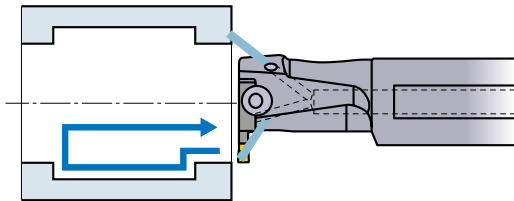
● The maximum groove depth is limited to the dimension LDRED. When machining with longer overhangs, refer to the dimension WF2 of the tool used.

## MACHINING RECOMMENDATIONS

### Notes on multi-function machining (MF, MS and MM breakers)

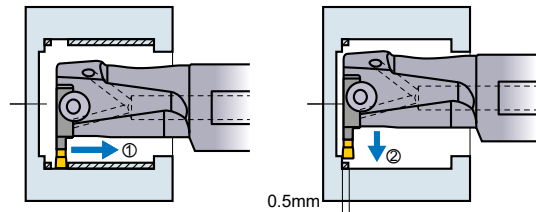
For internal grooving, the machining methods for external grooving can be used, but please note the following precautions.

#### Coolant



- Supply large amounts of coolant for effective chip disposal during cutting. Maintain supply until the tool has been retracted completely for improved chip disposal.

#### Machining blind holes

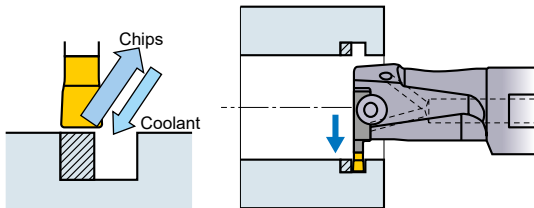


- As continuous chips tend to elongate at the back of the bore, the above operation is recommended. The recommended width of cut for ② is 0.5 mm.

#### Machining Wide Grooves

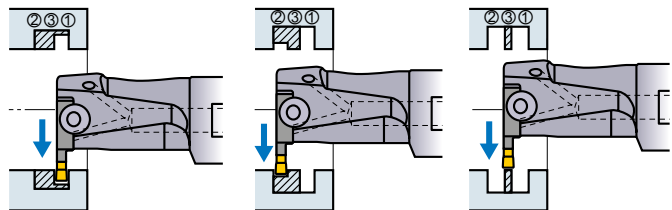
##### Grooving

- When the cutting edge width is  $\times 2 \geq$  groove width



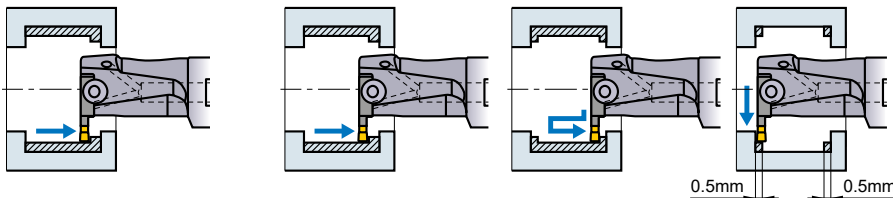
- When the depth of cut is shallower than the cutting edge width, continuous chips are usually produced. When plunging in several passes, it is recommended to carry out machining in the steps above. This ensures that coolant reaches the cutting edge and chips are easily discharged.

- When the cutting edge width is  $\times 2 <$  groove width



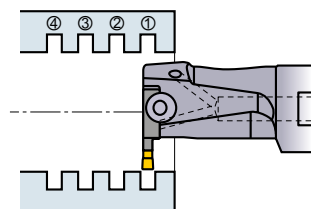
- When the groove depth is larger than the cutting edge width, carry out plunging in the steps above to break up chips efficiently.

##### Turning



- When chip breaking and disposal are especially important, cross-feed machining is recommended.
- Wide face grooving when the corner R of the work piece is equal to the corner R of the insert, machine as shown above. (When corner R of the material is larger than corner R of the insert, refer to the description of external wide grooving.)
- If the groove depth exceeds a given level, chips may elongate at the wall. In such a case, increase the feed and carry out machining as shown above.

#### Machining instruction



- It is recommended to carry out grooving from the front end of the workpiece. This reduces workpiece deflection.

**GW**SERIES**Easy to Utilise Configuration that Improves Tool Handling****Clamping method****Simple insert clamping method offering high rigidity**

To prevent extraction during machining, the insert features a reverse taper angle. Additionally the design also includes 3 large locating faces with the blade offering increased cutting edge reliability.

The blade itself is made from a suitable, special alloy steel. For changing the insert, a unique wrench is supplied to ensure ease of use.



Reverse Taper Angle

**Voice of the Developer****Easy insert setting**

By using the unique wrench, it is possible to remove the insert with one simple action making it easier for everyday use in the workshop.





## Through Coolant Blade

### Increased wear resistance due to 2 through coolant holes

2 through holes supply coolant to both the rake and flank face, leading to effective cutting edge cooling and increased wear resistance.

Additionally the blade can also be utilised with both low and high pressure coolant (7MPa).



#### Voice of the Developer

##### Reduced heat generation

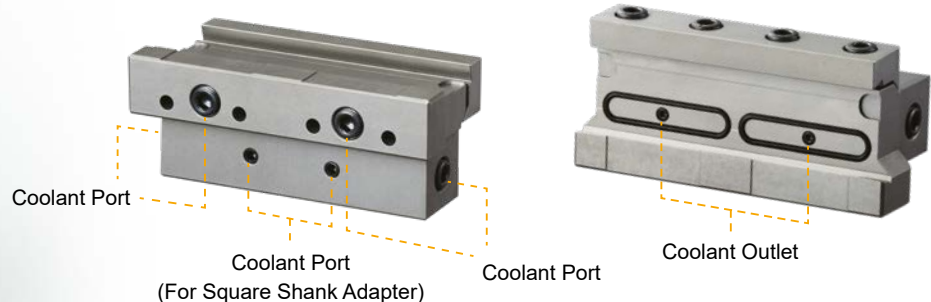
The 2 coolant holes used in the blade are capable of coping with pressures up to 7MPa. This is achieved by using as large as possible hole diameter. The coolant holes are located close to the cutting edge to improve cutting edge cooling effect and increasing wear resistance.

## Coolant Ports

### Flexibility with the use of 6 coolant ports

There are 6 coolant ports designed into the tool block, making it easy to set up the block and blade to a suitable configuration. The through coolant holes improve cutting edge cooling and chip evacuation.

The use of external coolant hoses is also possible.



#### Voice of the Developer

##### Possible to set up to suit the requirements of the workshop environment.

One of the objectives of this product is to respond to the customers complaints that "the product did not fit and could not be used". Starting with the coolant outlet that prevents leaks even when oil quantity or overhangs change, everything from the material and the shape of the O-ring, to the length of the hose has been tailored to the effective use in the workshop.

## Chipbreaker System Offering Excellent Chip Disposal Properties

### Low Feeds



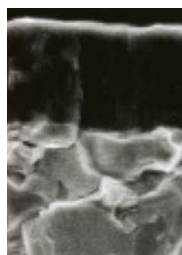
### Medium Feeds



## INSERT GRADE

| Machining Condition                                                                            | Material | P<br>Steel    | M<br>Stainless Steel | K<br>Cast Iron | S<br>Heat Resistant Alloy / Titanium Alloy |
|------------------------------------------------------------------------------------------------|----------|---------------|----------------------|----------------|--------------------------------------------|
|                                                                                                |          |               |                      |                |                                            |
| <div>Stable</div> <div>↑</div> <div>Machining Condition</div> <div>↓</div> <div>Unstable</div> |          | <b>MY5015</b> |                      | <b>MY5015</b>  | <b>VP10RT</b>                              |
|                                                                                                |          | <b>VP10RT</b> | <b>VP10RT</b>        | <b>VP10RT</b>  |                                            |
|                                                                                                |          | <b>VP20RT</b> | <b>VP20RT</b>        | <b>VP20RT</b>  | <b>VP20RT</b>                              |
|                                                                                                |          | <b>VP30RT</b> | <b>VP30RT</b>        |                |                                            |

### VP20RT (1st Recommendation)

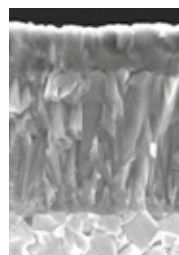


- PVD coated grade suitable for a wide range of applications. The combination of a special tough cemented carbide substrate with MIRACLE coating provides an excellent balance of wear and fracture resistance.

MIRACLE Coating

Carbide Substrate (90.5HRA)

### MY5015

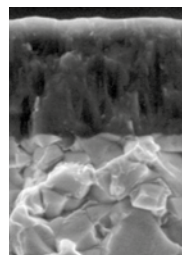


- CVD coated grade with excellent wear resistance even at high temperatures. Providing longer tool life when machining cast and ductile cast irons. Also suitable for high speed continuous cutting of steels.

CVD Coated Carbide

Carbide Substrate

### VP10RT

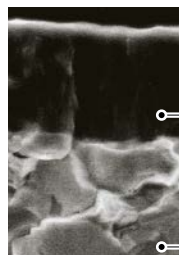


- PVD coated grade with a cemented carbide substrate harder than VP20RT. For use on difficult-to-cut materials and for extending tool life.

MIRACLE Coating

Carbide Substrate (92.0HRA)

### VP30RT



- A combination of a tough, special cemented carbide substrate and MIRACLE coating. Ideal for heavy interrupted cutting of stainless and general steels.

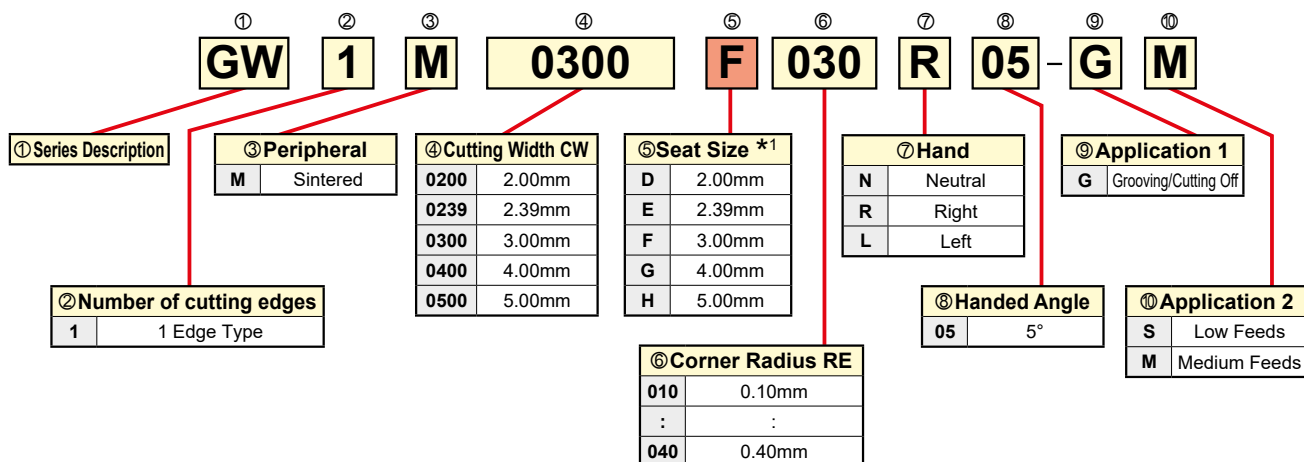
MIRACLE Coating (Al,Ti)N

Carbide Substrate (88.8HRA)

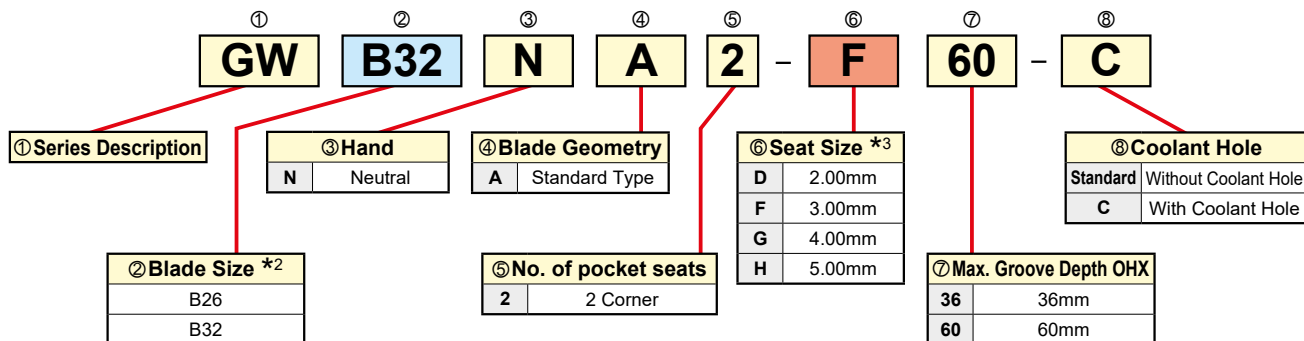
# GW SERIES ORDER NUMBER

## ■ Insert / Blade / Tool Block

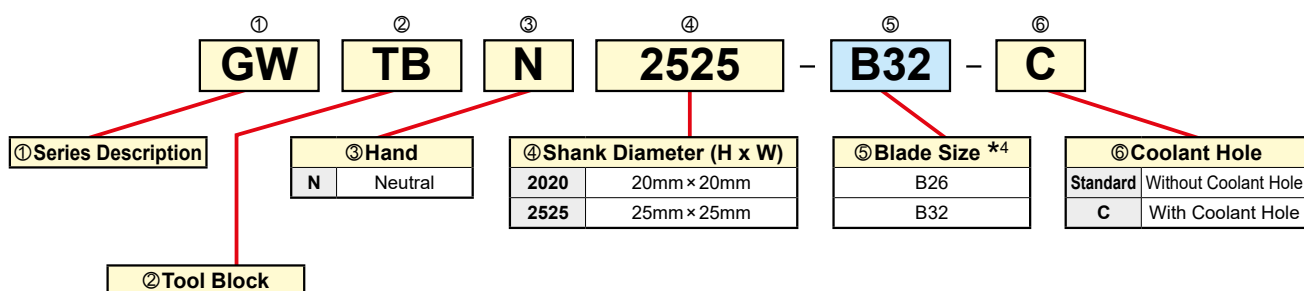
### ● Insert



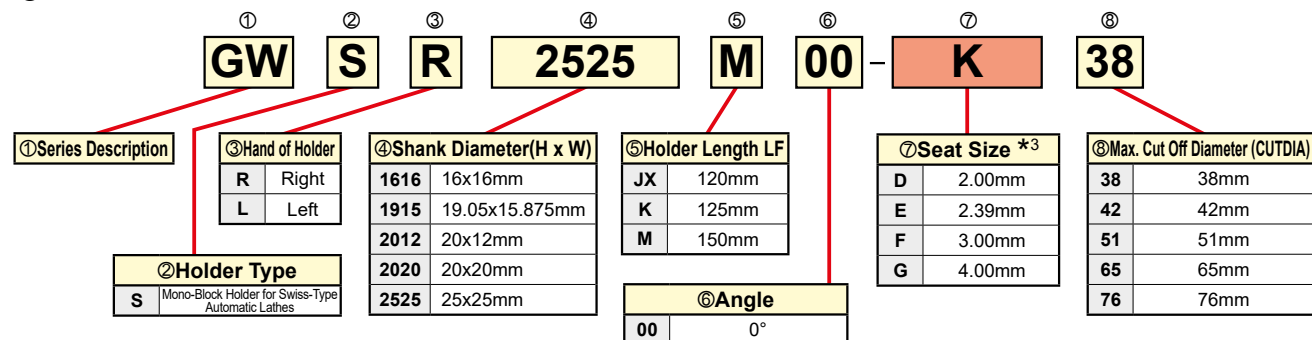
### ● Blade



### ● Tool Block



### ● MONOBLOCK HOLDER



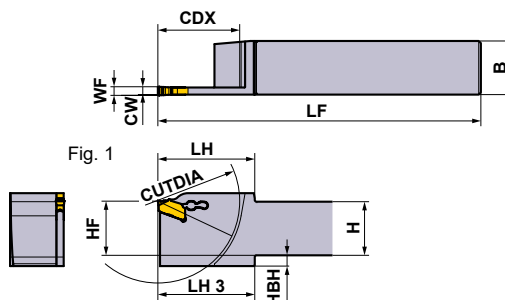
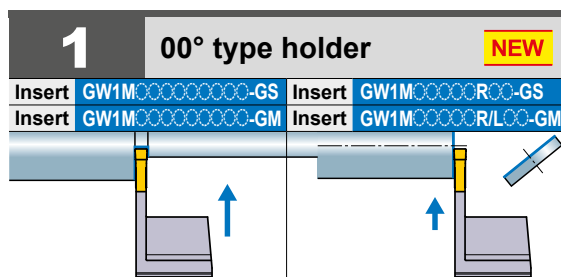
\*1 Select the mono-block holder with the same seat size symbol as the modular blade.

\*2 Select blade size with the same symbol as the tool block.

\*3 Select seat size with the same symbol as the insert.

\*4 Select blade size with the same symbol as the blade.

# GW SERIES (External for Swiss style lathes)



Right hand tool holder shown.

| Seat Size | CW   | CDX  | CUTDIA | Type       | Hand (R/L) | Order Number      | Stock | Fig. |  |
|-----------|------|------|--------|------------|------------|-------------------|-------|------|--|
| D         | 2.00 | 19   | 38     | Mono Block | R          | GWSR1616JX00-D38  | ●     | 1    |  |
|           |      |      | 38     | Mono Block | L          | GWSL1616JX00-D38  | ●     | 1    |  |
|           |      | 21   | 42     | Mono Block | R          | GWSR1915K00-D38   | ★     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL1915K00-D38   | ★     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2020K00-D42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-D42   | ●     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2012K00-D42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2012K00-D42   | ★     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2525M00-D42   | ●     | 2    |  |
| E         | 2.39 | 19   | 38     | Mono Block | R          | GWSR1915K00-E38   | ★     | 1    |  |
|           |      |      | 38     | Mono Block | L          | GWSL1915K00-E38   | ★     | 1    |  |
|           |      | 21   | 42     | Mono Block | R          | GWSR2020K00-E42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-E42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-E42-M | ★     | 3    |  |
|           |      |      |        | Mono Block | R          | GWSR2012K00-E42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2012K00-E42   | ★     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2525M00-E42   | ●     | 2    |  |
|           |      |      |        | Mono Block | L          | GWSL2525M00-E42   | ●     | 2    |  |
| F         | 3.00 | 19   | 38     | Mono Block | R          | GWSR1915K00-F38   | ★     | 1    |  |
|           |      |      | 38     | Mono Block | L          | GWSL1915K00-F38   | ★     | 1    |  |
|           |      | 21   | 42     | Mono Block | R          | GWSR2012K00-F42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2012K00-F42   | ★     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2020K00-F42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-F42   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-F42-M | ★     | 3    |  |
|           |      | 25.5 | 51     | Mono Block | R          | GWSR2020K00-F51   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-F51   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020K00-F51-M | ★     | 3    |  |
|           |      |      |        | Mono Block | R          | GWSR2525M00-F51   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2525M00-F51   | ●     | 1    |  |
|           |      | 32.5 | 65     | Mono Block | R          | GWSR2020M00-F65   | ●     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2020M00-F65   | ●     | 1    |  |
| G         | 4.00 | 38   | 76     | Mono Block | R          | GWSR2525M00-F76   | ★     | 1    |  |
|           |      |      |        | Mono Block | L          | GWSL2525M00-F76   | ★     | 1    |  |
|           |      |      |        | Mono Block | R          | GWSR2525M00-G76   | ★     | 1    |  |
|           |      |      |        |            | L          | GWSL2525M00-G76   | ★     | 1    |  |

● : Inventory maintained. ★ : Inventory maintained in Japan.

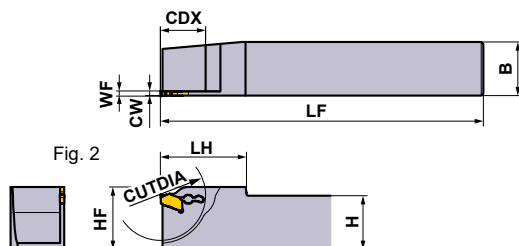


Fig. 2

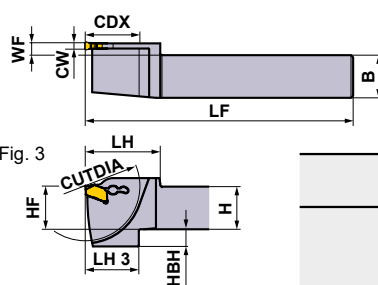


Fig. 3

Right hand tool holder shown.

Left hand tool holder shown.

## SPARE PARTS

|                     |        |
|---------------------|--------|
| Holder              |        |
| Wrench              |        |
| GWSR/L1616JX00-D38  |        |
| GWSR/L00000000-000  | GWY39L |
| GWSR/L2020K00-000-M |        |

| Dimensions (mm) |        |     |    |      |       |     |     |  | Cutting Mode |               |
|-----------------|--------|-----|----|------|-------|-----|-----|--|--------------|---------------|
| H               | B      | LF  | LH | LH 3 | HF    | WF  | HBH |  | Clockwise    | Anticlockwise |
| 16              | 16     | 120 | 30 | 30   | 16    | 0.3 | 6   |  |              |               |
| 16              | 16     | 120 | 30 | 30   | 16    | 0.3 | 6   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.3 | 3   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.3 | 3   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 25              | 25     | 150 | 40 | —    | 25    | 0.3 | —   |  |              |               |
| 25              | 25     | 150 | 40 | —    | 25    | 0.3 | —   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.2 | 3   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.2 | 3   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.2 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.2 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.2 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 5.7 | 8   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.2 | 4   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.2 | 4   |  |              |               |
| 25              | 25     | 150 | 40 | —    | 25    | 0.2 | —   |  |              |               |
| 25              | 25     | 150 | 40 | —    | 25    | 0.2 | —   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.3 | 3   |  |              |               |
| 19.05           | 15.875 | 125 | 35 | 35   | 19.05 | 0.3 | 3   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 12     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 4   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 5.8 | 8   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 8   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 0.3 | 8   |  |              |               |
| 20              | 20     | 125 | 35 | 25   | 20    | 5.8 | 8   |  |              |               |
| 25              | 25     | 150 | 40 | 40   | 25    | 0.3 | 3   |  |              |               |
| 25              | 25     | 150 | 40 | 40   | 25    | 0.3 | 3   |  |              |               |
| 20              | 20     | 150 | 40 | 33   | 20    | 0.3 | 10  |  |              |               |
| 20              | 20     | 150 | 40 | 33   | 20    | 0.3 | 10  |  |              |               |
| 25              | 25     | 150 | 45 | 45   | 25    | 0.3 | 5   |  |              |               |
| 25              | 25     | 150 | 45 | 45   | 25    | 0.3 | 5   |  |              |               |
| 25              | 25     | 150 | 45 | 45   | 25    | 0.4 | 5   |  |              |               |
| 25              | 25     | 150 | 45 | 45   | 25    | 0.4 | 5   |  |              |               |

## Insert Selection

| Seat Size | Insert Type |
|-----------|-------------|
| D         | GW1M0200D   |
| E         | GW1M0239E   |
| F         | GW1M0300F   |
| G         | GW1M0400G   |

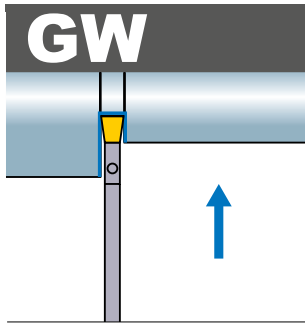
| For grooving/cutting off chipbreaker > F126 |             |          |             |             |             |                     |
|---------------------------------------------|-------------|----------|-------------|-------------|-------------|---------------------|
| Seat Size                                   | Chipbreaker | GS (Low) | GM (Medium) | 05-GS (Low) | 08-GS (Low) | 05-GM (Cutting off) |
|                                             |             | Neutral  | Neutral     | R           | R           | R/L                 |
| D                                           | 2.00mm      | ●        | ●           | ●           | ●           | ●                   |
| E                                           | 2.39mm      | ●        | ●           | ●           | ●           | ●                   |
| F                                           | 3.00mm      | ●        | ●           | ●           | ●           | ●                   |
| G                                           | 4.00mm      | ●        | ●           | ●           | ●           | ●                   |

● : Standard insert with dimensions

# GROOVING / CUTTING OFF

# GW BLADE

- Simple insert clamping method offering high rigidity.
- Possible to use with both external or through coolant.
- Groove Depth CW 2.0—5.0 mm



## For External Cutting Off / Grooving

Fig.1

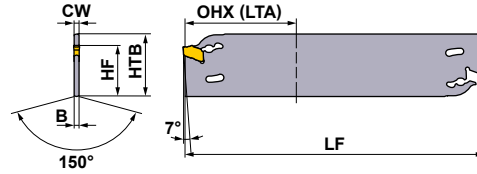
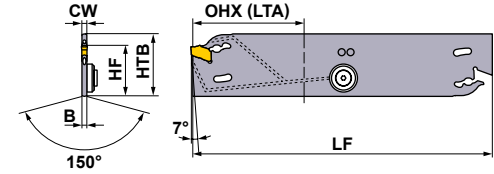


Fig.2



Without Coolant Hole

(mm)

| Seat Size | CW   | *1<br>CUTDIA | Order Number | Stock | *2<br>OHN | *3<br>OHX (LTA) | B    | LF  | HTB | HF   | Fig. |             |        | Tool Block Type |
|-----------|------|--------------|--------------|-------|-----------|-----------------|------|-----|-----|------|------|-------------|--------|-----------------|
|           |      |              |              |       |           |                 |      |     |     |      |      | Insert Type | Wrench |                 |
| D         | 2.00 | 72           | GWB26NA2-D36 | ●     | 16        | 36              | 1.55 | 110 | 26  | 21.4 | 1    | GW1M0200D   | GWY39L | GWTBN-B26       |
|           |      | 120          | GWB32NA2-D60 | ●     | 16        | 60              | 1.55 | 150 | 32  | 25   | 1    | GW1M0200D   | GWY39L | GWTBN-B32       |
| F         | 3.00 | 72           | GWB26NA2-F36 | ●     | 16        | 36              | 2.45 | 110 | 26  | 21.4 | 1    | GW1M0300F   | GWY39L | GWTBN-B26       |
|           |      | 120          | GWB32NA2-F60 | ●     | 16        | 60              | 2.45 | 150 | 32  | 25   | 1    | GW1M0300F   | GWY39L | GWTBN-B32       |
| G         | 4.00 | 72           | GWB26NA2-G36 | ●     | 19        | 36              | 3.35 | 110 | 26  | 21.4 | 1    | GW1M0400G   | GWY39L | GWTBN-B26       |
|           |      | 120          | GWB32NA2-G60 | ●     | 19        | 60              | 3.35 | 150 | 32  | 25   | 1    | GW1M0400G   | GWY39L | GWTBN-B32       |
| H         | 5.00 | 72           | GWB26NA2-H36 | ●     | 19        | 36              | 4.25 | 110 | 26  | 21.4 | 1    | GW1M0500H   | GWY39L | GWTBN-B26       |
|           |      | 120          | GWB32NA2-H60 | ●     | 19        | 60              | 4.25 | 150 | 32  | 25   | 1    | GW1M0500H   | GWY39L | GWTBN-B32       |

With Coolant Hole

(mm)

| Seat Size | CW   | *1<br>CUTDIA | Order Number   | Stock | *2<br>OHN | *3<br>OHX (LTA) | B    | LF  | HTB | HF   | Fig. |             |        | Tool Block Type |
|-----------|------|--------------|----------------|-------|-----------|-----------------|------|-----|-----|------|------|-------------|--------|-----------------|
|           |      |              |                |       |           |                 |      |     |     |      |      | Insert Type | Wrench |                 |
| D         | 2.00 | 72           | GWB26NA2-D36-C | ●     | 16        | 36              | 1.55 | 110 | 26  | 21.4 | 2    | GW1M0200D   | GWY39L | GWTBN-B26-C     |
|           |      | 120          | GWB32NA2-D60-C | ●     | 26        | 60              | 1.55 | 150 | 32  | 25   | 2    | GW1M0200D   | GWY39L | GWTBN-B32-C     |
| F         | 3.00 | 72           | GWB26NA2-F36-C | ●     | 16        | 36              | 2.45 | 110 | 26  | 21.4 | 2    | GW1M0300F   | GWY39L | GWTBN-B26-C     |
|           |      | 120          | GWB32NA2-F60-C | ●     | 26        | 60              | 2.45 | 150 | 32  | 25   | 2    | GW1M0300F   | GWY39L | GWTBN-B32-C     |
| G         | 4.00 | 72           | GWB26NA2-G36-C | ●     | 19        | 36              | 3.35 | 110 | 26  | 21.4 | 2    | GW1M0400G   | GWY39L | GWTBN-B26-C     |
|           |      | 120          | GWB32NA2-G60-C | ●     | 26        | 60              | 3.35 | 150 | 32  | 25   | 2    | GW1M0400G   | GWY39L | GWTBN-B32-C     |
| H         | 5.00 | 72           | GWB26NA2-H36-C | ●     | 19        | 36              | 4.25 | 110 | 26  | 21.4 | 2    | GW1M0500H   | GWY39L | GWTBN-B26-C     |
|           |      | 120          | GWB32NA2-H60-C | ●     | 26        | 60              | 4.25 | 150 | 32  | 25   | 2    | GW1M0500H   | GWY39L | GWTBN-B32-C     |

\*1 CUTDIA: Maximum Cut Off Diameter \*2 OHN: Minimum Overhang Length \*3 OHX(LTA): Maximum Overhang Length

Note 1) Recommended Maximum Coolant Pressure: 7MPa

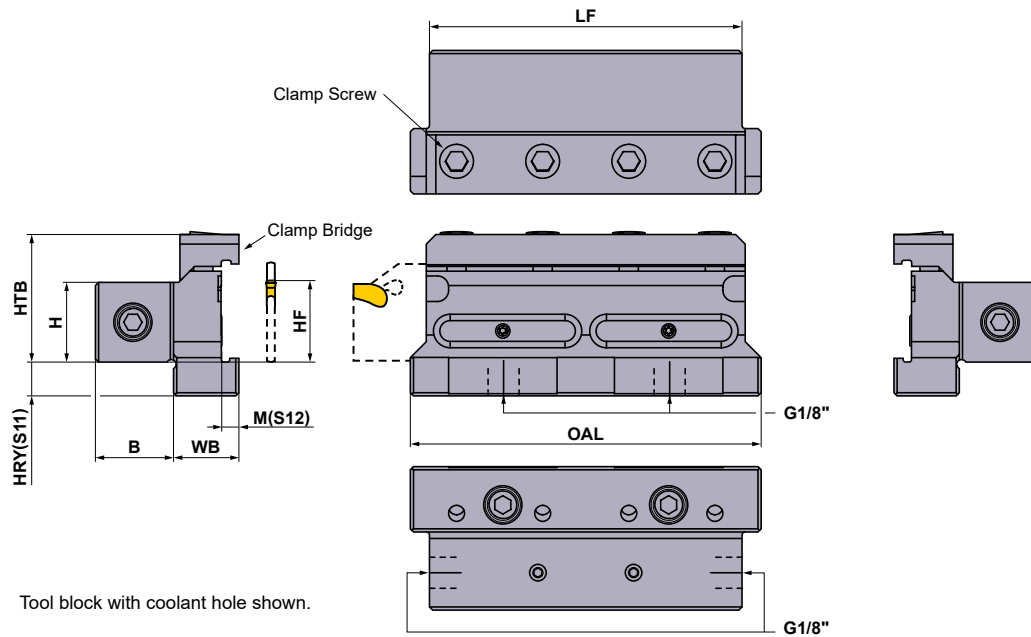
## Spare Parts for Blades with Coolant Hole

(mm)

| Order Number   | CW  |           |             |        |
|----------------|-----|-----------|-------------|--------|
|                |     | Washer    | Clamp Screw | Wrench |
| GWB26NA2-D36-C | 2.0 | ①GWW04038 | GW04005F    | HKY20R |
| GWB32NA2-D60-C | 2.0 | ①GWW04038 | GW04005F    | HKY20R |
| GWB26NA2-F36-C | 3.0 | ①GWW04038 | GW04005F    | HKY20R |
| GWB32NA2-F60-C | 3.0 | ①GWW04038 | GW04005F    | HKY20R |
| GWB26NA2-G36-C | 4.0 | ②GWW04026 | GW04005F    | HKY20R |
| GWB32NA2-G60-C | 4.0 | ②GWW04026 | GW04005F    | HKY20R |
| GWB26NA2-H36-C | 5.0 | ②GWW04026 | GW04005F    | HKY20R |
| GWB32NA2-H60-C | 5.0 | ②GWW04026 | GW04005F    | HKY20R |

● : Inventory maintained. ★ : Inventory maintained in Japan.

## ■ Tool Block



Without Coolant Hole

| Order Number  | Stock | H  | HF | HTB  | HRV (S11) | B    | WB   | M (S12) | LF  | OAL | ①<br>Clamp Bridge | ②<br>Clamp Screw | ③<br>Wrench |
|---------------|-------|----|----|------|-----------|------|------|---------|-----|-----|-------------------|------------------|-------------|
| GWTBN2020-B26 | ★     | 20 | 20 | 33.5 | 11        | 19.5 | 20.0 | 5.0     | 75  | 85  | ① GWCW1           | HSC06020         | HKY50R      |
| GWTBN2020-B32 | ★     | 20 | 20 | 35.0 | 15.6      | 19.5 | 20.5 | 5.5     | 100 | 110 | ② GWCW2           | HSC06020         | HKY50R      |
| GWTBN2525-B26 | ★     | 25 | 25 | 38.5 | 6         | 24.5 | 20.0 | 5.0     | 75  | 85  | ① GWCW1           | HSC06020         | HKY50R      |
| GWTBN2525-B32 | ★     | 25 | 25 | 40.0 | 10.6      | 24.5 | 20.5 | 5.5     | 100 | 110 | ② GWCW2           | HSC06020         | HKY50R      |

With Coolant Hole

| Order Number    | Stock | H  | HF | HTB  | HRV (S11) | B    | WB   | M (S12) | LF  | OAL | ①<br>Clamp Bridge | ②<br>Clamp Screw | ③<br>Wrench |
|-----------------|-------|----|----|------|-----------|------|------|---------|-----|-----|-------------------|------------------|-------------|
| GWTBN2020-B26-C | ●     | 20 | 20 | 33.5 | 11        | 19.5 | 20.0 | 5.0     | 75  | 85  | ① GWCW1           | HSC06020         | HKY50R      |
| GWTBN2020-B32-C | ●     | 20 | 20 | 35.0 | 15.6      | 19.5 | 20.5 | 5.5     | 100 | 110 | ② GWCW2           | HSC06020         | HKY50R      |
| GWTBN2525-B26-C | ●     | 25 | 25 | 38.5 | 6         | 24.5 | 20.0 | 5.0     | 75  | 85  | ① GWCW1           | HSC06020         | HKY50R      |
| GWTBN2525-B32-C | ●     | 25 | 25 | 40.0 | 10.6      | 24.5 | 20.5 | 5.5     | 100 | 110 | ② GWCW2           | HSC06020         | HKY50R      |

\* Clamp Torque (N · m) : HSC06020=7.0

Note 1) Recommended Maximum Coolant Pressure : 7MPa

## Spare Parts for Tool Block with Coolant Hole

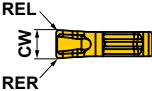
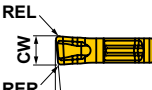
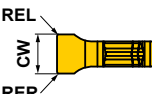
| Order Number    | ①<br>O-ring | ②<br>Plug | ③<br>Plug | ④<br>Wrench | ⑤<br>Plug | ⑥<br>Wrench |
|-----------------|-------------|-----------|-----------|-------------|-----------|-------------|
| GWTBN2020-B26-C | ORGW332N9   | HGJ-PT1/8 | HSD05004S | HKY25R      | CS300590T | TKY08R      |
| GWTBN2020-B32-C | ORGW457N9   | HGJ-PT1/8 | HSD05004S | HKY25R      | CS300590T | TKY08R      |
| GWTBN2525-B26-C | ORGW332N9   | HGJ-PT1/8 | HSD05004S | HKY25R      | CS300590T | TKY08R      |
| GWTBN2525-B32-C | ORGW457N9   | HGJ-PT1/8 | HSD05004S | HKY25R      | CS300590T | TKY08R      |



# GROOVING / CUTTING OFF

## Inserts

(mm)

| Application                         | Order Number           | Stock   |        |        |         |        | CW               |           | REL   | RER  | PSIRR<br>PSIRL | Geometry |                                                                                                                                                                                |
|-------------------------------------|------------------------|---------|--------|--------|---------|--------|------------------|-----------|-------|------|----------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                        | Coating |        |        | Carbide |        | Cutting<br>Width | Tolerance |       |      |                |          |                                                                                                                                                                                |
|                                     |                        | MY5015  | VP10RT | VP20RT | VP30RT  | RT9010 |                  |           |       |      |                |          | RT9020                                                                                                                                                                         |
| Grooving, Cutting Off               | GW1M0200D020N-GS       |         | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.2  | 0.2            | —        |                                                                                             |
| Grooving, Cutting Off               | NEW GW1M0239E020N-GS   |         | ●      | ●      | ●       |        |                  | 2.39      | ±0.03 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0300F020N-GS       |         | ●      | ●      | ●       |        |                  | 3.00      | ±0.03 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0400G020N-GS       |         | ●      | ●      | ●       |        |                  | 4.00      | ±0.04 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0500H030N-GS       |         | ●      | ●      | ●       |        |                  | 5.00      | ±0.04 | 0.3  | 0.3            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0200D020N-GM       | ●       | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.2  | 0.2            | —        |                                                                                             |
| Grooving, Cutting Off               | NEW GW1M0239E020N-GM   | ●       | ●      | ●      | ●       |        |                  | 2.39      | ±0.03 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0300F030N-GM       | ●       | ●      | ●      | ●       |        |                  | 3.00      | ±0.03 | 0.3  | 0.3            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0400G030N-GM       | ●       | ●      | ●      | ●       |        |                  | 4.00      | ±0.04 | 0.3  | 0.3            | —        |                                                                                                                                                                                |
| Grooving, Cutting Off               | GW1M0500H040N-GM       | ●       | ●      | ●      | ●       |        |                  | 5.00      | ±0.04 | 0.4  | 0.4            | —        |                                                                                                                                                                                |
| Cutting off, Low Feed               | GW1M0200D020R05-GS     |         | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.2  | 0.2            | 5        | <br>  |
| Cutting off, Low Feed               | NEW GW1M0239E020R05-GS |         | ●      | ●      | ★       |        |                  | 2.39      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting off, Low Feed               | GW1M0300F020R05-GS     |         | ★      | ★      | ★       |        |                  | 3.00      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting off Low Feed, Lead Angle 8° | GW1M0200D003R08-GS     |         | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.03 | 0.03           | 8        |                                                                                                                                                                                |
| Cutting off Low Feed, Lead Angle 8° | NEW GW1M0239E003R08-GS |         | ★      | ★      | ★       |        |                  | 2.39      | ±0.03 | 0.03 | 0.03           | 8        |                                                                                                                                                                                |
| Cutting off Low Feed, Lead Angle 8° | GW1M0300F003R08-GS     |         | ★      | ★      | ★       |        |                  | 3.00      | ±0.03 | 0.03 | 0.03           | 8        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0200D020R05-GM     |         | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0200D020L05-GM     |         | ●      | ●      | ●       |        |                  | 2.00      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting Off                         | NEW GW1M0239E020R05-GM |         | ●      | ●      | ★       |        |                  | 2.39      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting Off                         | NEW GW1M0239E020L05-GM |         | ●      | ●      | ★       |        |                  | 2.39      | ±0.03 | 0.2  | 0.2            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0300F030R05-GM     |         | ●      | ●      | ●       |        |                  | 3.00      | ±0.03 | 0.3  | 0.3            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0300F030L05-GM     |         | ●      | ●      | ●       |        |                  | 3.00      | ±0.03 | 0.3  | 0.3            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0400G030R05-GM     |         | ●      | ●      | ●       |        |                  | 4.00      | ±0.04 | 0.3  | 0.3            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0400G030L05-GM     |         | ●      | ●      | ●       |        |                  | 4.00      | ±0.04 | 0.3  | 0.3            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0500H040R05-GM     |         | ●      | ●      | ●       |        |                  | 5.00      | ±0.04 | 0.4  | 0.4            | 5        |                                                                                                                                                                                |
| Cutting Off                         | GW1M0500H040L05-GM     |         | ●      | ●      | ●       |        |                  | 5.00      | ±0.04 | 0.4  | 0.4            | 5        |                                                                                                                                                                                |
| Blank                               | GW1B0320D020N          |         |        |        |         | ★      | ★                | 3.24      | ±0.10 | 0.2  | 0.2            | —        | <br> |
| Blank                               | GW1B0440F020N          |         |        |        |         | ★      | ★                | 4.44      | ±0.10 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Blank                               | GW1B0540G020N          |         |        |        |         | ★      | ★                | 5.44      | ±0.10 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
| Blank                               | GW1B0640H020N          |         |        |        |         | ★      | ★                | 6.44      | ±0.10 | 0.2  | 0.2            | —        |                                                                                                                                                                                |
|                                     |                        |         |        |        |         |        |                  |           |       |      |                |          |                                                                                           |

Note 1) Blank inserts to be ground by customers.

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(10 inserts in one case)

# Proper Use of GW Series Right Hand Inserts

## First Recommendation

Improved Fracture Resistance

Reduction of Burrs and Core Residue

### GM Chipbreaker

PSIRR=5°  
RE=0.20

### GS Chipbreaker

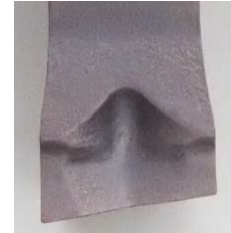
PSIRR=5°  
RE=0.20

### GS Chipbreaker

PSIRR=8°  
RE=0.03

Reduction of Cutting Resistance

Improved Fracture Resistance



## Coolant Hose Kit

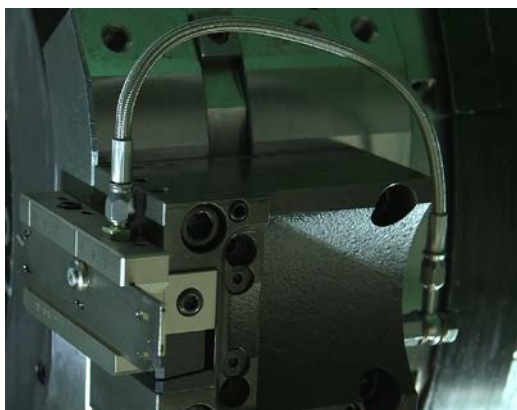
(mm)

| Connector Type | Order Number | Stock | Hose Length | Kit Details                                                                       |                                                                                   |                                                                                     |                                                                                     |                                                                                     |          |      |          |      |
|----------------|--------------|-------|-------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|------|----------|------|
|                |              |       |             |  |  |  |  |  |          |      |          |      |
|                |              |       |             | Hose                                                                              | Banjo Adapter                                                                     |                                                                                     | Banjo Bolt                                                                          |                                                                                     | Adapter  |      | Washer   |      |
|                |              |       |             | Code No.                                                                          | Code No.                                                                          | QTY.                                                                                | Code No.                                                                            | QTY.                                                                                | Code No. | QTY. | Code No. | QTY. |
| Straight       | CS-1/8-150SS | ●     | 150         | HOSE-1/8-150                                                                      | —                                                                                 | —                                                                                   | —                                                                                   | —                                                                                   | AD-G1/8  | 2    | WA-M10   | 2    |
| Straight       | CS-1/8-200SS | ●     | 200         | HOSE-1/8-200                                                                      | —                                                                                 | —                                                                                   | —                                                                                   | —                                                                                   | AD-G1/8  | 2    | WA-M10   | 2    |
| Straight       | CS-1/8-250SS | ●     | 250         | HOSE-1/8-250                                                                      | —                                                                                 | —                                                                                   | —                                                                                   | —                                                                                   | AD-G1/8  | 2    | WA-M10   | 2    |
| Straight       | CS-1/8-300SS | ●     | 300         | HOSE-1/8-300                                                                      | —                                                                                 | —                                                                                   | —                                                                                   | —                                                                                   | AD-G1/8  | 2    | WA-M10   | 2    |
| Elbow Straight | CS-1/8-150BS | ●     | 150         | HOSE-1/8-150                                                                      | AD-BM10                                                                           | 1                                                                                   | BB-G1/8                                                                             | 1                                                                                   | AD-G1/8  | 1    | WA-M10   | 3    |
| Elbow Straight | CS-1/8-200BS | ●     | 200         | HOSE-1/8-200                                                                      | AD-BM10                                                                           | 1                                                                                   | BB-G1/8                                                                             | 1                                                                                   | AD-G1/8  | 1    | WA-M10   | 3    |
| Elbow Straight | CS-1/8-250BS | ●     | 250         | HOSE-1/8-250                                                                      | AD-BM10                                                                           | 1                                                                                   | BB-G1/8                                                                             | 1                                                                                   | AD-G1/8  | 1    | WA-M10   | 3    |
| Elbow Straight | CS-1/8-300BS | ●     | 300         | HOSE-1/8-300                                                                      | AD-BM10                                                                           | 1                                                                                   | BB-G1/8                                                                             | 1                                                                                   | AD-G1/8  | 1    | WA-M10   | 3    |
| Elbow          | CS-1/8-150BB | ●     | 150         | HOSE-1/8-150                                                                      | AD-BM10                                                                           | 2                                                                                   | BB-G1/8                                                                             | 2                                                                                   | —        | —    | WA-M10   | 4    |
| Elbow          | CS-1/8-200BB | ●     | 200         | HOSE-1/8-200                                                                      | AD-BM10                                                                           | 2                                                                                   | BB-G1/8                                                                             | 2                                                                                   | —        | —    | WA-M10   | 4    |
| Elbow          | CS-1/8-250BB | ●     | 250         | HOSE-1/8-250                                                                      | AD-BM10                                                                           | 2                                                                                   | BB-G1/8                                                                             | 2                                                                                   | —        | —    | WA-M10   | 4    |
| Elbow          | CS-1/8-300BB | ●     | 300         | HOSE-1/8-300                                                                      | AD-BM10                                                                           | 2                                                                                   | BB-G1/8                                                                             | 2                                                                                   | —        | —    | WA-M10   | 4    |

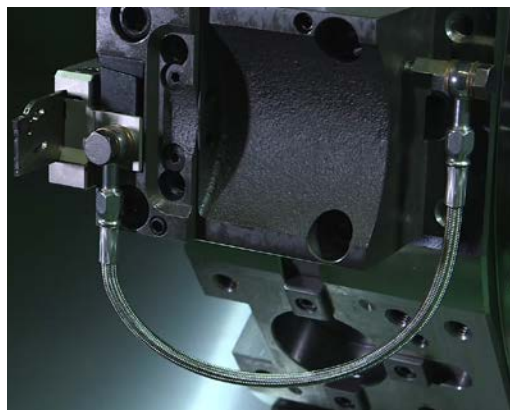
Connection Screw Size = G1/8"

## Mounting Example

Elbow Straight Type



Elbow Type



## RECOMMENDED CUTTING CONDITIONS

### ■ Cutting Speed

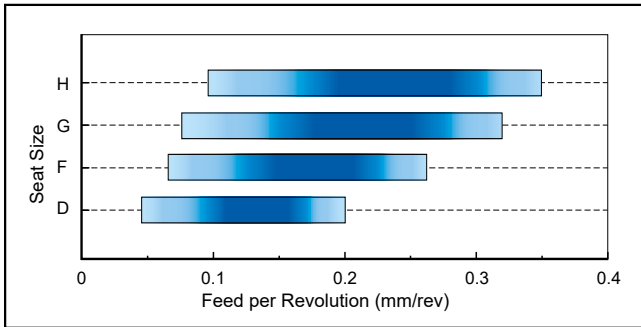
|   | Material                               | Hardness                    | Grade  | Cutting Speed (m/min) |     |     |     |     |     |
|---|----------------------------------------|-----------------------------|--------|-----------------------|-----|-----|-----|-----|-----|
|   |                                        |                             |        | 50                    | 100 | 150 | 200 | 250 | 300 |
| P | Mild Steel                             | ≤160HB                      | VP20RT |                       | 100 |     | 240 |     |     |
|   |                                        |                             | VP10RT |                       | 110 |     | 250 |     |     |
|   | Carbon Steel Alloy Steel               | 160—280HB                   | VP20RT |                       | 80  |     | 200 |     |     |
|   |                                        |                             | VP10RT |                       | 90  |     | 210 |     |     |
|   |                                        |                             | VP30RT | 60                    |     | 180 |     |     |     |
|   |                                        |                             | MY5015 |                       | 110 |     | 250 |     |     |
|   |                                        | ≥280HB                      | VP20RT | 60                    |     | 160 |     |     |     |
|   |                                        |                             | VP10RT |                       | 70  |     | 170 |     |     |
|   |                                        |                             | VP30RT | 40                    |     | 140 |     |     |     |
|   |                                        |                             | MY5015 |                       | 90  |     | 210 |     |     |
| M | Stainless Steel                        | ≤270HB                      | VP20RT | 60                    |     | 180 |     |     |     |
|   |                                        |                             | VP10RT |                       | 70  |     | 190 |     |     |
|   |                                        |                             | VP30RT | 40                    |     | 160 |     |     |     |
| K | Gray Cast Iron                         | Tensile Strength<br>≤300MPa | VP20RT |                       | 80  |     | 200 |     |     |
|   |                                        |                             | VP10RT |                       | 90  |     | 210 |     |     |
|   |                                        |                             | MY5015 |                       |     | 140 |     | 300 |     |
|   | Ductile Cast Iron                      | Tensile Strength<br>≤800MPa | VP20RT | 60                    |     | 160 |     |     |     |
|   |                                        |                             | VP10RT |                       | 70  |     | 170 |     |     |
|   |                                        |                             | MY5015 |                       | 90  |     | 210 |     |     |
| S | Heat Resistant Alloy<br>Titanium Alloy | —                           | VP20RT | 30 60                 |     |     |     |     |     |
|   |                                        |                             | VP10RT | 40 70                 |     |     |     |     |     |

Note 1) VP20RT is the first recommended grade for general materials.

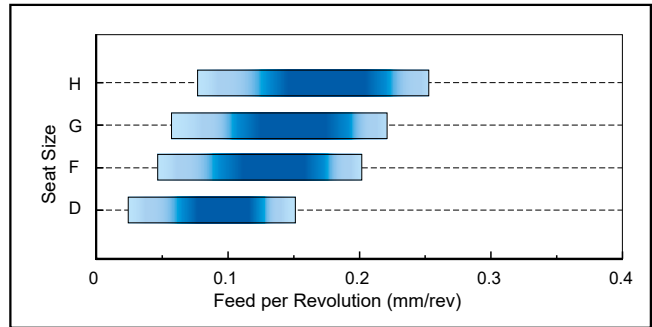
Note 2) For VP10RT, VP20RT, VP30RT and MY5015, wet cutting is recommended.

## ■ Feed per Revolution

### GM Chipbreaker



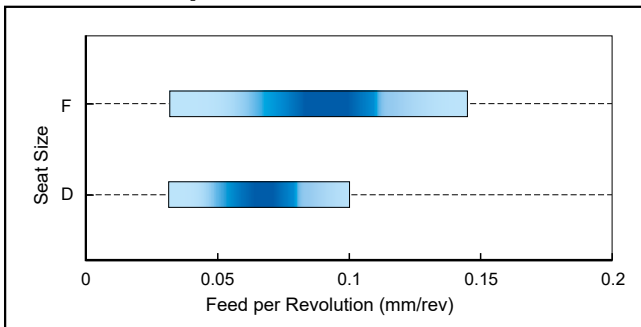
### GS Chipbreaker



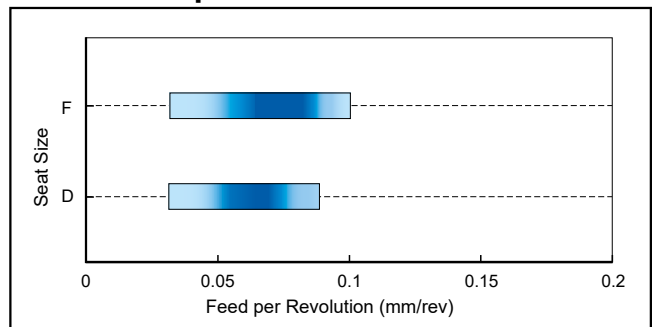
| Chipbreaker    | Feed per Revolution (mm/rev) |             |             |             |
|----------------|------------------------------|-------------|-------------|-------------|
|                | Seat Size D                  | Seat Size F | Seat Size G | Seat Size H |
| GM Chipbreaker | 0.05–0.20                    | 0.07–0.26   | 0.08–0.32   | 0.10–0.35   |
| GS Chipbreaker | 0.03–0.15                    | 0.05–0.20   | 0.06–0.22   | 0.08–0.25   |

## ■ Cutting Off Feed per Revolution

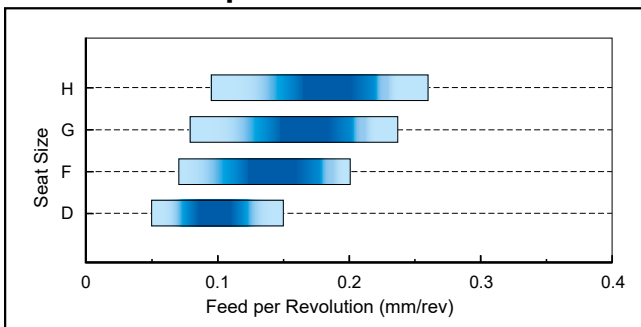
### R05-GS Chipbreaker



### R08-GS Chipbreaker



### R/L05-GM Chipbreaker



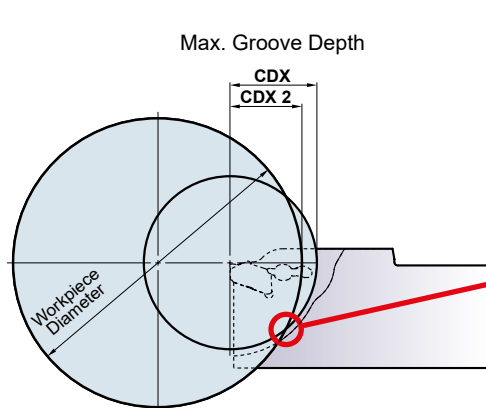
| Chipbreaker | PSIPR | Hand | Feed per Revolution (mm/rev) |             |             |             |
|-------------|-------|------|------------------------------|-------------|-------------|-------------|
|             |       |      | Seat Size D                  | Seat Size F | Seat Size G | Seat Size H |
| R05-GS      | 5°    | R    | 0.03–0.10                    | 0.03–0.14   | –           | –           |
| R08-GS      | 8°    | R    | 0.03–0.08                    | 0.03–0.14   | –           | –           |
| R05-GM      | 5°    | R/L  | 0.05–0.15                    | 0.07–0.20   | 0.08–0.23   | 0.10–0.26   |

F

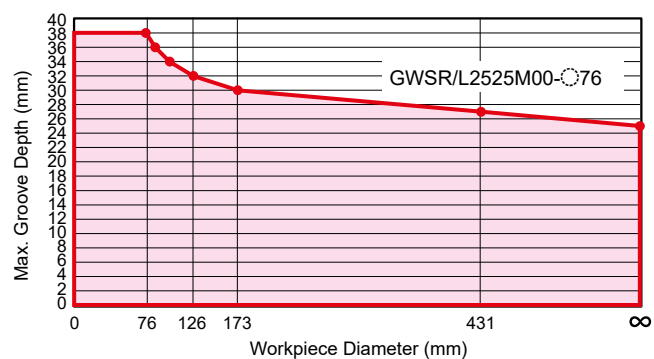
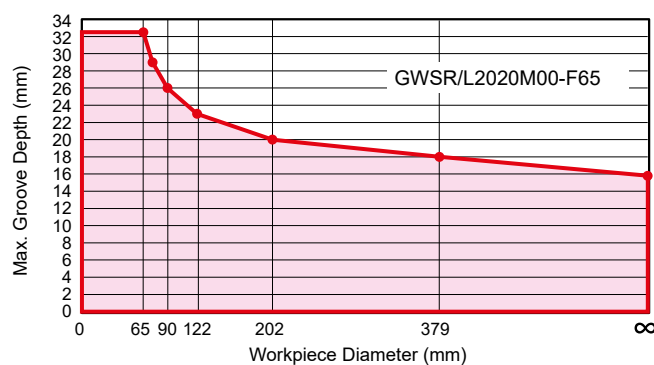
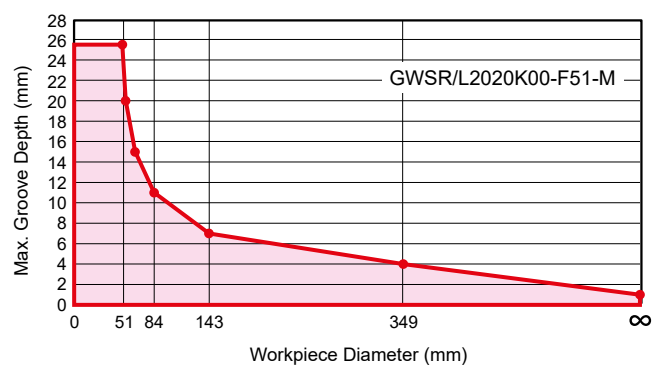
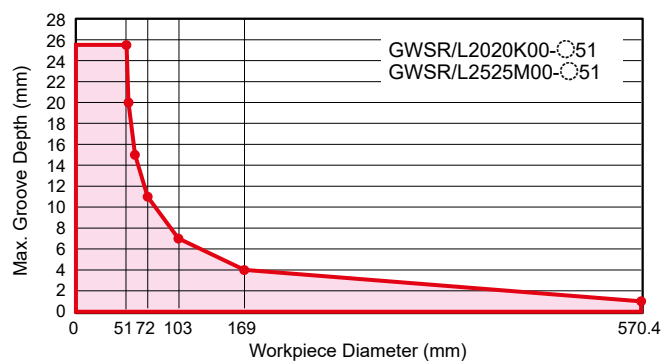
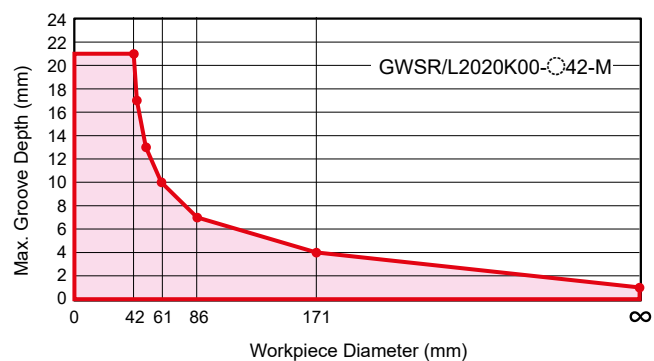
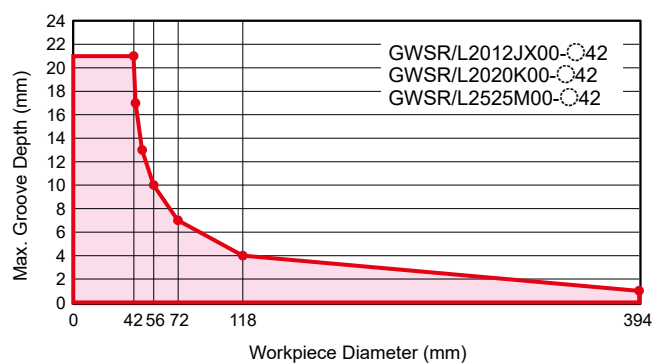
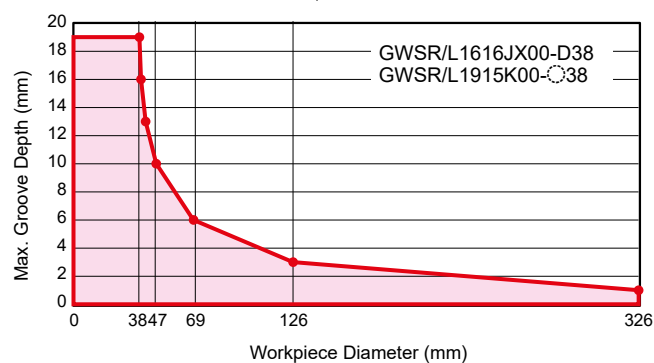
GROOVING / CUTTING OFF

## LIMITATION OF THE MAXIMUM GROOVE DEPTH [For External Grooving]

The maximum groove depth is limited by the workpiece diameter.



Due to interference, the maximum groove depth is limited by the workpiece diameter.

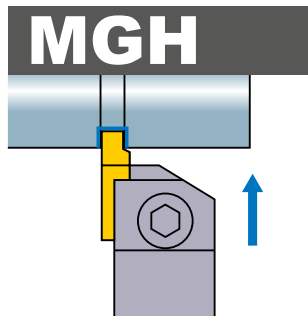


This image shows a full page of a document template designed for writing. At the top left, there is a header area labeled "Memo" in a bold, black font. Below this header, the entire page is filled with horizontal ruling lines, which are thin and light gray, providing a guide for handwriting or typing. The lines are evenly spaced and extend across the width of the page.

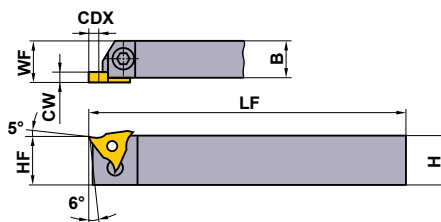
# GROOVING / CUTTING OFF

## MG HOLDER

- Clamp-on type
- Positive insert suffers from negligible chattering and thus produces a good finished surface.
- Cutting width CW 1.25—6.0mm



### External grooving



Right hand tool holder shown.

| Order Number    | Stock |   | Insert Number                 | Dimensions(mm)            |            |    |    |     |    |      |
|-----------------|-------|---|-------------------------------|---------------------------|------------|----|----|-----|----|------|
|                 | R     | L |                               | CW                        | CDX        | H  | B  | LF  | HF | WF   |
| MGHR/L2020K3315 | ●     | ● | MGTR/L<br>33125<br> <br>33400 | 1.25                      | 1.2        | 20 | 20 | 125 | 20 | 20.2 |
|                 |       |   |                               | 1.45                      | 1.5        |    |    |     |    |      |
|                 |       |   |                               | $1.5 \leq CW \leq 2.3$    | 3.0        |    |    |     |    |      |
| MGHR/L2020K3323 | ●     | ● |                               | $2.3 < CW \leq 3.3$       | 3.0        | 20 | 20 | 125 | 20 | 20.2 |
| MGHR/L2525M3315 | ●     | ● |                               | 1.25                      | 1.2        | 25 | 25 | 150 | 25 | 25.2 |
|                 |       |   |                               | 1.45                      | 1.5        |    |    |     |    |      |
|                 |       |   |                               | $1.5 \leq CW \leq 2.3$    | 3.0        |    |    |     |    |      |
| MGHR/L2525M3323 | ●     | ● |                               | $2.3 < CW \leq 3.3$       | 3.0        | 25 | 25 | 150 | 25 | 25.2 |
| MGHR/L2525M3333 | ★     | ● |                               | $3.3 < CW \leq 4.7$       | 3.0        | 25 | 25 | 150 | 25 | 25.2 |
| MGHR/L2020K4315 | ●     | ● | MGTR/L<br>43125<br> <br>43470 | 1.25                      | 1.2 (2.0)* | 20 | 20 | 125 | 20 | 20.2 |
|                 |       |   |                               | 1.45                      | 1.5        |    |    |     |    |      |
|                 |       |   |                               | $1.5 \leq CW \leq 2.3$    | 3.0 (3.5)* |    |    |     |    |      |
| MGHR/L2020K4323 | ●     | ● |                               | $2.3 < CW \leq 3.3$       | 4.5 (4.0)* | 20 | 20 | 125 | 20 | 20.2 |
| MGHR/L2020K4333 | ●     | ● |                               | $3.3 < CW \leq 4.7(4.0)*$ | 4.5 (5.0)* | 20 | 20 | 125 | 20 | 20.2 |
|                 |       |   |                               | 1.25                      | 1.2 (2.0)* | 25 | 25 | 150 | 25 | 25.2 |
| MGHR/L2525M4315 | ●     | ● |                               | 1.45                      | 1.5        |    |    |     |    |      |
|                 |       |   |                               | $1.5 \leq CW \leq 2.3$    | 3.0 (3.5)* |    |    |     |    |      |
| MGHR/L2525M4323 | ●     | ● |                               | $2.3 < CW \leq 3.3$       | 4.5 (4.0)* | 25 | 25 | 150 | 25 | 25.2 |
| MGHR/L2525M4333 | ★     | ● |                               | $3.3 < CW \leq 4.7(4.0)*$ | 4.5 (5.0)* | 25 | 25 | 150 | 25 | 25.2 |
| MGHR/L2525M4447 | ●     | ● | MGTR/L<br>44500<br> <br>44600 | $4.7 < CW \leq 6.3$       | 4.5        | 25 | 25 | 150 | 25 | 25.2 |

\* Dimensions when installing the CBN insert.

## SPARE PARTS

| Order Number                            |         | *        |      |        |
|-----------------------------------------|---------|----------|------|--------|
| MGHR/L2020K3315<br> <br>MGHR/L2525M4447 | MTK1R/L | HBH06020 | MES3 | HKY40R |

\* Clamp Torque (N · m) : HBH06020=7.0

## RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Hardness                 | Grade  | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|-----------------------------|--------------------------|--------|-----------------------|------------------|
| P | Carbon Steel<br>Alloy Steel | 180—280HB                | VP20MF | 120 (100—140)         | 0.14 (0.03—0.25) |
|   |                             |                          | NX2525 | 130 (100—160)         | 0.12 (0.03—0.2)  |
| M | Stainless Steel             | ≤200HB                   | VP20MF | 120 (100—140)         | 0.12 (0.03—0.18) |
| K | Gray Cast Iron              | Tensile Strength ≤350MPa | VP20MF | 120 (100—140)         | 0.12 (0.03—0.18) |

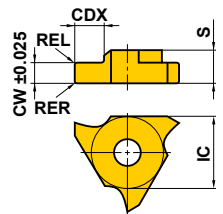
Note 1) For machining a narrow groove, apply a lower feed within the recommended range.

● : Inventory maintained. ★ : Inventory maintained in Japan.

(10 inserts in one case) (CBN inserts are available in 1 piece in one case.)



## INSERTS

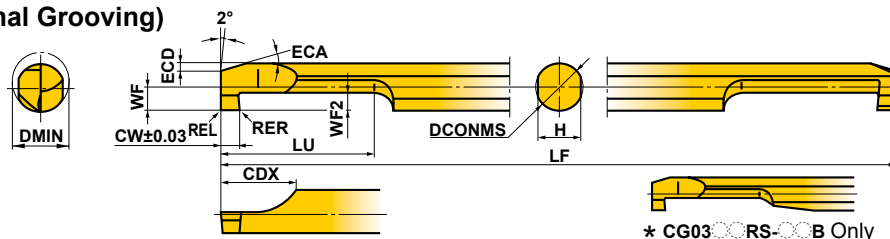
| Order Number | Stock  |   |        |   |         |   | Dimensions (mm) |     |       |      |       | Geometry                                                                                                                                                 |
|--------------|--------|---|--------|---|---------|---|-----------------|-----|-------|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | Coated |   | Cermet |   | Carbide |   | CW              | CDX | IC    | S    | RER/L |                                                                                                                                                          |
|              | VP20MF |   | NX2525 |   | UT20T   |   |                 |     |       |      |       |                                                                                                                                                          |
|              | R      | L | R      | L | R       | L |                 |     |       |      |       |                                                                                                                                                          |
| MGTR/L33125  | ★      | ★ | ★      |   | ●       | ● | 1.25            | 1.2 | 9.525 | 4.76 | 0.2   | <div>MGTR/L...</div> <div></div> <div>Right hand insert shown.</div> |
| MGTR/L33145  | ★      | ★ | ★      |   | ●       | ★ | 1.45            | 1.5 | 9.525 | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L33150  | ★      | ★ | ★      | ★ | ●       | ● | 1.5             | 3   | 9.525 | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L33175  | ★      | ★ | ★      | ★ | ●       | ● | 1.75            | 3   | 9.525 | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L33200  | ★      | ★ | ★      | ★ | ●       | ● | 2               | 3   | 9.525 | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L33230  | ★      | ★ |        |   | ●       | ● | 2.3             | 3   | 9.525 | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L33250  | ★      | ★ | ★      | ★ | ●       | ● | 2.5             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33270  | ★      | ★ |        |   | ●       | ★ | 2.7             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33280  | ★      | ★ |        |   | ●       | ★ | 2.8             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33300  | ★      | ★ | ★      | ★ | ●       | ● | 3               | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33320  | ★      | ★ |        |   | ●       |   | 3.2             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33330  |        | ★ |        |   | ●       | ★ | 3.3             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33350  | ★      | ★ | ★      |   | ●       | ★ | 3.5             | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L33400  | ★      | ★ | ★      | ★ | ●       | ● | 4               | 3   | 9.525 | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43125  | ★      | ★ | ★      | ★ | ●       | ● | 1.25            | 1.2 | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43145  | ★      | ★ |        | ★ | ●       | ★ | 1.45            | 1.5 | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43150  | ★      | ★ | ★      | ● | ●       | ● | 1.5             | 3   | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43175  | ★      | ★ | ★      | ★ | ●       | ● | 1.75            | 3   | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43200  | ★      | ★ | ★      | ● | ●       | ● | 2               | 3   | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43230  | ★      | ★ | ●      | ★ | ●       | ● | 2.3             | 3   | 12.7  | 4.76 | 0.2   |                                                                                                                                                          |
| MGTR/L43250  | ★      | ★ | ★      | ★ | ●       | ● | 2.5             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43260  | ★      | ★ | ★      |   | ●       | ● | 2.6             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43270  | ★      | ★ |        |   | ●       | ★ | 2.7             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43280  |        | ★ |        | ★ | ●       | ● | 2.8             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43300  | ★      | ★ | ★      | ★ | ●       | ● | 3               | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43320  | ★      |   |        |   | ●       | ● | 3.2             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43330  |        | ★ |        | ★ | ●       | ● | 3.3             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43350  | ★      | ★ | ★      | ★ | ●       | ● | 3.5             | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43400  | ★      | ★ | ★      |   | ●       | ● | 4               | 4.5 | 12.7  | 4.76 | 0.3   |                                                                                                                                                          |
| MGTR/L43420  | ★      | ★ | ★      |   | ●       | ● | 4.2             | 4.5 | 12.7  | 4.76 | 0.4   |                                                                                                                                                          |
| MGTR/L43430  | ★      | ★ | ★      |   | ●       | ● | 4.3             | 4.5 | 12.7  | 4.76 | 0.4   |                                                                                                                                                          |
| MGTR/L43450  | ★      | ★ | ●      | ★ | ●       | ● | 4.5             | 4.5 | 12.7  | 4.76 | 0.4   |                                                                                                                                                          |
| MGTR/L43470  | ★      | ★ | ★      | ★ | ●       | ★ | 4.7             | 4.5 | 12.7  | 4.76 | 0.4   |                                                                                                                                                          |
| MGTR/L44500  | ★      | ★ |        |   | ●       | ★ | 5               | 4.5 | 12.7  | 6.35 | 0.4   |                                                                                                                                                          |
| MGTR/L44550  | ★      |   |        |   | ●       |   | 5.5             | 4.5 | 12.7  | 6.35 | 0.4   |                                                                                                                                                          |
| MGTR/L44600  | ★      |   |        |   | ●       | ● | 6               | 4.5 | 12.7  | 6.35 | 0.4   |                                                                                                                                                          |

F

GROOVING / CUTTING OFF

# MICRO-MINI TWIN

## ■ CG TYPE (Internal Grooving)



\* CG03 RS-B Only

| Order Number | Stock               |               |      |        | Chipbreaker | Dimensions (mm) |      |     |      |       |        |    |    |     |     |     |     |     |
|--------------|---------------------|---------------|------|--------|-------------|-----------------|------|-----|------|-------|--------|----|----|-----|-----|-----|-----|-----|
|              | Micro Grain Carbide |               | TF15 | Coated |             | VP15TF          | DMIN | CW  | WF2  | RER/L | DCONMS | LF | LU | CDX | WF  | H   | ECA | ECD |
|              | NEW<br>MS7025       | NEW<br>MS9025 |      |        |             |                 |      |     |      |       |        |    |    |     |     |     |     |     |
| CG0305RS-10  |                     |               | ★    | ●      | Without     | 3               | 1    | 1   | 0.05 | 3     | 50     | 5  | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG0305RS-10B | ●                   | ●             | ★    | ★      | With        | 3               | 1    | 1   | 0.05 | 3     | 50     | 5  | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG0306RS-20  |                     |               | ★    | ★      | Without     | 3               | 2    | 1   | 0.1  | 3     | 50     | 6  | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG0306RS-20B | ●                   | ●             | ★    | ★      | With        | 3               | 2    | 1   | 0.1  | 3     | 50     | 6  | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG03RS-10    |                     |               | ★    | ●      | Without     | 3               | 1    | 1   | 0.05 | 3     | 50     | 10 | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG03RS-10B   | ●                   | ●             | ★    | ★      | With        | 3               | 1    | 1   | 0.05 | 3     | 50     | 10 | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG03RS-20    |                     |               | ★    | ★      | Without     | 3               | 2    | 1   | 0.1  | 3     | 50     | 11 | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG03RS-20B   | ●                   | ●             | ★    | ★      | With        | 3               | 2    | 1   | 0.1  | 3     | 50     | 11 | 6  | 1.3 | 2.7 | 15° | 0.3 |     |
| CG0407RS-10  |                     |               | ★    | ★      | Without     | 4               | 1    | 1.5 | 0.05 | 4     | 60     | 7  | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG0407RS-10B | ●                   | ●             | ★    | ★      | With        | 4               | 1    | 1.5 | 0.05 | 4     | 60     | 7  | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG0408RS-20  |                     |               | ★    | ★      | Without     | 4               | 2    | 1.5 | 0.1  | 4     | 60     | 8  | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG0408RS-20B | ●                   | ●             | ★    | ★      | With        | 4               | 2    | 1.5 | 0.1  | 4     | 60     | 8  | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG04RS-10    |                     |               | ★    | ●      | Without     | 4               | 1    | 1.5 | 0.05 | 4     | 60     | 15 | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG04RS-10B   | ●                   | ●             | ★    | ★      | With        | 4               | 1    | 1.5 | 0.05 | 4     | 60     | 15 | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG04RS-20    |                     |               | ★    | ★      | Without     | 4               | 2    | 1.5 | 0.1  | 4     | 60     | 16 | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG04RS-20B   | ●                   | ●             | ★    | ●      | With        | 4               | 2    | 1.5 | 0.1  | 4     | 60     | 16 | 7  | 1.8 | 3.6 | 15° | 0.5 |     |
| CG0510RS-10  |                     |               | ★    | ●      | Without     | 5               | 1    | 2   | 0.05 | 5     | 70     | 10 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG0510RS-10B | ●                   | ●             | ★    | ●      | With        | 5               | 1    | 2   | 0.05 | 5     | 70     | 10 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG0511RS-20  |                     |               | ★    | ●      | Without     | 5               | 2    | 2   | 0.1  | 5     | 70     | 11 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG0511RS-20B | ●                   | ●             | ★    | ★      | With        | 5               | 2    | 2   | 0.1  | 5     | 70     | 11 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG05RS-10    |                     |               | ★    | ●      | Without     | 5               | 1    | 2   | 0.05 | 5     | 70     | 20 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG05RS-10B   | ●                   | ●             | ★    | ★      | With        | 5               | 1    | 2   | 0.05 | 5     | 70     | 20 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG05RS-20    |                     |               | ●    | ★      | Without     | 5               | 2    | 2   | 0.1  | 5     | 70     | 21 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG05RS-20B   | ●                   | ●             | ★    | ●      | With        | 5               | 2    | 2   | 0.1  | 5     | 70     | 21 | 8  | 2.3 | 4.5 | 15° | 0.7 |     |
| CG0610RS-10  |                     |               | ★    | ●      | Without     | 6               | 1    | 2   | 0.05 | 6     | 75     | 10 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG0610RS-10B | ●                   | ●             | ★    | ●      | With        | 6               | 1    | 2   | 0.05 | 6     | 75     | 10 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG0611RS-20  |                     |               | ★    | ●      | Without     | 6               | 2    | 2   | 0.1  | 6     | 75     | 11 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG0611RS-20B | ●                   | ●             | ★    | ●      | With        | 6               | 2    | 2   | 0.1  | 6     | 75     | 11 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG06RS-10    |                     |               | ★    | ●      | Without     | 6               | 1    | 2   | 0.05 | 6     | 75     | 20 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG06RS-10B   | ●                   | ●             | ●    | ●      | With        | 6               | 1    | 2   | 0.05 | 6     | 75     | 20 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG06RS-20    |                     |               | ★    | ●      | Without     | 6               | 2    | 2   | 0.1  | 6     | 75     | 21 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG06RS-20B   | ●                   | ●             | ●    | ●      | With        | 6               | 2    | 2   | 0.1  | 6     | 75     | 21 | 8  | 2.8 | 5.4 | 15° | 0.7 |     |
| CG0712RS-10  |                     |               | ★    | ●      | Without     | 7               | 1    | 2   | 0.05 | 7     | 85     | 12 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG0712RS-10B | ●                   | ●             | ★    | ●      | With        | 7               | 1    | 2   | 0.05 | 7     | 85     | 12 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG0713RS-20  |                     |               | ★    | ★      | Without     | 7               | 2    | 2   | 0.1  | 7     | 85     | 13 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG0713RS-20B | ●                   | ●             | ★    | ★      | With        | 7               | 2    | 2   | 0.1  | 7     | 85     | 13 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG07RS-10    |                     |               | ★    | ★      | Without     | 7               | 1    | 2   | 0.05 | 7     | 85     | 25 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG07RS-10B   | ●                   | ●             | ★    | ●      | With        | 7               | 1    | 2   | 0.05 | 7     | 85     | 25 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG07RS-20    |                     |               | ★    | ●      | Without     | 7               | 2    | 2   | 0.1  | 7     | 85     | 26 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |
| CG07RS-20B   | ●                   | ●             | ●    | ●      | With        | 7               | 2    | 2   | 0.1  | 7     | 85     | 26 | 8  | 3.3 | 6.4 | 15° | 0.7 |     |

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(MICRO-MINI TWIN is available in 1 piece in one pack.)

## RECOMMENDED CUTTING CONDITIONS

|          | Material                   | Hardness                    | Cutting Speed (m/min) | Feed (mm/rev)    |                      | Recommended Tool Overhang (mm) |
|----------|----------------------------|-----------------------------|-----------------------|------------------|----------------------|--------------------------------|
|          |                            |                             |                       | CG03RS/CG04RS    | CG05RS/CG06RS/CG07RS |                                |
| <b>P</b> | Carbon Steel · Alloy Steel | 180—280HB                   | 80 (40—120)           | 0.02 (0.01—0.03) | 0.03 (0.01—0.05)     |                                |
| <b>M</b> | Stainless Steel            | ≤200HB                      | 80 (40—120)           | 0.02 (0.01—0.03) | 0.03 (0.01—0.05)     |                                |
| <b>K</b> | Gray Cast Iron             | Tensile Strength<br>≤350MPa | 80 (40—120)           | 0.03 (0.01—0.05) | 0.03 (0.01—0.05)     |                                |
| <b>N</b> | Non-ferrous Metal          | —                           | 120 (80—160)          | 0.03 (0.01—0.05) | 0.05 (0.01—0.08)     |                                |

Note 1) Wet cutting is recommended.

## ■ PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

● When using a holder for general purpose / small automatic lathe:

① To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

② When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

◎ When using Mitsubishi Materials holders

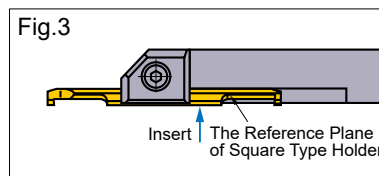
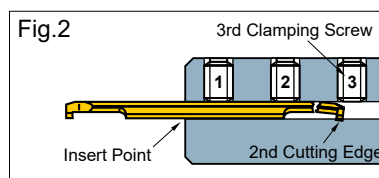
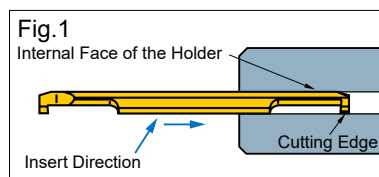
When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for the clamping screw is 2.0 N·m.

● When using a square type holder:

① When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.

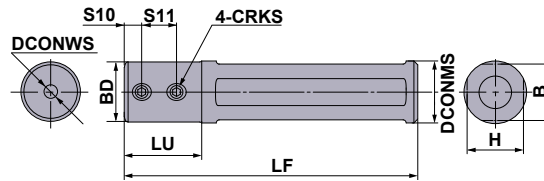
② Make sure that the clamping screws are tightened to the recommended values.

③ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.



## ROUND TYPE HOLDER

**NEW**



| Order Number  | Stock | Dimensions (mm) |        |      |     |    |      |      |     |     |
|---------------|-------|-----------------|--------|------|-----|----|------|------|-----|-----|
|               |       | DCONMS          | DCONWS | BD   | LF  | LU | H    | B    | S10 | S11 |
| SLV190085025N | ●     | 19.05           | 2.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085035N | ●     | 19.05           | 3.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085045N | ●     | 19.05           | 4.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110025N | ●     | 19.05           | 2.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110035N | ●     | 19.05           | 3.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110045N | ●     | 19.05           | 4.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV200085025N | ●     | 20.0            | 2.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085035N | ●     | 20.0            | 3.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085045N | ●     | 20.0            | 4.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV220135025N | ●     | 22.0            | 2.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135035N | ●     | 22.0            | 3.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135045N | ●     | 22.0            | 4.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV250067025N | ●     | 25.0            | 2.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067035N | ●     | 25.0            | 3.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067045N | ●     | 25.0            | 4.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110025N | ●     | 25.0            | 2.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110035N | ●     | 25.0            | 3.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110045N | ●     | 25.0            | 4.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV254085025N | ●     | 25.4            | 2.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085035N | ●     | 25.4            | 3.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085045N | ●     | 25.4            | 4.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110025N | ●     | 25.4            | 2.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110035N | ●     | 25.4            | 3.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110045N | ●     | 25.4            | 4.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |

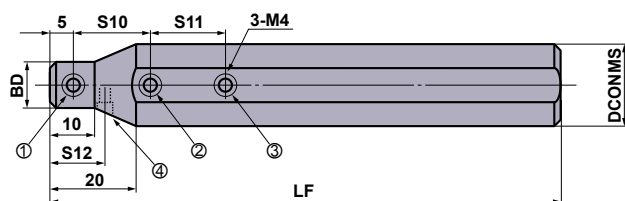
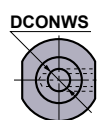
GROOVING / CUTTING OFF

## SPARE PARTS

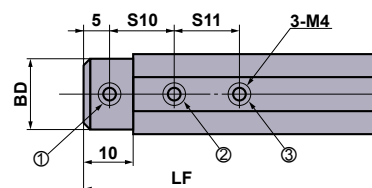
| Holder Type  | Clamp Screw | Wrench | Clamp Torque (N・m) |
|--------------|-------------|--------|--------------------|
| SLV○○○○○025N | HSS04005    | HKY20R | 2.0                |
| SLV○○○○○035N | HSS04005    | HKY20R | 2.0                |
| SLV○○○○○045N | HSS04005    | HKY20R | 2.0                |

● : Inventory maintained. ★ : Inventory maintained in Japan.

## ROUND TYPE HOLDER



RBH2200N has a temporary set screw for different machine specifications.  
(Represented by number 4)



RBH1580N, RBH1600N,  
RBH1900N

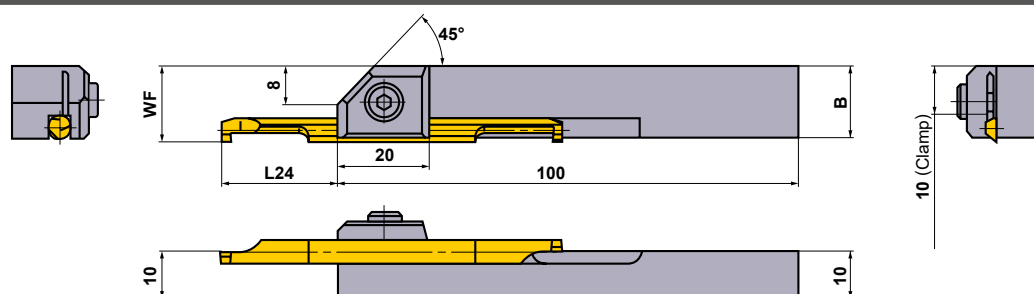
| Order Number | Stock | Dimensions (mm) |        |    |     |     |     |      | MICRO-MINI<br>C | MICRO-MINI TWIN<br>CG | ★1 Clamp Screw |   |   |   | Wrench | Torque<br>(N・m) |
|--------------|-------|-----------------|--------|----|-----|-----|-----|------|-----------------|-----------------------|----------------|---|---|---|--------|-----------------|
|              |       | DCONMS          | DCONWS | BD | LF  | S10 | S11 | S12  |                 |                       | ①              | ② | ③ | ④ |        |                 |
| RBH15820N    | ★     | 15.875          | 2      | 15 | 100 | 10  | —   | —    | —               | —                     | B              | B | — | — | HKY20F | 2.0             |
| RBH15830N    | ★     | 15.875          | 3      | 15 | 100 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH15840N    | ★     | 15.875          | 4      | 15 | 100 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH15850N    | ★     | 15.875          | 5      | 15 | 100 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH15860N    | ★     | 15.875          | 6      | 15 | 100 | 15  | 15  | —    | —               | 06RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH15870N    | ★     | 15.875          | 7      | 15 | 100 | 20  | 20  | —    | —               | 07RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH15880N    | ★     | 15.875          | 8      | 15 | 100 | 20  | 20  | —    | —               | —                     | D              | D | D | — | HKY20F | 2.0             |
| RBH1620N     | ●     | 16              | 2      | 15 | 100 | 10  | —   | —    | —               | —                     | B              | B | — | — | HKY20F | 2.0             |
| RBH1630N     | ●     | 16              | 3      | 15 | 100 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH1640N     | ●     | 16              | 4      | 15 | 100 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH1650N     | ●     | 16              | 5      | 15 | 100 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH1660N     | ●     | 16              | 6      | 15 | 100 | 15  | 15  | —    | —               | 06RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH1670N     | ●     | 16              | 7      | 15 | 100 | 20  | 20  | —    | —               | 07RS-○○(B)            | A              | A | A | — | HKY20F | 2.0             |
| RBH1680N     | ★     | 16              | 8      | 15 | 100 | 20  | 20  | —    | —               | —                     | D              | D | D | — | HKY20F | 2.0             |
| RBH19020N    | ★     | 19.05           | 2      | 18 | 125 | 10  | —   | —    | —               | —                     | C              | C | — | — | HKY20F | 2.0             |
| RBH19030N    | ★     | 19.05           | 3      | 18 | 125 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | B              | B | B | — | HKY20F | 2.0             |
| RBH19040N    | ★     | 19.05           | 4      | 18 | 125 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | B              | B | B | — | HKY20F | 2.0             |
| RBH19050N    | ★     | 19.05           | 5      | 18 | 125 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | B              | B | B | — | HKY20F | 2.0             |
| RBH19060N    | ★     | 19.05           | 6      | 18 | 125 | 15  | 15  | —    | —               | 06RS-○○(B)            | B              | B | B | — | HKY20F | 2.0             |
| RBH19070N    | ★     | 19.05           | 7      | 18 | 125 | 20  | 20  | —    | —               | 07RS-○○(B)            | B              | B | B | — | HKY20F | 2.0             |
| RBH19080N    | ★     | 19.05           | 8      | 18 | 125 | 20  | 20  | —    | —               | —                     | A              | A | A | — | HKY20F | 2.0             |
| RBH2020N     | ★     | 20              | 2      | 11 | 125 | 10  | —   | —    | —               | —                     | A              | A | — | — | HKY20F | 2.0             |
| RBH2030N     | ★     | 20              | 3      | 12 | 125 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | A              | A | B | — | HKY20F | 2.0             |
| RBH2040N     | ★     | 20              | 4      | 13 | 125 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | A              | B | B | — | HKY20F | 2.0             |
| RBH2050N     | ★     | 20              | 5      | 14 | 125 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | A              | B | B | — | HKY20F | 2.0             |
| RBH2060N     | ★     | 20              | 6      | 15 | 125 | 15  | 15  | —    | —               | 06RS-○○(B)            | A              | B | B | — | HKY20F | 2.0             |
| RBH2070N     | ★     | 20              | 7      | 16 | 125 | 20  | 20  | —    | —               | 07RS-○○(B)            | A              | B | B | — | HKY20F | 2.0             |
| RBH2080N     | ★     | 20              | 8      | 17 | 125 | 20  | 20  | —    | —               | —                     | A              | A | A | — | HKY20F | 2.0             |
| RBH2220N     | ★     | 22              | 2      | 11 | 125 | 10  | —   | 10   | —               | —                     | A              | B | — | A | HKY20F | 2.0             |
| RBH2230N     | ★     | 22              | 3      | 12 | 125 | 10  | 10  | 10   | 03FR-BLS        | 03RS-○○(B)            | A              | B | C | A | HKY20F | 2.0             |
| RBH2240N     | ★     | 22              | 4      | 13 | 125 | 15  | 15  | 12.5 | 04FR-BLS        | 04RS-○○(B)            | A              | B | B | A | HKY20F | 2.0             |
| RBH2250N     | ★     | 22              | 5      | 14 | 125 | 15  | 15  | 12.5 | 05HR-BLS        | 05RS-○○(B)            | A              | B | B | A | HKY20F | 2.0             |
| RBH2260N     | ★     | 22              | 6      | 15 | 125 | 15  | 15  | 15   | —               | 06RS-○○(B)            | A              | B | B | A | HKY20F | 2.0             |
| RBH2270N     | ★     | 22              | 7      | 16 | 125 | 20  | 20  | 15   | —               | 07RS-○○(B)            | A              | B | B | A | HKY20F | 2.0             |
| RBH2280N     | ★     | 22              | 8      | 17 | 125 | 20  | 20  | 15   | —               | —                     | A              | B | B | A | HKY20F | 2.0             |
| RBH2520N     | ★     | 25              | 2      | 11 | 150 | 10  | —   | —    | —               | —                     | A              | B | — | — | HKY20F | 2.0             |
| RBH2530N     | ★     | 25              | 3      | 12 | 150 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | A              | B | C | — | HKY20F | 2.0             |
| RBH2540N     | ★     | 25              | 4      | 13 | 150 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH2550N     | ★     | 25              | 5      | 14 | 150 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH2560N     | ★     | 25              | 6      | 15 | 150 | 15  | 15  | —    | —               | 06RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH2570N     | ★     | 25              | 7      | 16 | 150 | 20  | 20  | —    | —               | 07RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH2580N     | ★     | 25              | 8      | 17 | 150 | 20  | 20  | —    | —               | —                     | A              | B | B | — | HKY20F | 2.0             |
| RBH25420N    | ★     | 25.4            | 2      | 11 | 150 | 10  | —   | —    | —               | —                     | A              | B | — | — | HKY20F | 2.0             |
| RBH25430N    | ★     | 25.4            | 3      | 12 | 150 | 10  | 10  | —    | 03FR-BLS        | 03RS-○○(B)            | A              | B | C | — | HKY20F | 2.0             |
| RBH25440N    | ★     | 25.4            | 4      | 13 | 150 | 15  | 15  | —    | 04FR-BLS        | 04RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH25450N    | ★     | 25.4            | 5      | 14 | 150 | 15  | 15  | —    | 05HR-BLS        | 05RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH25460N    | ★     | 25.4            | 6      | 15 | 150 | 15  | 15  | —    | —               | 06RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH25470N    | ★     | 25.4            | 7      | 16 | 150 | 20  | 20  | —    | —               | 07RS-○○(B)            | A              | C | C | — | HKY20F | 2.0             |
| RBH25480N    | ★     | 25.4            | 8      | 17 | 150 | 20  | 20  | —    | —               | —                     | A              | B | B | — | HKY20F | 2.0             |

★1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008

F

GROOVING / CUTTING OFF

## SQUARE TYPE HOLDER



| Order Number | Stock | Dimensions (mm)    |      |                              |                              | MICRO-MINI TWIN<br>CG | Clamp Screw | Wrench | Torque<br>(N • m) |
|--------------|-------|--------------------|------|------------------------------|------------------------------|-----------------------|-------------|--------|-------------------|
|              |       | MICRO-MINI TWIN CG |      |                              |                              |                       |             |        |                   |
|              |       | B                  | WF   | L24 *                        |                              |                       |             |        |                   |
|              |       |                    |      | Width of Cutting<br>Edge 1mm | Width of Cutting<br>Edge 2mm |                       |             |        |                   |
| SBH1030R     | ★     | 13.8               | 13.8 | 13—17.5 (14)                 | 14—16.5 (15)                 | 03RS-10(B),03RS-20(B) | HSC05012    | HKY40R | 9.5               |
| SBH1040R     | ★     | 14.7               | 14.8 | 18—22.5 (19)                 | 19—21.5 (20)                 | 04RS-10(B),04RS-20(B) | HSC05012    | HKY40R | 9.5               |
| SBH1050R     | ★     | 15.6               | 15.8 | 23—27.5 (24)                 | 24—26.5 (25)                 | 05RS-10(B),05RS-20(B) | HSC05012    | HKY40R | 9.5               |
| SBH1060R     | ★     | 16.5               | 16.8 | 23—32.5 (24)                 | 24—31.5 (25)                 | 06RS-10(B),06RS-20(B) | HSC05012    | HKY40R | 9.5               |
| SBH1070R     | ★     | 17.4               | 17.8 | 28—38 (29)                   | 29—37 (30)                   | 07RS-10(B),07RS-20(B) | HSC05012    | HKY40R | 9.5               |

★ L24 is the length of overhang for sufficient clamping, and ( ) is the recommended length for steel machining and for general purpose.  
Note 1) The MICRO-DEX and the MICRO-MINI cannot be fitted to square holders.

This image shows a blank sheet of white paper designed as a memo template. At the top left, the word "Memo" is written in a bold, black, sans-serif font. A thick horizontal black line runs across the entire width of the page directly below the header. The main body of the page is filled with horizontal dashed lines, providing space for writing. The paper has a clean, minimalist aesthetic.



① Classified according to external or internal applications.  
② Sub-classified according to product series.  
(Refer to the index on the next page.)

**TYPE OF TOOL HOLDER**  
Indicates the initial letters for the order number and cutting applications.

PRODUCT SECTION

PRODUCT FEATURES

**INTERNAL THREADING**

**MMT<sup>®</sup> TYPE BORING BARS**

- Minimum cutting diameter 13mm.
- Various insert types.
- Precision class insert.
- Available with a wiper cutting edge to provide a precise thread geometry.
- Capable to machine lead angle  $\leq 0.005\text{mm}$ .

| SHIM           |              |                          |                   |                |              |                          |                   |
|----------------|--------------|--------------------------|-------------------|----------------|--------------|--------------------------|-------------------|
| Lead Angle (°) | Order Number | Stock Inductor Angle (°) | Applicable Holder | Lead Angle (°) | Order Number | Stock Inductor Angle (°) | Applicable Holder |
| 1.5            | CT132TN15    | ● 3°                     |                   | 1.5            | CT143TN15    | ● 3°                     |                   |
| -0.5           | CT132TN05    | ● -2°                    |                   | -0.5           | CT143TN05    | ● -2°                    |                   |
| 0              | CT132TN00    | ● 0°                     | MMTIR             | 0              | CT143TN00    | ● 0°                     | MMTIR             |
| 1.5            | CT132TP15    | ● 0°                     | OC16-C            | 1.5            | CT143TP15    | ● 0°                     | OC22-C            |
| 2.5            | CT132TP25    | ● 1°                     |                   | 2.5            | CT143TP25    | ● 1°                     |                   |
| 3.5            | CT132TP35    | ● 2°                     |                   | 3.5            | CT143TP35    | ● 2°                     |                   |
| 4.5            | CT132TP45    | ● 3°                     |                   | 4.5            | CT143TP45    | ● 3°                     |                   |

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**PRODUCT STANDARDS**  
Indicates order numbers, stock status  
(per right/left hand), applicable inserts,  
holder dimensions, and spare parts.

## MMT M-CLASS INSERTS WITH 3-D CHIPBREAKERS

**IDENTIFICATION**

**MMT 16 I R 100 ISO - S**

**Designation**

**Hand of Tool**  
R Right

**Pitch**

|     |        |    |             |
|-----|--------|----|-------------|
| 100 | 1.0mm  | A  | 0.5 – 1.5mm |
| 125 | 1.25mm | A  | 0.8 – 2.0mm |
| 160 | 1.6mm  | B  | 1.2 – 3.0mm |
| 175 | 1.75mm | B  | 1.4 – 3.0mm |
| 200 | 2.0mm  | G  | 1.6 – 3.0mm |
| 250 | 2.5mm  | G  | 1.8 – 3.0mm |
| 300 | 3.0mm  | AG | 0.5 – 3.0mm |

**Threading Type**

|      |                            |
|------|----------------------------|
| BS   | British Standard Whitworth |
| ISO  | ISO Metric                 |
| ISO  | ISO Metric Fine            |
| ISO  | ISO Metric                 |
| BSPT | British Standard Pipe      |
| BSPT | British Standard Pipe      |
| UN   | American UN                |

**Machine inserts with 3-D chipformers**

**STANDARD DEPTH OF CUT → G16**    **SPARE PARTS → N001**    **TECHNICAL DATA → P001**

**G000**

# TURNING TOOLS

# THREADING

|                                                         |      |
|---------------------------------------------------------|------|
| CLASSIFICATION (EXTERNAL).....                          | G002 |
| CLASSIFICATION (INTERNAL).....                          | G003 |
| CROSS REFERENCE THREAD PITCH                            |      |
| EXTERNAL .....                                          | G004 |
| INTERNAL .....                                          | G006 |
| STANDARD THREAD AND CORRESPONDING INSERT / HOLDER ..... | G008 |

## STANDARD OF THREADING TOOLS

### MMT SERIES

|                               |      |
|-------------------------------|------|
| FEATURES .....                | G010 |
| CUTTING CONDITIONS.....       | G012 |
| STANDARD OF DEPTH OF CUT..... | G014 |

### EXTERNAL THREADING

|                   |      |
|-------------------|------|
| MMTE HOLDER ..... | G019 |
| MT HOLDER .....   | G024 |

### INTERNAL THREADING

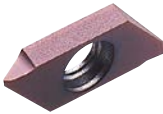
|                             |      |
|-----------------------------|------|
| MMTI TYPE BORING BARS ..... | G026 |
| MICRO-MINI TWIN .....       | G031 |

#### \*Alphabetical order index

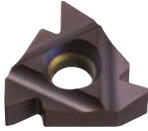
G031 CT  
 G020 MMT (EXTERNAL INSERTS)  
 G027 MMT (INTERNAL INSERTS)  
 G019 MMTE  
 G026 MMTI  
 G024 MT1  
 G024 MTH  
 G025 MTT (EXTERNAL INSERTS)  
 G034 RBH  
 G032 SBH  
 G033 SLV



# CLASSIFICATION (EXTERNAL)

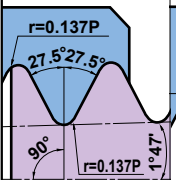
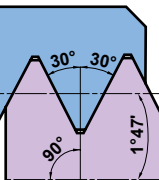
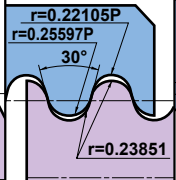
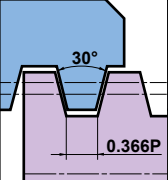
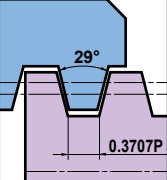
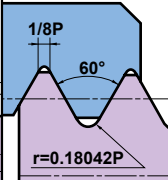
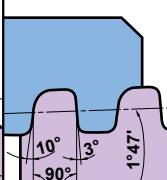
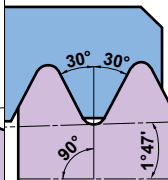
| Name of Tool Holder                                                                                               |                                                                                                             | Insert Shape                                                                        | Features                                                                                                                                                                                                                                                                                                                                                     | Shank Size<br>(H x W x L)<br>(mm)                                                 |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>MMTE Holder</b><br><br>➡ G019 |                                                                                                             |    | <ul style="list-style-type: none"><li>● Various insert types.</li><li>● Precision class insert.</li><li>● Available with a wiper cutting edge to provide a precise thread geometry.</li><li>● Able to change lead angle by replacing the shim.</li></ul>                                                                                                     | 12 x 12 x 100<br>16 x 16 x 100<br>20 x 20 x 125<br>25 x 25 x 150<br>32 x 32 x 170 |
| <b>MT Holder</b><br><br>➡ G024   |                                                                                                             |    | <ul style="list-style-type: none"><li>● Clamp-on type.</li><li>● Precision class insert.</li><li>● Positive insert suffers from negligible chattering and thus produces a good finished surface.</li></ul>                                                                                                                                                   | 16 x 16 x 100<br>20 x 20 x 125<br>25 x 25 x 150<br>32 x 32 x 170                  |
| SMALL TOOLS                                                                                                       | <b>TTAH</b><br><br>➡ D024 |  | <ul style="list-style-type: none"><li>● Tools to be used on gang type tool posts.</li><li>● Small Shank : 8mm—16mm</li><li>● High rigidity vertical insert design.</li><li>● Screw is designed for use on both front and back to enable back clamping.</li><li>● Most suitable for threading diameters of 2mm or smaller.</li><li>● Screw-on type.</li></ul> | 8 x 10 x 120<br>10 x 10 x 120<br>12 x 12 x 120<br>16 x 16 x 120                   |

# CLASSIFICATION (INTERNAL)

| Name of Tool Holder                                                                                                                                                                                                      | Insert Shape                                                                      | Features                                                                                                                                                                                                                                                                                            | Shank Size<br>(Dia. x L x Min.<br>Cutting Dia.)<br>(mm)                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>MMTI</b><br><br> <b>G026</b>                        |  | <ul style="list-style-type: none"> <li>● Minimum cutting diameter 13mm.</li> <li>● Various insert types.</li> <li>● Precision class insert.</li> <li>● Available with a wiper cutting edge to provide a precise thread geometry.</li> <li>● Able to change lead angle by replacing shim.</li> </ul> | 16 x 125 x 13<br>16 x 150 x 15<br>20 x 170 x 24<br>25 x 200 x 29<br>32 x 250 x 37<br>40 x 300 x 46 |
| <b>MICRO-MINI TWIN<br/>CT TYPE</b><br><br> <b>G031</b> |  | <ul style="list-style-type: none"> <li>● Minimum cutting diameter 3mm.</li> <li>● Solid carbide type.</li> <li>● Economical two cutting edges type.</li> </ul>                                                                                                                                      | 3 x 50 x 3<br>3.5 x 60 x 4<br>4 x 60 x 4.5<br>4.5 x 70 x 5<br>5 x 70 x 6<br>6 x 75 x 7             |

# CROSS REFERENCE THREAD PITCH (EXTERNAL)

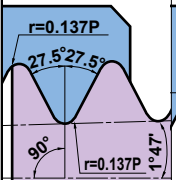
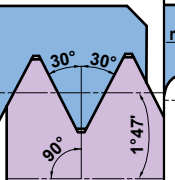
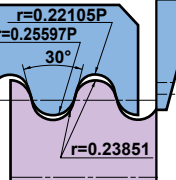
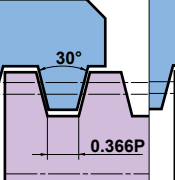
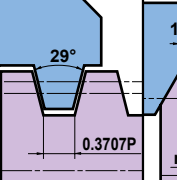
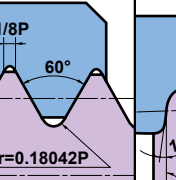
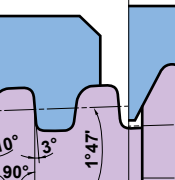
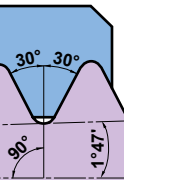
| Application                          |              | General machining      |                     |            |             | Pipe fittings and couplings for gas and water |                       |
|--------------------------------------|--------------|------------------------|---------------------|------------|-------------|-----------------------------------------------|-----------------------|
| Type                                 |              | Partial Profile 60°    | Partial Profile 55° | ISO Metric | American UN | Parallel Pipe Thread Whitworth for BSW, BSP   | American NPT          |
|                                      |              |                        |                     |            |             |                                               |                       |
| Symbol                               |              | M<br>UNC<br>UNF        | W                   | M          | UNC<br>UNF  | G(PF)<br>Rp(PS)<br>W                          | NPT                   |
| Pitch                                |              | mm<br>(thread/inch)    | thread/inch         | mm         | thread/inch | thread/inch                                   | thread/inch           |
| Holder                               |              |                        |                     |            |             |                                               |                       |
| <b>MMT Holder</b><br><br><b>G019</b> | Full form    | —                      | —                   | 0.5 – 5.0  | 32 – 5      | 28 – 5                                        | 27, 18, 14<br>11.5, 8 |
|                                      | Partial form | 0.5 – 5.0<br>(48 – 5)  | 48 – 5              | 0.5 – 5.0  | 48 – 5      | —                                             | —                     |
| <b>MT Holder</b><br><br><b>G024</b>  | Partial form | 0.25 – 4.5<br>(64 – 6) | 20 – 9              | 0.25 – 4.5 | 64 – 6      | —                                             | —                     |

|  | Steam, gas and water pipes                                                        |                                                                                   | Pipe couplings for food and fire fighting industries                              | Motion transmissions                                                              |                                                                                   | Aircraft and aerospace                                                             | Oil and gas                                                                         |                                                                                     |
|--|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Taper Pipe Thread BSPT                                                            | American NPTF                                                                     | Round DIN 405                                                                     | ISO Trapezoidal 30°                                                               | American ACME                                                                     | UNJ                                                                                | API Buttress Casing                                                                 | API Round Casing&Tubing                                                             |
|  |  |  |  |  |  |  |  |  |
|  | R(PT)<br>Rc(PT)<br>Rp                                                             | NPTF                                                                              | Rd                                                                                | Tr<br>(TM)                                                                        | ACME<br>(Tw)                                                                      | UNJ                                                                                | BCSG                                                                                | CSG<br>LCSG                                                                         |
|  | thread/inch                                                                       | thread/inch                                                                       | thread/inch                                                                       | mm                                                                                | thread/inch                                                                       | thread/inch                                                                        | thread/inch                                                                         | thread/inch                                                                         |
|  | 28, 19<br>14, 11                                                                  | 27, 18, 14<br>11.5, 8                                                             | 10, 8, 6, 4                                                                       | 1.5, 2<br>3, 4, 5                                                                 | 12, 10<br>8, 6, 5                                                                 | 32–8                                                                               | 5                                                                                   | 10, 8                                                                               |
|  | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                  | —                                                                                   | —                                                                                   |
|  | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                  | —                                                                                   | —                                                                                   |

# CROSS REFERENCE THREAD PITCH (INTERNAL)

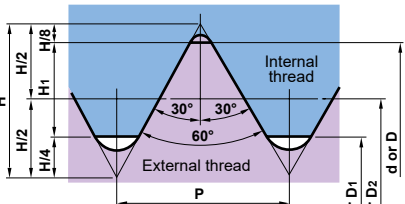
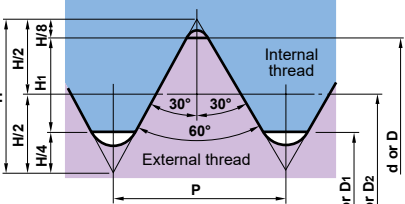
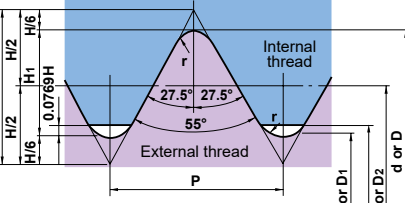
| Application                                                                                                                                                                                          |              | General machining       |                     |            |             | Pipe fittings and couplings for gas and water |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|---------------------|------------|-------------|-----------------------------------------------|-----------------------|
| Type                                                                                                                                                                                                 |              | Partial Profile 60°     | Partial Profile 55° | ISO Metric | American UN | Parallel Pipe Thread Whitworth for BSW, BSP   | American NPT          |
|                                                                                                                                                                                                      |              |                         |                     |            |             |                                               |                       |
| Symbol                                                                                                                                                                                               |              | M<br>UNC<br>UNF         | W                   | M          | UNC<br>UNF  | G(PF)<br>Rp(PS)<br>W                          | NPT                   |
| Pitch                                                                                                                                                                                                |              | mm<br>(thread/inch)     | thread/inch         | mm         | thread/inch | thread/inch                                   | thread/inch           |
| <b>MMT Boring Bar</b><br><br>    | Holder       |                         |                     |            |             |                                               |                       |
|                                                                                                                                                                                                      | Full form    | —                       | —                   | 0.5 – 5.0  | 32 – 5      | 28 – 5                                        | 27, 18, 14<br>11.5, 8 |
| <b>MICRO-MINI TWIN</b><br><br> | Partial form | 0.5 – 5.0<br>(48 – 5)   | 48 – 5              | 0.5 – 5.0  | 48 – 5      | —                                             | —                     |
|                                                                                                                                                                                                      | Partial form | 0.5 – 1.75<br>(36 – 16) | —                   | 0.5 – 1.75 | 36 – 16     | —                                             | —                     |



|  | Steam, gas and water pipes                                                        |                                                                                   | Pipe couplings for food and fire fighting industries                              | Motion transmissions                                                              |                                                                                   | Aircraft and aerospace                                                             | Oil and gas                                                                         |                                                                                     |
|--|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Taper Pipe Thread BSPT                                                            | American NPTF                                                                     | Round DIN 405                                                                     | ISO Trapezoidal 30°                                                               | American ACME                                                                     | UNJ                                                                                | API Buttress Casing                                                                 | API Round Casing&Tubing                                                             |
|  |  |  |  |  |  |  |  |  |
|  | R(PT)<br>Rc(PT)<br>Rp                                                             | NPTF                                                                              | Rd                                                                                | Tr (TM)                                                                           | ACME (Tw)                                                                         | UNJ                                                                                | BCSG                                                                                | CSG<br>LCSG                                                                         |
|  | thread/inch                                                                       | thread/inch                                                                       | thread/inch                                                                       | mm                                                                                | thread/inch                                                                       | thread/inch                                                                        | thread/inch                                                                         | thread/inch                                                                         |
|  | 19, 14, 11                                                                        | 14, 11.5, 8                                                                       | 10, 8<br>6, 4                                                                     | 1.5, 2<br>3, 4, 5                                                                 | 12, 10<br>8, 6, 5                                                                 | —                                                                                  | 5                                                                                   | 10, 8                                                                               |
|  | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | *<br>—                                                                             | —                                                                                   | —                                                                                   |
|  | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                 | —                                                                                  | —                                                                                   | —                                                                                   |

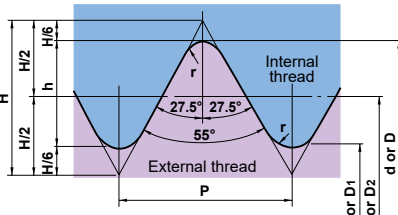
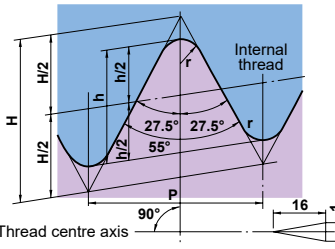
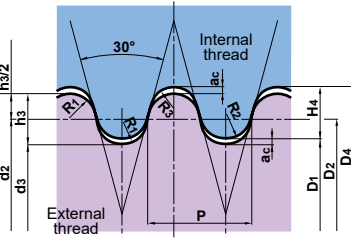
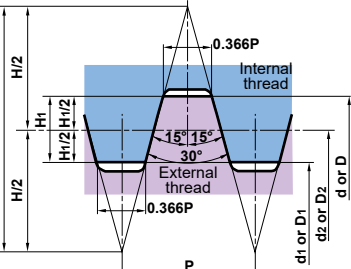
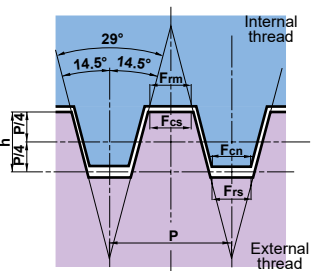
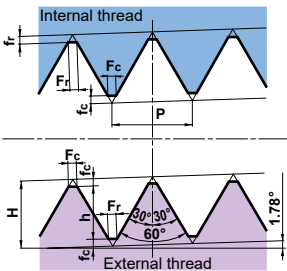
\* When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with American UN 60°. In this case, a full form type insert cannot be used.

# STANDARD THREAD AND CORRESPONDING INSERT / HOLDER

| Thread Name            | Standard Thread Type                                                                                                                                                                                                                                                                                                                                                                                   | Type       | Ext./Int. | Insert Number                               | Wiper/General | Tool Holder                                                                                     | Page |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|---------------------------------------------|---------------|-------------------------------------------------------------------------------------------------|------|
| ISO Metric             |  <p> <math>H=0.866025P</math> <math>d_2=d-0.649519P</math><br/> <math>H_1=0.541266P</math> <math>d_1=d-1.082532P</math><br/> <math>D=d</math> <math>D_2=d_2</math> <math>D_1=d_1</math> </p>                                                                                                                          | M          | Ext.      | MMT $\circ\circ$ ER $\circ\circ\circ$ ISO   | Wiper         | MMTER $\circ\circ\circ\circ\circ$ -C                                                            | G019 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ ISO-S | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 60    | General       |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 60-S  | General       |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            | Int.      | MTTR/L4360 $\circ\circ$                     | General       | MTHR/L $\circ\circ\circ\circ\circ$ 4<br>MT1R/L $\circ\circ\circ\circ\circ$ 4                    | G024 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ ISO   | Wiper         | MMTIR $\circ\circ$ A $\circ\circ\circ$ -SP $\circ$<br>MMTIR $\circ\circ$ A $\circ\circ\circ$ -C | G026 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ ISO-S | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ 60    | General       |                                                                                                 |      |
| American UN            |  <p> <math>H=0.866025 \times 25.4/n</math> <math>d_2=(d-0.649519/n) \times 25.4</math><br/> <math>H_1=0.541266 \times 25.4/n</math> <math>d_1=(d-1.082532/n) \times 25.4</math><br/> <math>d=(d) \times 25.4</math> <math>D=d</math> <math>D_2=d_2</math> <math>D_1=d_1</math> <math>P=25.4/\text{thread}</math> </p> | UNC<br>UNF | Ext.      | MMT $\circ\circ$ ER $\circ\circ\circ$ UN    | Wiper         | MMTER $\circ\circ\circ\circ\circ$ -C                                                            | G019 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ UN-S  | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 60    | General       |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 60-S  | General       | MTHR/L $\circ\circ\circ\circ\circ$ 4<br>MT1R/L $\circ\circ\circ\circ\circ$ 4                    | G024 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            | Int.      | MTTR/L4360 $\circ\circ$                     | General       | MMTIR $\circ\circ$ A $\circ\circ\circ$ -SP $\circ$<br>MMTIR $\circ\circ$ A $\circ\circ\circ$ -C | G026 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ UN    | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ UN-S  | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ 60    | General       |                                                                                                 |      |
| Whitworth for BSW, BSP |  <p> <math>H=0.9605P</math> <math>d_2=d-H_1</math> <math>d_1=d-2H_1</math> <math>r=0.1373P</math><br/> <math>H_1=0.6403P</math> <math>D_1=d_1+2 \times 0.0769H</math><br/> <math>D=d</math> <math>D_2=d_2</math> <math>D_1=d_1</math> <math>P=25.4/\text{thread}</math> </p>                                         | W          | Ext.      | MMT $\circ\circ$ ER $\circ\circ\circ$ W     | Wiper         | MMTER $\circ\circ\circ\circ\circ$ -C                                                            | G019 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ W-S   | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 55    | General       |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ ER $\circ\circ\circ$ 55-S  | General       | MTHR/L $\circ\circ\circ\circ\circ$ 4<br>MT1R/L $\circ\circ\circ\circ\circ$ 4                    | G024 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            | Int.      | MTTR/L4355 $\circ\circ$                     | General       | MMTIR $\circ\circ$ A $\circ\circ\circ$ -SP $\circ$<br>MMTIR $\circ\circ$ A $\circ\circ\circ$ -C | G026 |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ W     | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ W-S   | Wiper         |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ 55    | General       |                                                                                                 |      |
|                        |                                                                                                                                                                                                                                                                                                                                                                                                        |            |           | MMT $\circ\circ$ IR $\circ\circ\circ$ 55-S  | General       |                                                                                                 |      |

Wiper : Insert order number is determined by the selected pitch.

General : An insert is applicable to several pitch types.

| Thread Name          | Standard Thread Type                                                                                                                                                                                                                                                                                 | Type          | Ext./Int. | Insert Number                           | Wiper/General | Tool Holder                                                                                     | Page |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-----------------------------------------|---------------|-------------------------------------------------------------------------------------------------|------|
| Parallel Pipe Thread |  <p> <math>H=0.960491P</math> <math>d_2=d-h</math> <math>d_1=d-2h</math> <math>r=0.137329P</math><br/> <math>h=0.640327</math> <math>D=d</math> <math>D_2=d_2</math> <math>D_1=d_1</math> 25.4/ thread         </p> | PF<br>G<br>Rp | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ W      | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               |           | MMT $\odot\odot$ ER $\odot\odot$ W-S    | Wiper         |                                                                                                 |      |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ W      | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |
|                      |                                                                                                                                                                                                                                                                                                      |               |           | MMT $\odot\odot$ IR $\odot\odot$ W-S    | Wiper         |                                                                                                 |      |
| BSPT                 |  <p> <math>H=0.960237P</math> <math>h=0.640327</math> <math>r=0.137278P</math> <math>P=25.4/\text{thread}</math> </p>                                                                                               | BSPT          | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ BSPT   | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               |           | MMT $\odot\odot$ ER $\odot\odot$ BSPT-S | Wiper         |                                                                                                 |      |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ BSPT   | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |
|                      |                                                                                                                                                                                                                                                                                                      |               |           | MMT $\odot\odot$ IR $\odot\odot$ BSPT-S | Wiper         |                                                                                                 |      |
| Round DIN 405        |  <p> <math>a_c=0.05 \times P</math> <math>h_3=H_4=0.5 \times P</math><br/> <math>R_1=0.238507 \times P</math> <math>R_2=0.255967 \times P</math> <math>R_3=0.221047 \times P</math> </p>                           | Rd            | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ RD     | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ RD     | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |
| ISO Trapezoidal 30°  |                                                                                                                                                                                                                   | Tr            | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ TR     | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ TR     | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |
| American ACME        |                                                                                                                                                                                                                   | ACME          | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ ACME   | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ TACME  | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |
| American NPT         |  <p> <math>H=0.866025P</math> <math>h=0.800000P</math> </p>                                                                                                                                                       | NPT           | Ext.      | MMT $\odot\odot$ ER $\odot\odot$ NPT    | Wiper         | MMTER $\odot\odot\odot\odot\odot\odot$ -C                                                       | G019 |
|                      |                                                                                                                                                                                                                                                                                                      |               | Int.      | MMT $\odot\odot$ IR $\odot\odot$ NPT    | Wiper         | MMTIR $\odot\odot$ A $\odot\odot\odot$ -SP $\odot$<br>MMTIR $\odot\odot$ A $\odot\odot\odot$ -C | G026 |

Wiper : Insert order number is determined by the selected pitch.

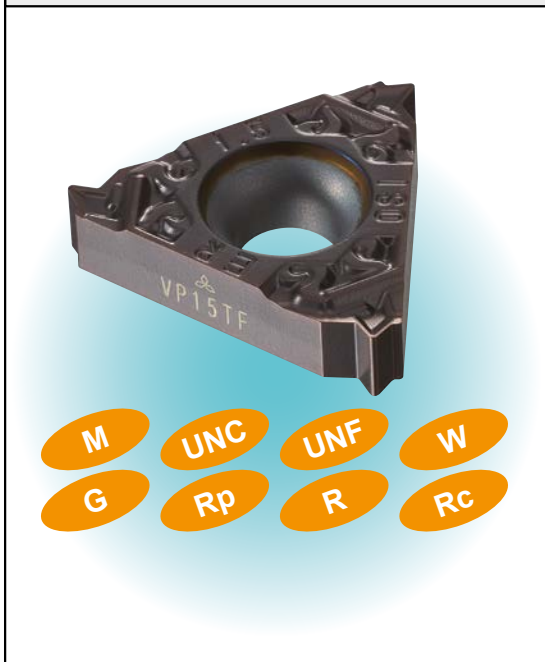
General : An insert is applicable to several pitch types.

# FEATURES OF MMT SERIES

## ■ A WIDE VARIETY OF PRODUCTS

Mitsubishi Materials Threading (MMT) series.

### M-CLASS INSERTS WITH 3-D CHIPBREAKERS

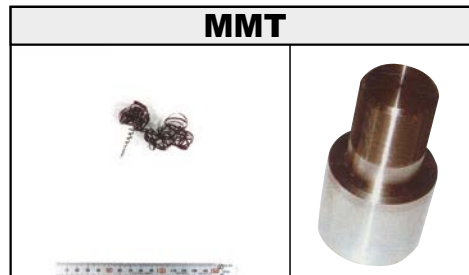
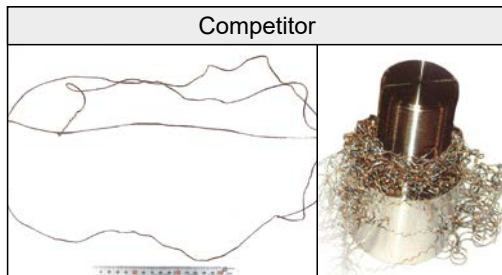


### G-CLASS GROUND INSERTS



## ■ IDEAL CHIP CONTROL EVEN DURING THE LATTER HALF OF PASSES WHEN CONTINUOUS CHIPS ARE USUALLY PRODUCED. (M-CLASS INSERTS WITH 3-D CHIPBREAKERS)

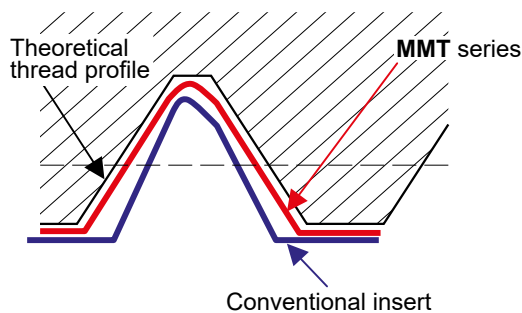
ISO metric external thread pitch 1.5mm Final pass (6th pass)



<Cutting Conditions>

Material : DIN 41CrMo4  
Insert : MMT16ER150ISO-S  
Grade : VP15TF  
Cutting speed : 120m/min  
Cutting method : Radial Infeed  
Depth of cut : Fixed cut area  
Pass : 6 times  
Coolant : Wet

## ■ A HIGHER LEVEL OF PRECISION THAN CONVENTIONAL INSERTS (G-CLASS GROUND INSERTS)

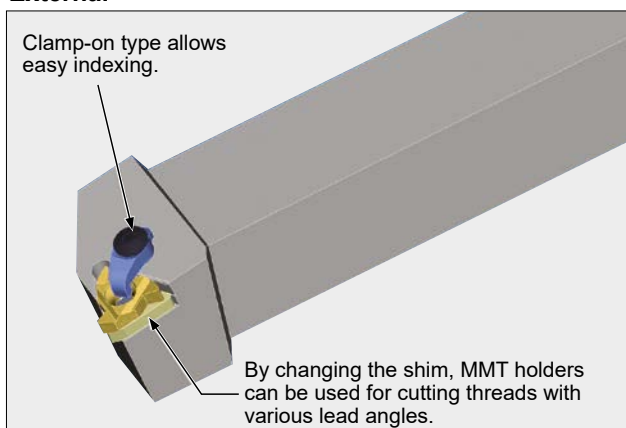


High precision threading can be achieved by using MMT inserts that feature a ground rake faces and peripheral cutting edges.

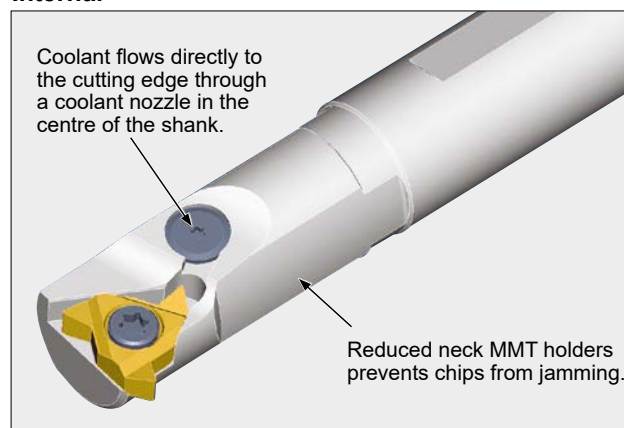
| Thread Type                 | Threading Tolerance |
|-----------------------------|---------------------|
| ISO Metric                  | 6g / 6H             |
| American UN                 | 2A / 2B             |
| Whitworth for BSW, BSP      | Medium Class A      |
| BSPT                        | Standard BSPT       |
| Round DIN 405               | 7h / 7H             |
| ISO Trapezoidal 30°         | 7e / 7H             |
| American ACME               | 3G                  |
| UNJ                         | 3A                  |
| API Buttress Casing         | Standard API        |
| API Rounded Casing & Tubing | Standard API RD     |
| American NPT                | Standard NPT        |
| American NPTF               | Class2              |

## ■ HOLDER (Use of special surface treatment)

### External

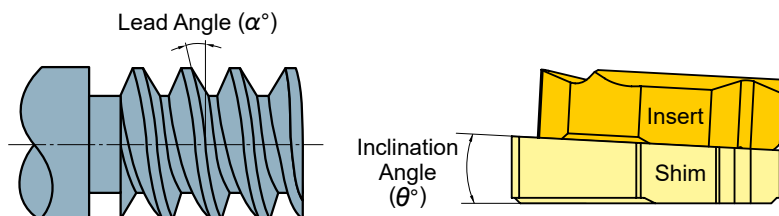


### Internal



★ Order number of coolant guide screw: TFS03006  
(Except MMTIR1316/MMTIR1516)

## ■ SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE



By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads.

| Lead Angle ( $\alpha^\circ$ ) | Inclination Angle ( $\theta^\circ$ ) |
|-------------------------------|--------------------------------------|
| -1.5°                         | -3°                                  |
| -0.5°                         | -2°                                  |
| 0.5°                          | -1°                                  |
| 1.5°                          | 0°                                   |
| 2.5°                          | 1°                                   |
| 3.5°                          | 2°                                   |
| 4.5°                          | 3°                                   |

Standard shim delivered with the holder.

## ■ GRADE

### VP10MF (G-class ground inserts only)

#### ● Superior wear and plastic deformation resistance

- High wear and plastic deformation resistance for threading when maintaining the thread form is important. Suitable for continuous high precision machining with extensive tool life.
- Effective in combination with G-class inserts for high precision threading.

### VP15TF (G-class ground inserts, M-class inserts with 3-D chipbreakers)

#### ● Wide versatility

- High fracture resistance during low rigidity applications such as bar feed machining. Able to withstand harsh conditions for long periods where conventional inserts would be liable to breakage.
- Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

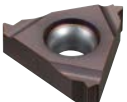
### VP20RT (M-class inserts with 3-D chipbreakers)

#### ● Excellent fracture resistance

- Suitable for stainless steel boring and unstable machining where inserts are vulnerable to fracturing.
- Effective combination of high cost performance M-class inserts with 3-D chipbreakers.

## ■ CHOOSING M-CLASS INSERTS WITH 3-D CHIPBREAKERS OR G-CLASS INSERTS

| Insert                                                                                                                       | Chip control | Precision of thread |
|------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------|
| M-class inserts with 3-D chipbreakers<br> | ◎            | ○                   |

| Insert                                                                                                 | Chip control | Precision of thread |
|--------------------------------------------------------------------------------------------------------|--------------|---------------------|
| G-class inserts<br> | ○            | ◎                   |

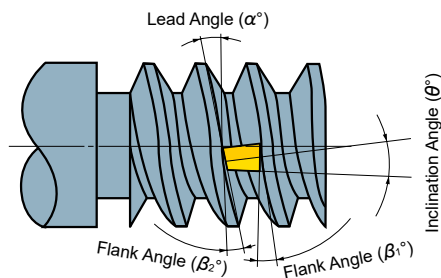
- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chipbreakers are recommended.
- G-class inserts are recommended where higher precision is required.

# CUTTING CONDITIONS OF MMT SERIES

## SELECTING A SHIM FOR THE MMT SERIES

### FLANK ANGLE AND LEAD ANGLE

Lead angle ( $\alpha$ ) depends on a combination of thread diameter and pitch. Select a shim so that the lead angle of the thread can coincide with the flank angles of the thread and insert ( $\beta_1, \beta_2$ ). No need to change a shim for general threading with an MMT holder. When threading with a small diameter or large pitch, change the shim depending on the lead angle, referring to the table and graph below. When threading left hand threads, change to a shim with a negative inclination angle.



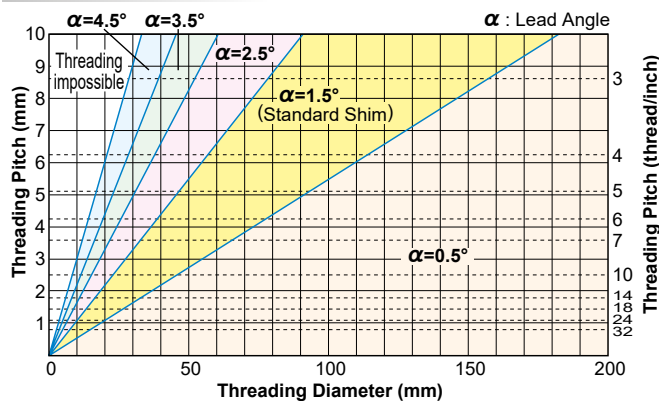
### SHIM REFERENCE TABLE (THREADING DIAMETER) (Thread angle 60° and 55°)

| Lead Angle<br>Pitch (mm) | Right Hand Thread (mm) |                                   |                                   |                                   |                                   |                       | Left Hand Thread (mm) * |                                   |                       |
|--------------------------|------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------|-----------------------------------|-----------------------|
|                          | Threading impossible   | 4.5°                              | 3.5°                              | 2.5°                              | 1.5°                              | 0.5°                  | Threading impossible    | -1.5°                             | -0.5°                 |
| 0.5                      | $\leq \emptyset 1.7$   | $\emptyset 1.7 - \emptyset 2.3$   | $\emptyset 2.3 - \emptyset 3.0$   | $\emptyset 3.0 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 9.1$   | $\geq \emptyset 9.1$  | $\leq \emptyset 3.6$    | $\emptyset 3.6 - \emptyset 9.1$   | $\geq \emptyset 9.1$  |
| 0.75                     | $\leq \emptyset 2.5$   | $\emptyset 2.5 - \emptyset 3.4$   | $\emptyset 3.4 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 6.8$   | $\emptyset 6.8 - \emptyset 13.7$  | $\geq \emptyset 13.7$ | $\leq \emptyset 5.5$    | $\emptyset 5.5 - \emptyset 13.7$  | $\geq \emptyset 13.7$ |
| 1                        | $\leq \emptyset 3.3$   | $\emptyset 3.3 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 6.1$   | $\emptyset 6.1 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 18.2$  | $\geq \emptyset 18.2$ | $\leq \emptyset 7.3$    | $\emptyset 7.3 - \emptyset 18.2$  | $\geq \emptyset 18.2$ |
| 1.25                     | $\leq \emptyset 4.1$   | $\emptyset 4.1 - \emptyset 5.7$   | $\emptyset 5.7 - \emptyset 7.6$   | $\emptyset 7.6 - \emptyset 11.4$  | $\emptyset 11.4 - \emptyset 22.8$ | $\geq \emptyset 22.8$ | $\leq \emptyset 9.1$    | $\emptyset 9.1 - \emptyset 22.8$  | $\geq \emptyset 22.8$ |
| 1.5                      | $\leq \emptyset 5.0$   | $\emptyset 5.0 - \emptyset 6.8$   | $\emptyset 6.8 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 13.7$  | $\emptyset 13.7 - \emptyset 27.4$ | $\geq \emptyset 27.4$ | $\leq \emptyset 10.9$   | $\emptyset 10.9 - \emptyset 27.4$ | $\geq \emptyset 27.4$ |
| 1.75                     | $\leq \emptyset 5.8$   | $\emptyset 5.8 - \emptyset 8.0$   | $\emptyset 8.0 - \emptyset 10.6$  | $\emptyset 10.6 - \emptyset 16.0$ | $\emptyset 16.0 - \emptyset 31.9$ | $\geq \emptyset 31.9$ | $\leq \emptyset 12.8$   | $\emptyset 12.8 - \emptyset 31.9$ | $\geq \emptyset 31.9$ |
| 2                        | $\leq \emptyset 6.6$   | $\emptyset 6.6 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 12.1$  | $\emptyset 12.1 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 36.5$ | $\geq \emptyset 36.5$ | $\leq \emptyset 14.6$   | $\emptyset 14.6 - \emptyset 36.5$ | $\geq \emptyset 36.5$ |
| 2.5                      | $\leq \emptyset 8.3$   | $\emptyset 8.3 - \emptyset 11.4$  | $\emptyset 11.4 - \emptyset 15.2$ | $\emptyset 15.2 - \emptyset 22.8$ | $\emptyset 22.8 - \emptyset 45.6$ | $\geq \emptyset 45.6$ | $\leq \emptyset 18.2$   | $\emptyset 18.2 - \emptyset 45.6$ | $\geq \emptyset 45.6$ |
| 3                        | $\leq \emptyset 9.9$   | $\emptyset 9.9 - \emptyset 13.7$  | $\emptyset 13.7 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 27.3$ | $\emptyset 27.3 - \emptyset 54.7$ | $\geq \emptyset 54.7$ | $\leq \emptyset 21.9$   | $\emptyset 21.9 - \emptyset 54.7$ | $\geq \emptyset 54.7$ |
| 3.5                      | $\leq \emptyset 11.6$  | $\emptyset 11.6 - \emptyset 15.9$ | $\emptyset 15.9 - \emptyset 21.3$ | $\emptyset 21.3 - \emptyset 31.9$ | $\emptyset 31.9 - \emptyset 63.8$ | $\geq \emptyset 63.8$ | $\leq \emptyset 25.5$   | $\emptyset 25.5 - \emptyset 63.8$ | $\geq \emptyset 63.8$ |
| 4                        | $\leq \emptyset 13.2$  | $\emptyset 13.2 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 24.3$ | $\emptyset 24.3 - \emptyset 36.5$ | $\emptyset 36.5 - \emptyset 72.9$ | $\geq \emptyset 72.9$ | $\leq \emptyset 29.2$   | $\emptyset 29.2 - \emptyset 72.9$ | $\geq \emptyset 72.9$ |
| 4.5                      | $\leq \emptyset 14.9$  | $\emptyset 14.9 - \emptyset 20.5$ | $\emptyset 20.5 - \emptyset 27.3$ | $\emptyset 27.3 - \emptyset 41.0$ | $\emptyset 41.0 - \emptyset 82.1$ | $\geq \emptyset 82.1$ | $\leq \emptyset 32.8$   | $\emptyset 32.8 - \emptyset 82.1$ | $\geq \emptyset 82.1$ |
| 5                        | $\leq \emptyset 16.5$  | $\emptyset 16.5 - \emptyset 22.8$ | $\emptyset 22.8 - \emptyset 30.4$ | $\emptyset 30.4 - \emptyset 45.6$ | $\emptyset 45.6 - \emptyset 91.2$ | $\geq \emptyset 91.2$ | $\leq \emptyset 36.5$   | $\emptyset 36.5 - \emptyset 91.2$ | $\geq \emptyset 91.2$ |

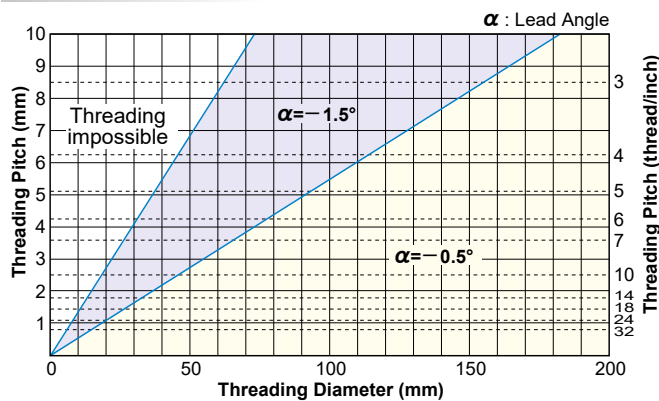
\* Back turning in the case of left hand threads.

### SHIM REFERENCE GRAPH (Thread angle 60° and 55°)

#### Right Hand Thread



#### Left Hand Thread



Note 1) When a thread lead angle  $\leq$  the tool flank angle, change the shim to prevent side interference with the insert.  
(Refer to the table on page G013 for the calculation of thread lead angle and tool flank angle.)

### SHIM REFERENCE TABLE (THREADING DIAMETER) (Thread angle 30° and 29°)

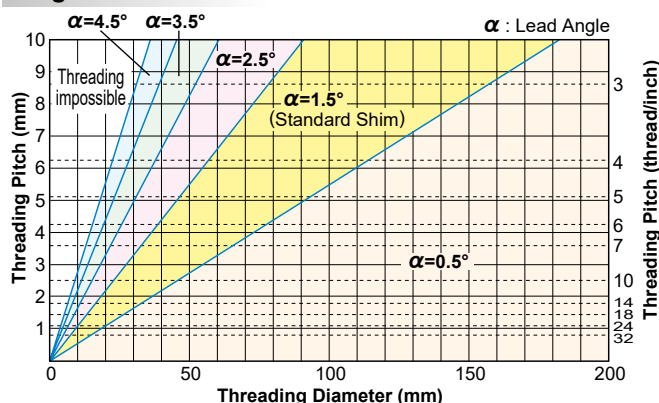
| Lead Angle<br>Pitch (mm) | Right Hand Thread (mm) |                                   |                                   |                                   |                                   |                       | Left Hand Thread (mm) * |                                   |                       |
|--------------------------|------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------|-------------------------|-----------------------------------|-----------------------|
|                          | Threading impossible   | 4.5°                              | 3.5°                              | 2.5°                              | 1.5°                              | 0.5°                  | Threading impossible    | -1.5°                             | -0.5°                 |
| 0.5                      | $\leq \emptyset 1.8$   | $\emptyset 1.8 - \emptyset 2.3$   | $\emptyset 2.3 - \emptyset 3.0$   | $\emptyset 3.0 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 9.1$   | $\geq \emptyset 9.1$  | $\leq \emptyset 4.6$    | $\emptyset 4.6 - \emptyset 9.1$   | $\geq \emptyset 9.1$  |
| 0.75                     | $\leq \emptyset 2.7$   | $\emptyset 2.7 - \emptyset 3.4$   | $\emptyset 3.4 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 6.8$   | $\emptyset 6.8 - \emptyset 13.7$  | $\geq \emptyset 13.7$ | $\leq \emptyset 6.8$    | $\emptyset 6.8 - \emptyset 13.7$  | $\geq \emptyset 13.7$ |
| 1                        | $\leq \emptyset 3.6$   | $\emptyset 3.6 - \emptyset 4.6$   | $\emptyset 4.6 - \emptyset 6.1$   | $\emptyset 6.1 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 18.2$  | $\geq \emptyset 18.2$ | $\leq \emptyset 9.1$    | $\emptyset 9.1 - \emptyset 18.2$  | $\geq \emptyset 18.2$ |
| 1.25                     | $\leq \emptyset 4.5$   | $\emptyset 4.5 - \emptyset 5.7$   | $\emptyset 5.7 - \emptyset 7.6$   | $\emptyset 7.6 - \emptyset 11.4$  | $\emptyset 11.4 - \emptyset 22.8$ | $\geq \emptyset 22.8$ | $\leq \emptyset 11.4$   | $\emptyset 11.4 - \emptyset 22.8$ | $\geq \emptyset 22.8$ |
| 1.5                      | $\leq \emptyset 5.5$   | $\emptyset 5.5 - \emptyset 6.8$   | $\emptyset 6.8 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 13.7$  | $\emptyset 13.7 - \emptyset 27.4$ | $\geq \emptyset 27.4$ | $\leq \emptyset 13.7$   | $\emptyset 13.7 - \emptyset 27.4$ | $\geq \emptyset 27.4$ |
| 1.75                     | $\leq \emptyset 6.4$   | $\emptyset 6.4 - \emptyset 8.0$   | $\emptyset 8.0 - \emptyset 10.6$  | $\emptyset 10.6 - \emptyset 16.0$ | $\emptyset 16.0 - \emptyset 31.9$ | $\geq \emptyset 31.9$ | $\leq \emptyset 16.0$   | $\emptyset 16.0 - \emptyset 31.9$ | $\geq \emptyset 31.9$ |
| 2                        | $\leq \emptyset 7.3$   | $\emptyset 7.3 - \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 12.1$  | $\emptyset 12.1 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 36.5$ | $\geq \emptyset 36.5$ | $\leq \emptyset 18.2$   | $\emptyset 18.2 - \emptyset 36.5$ | $\geq \emptyset 36.5$ |
| 2.5                      | $\leq \emptyset 9.1$   | $\emptyset 9.1 - \emptyset 11.4$  | $\emptyset 11.4 - \emptyset 15.2$ | $\emptyset 15.2 - \emptyset 22.8$ | $\emptyset 22.8 - \emptyset 45.6$ | $\geq \emptyset 45.6$ | $\leq \emptyset 22.8$   | $\emptyset 22.8 - \emptyset 45.6$ | $\geq \emptyset 45.6$ |
| 3                        | $\leq \emptyset 10.9$  | $\emptyset 10.9 - \emptyset 13.7$ | $\emptyset 13.7 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 27.3$ | $\emptyset 27.3 - \emptyset 54.7$ | $\geq \emptyset 54.7$ | $\leq \emptyset 27.3$   | $\emptyset 27.3 - \emptyset 54.7$ | $\geq \emptyset 54.7$ |
| 3.5                      | $\leq \emptyset 12.7$  | $\emptyset 12.7 - \emptyset 15.9$ | $\emptyset 15.9 - \emptyset 21.3$ | $\emptyset 21.3 - \emptyset 31.9$ | $\emptyset 31.9 - \emptyset 63.8$ | $\geq \emptyset 63.8$ | $\leq \emptyset 31.9$   | $\emptyset 31.9 - \emptyset 63.8$ | $\geq \emptyset 63.8$ |
| 4                        | $\leq \emptyset 14.6$  | $\emptyset 14.6 - \emptyset 18.2$ | $\emptyset 18.2 - \emptyset 24.3$ | $\emptyset 24.3 - \emptyset 36.5$ | $\emptyset 36.5 - \emptyset 72.9$ | $\geq \emptyset 72.9$ | $\leq \emptyset 36.5$   | $\emptyset 36.5 - \emptyset 72.9$ | $\geq \emptyset 72.9$ |
| 4.5                      | $\leq \emptyset 16.4$  | $\emptyset 16.4 - \emptyset 20.5$ | $\emptyset 20.5 - \emptyset 27.3$ | $\emptyset 27.3 - \emptyset 41.0$ | $\emptyset 41.0 - \emptyset 82.1$ | $\geq \emptyset 82.1$ | $\leq \emptyset 41.0$   | $\emptyset 41.0 - \emptyset 82.1$ | $\geq \emptyset 82.1$ |
| 5                        | $\leq \emptyset 18.2$  | $\emptyset 18.2 - \emptyset 22.8$ | $\emptyset 22.8 - \emptyset 30.4$ | $\emptyset 30.4 - \emptyset 45.6$ | $\emptyset 45.6 - \emptyset 91.2$ | $\geq \emptyset 91.2$ | $\leq \emptyset 45.6$   | $\emptyset 45.6 - \emptyset 91.2$ | $\geq \emptyset 91.2$ |

\* Back turning in the case of left hand threads.

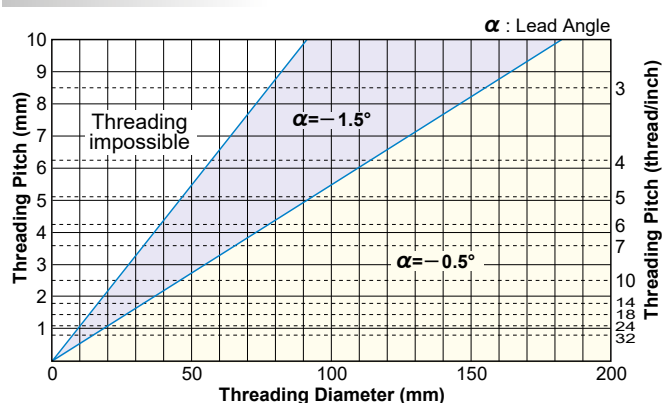


## SHIM REFERENCE GRAPH (Thread angle 30° and 29°)

### Right Hand Thread



### Left Hand Thread



Note 1) When a thread lead angle  $\leq$  the tool flank angle, change the shim to prevent side interference with the insert.  
(Refer to the table below for the calculation of thread lead angle and tool flank angle.)

## SELECTION TABLE

| Lead Angle | Opening angle 60°/55°<br>Right Hand Thread |            | Opening angle 60°/55°<br>Left Hand Thread * |            | Opening angle 30°/29°<br>Right Hand Thread |            | Opening angle 30°/29°<br>Left Hand Thread * |            |
|------------|--------------------------------------------|------------|---------------------------------------------|------------|--------------------------------------------|------------|---------------------------------------------|------------|
| 0          | P05                                        | P05        | N05                                         | N05        | P05                                        | P05        | N05                                         | N05        |
| 0.5        | P05                                        | P05        | N05                                         | N05        | P05                                        | P05        | N05                                         | N05        |
| 1          | P15                                        | P15        | N15                                         | N15        | P15                                        | P15        | N15                                         | N15        |
| 1.5        | P15                                        | P15        | N15                                         | N15        | P15                                        | P15        | N15                                         | N15        |
| 2          | P25                                        | P25        | N15                                         | N15        | P25                                        | P25        | Compatible                                  | Compatible |
| 2.5        | P25                                        | P25        | Compatible                                  | Compatible | P25                                        | P25        | Compatible                                  | Compatible |
| 3          | P35                                        | P35        | Compatible                                  | Compatible | P35                                        | P35        | Compatible                                  | Compatible |
| 3.5        | P35                                        | P35        | Compatible                                  | Compatible | P35                                        | P35        | Compatible                                  | Compatible |
| 4          | P45                                        | P45        | Compatible                                  | Compatible | P45                                        | P45        | Compatible                                  | Compatible |
| 4.5        | P45                                        | P45        | Compatible                                  | Compatible | P45                                        | P45        | Compatible                                  | Compatible |
| 5          | P45                                        | P45        | Compatible                                  | Compatible | Compatible                                 | Compatible | Compatible                                  | Compatible |
| 5.5        | Compatible                                 | Compatible | Compatible                                  | Compatible | Compatible                                 | Compatible | Compatible                                  | Compatible |

\* Back turning in the case of left hand threads.

When replacing a shim, check if the difference between the thread lead angle and shim inclination angle is within:

2.5° – 0.5° where thread helix angle is 60° (55°)

2° – 1° where thread helix angle is 30° (29°)

\* Inclination angle of a standard shim is 0°.

\* The holder has a 1.5° lead angle.

## CALCULATION OF THREAD LEAD ANGLE

$$\tan \alpha = \frac{l}{\pi d} = \frac{nP}{\pi d}$$

$\alpha$  : Lead angle

$l$  : Lead

$n$  : Number of threads

$P$  : Pitch

$d$  : Effective diameter of thread

## EXAMPLE OF SELECTING A SHIM

- When the thread lead angle is 2.2°

① In the case when the thread helix angle is 60°

(2.2° lead angle) – (2.5° – 0.5°) = -0.3° – 1.7° shim inclination angle is appropriate.

Threading with a standard shim (0° inclination angle) is possible. But, replacing with a shim with a 1° inclination angle is recommended, refer to the Standard Shim List on pages G019 and G026.

② In the case when the thread helix angle is 30°

(2.2° lead angle) – (2° – 1°) = -0.2° – 1.2° shim inclination angle is appropriate.

Replacing with a shim with a 1° inclination angle is recommended, referring to the Standard Shim List on pages G019 and G026.

## RELIEF ANGLE OF AN INSERT SET ON A HOLDER

| Thread Helix Angle | Internal Relief Angle | External Relief Angle |
|--------------------|-----------------------|-----------------------|
| 60°                | 8.8°                  | 5.8°                  |
| 55°                | 7.9°                  | 5.2°                  |
| 30°                | 4.1°                  | 2.7°                  |
| 29°                | 4°                    | 2.6°                  |

- Relief angles ( $\beta_2$ ,  $\beta_1$ ) of an insert become small when the thread helix angle of a trapezoidal, round, or other thread is small. Take care when selecting a shim.



# THREADING

## STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFED)

### ISO Metric

| Pitch (mm) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |                                       |
|------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|---------------------------------------|
|            |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts | M-class inserts with 3-D chipbreakers |
| 0.5        | 0.31                | 0.10             | 0.08 | 0.07 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT16ER050ISO          | —                                     |
| 0.75       | 0.46                | 0.16             | 0.14 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT16ER075ISO          | —                                     |
| 1.0        | 0.61                | 0.18             | 0.15 | 0.12 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER100ISO          | MMT16ER100ISO-S                       |
| 1.25       | 0.77                | 0.19             | 0.17 | 0.14 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER125ISO          | MMT16ER125ISO-S                       |
| 1.5        | 0.92                | 0.22             | 0.21 | 0.17 | 0.14 | 0.12 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER150ISO          | MMT16ER150ISO-S                       |
| 1.75       | 1.07                | 0.22             | 0.21 | 0.16 | 0.13 | 0.11 | 0.09 | 0.09 | 0.06 |      |      |      |      |      |      | MMT16ER175ISO          | MMT16ER175ISO-S                       |
| 2.0        | 1.23                | 0.24             | 0.23 | 0.17 | 0.16 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | MMT16ER200ISO          | MMT16ER200ISO-S                       |
| 2.5        | 1.53                | 0.26             | 0.23 | 0.19 | 0.17 | 0.15 | 0.13 | 0.12 | 0.11 | 0.11 | 0.06 |      |      |      |      | MMT16ER250ISO          | MMT16ER250ISO-S                       |
| 3.0        | 1.84                | 0.27             | 0.25 | 0.20 | 0.18 | 0.16 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.10 | 0.06 |      |      | MMT16ER300ISO          | MMT16ER300ISO-S                       |
| 3.5        | 2.15                | 0.33             | 0.30 | 0.24 | 0.21 | 0.18 | 0.17 | 0.15 | 0.14 | 0.14 | 0.12 | 0.11 | 0.06 |      |      | MMT22ER350ISO          | —                                     |
| 4.0        | 2.45                | 0.34             | 0.31 | 0.24 | 0.22 | 0.19 | 0.17 | 0.16 | 0.14 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.06 | MMT22ER400ISO          | —                                     |
| 4.5        | 2.76                | 0.38             | 0.34 | 0.28 | 0.24 | 0.22 | 0.20 | 0.18 | 0.16 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22ER450ISO          | —                                     |
| 5.0        | 3.07                | 0.42             | 0.38 | 0.32 | 0.27 | 0.24 | 0.22 | 0.20 | 0.18 | 0.18 | 0.17 | 0.16 | 0.15 | 0.12 | 0.06 | MMT22ER500ISO          | —                                     |

### American UN

| Pitch (thread/inch) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |                                       |
|---------------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|---------------------------------------|
|                     |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts | M-class inserts with 3-D chipbreakers |
| 32                  | 0.49                | 0.17             | 0.15 | 0.11 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT16ER320UN           | —                                     |
| 28                  | 0.56                | 0.17             | 0.14 | 0.10 | 0.09 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER280UN           | —                                     |
| 24                  | 0.65                | 0.18             | 0.16 | 0.14 | 0.11 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER240UN           | —                                     |
| 20                  | 0.78                | 0.20             | 0.18 | 0.13 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER200UN           | —                                     |
| 18                  | 0.87                | 0.22             | 0.20 | 0.15 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER180UN           | —                                     |
| 16                  | 0.97                | 0.22             | 0.20 | 0.15 | 0.12 | 0.11 | 0.11 | 0.06 |      |      |      |      |      |      |      | MMT16ER160UN           | MMT16ER160UN-S                        |
| 14                  | 1.11                | 0.23             | 0.21 | 0.16 | 0.13 | 0.11 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      | MMT16ER140UN           | MMT16ER140UN-S                        |
| 13                  | 1.20                | 0.25             | 0.22 | 0.17 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | MMT16ER130UN           | —                                     |
| 12                  | 1.30                | 0.28             | 0.23 | 0.18 | 0.16 | 0.14 | 0.13 | 0.12 | 0.06 |      |      |      |      |      |      | MMT16ER120UN           | MMT16ER120UN-S                        |
| 11                  | 1.42                | 0.28             | 0.23 | 0.19 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      |      | MMT16ER110UN           | —                                     |
| 10                  | 1.56                | 0.28             | 0.24 | 0.19 | 0.16 | 0.14 | 0.13 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      | MMT16ER100UN           | —                                     |
| 9                   | 1.73                | 0.34             | 0.29 | 0.22 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      | MMT16ER090UN           | —                                     |
| 8                   | 1.95                | 0.35             | 0.30 | 0.24 | 0.19 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      | MMT16ER080UN           | —                                     |
| 7                   | 2.22                | 0.37             | 0.33 | 0.28 | 0.24 | 0.20 | 0.17 | 0.16 | 0.15 | 0.14 | 0.12 | 0.06 |      |      |      | MMT22ER070UN           | —                                     |
| 6                   | 2.60                | 0.42             | 0.35 | 0.29 | 0.25 | 0.21 | 0.18 | 0.17 | 0.16 | 0.15 | 0.13 | 0.12 | 0.11 | 0.06 |      | MMT22ER060UN           | —                                     |
| 5                   | 3.12                | 0.43             | 0.39 | 0.31 | 0.27 | 0.24 | 0.22 | 0.20 | 0.19 | 0.19 | 0.18 | 0.17 | 0.15 | 0.12 | 0.06 | MMT22ER050UN           | —                                     |

### Whitworth for BSW, BSP

| Pitch (thread/inch) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |                                       |
|---------------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|---------------------------------------|
|                     |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts | M-class inserts with 3-D chipbreakers |
| 28                  | 0.58                | 0.17             | 0.14 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER280W            | —                                     |
| 26                  | 0.63                | 0.18             | 0.15 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER260W            | —                                     |
| 20                  | 0.81                | 0.20             | 0.18 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER200W            | —                                     |
| 19                  | 0.86                | 0.21             | 0.19 | 0.15 | 0.13 | 0.12 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER190W            | MMT16ER190W-S                         |
| 18                  | 0.90                | 0.25             | 0.19 | 0.15 | 0.13 | 0.12 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER180W            | —                                     |
| 16                  | 1.02                | 0.21             | 0.18 | 0.15 | 0.13 | 0.11 | 0.09 | 0.09 | 0.06 |      |      |      |      |      |      | MMT16ER160W            | —                                     |
| 14                  | 1.16                | 0.23             | 0.21 | 0.17 | 0.14 | 0.12 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | MMT16ER140W            | MMT16ER140W-S                         |
| 12                  | 1.36                | 0.27             | 0.25 | 0.20 | 0.16 | 0.15 | 0.14 | 0.13 | 0.06 |      |      |      |      |      |      | MMT16ER120W            | —                                     |
| 11                  | 1.48                | 0.27             | 0.24 | 0.20 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 |      |      |      |      |      | MMT16ER110W            | MMT16ER110W-S                         |
| 10                  | 1.63                | 0.27             | 0.25 | 0.20 | 0.17 | 0.15 | 0.15 | 0.13 | 0.13 | 0.12 | 0.06 |      |      |      |      | MMT16ER100W            | —                                     |
| 9                   | 1.81                | 0.28             | 0.26 | 0.21 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.06 |      |      |      | MMT16ER090W            | —                                     |
| 8                   | 2.03                | 0.30             | 0.27 | 0.22 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.06 |      |      | MMT16ER080W            | —                                     |
| 7                   | 2.32                | 0.34             | 0.32 | 0.26 | 0.22 | 0.20 | 0.18 | 0.17 | 0.16 | 0.15 | 0.14 | 0.12 | 0.06 |      |      | MMT22ER070W            | —                                     |
| 6                   | 2.71                | 0.35             | 0.33 | 0.27 | 0.23 | 0.21 | 0.20 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22ER060W            | —                                     |
| 5                   | 3.25                | 0.42             | 0.40 | 0.35 | 0.29 | 0.26 | 0.24 | 0.22 | 0.20 | 0.19 | 0.18 | 0.17 | 0.15 | 0.12 | 0.06 | MMT22ER050W            | —                                     |

### BSPT

| Pitch (thread/inch) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |  |  |  |  |  | Insert Type            |                                       |
|---------------------|---------------------|------------------|------|------|------|------|------|------|------|------|--|--|--|--|--|------------------------|---------------------------------------|
|                     |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |  |  |  |  |  | G-class ground inserts | M-class inserts with 3-D chipbreakers |
| 28                  | 0.58                | 0.17             | 0.14 | 0.11 | 0.10 | 0.06 |      |      |      |      |  |  |  |  |  | MMT16ER280BSPT         | —                                     |
| 19                  | 0.86                | 0.22             | 0.19 | 0.15 | 0.12 | 0.12 | 0.06 |      |      |      |  |  |  |  |  | MMT16ER190BSPT         | MMT16ER190BSPT-S                      |
| 14                  | 1.16                | 0.24             | 0.20 | 0.17 | 0.14 | 0.12 | 0.12 | 0.11 | 0.06 |      |  |  |  |  |  | MMT16ER140BSPT         | MMT16ER140BSPT-S                      |
| 11                  | 1.48                | 0.25             | 0.23 | 0.21 | 0.18 | 0.16 | 0.14 | 0.13 | 0.12 | 0.06 |  |  |  |  |  | MMT16ER110BSPT         | MMT16ER110BSPT-S                      |

Note 1) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.

- Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
- Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

## ■ Round DIN 405

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |              |
| 10                         | 1.27                      | 0.23             | 0.21 | 0.20 | 0.19 | 0.16 | 0.12 | 0.10 | 0.06 |      |      |      |      |      |      | MMT16ER100RD |
| 8                          | 1.59                      | 0.23             | 0.21 | 0.20 | 0.19 | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.06 |      |      |      |      | MMT16ER080RD |
| 6                          | 2.12                      | 0.26             | 0.25 | 0.24 | 0.22 | 0.21 | 0.19 | 0.17 | 0.16 | 0.14 | 0.12 | 0.10 | 0.06 |      |      | MMT16ER060RD |
| 4                          | 3.18                      | 0.34             | 0.33 | 0.32 | 0.30 | 0.28 | 0.26 | 0.24 | 0.22 | 0.20 | 0.19 | 0.17 | 0.15 | 0.12 | 0.06 | MMT22ER040RD |

## ■ ISO Trapezoidal 30°

| Pitch<br>(mm) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type  |
|---------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------|
|               |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |              |
| 1.5           | 0.90                      | 0.23             | 0.21 | 0.16 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT16ER150TR |
| 2.0           | 1.25                      | 0.29             | 0.26 | 0.21 | 0.17 | 0.14 | 0.12 | 0.06 |      |      |      |      |      |      |      | MMT16ER200TR |
| 3.0           | 1.75                      | 0.32             | 0.31 | 0.24 | 0.19 | 0.18 | 0.17 | 0.15 | 0.13 | 0.06 |      |      |      |      |      | MMT16ER300TR |
| 4.0           | 2.25                      | 0.33             | 0.32 | 0.24 | 0.22 | 0.21 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.16 |      |      | MMT22ER400TR |
| 5.0           | 2.75                      | 0.35             | 0.32 | 0.26 | 0.24 | 0.22 | 0.21 | 0.19 | 0.19 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22ER500TR |

## ■ American ACME

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type    |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |                |
| 12                         | 1.19                      | 0.27             | 0.23 | 0.20 | 0.17 | 0.14 | 0.12 | 0.06 |      |      |      |      |      |      |      | MMT16ER120ACME |
| 10                         | 1.52                      | 0.29             | 0.25 | 0.21 | 0.18 | 0.16 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      | MMT16ER100ACME |
| 8                          | 1.84                      | 0.30             | 0.26 | 0.22 | 0.19 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      | MMT16ER080ACME |
| 6                          | 2.37                      | 0.34             | 0.30 | 0.27 | 0.24 | 0.21 | 0.19 | 0.16 | 0.14 | 0.12 | 0.12 | 0.11 | 0.11 | 0.06 |      | MMT22ER060ACME |
| 5                          | 2.79                      | 0.36             | 0.33 | 0.30 | 0.26 | 0.23 | 0.20 | 0.18 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22ER050ACME |

## ■ UNJ

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |  |  |  | Insert Type   |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|--|--|--|---------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   |  |  |  |               |
| 32                         | 0.46                      | 0.16             | 0.14 | 0.10 | 0.06 |      |      |      |      |      |      |      |  |  |  | MMT16ER320UNJ |
| 28                         | 0.52                      | 0.16             | 0.12 | 0.09 | 0.09 | 0.06 |      |      |      |      |      |      |  |  |  | MMT16ER280UNJ |
| 24                         | 0.61                      | 0.17             | 0.14 | 0.14 | 0.10 | 0.06 |      |      |      |      |      |      |  |  |  | MMT16ER240UNJ |
| 20                         | 0.73                      | 0.19             | 0.16 | 0.13 | 0.10 | 0.09 | 0.06 |      |      |      |      |      |  |  |  | MMT16ER200UNJ |
| 18                         | 0.81                      | 0.23             | 0.18 | 0.14 | 0.10 | 0.10 | 0.06 |      |      |      |      |      |  |  |  | MMT16ER180UNJ |
| 16                         | 0.92                      | 0.26             | 0.21 | 0.14 | 0.12 | 0.10 | 0.09 |      |      |      |      |      |  |  |  | MMT16ER160UNJ |
| 14                         | 1.05                      | 0.26             | 0.23 | 0.17 | 0.12 | 0.11 | 0.10 | 0.06 |      |      |      |      |  |  |  | MMT16ER140UNJ |
| 12                         | 1.22                      | 0.28             | 0.27 | 0.20 | 0.17 | 0.13 | 0.11 | 0.06 |      |      |      |      |  |  |  | MMT16ER120UNJ |
| 10                         | 1.47                      | 0.30             | 0.29 | 0.21 | 0.15 | 0.13 | 0.12 | 0.11 | 0.10 | 0.06 |      |      |  |  |  | MMT16ER100UNJ |
| 8                          | 1.83                      | 0.31             | 0.30 | 0.23 | 0.18 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.06 |  |  |  | MMT16ER080UNJ |

## ■ API Buttress Casing

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |  |  |  | Insert Type    |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|--|--|--|----------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   |  |  |  |                |
| 5                          | 1.55                      | 0.25             | 0.23 | 0.17 | 0.15 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 |  |  |  | MMT22ER050APBU |

## ■ API Round Casing&Tubing

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |  |  | Insert Type    |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|--|--|----------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |  |  |                |
| 10                         | 1.41                      | 0.25             | 0.23 | 0.16 | 0.14 | 0.12 | 0.12 | 0.12 | 0.11 | 0.10 | 0.06 |      |      |  |  | MMT16ER100APRD |
| 8                          | 1.81                      | 0.25             | 0.24 | 0.19 | 0.16 | 0.14 | 0.14 | 0.13 | 0.13 | 0.13 | 0.13 | 0.11 | 0.06 |  |  | MMT16ER080APRD |

## ■ American NPT

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type   |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |               |
| 27                         | 0.66                      | 0.15             | 0.13 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER270NPT |
| 18                         | 1.01                      | 0.20             | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      | MMT16ER180NPT |
| 14                         | 1.33                      | 0.23             | 0.19 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      |      |      | MMT16ER140NPT |
| 11.5                       | 1.64                      | 0.24             | 0.19 | 0.17 | 0.15 | 0.15 | 0.13 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      | MMT16ER115NPT |
| 8                          | 2.42                      | 0.33             | 0.28 | 0.23 | 0.20 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 | MMT16ER080NPT |

## ■ American NPTF

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type    |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |                |
| 27                         | 0.64                      | 0.16             | 0.14 | 0.11 | 0.09 | 0.08 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16ER270NPTF |
| 18                         | 1.00                      | 0.19             | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      | MMT16ER180NPTF |
| 14                         | 1.35                      | 0.23             | 0.21 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      |      |      | MMT16ER140NPTF |
| 11.5                       | 1.63                      | 0.24             | 0.23 | 0.19 | 0.15 | 0.13 | 0.11 | 0.11 | 0.11 | 0.10 | 0.10 | 0.10 | 0.06 |      |      |      | MMT16ER115NPTF |
| 8                          | 2.38                      | 0.32             | 0.27 | 0.23 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 | MMT16ER080NPTF |

Note 1) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.

- Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
- Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

# THREADING

## STANDARD OF DEPTH OF CUT INTERNAL (RADIAL INFED)

### ISO Metric

| Pitch (mm) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |               |                                       |                 |
|------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|---------------|---------------------------------------|-----------------|
|            |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts |               | M-class inserts with 3-D chipbreakers |                 |
| 0.5        | 0.29                | 0.09             | 0.07 | 0.07 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT11IR050ISO          | MMT16IR050ISO | —                                     | —               |
| 0.75       | 0.43                | 0.15             | 0.13 | 0.09 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT11IR075ISO          | MMT16IR075ISO | —                                     | —               |
| 1.0        | 0.58                | 0.17             | 0.15 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      |      |      | MMT11IR100ISO          | MMT16IR100ISO | MMT11IR100ISO-S                       | MMT16IR100ISO-S |
| 1.25       | 0.72                | 0.18             | 0.16 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      |      | MMT11IR125ISO          | MMT16IR125ISO | MMT11IR125ISO-S                       | MMT16IR125ISO-S |
| 1.5        | 0.87                | 0.21             | 0.20 | 0.16 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT11IR150ISO          | MMT16IR150ISO | MMT11IR150ISO-S                       | MMT16IR150ISO-S |
| 1.75       | 1.01                | 0.21             | 0.20 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.06 |      |      |      |      |      |      | MMT11IR175ISO          | MMT16IR175ISO | —                                     | MMT16IR175ISO-S |
| 2.0        | 1.15                | 0.24             | 0.22 | 0.18 | 0.14 | 0.12 | 0.10 | 0.09 | 0.06 |      |      |      |      |      |      | MMT11IR200ISO          | MMT16IR200ISO | —                                     | MMT16IR200ISO-S |
| 2.5        | 1.44                | 0.25             | 0.24 | 0.21 | 0.15 | 0.13 | 0.12 | 0.10 | 0.09 | 0.09 | 0.06 |      |      |      |      | —                      | MMT16IR250ISO | —                                     | MMT16IR250ISO-S |
| 3.0        | 1.73                | 0.26             | 0.25 | 0.22 | 0.17 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.08 | 0.06 |      |      | —                      | MMT16IR300ISO | —                                     | MMT16IR300ISO-S |
| 3.5        | 2.02                | 0.32             | 0.30 | 0.23 | 0.19 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.06 |      |      | —                      | MMT22IR350ISO | —                                     | —               |
| 4.0        | 2.31                | 0.33             | 0.31 | 0.24 | 0.22 | 0.18 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.10 | 0.10 | 0.06 | —                      | MMT22IR400ISO | —                                     | —               |
| 4.5        | 2.60                | 0.36             | 0.33 | 0.28 | 0.24 | 0.21 | 0.19 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.06 | —                      | MMT22IR450ISO | —                                     | —               |
| 5.0        | 2.89                | 0.41             | 0.38 | 0.32 | 0.27 | 0.24 | 0.21 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.06 | —                      | MMT22IR500ISO | —                                     | —               |

### American UN

| Pitch (thread/inch) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |              |                                       |   |
|---------------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|--------------|---------------------------------------|---|
|                     |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts |              | M-class inserts with 3-D chipbreakers |   |
| 32                  | 0.46                | 0.16             | 0.14 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      |      | MMT11IR320UN           | MMT16IR320UN | —                                     | — |
| 28                  | 0.52                | 0.16             | 0.13 | 0.09 | 0.08 | 0.06 |      |      |      |      |      |      |      |      |      | MMT11IR280UN           | MMT16IR280UN | —                                     | — |
| 24                  | 0.61                | 0.17             | 0.15 | 0.13 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      | MMT11IR240UN           | MMT16IR240UN | —                                     | — |
| 20                  | 0.73                | 0.18             | 0.15 | 0.13 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      |      | MMT11IR200UN           | MMT16IR200UN | —                                     | — |
| 18                  | 0.81                | 0.20             | 0.18 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT11IR180UN           | MMT16IR180UN | —                                     | — |
| 16                  | 0.92                | 0.20             | 0.18 | 0.15 | 0.12 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      | MMT11IR160UN           | MMT16IR160UN | MMT16IR160UN-S                        | — |
| 14                  | 1.05                | 0.21             | 0.18 | 0.15 | 0.13 | 0.11 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      | MMT11IR140UN           | MMT16IR140UN | MMT16IR140UN-S                        | — |
| 13                  | 1.13                | 0.22             | 0.19 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | —                      | MMT16IR130UN | —                                     | — |
| 12                  | 1.22                | 0.24             | 0.22 | 0.18 | 0.16 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | —                      | MMT16IR120UN | MMT16IR120UN-S                        | — |
| 11                  | 1.33                | 0.24             | 0.22 | 0.20 | 0.15 | 0.12 | 0.12 | 0.11 | 0.11 | 0.06 |      |      |      |      |      | —                      | MMT16IR110UN | —                                     | — |
| 10                  | 1.47                | 0.25             | 0.22 | 0.21 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.06 |      |      |      |      | —                      | MMT16IR100UN | —                                     | — |
| 9                   | 1.63                | 0.31             | 0.23 | 0.21 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      |      | —                      | MMT16IR090UN | —                                     | — |
| 8                   | 1.83                | 0.31             | 0.26 | 0.21 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      | —                      | MMT16IR080UN | —                                     | — |
| 7                   | 2.09                | 0.36             | 0.30 | 0.24 | 0.21 | 0.18 | 0.17 | 0.16 | 0.15 | 0.14 | 0.12 | 0.06 |      |      |      | —                      | MMT22IR070UN | —                                     | — |
| 6                   | 2.44                | 0.40             | 0.33 | 0.25 | 0.23 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      | —                      | MMT22IR060UN | —                                     | — |
| 5                   | 2.93                | 0.41             | 0.35 | 0.31 | 0.26 | 0.23 | 0.21 | 0.20 | 0.19 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | —                      | MMT22IR050UN | —                                     | — |

### Whitworth for BSW, BSP

| Pitch (thread/inch) | Total Cutting Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type            |             |                                       |   |
|---------------------|---------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------------------|-------------|---------------------------------------|---|
|                     |                     | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | G-class ground inserts |             | M-class inserts with 3-D chipbreakers |   |
| 28                  | 0.58                | 0.17             | 0.14 | 0.11 | 0.10 | 0.06 |      |      |      |      |      |      |      |      |      | —                      | MMT16IR280W | —                                     | — |
| 26                  | 0.63                | 0.18             | 0.15 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      |      | —                      | MMT16IR260W | —                                     | — |
| 20                  | 0.81                | 0.20             | 0.18 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | —                      | MMT16IR200W | —                                     | — |
| 19                  | 0.86                | 0.21             | 0.19 | 0.15 | 0.13 | 0.12 | 0.06 |      |      |      |      |      |      |      |      | MMT11IR190W            | MMT16IR190W | MMT16IR190W-S                         | — |
| 18                  | 0.90                | 0.25             | 0.19 | 0.15 | 0.13 | 0.12 | 0.06 |      |      |      |      |      |      |      |      | —                      | MMT16IR180W | —                                     | — |
| 16                  | 1.02                | 0.21             | 0.18 | 0.15 | 0.13 | 0.11 | 0.09 | 0.09 | 0.06 |      |      |      |      |      |      | —                      | MMT16IR160W | —                                     | — |
| 14                  | 1.16                | 0.23             | 0.21 | 0.17 | 0.14 | 0.12 | 0.12 | 0.11 | 0.06 |      |      |      |      |      |      | MMT11IR140W            | MMT16IR140W | MMT16IR140W-S                         | — |
| 12                  | 1.36                | 0.27             | 0.25 | 0.20 | 0.16 | 0.15 | 0.14 | 0.13 | 0.06 |      |      |      |      |      |      | —                      | MMT16IR120W | MMT16IR120W-S                         | — |
| 11                  | 1.48                | 0.27             | 0.24 | 0.20 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 |      |      |      |      |      | —                      | MMT16IR110W | —                                     | — |
| 10                  | 1.63                | 0.27             | 0.25 | 0.20 | 0.17 | 0.15 | 0.15 | 0.13 | 0.13 | 0.12 | 0.06 |      |      |      |      | —                      | MMT16IR100W | —                                     | — |
| 9                   | 1.81                | 0.28             | 0.26 | 0.21 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.06 |      |      |      | —                      | MMT16IR090W | —                                     | — |
| 8                   | 2.03                | 0.30             | 0.27 | 0.22 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.06 |      |      | —                      | MMT16IR080W | —                                     | — |
| 7                   | 2.32                | 0.34             | 0.32 | 0.26 | 0.22 | 0.20 | 0.18 | 0.17 | 0.16 | 0.15 | 0.14 | 0.12 | 0.06 |      |      | —                      | MMT22IR070W | —                                     | — |
| 6                   | 2.71                | 0.35             | 0.33 | 0.27 | 0.23 | 0.21 | 0.20 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | —                      | MMT22IR060W | —                                     | — |
| 5                   | 3.25                | 0.42             | 0.40 | 0.35 | 0.29 | 0.26 | 0.24 | 0.22 | 0.20 | 0.19 | 0.18 | 0.17 | 0.15 | 0.12 | 0.06 | —                      | MMT22IR050W | —                                     | — |

Note 1) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.

- Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
- Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

## ■ BSPT

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |  |  |  |  |  | Insert Type            |               |                                          |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|--|--|--|--|--|------------------------|---------------|------------------------------------------|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |  |  |  |  |  | G-class ground inserts |               | M-class inserts with<br>3-D chipbreakers |
| 19                         | 0.86                      | 0.22             | 0.19 | 0.15 | 0.12 | 0.12 | 0.06 |      |      |      |  |  |  |  |  | MMT11R190BSPT          | MMT16R190BSPT | MMT16R190BSPT-S                          |
| 14                         | 1.16                      | 0.24             | 0.20 | 0.17 | 0.14 | 0.12 | 0.12 | 0.11 | 0.06 |      |  |  |  |  |  | MMT11R140BSPT          | MMT16R140BSPT | MMT16R140BSPT-S                          |
| 11                         | 1.48                      | 0.25             | 0.23 | 0.21 | 0.18 | 0.16 | 0.14 | 0.13 | 0.12 | 0.06 |  |  |  |  |  | —                      | MMT16R110BSPT | MMT16R110BSPT-S                          |

## ■ Round DIN 405

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type |  |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|--|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |             |  |  |
| 10                         | 1.27                      | 0.23             | 0.21 | 0.20 | 0.19 | 0.16 | 0.12 | 0.10 | 0.06 |      |      |      |      |      |      | MMT16R100RD |  |  |
| 8                          | 1.59                      | 0.23             | 0.21 | 0.20 | 0.19 | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.06 |      |      |      |      | MMT16R080RD |  |  |
| 6                          | 2.12                      | 0.26             | 0.25 | 0.24 | 0.22 | 0.21 | 0.19 | 0.17 | 0.16 | 0.14 | 0.12 | 0.10 | 0.06 |      |      | MMT16R060RD |  |  |
| 4                          | 3.18                      | 0.34             | 0.33 | 0.32 | 0.30 | 0.28 | 0.26 | 0.24 | 0.22 | 0.20 | 0.19 | 0.17 | 0.15 | 0.12 | 0.06 | MMT22R040RD |  |  |

## ■ ISO Trapezoidal 30°

| Pitch<br>(mm) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type |  |  |
|---------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|--|--|
|               |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |             |  |  |
| 1.5           | 0.90                      | 0.23             | 0.21 | 0.16 | 0.13 | 0.11 | 0.06 |      |      |      |      |      |      |      |      | MMT16R150TR |  |  |
| 2             | 1.25                      | 0.29             | 0.26 | 0.21 | 0.17 | 0.14 | 0.12 | 0.06 |      |      |      |      |      |      |      | MMT16R200TR |  |  |
| 3             | 1.75                      | 0.32             | 0.31 | 0.24 | 0.19 | 0.18 | 0.17 | 0.15 | 0.13 | 0.06 |      |      |      |      |      | MMT16R300TR |  |  |
| 4             | 2.25                      | 0.33             | 0.32 | 0.24 | 0.22 | 0.21 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 |      |      | MMT22R400TR |  |  |
| 5             | 2.75                      | 0.35             | 0.32 | 0.26 | 0.24 | 0.22 | 0.21 | 0.19 | 0.19 | 0.17 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22R500TR |  |  |

## ■ American ACME

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type   |  |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|--|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   |               |  |  |
| 12                         | 1.19                      | 0.27             | 0.23 | 0.20 | 0.17 | 0.14 | 0.12 | 0.06 |      |      |      |      |      |      |      | MMT16R120ACME |  |  |
| 10                         | 1.52                      | 0.29             | 0.25 | 0.21 | 0.18 | 0.16 | 0.14 | 0.12 | 0.11 | 0.06 |      |      |      |      |      | MMT16R100ACME |  |  |
| 8                          | 1.84                      | 0.30             | 0.26 | 0.22 | 0.19 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.11 | 0.06 |      |      |      | MMT16R080ACME |  |  |
| 6                          | 2.37                      | 0.34             | 0.30 | 0.27 | 0.24 | 0.21 | 0.19 | 0.16 | 0.14 | 0.12 | 0.12 | 0.11 | 0.11 | 0.06 |      | MMT22R060ACME |  |  |
| 5                          | 2.79                      | 0.36             | 0.33 | 0.30 | 0.26 | 0.23 | 0.20 | 0.18 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.06 | MMT22R050ACME |  |  |

## ■ API Buttress Casing

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |  |  |  | Insert Type   |  |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|--|--|--|---------------|--|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   |  |  |  |               |  |  |
| 5                          | 1.55                      | 0.25             | 0.23 | 0.17 | 0.15 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 |  |  |  | MMT22R050APBU |  |  |

## ■ API Round Casing&Tubing

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |  |  | Insert Type   |  |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|--|--|---------------|--|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |  |  |               |  |  |
| 10                         | 1.41                      | 0.25             | 0.23 | 0.16 | 0.14 | 0.12 | 0.12 | 0.12 | 0.11 | 0.10 | 0.06 |      |      |  |  | MMT16R100APRD |  |  |
| 8                          | 1.81                      | 0.25             | 0.24 | 0.19 | 0.16 | 0.14 | 0.14 | 0.13 | 0.13 | 0.13 | 0.13 | 0.11 | 0.06 |  |  | MMT16R080APRD |  |  |

## ■ American NPT

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type  |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |              |  |
| 27                         | 0.66                      | 0.15             | 0.13 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      |      |      | MMT16R270NPT |  |
| 18                         | 1.01                      | 0.20             | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.09 | 0.06 |      |      |      |      |      |      |      | MMT16R180NPT |  |
| 14                         | 1.33                      | 0.23             | 0.19 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      |      |      | MMT16R140NPT |  |
| 11.5                       | 1.64                      | 0.24             | 0.19 | 0.17 | 0.15 | 0.15 | 0.13 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      | MMT16R115NPT |  |
| 8                          | 2.42                      | 0.33             | 0.28 | 0.23 | 0.20 | 0.18 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 | MMT16R080NPT |  |

## ■ American NPTF

| Pitch<br>(thread/<br>inch) | Total<br>Cutting<br>Depth | Number of Passes |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Insert Type   |  |
|----------------------------|---------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|--|
|                            |                           | 1                | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   |               |  |
| 14                         | 1.35                      | 0.23             | 0.21 | 0.16 | 0.14 | 0.13 | 0.12 | 0.11 | 0.10 | 0.09 | 0.06 |      |      |      |      |      | MMT16R140NPTF |  |
| 11.5                       | 1.63                      | 0.24             | 0.23 | 0.19 | 0.15 | 0.13 | 0.11 | 0.11 | 0.11 | 0.10 | 0.10 | 0.10 | 0.06 |      |      |      | MMT16R115NPTF |  |
| 8                          | 2.38                      | 0.32             | 0.27 | 0.23 | 0.19 | 0.17 | 0.16 | 0.15 | 0.14 | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.10 | 0.06 | MMT16R080NPTF |  |

Note 1) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.

- Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
- Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

# MMT SERIES ORDER NUMBER

## HOLDERS

### EXTERNAL

|                    |                     |          |                                              |           |                             |           |                             |          |                          |
|--------------------|---------------------|----------|----------------------------------------------|-----------|-----------------------------|-----------|-----------------------------|----------|--------------------------|
| <b>MMT</b>         | <b>E</b>            | <b>R</b> | <b>12</b>                                    | <b>12</b> | <b>H</b>                    | <b>16</b> | <b>-</b>                    | <b>C</b> |                          |
| <b>Designation</b> | <b>Application</b>  |          | <b>Tool Size (mm)<br/>(Height and Width)</b> |           | <b>Tool Length<br/>(mm)</b> |           | <b>Insert Size<br/>(mm)</b> |          | <b>Method of Holding</b> |
|                    | <b>E</b>            | External | 12                                           | 12        | <b>H</b>                    | 100       | 16                          | 9.525    | <b>C</b>                 |
|                    | <b>Hand of Tool</b> |          | 16                                           | 16        | <b>K</b>                    | 125       | 22                          | 12.7     | Clamp-on                 |
|                    | <b>R</b>            | Right    | 20                                           | 20        | <b>M</b>                    | 150       |                             |          |                          |
|                    |                     |          | 25                                           | 25        | <b>P</b>                    | 170       |                             |          |                          |
|                    |                     |          | 32                                           | 32        |                             |           |                             |          |                          |

### INTERNAL

|                    |                     |          |                                        |           |                         |          |                             |          |                       |                   |
|--------------------|---------------------|----------|----------------------------------------|-----------|-------------------------|----------|-----------------------------|----------|-----------------------|-------------------|
| <b>MMT</b>         | <b>I</b>            | <b>R</b> | <b>13</b>                              | <b>16</b> | <b>A</b>                | <b>K</b> | <b>11</b>                   | <b>-</b> | <b>S</b>              | <b>P15</b>        |
| <b>Designation</b> | <b>Application</b>  |          | <b>Min. Cutting Diameter (mm)</b>      |           | <b>Tool Length (mm)</b> |          | <b>Insert Size<br/>(mm)</b> |          | <b>Holding Method</b> | <b>Lead Angle</b> |
|                    | <b>I</b> Internal   |          |                                        |           | <b>K</b>                | 125      | <b>R</b>                    | 200      | <b>S</b> Screw-on     | <b>P15</b> 1.5°   |
|                    | <b>Hand of Tool</b> |          | <b>Shank Diameter (mm)</b>             |           | <b>M</b>                | 150      | <b>S</b>                    | 250      | <b>C</b> Clamp-on     | <b>P25</b> 2.5°   |
|                    | <b>R</b> Right      |          | <b>Shank Material</b>                  |           | <b>Q</b>                | 180      | <b>T</b>                    | 300      |                       | <b>P35</b> 3.5°   |
|                    |                     |          | <b>A</b> Steel Shank with Coolant Hole |           |                         |          |                             |          |                       |                   |

G

THREADING

## INSERTS

### M-CLASS

|                    |                                          |                    |                     |              |            |                       |                        |
|--------------------|------------------------------------------|--------------------|---------------------|--------------|------------|-----------------------|------------------------|
| <b>MMT</b>         | <b>16</b>                                | <b>E</b>           | <b>R</b>            | <b>100</b>   | <b>ISO</b> | <b>-</b>              | <b>S</b>               |
| <b>Designation</b> | <b>Diameter of Inscribed Circle (mm)</b> | <b>Application</b> | <b>Hand of Tool</b> | <b>Pitch</b> |            | <b>Threading Type</b> |                        |
|                    | 11 6.35                                  | <b>E</b> External  | <b>R</b> Right      | 100          | 1.0mm      | <b>60</b>             | Partial Profile 60°    |
|                    | 16 9.525                                 | <b>I</b> Internal  |                     | 125          | 1.25mm     | <b>55</b>             | Partial Profile 55°    |
|                    |                                          |                    |                     | 150          | 1.5mm      | <b>ISO</b>            | ISO Metric             |
|                    |                                          |                    |                     | 175          | 1.75mm     | <b>W</b>              | Whitworth for BSW, BSP |
|                    |                                          |                    |                     | 200          | 2.0mm      | <b>BSPT</b>           | BSPT                   |
|                    |                                          |                    |                     | 250          | 2.5mm      | <b>UN</b>             | American UN            |
|                    |                                          |                    |                     | 300          | 3.0mm      |                       |                        |

### G-CLASS

|                                          |           |                     |          |              |                                      |
|------------------------------------------|-----------|---------------------|----------|--------------|--------------------------------------|
| <b>MMT</b>                               | <b>16</b> | <b>E</b>            | <b>R</b> | <b>050</b>   | <b>ISO</b>                           |
| <b>Designation</b>                       |           |                     |          |              |                                      |
| <b>Diameter of Inscribed Circle (mm)</b> |           | <b>Application</b>  |          | <b>Pitch</b> |                                      |
| <b>11</b>                                | 6.35      | <b>E</b>            | External | <b>A</b>     | 0.5—1.5mm<br>or<br>48—16 thread/inch |
| <b>16</b>                                | 9.525     | <b>I</b>            | Internal |              |                                      |
| <b>22</b>                                | 12.7      |                     |          |              |                                      |
|                                          |           | <b>Hand of Tool</b> |          | <b>G</b>     | 1.75—3.0mm<br>or<br>14—8 thread/inch |
|                                          |           |                     |          |              |                                      |
|                                          |           |                     |          |              |                                      |
|                                          |           |                     |          | <b>AG</b>    | 0.5—3.0mm<br>or<br>48—8 thread/inch  |
|                                          |           |                     |          |              |                                      |
|                                          |           |                     |          |              |                                      |
|                                          |           |                     |          | <b>N</b>     | 3.5—5.0mm<br>or<br>7—5 thread/inch   |
|                                          |           |                     |          |              |                                      |
|                                          |           |                     |          |              |                                      |

|                       |                         |
|-----------------------|-------------------------|
| <b>Threading Type</b> |                         |
| <b>60</b>             | Partial Profile 60°     |
| <b>55</b>             | Partial Profile 55°     |
| <b>ISO</b>            | ISO Metric              |
| <b>W</b>              | Whitworth for BSW, BSP  |
| <b>BSPT</b>           | BSPT                    |
| <b>UN</b>             | American UN             |
| <b>RD</b>             | Round DIN 405           |
| <b>TR</b>             | ISO Trapezoidal 30°     |
| <b>ACME</b>           | American ACME           |
| <b>UNJ</b>            | UNJ                     |
| <b>APBU</b>           | API Buttress Casing     |
| <b>APRD</b>           | API Round Casing&Tubing |
| <b>NPT</b>            | NPT                     |
| <b>NPTF</b>           | NPTF                    |

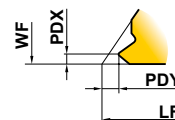
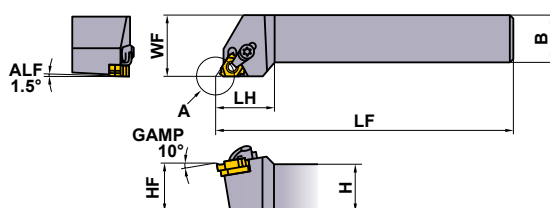
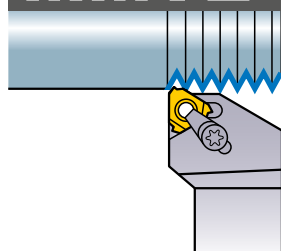
# EXTERNAL THREADING

## MMTE HOLDER

- Various insert types.
- Precision class insert.
- Available with a wiper cutting edge to provide a precise thread geometry.
- Able to change lead angle by replacing the shim.

### MMTE

External threading



Details of position A  
Refer to page G020—G023,  
for size PDX, PDY.

Right hand tool holder only.

| Order Number   | Stock | Insert Number                                                                                | Dimensions (mm) |    |     |    |    |    |  |  * |  |  * |  |  |
|----------------|-------|----------------------------------------------------------------------------------------------|-----------------|----|-----|----|----|----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                | R     |                                                                                              | H               | B  | LF  | LH | HF | WF | Clamp Bridge                                                                      | Clamp Screw                                                                           | Stop Ring                                                                           | Shim Screw                                                                            | Shim                                                                                | Wrench                                                                              |
| MMTER1212H16-C | ●     | MMT16ER<br> | 12              | 12 | 100 | 25 | 12 | 16 | SETK51                                                                            | SETS51                                                                                | CR4                                                                                 | HFC03008                                                                              | CTE32TP15                                                                           | ①TKY15F<br>②HKY20R                                                                  |
| MMTER1616H16-C | ●     |                                                                                              | 16              | 16 | 100 | 25 | 16 | 20 | SETK51                                                                            | SETS51                                                                                | CR4                                                                                 | HFC03008                                                                              | CTE32TP15                                                                           | ①TKY15F<br>②HKY20R                                                                  |
| MMTER2020K16-C | ●     |                                                                                              | 20              | 20 | 125 | 26 | 20 | 25 | SETK51                                                                            | SETS51                                                                                | CR4                                                                                 | HFC03008                                                                              | CTE32TP15                                                                           | ①TKY15F<br>②HKY20R                                                                  |
| MMTER2525M16-C | ●     |                                                                                              | 25              | 25 | 150 | 28 | 25 | 32 | SETK51                                                                            | SETS51                                                                                | CR4                                                                                 | HFC03008                                                                              | CTE32TP15                                                                           | ①TKY15F<br>②HKY20R                                                                  |
| MMTER3232P16-C | ●     |                                                                                              | 32              | 32 | 170 | 32 | 32 | 40 | SETK51                                                                            | SETS51                                                                                | CR4                                                                                 | HFC03008                                                                              | CTE32TP15                                                                           | ①TKY15F<br>②HKY20R                                                                  |
| MMTER2525M22-C | ●     | MMT22ER<br> | 25              | 25 | 150 | 32 | 25 | 32 | SETK61                                                                            | SETS61                                                                                | CR5                                                                                 | HFC04010                                                                              | CTE43TP15                                                                           | ①TKY20F<br>②HKY25R                                                                  |
| MMTER3232P22-C | ●     |                                                                                              | 32              | 32 | 170 | 32 | 32 | 40 | SETK61                                                                            | SETS61                                                                                | CR5                                                                                 | HFC04010                                                                              | CTE43TP15                                                                           | ①TKY20F<br>②HKY25R                                                                  |

Note 1) Select and use a shim as shown below (sold separately), dependant on the lead angle.

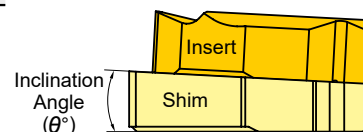
\* Clamp Torque (N • m) : SETS51=3.5, SETS61=5.0, HFC03008=1.5, HFC04010=2.2

### SHIM

| Lead<br>Angle<br>(α°) | Order Number | Stock<br>R | Inclination<br>Angle<br>(θ°) | Applicable<br>Holder   |
|-----------------------|--------------|------------|------------------------------|------------------------|
| -1.5°                 | CTE32TN15    | ●          | -3°                          | MMTER<br>○○○○○<br>16-C |
| -0.5°                 | CTE32TN05    | ●          | -2°                          |                        |
| 0.5°                  | CTE32TP05    | ●          | -1°                          |                        |
| 1.5°                  | CTE32TP15    | ●          | 0°                           |                        |
| 2.5°                  | CTE32TP25    | ●          | 1°                           |                        |
| 3.5°                  | CTE32TP35    | ●          | 2°                           |                        |
| 4.5°                  | CTE32TP45    | ●          | 3°                           |                        |

Standard shim delivered with the holder.

| Lead<br>Angle<br>(α°) | Order Number | Stock<br>R | Inclination<br>Angle<br>(θ°) | Applicable<br>Holder   |
|-----------------------|--------------|------------|------------------------------|------------------------|
| -1.5°                 | CTE43TN15    | ●          | -3°                          | MMTER<br>○○○○○<br>22-C |
| -0.5°                 | CTE43TN05    | ●          | -2°                          |                        |
| 0.5°                  | CTE43TP05    | ●          | -1°                          |                        |
| 1.5°                  | CTE43TP15    | ●          | 0°                           |                        |
| 2.5°                  | CTE43TP25    | ●          | 1°                           |                        |
| 3.5°                  | CTE43TP35    | ●          | 2°                           |                        |
| 4.5°                  | CTE43TP45    | ●          | 3°                           |                        |



### RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Hardness                    | Grade  | Cutting Speed (m/min) |
|---|-----------------------------|-----------------------------|--------|-----------------------|
| P | Mild Steel                  | ≤180HB                      | MP9025 | 80 (60—100)           |
|   |                             |                             | VP10MF | 150 (70—230)          |
|   |                             |                             | VP15TF | 100 (60—140)          |
|   |                             |                             | VP20RT | 80 (60—100)           |
| M | Carbon Steel<br>Alloy Steel | 180—280HB                   | MP9025 | 80 (60—100)           |
|   |                             |                             | VP10MF | 140 (80—200)          |
|   |                             |                             | VP15TF | 100 (60—140)          |
|   |                             |                             | VP20RT | 80 (60—100)           |
| M | Stainless Steel             | ≤200HB                      | MP9025 | 80 (40—120)           |
|   |                             |                             | VP15TF | 80 (40—120)           |
|   |                             |                             | VP20RT |                       |
| K | Gray Cast Iron              | Tensile Strength<br>≤350MPa | VP10MF | 140 (80—200)          |
|   |                             |                             | VP15TF | 90 (60—120)           |

|   | Material             | Hardness | Grade  | Cutting Speed (m/min) |
|---|----------------------|----------|--------|-----------------------|
| S | Heat-Resistant Alloy | —        | MP9025 | 30 (20—40)            |
|   |                      |          | VP10MF | 45 (15—70)            |
|   |                      |          | VP15TF | 30 (20—40)            |
|   |                      |          | VP20RT |                       |
| H | Titanium Alloy       | —        | MP9025 | 45 (25—65)            |
|   |                      |          | VP10MF | 60 (40—80)            |
|   |                      |          | VP15TF | 45 (25—65)            |
|   |                      |          | VP20RT |                       |
| H | Heat-Treated Alloy   | 45—55HRC | VP10MF | 50 (30—70)            |
|   |                      |          | VP15TF | 40 (20—60)            |

● : Inventory maintained.

HOW TO SELECT A SHIM > G012  
SPARE PARTS > N001  
TECHNICAL DATA > P001

G019

THREADING



# EXTERNAL THREADING

## MMT M-CLASS INSERTS WITH 3-D CHIPBREAKERS

### INSERTS

| Type                   | Order Number     | Coated |        |        | Pitch    |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry |
|------------------------|------------------|--------|--------|--------|----------|-------------|-----------------|------|-----|-----|------|--------------------------|----------|
|                        |                  | NEW    | VP15TF | VP20RT |          |             | IC              | S    | PDY | PDX | RE   |                          |          |
|                        |                  | MP9025 |        |        | mm       | thread/inch |                 |      |     |     |      |                          |          |
| Partial Profile 60°    | MMT16ERAG60-S    | ●      | ●      | ●      | 0.5—3.0  | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.08 | —                        |          |
|                        | MMT16ERA60-S     | ●      | ●      | ●      | 0.5—1.5  | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.06 | —                        |          |
|                        | MMT16ERG60-S     | ●      | ●      | ●      | 1.75—3.0 | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.23 | —                        |          |
|                        |                  |        |        |        |          |             |                 |      |     |     |      |                          |          |
| Partial Profile 55°    | MMT16ERAG55-S    | ●      | ●      | ●      |          | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.07 | —                        |          |
|                        | MMT16ERA55-S     | ●      | ●      | ●      |          | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.07 | —                        |          |
|                        | MMT16ERG55-S     | ●      | ●      | ●      |          | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.23 | —                        |          |
|                        |                  |        |        |        |          |             |                 |      |     |     |      |                          |          |
| ISO Metric             | MMT16ER100ISO-S  | ●      | ●      | ●      | 1.0      |             | 9.525           | 3.44 | 0.7 | 0.7 | 0.13 | 0.61                     |          |
|                        | MMT16ER125ISO-S  | ●      | ●      | ●      | 1.25     |             | 9.525           | 3.44 | 0.8 | 0.9 | 0.16 | 0.77                     |          |
|                        | MMT16ER150ISO-S  | ●      | ●      | ●      | 1.5      |             | 9.525           | 3.44 | 0.8 | 1.0 | 0.20 | 0.92                     |          |
|                        | MMT16ER175ISO-S  | ●      | ●      | ●      | 1.75     |             | 9.525           | 3.44 | 0.9 | 1.2 | 0.22 | 1.07                     |          |
|                        | MMT16ER200ISO-S  | ●      | ●      | ●      | 2.0      |             | 9.525           | 3.44 | 1.0 | 1.3 | 0.26 | 1.23                     |          |
|                        | MMT16ER250ISO-S  | ●      | ●      | ●      | 2.5      |             | 9.525           | 3.44 | 1.1 | 1.5 | 0.33 | 1.53                     |          |
|                        | MMT16ER300ISO-S  | ●      | ●      | ●      | 3.0      |             | 9.525           | 3.44 | 1.2 | 1.6 | 0.40 | 1.84                     |          |
| American UN            | MMT16ER160UN-S   | ★      | ●      | ★      |          | 16          | 9.525           | 3.44 | 0.9 | 1.1 | 0.23 | 0.97                     |          |
|                        | MMT16ER140UN-S   | ★      | ●      | ★      |          | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.26 | 1.11                     |          |
|                        | MMT16ER120UN-S   | ★      | ●      | ★      |          | 12          | 9.525           | 3.44 | 1.1 | 1.4 | 0.30 | 1.30                     |          |
|                        |                  |        |        |        |          |             |                 |      |     |     |      |                          |          |
| Whitworth for BSW, BSP | MMT16ER190W-S    | ●      | ●      | ●      |          | 19          | 9.525           | 3.44 | 0.8 | 1.0 | 0.18 | 0.86                     |          |
|                        | MMT16ER140W-S    | ●      | ●      | ●      |          | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.25 | 1.16                     |          |
|                        | MMT16ER110W-S    | ●      | ●      | ●      |          | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.32 | 1.48                     |          |
|                        |                  |        |        |        |          |             |                 |      |     |     |      |                          |          |
| BSPT                   | MMT16ER190BSPT-S | ★      | ●      | ★      |          | 19          | 9.525           | 3.44 | 0.8 | 0.9 | 0.18 | 0.86                     |          |
|                        | MMT16ER140BSPT-S | ★      | ●      | ★      |          | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.25 | 1.16                     |          |
|                        | MMT16ER110BSPT-S | ★      | ●      | ★      |          | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.32 | 1.48                     |          |
|                        |                  |        |        |        |          |             |                 |      |     |     |      |                          |          |

### IDENTIFICATION

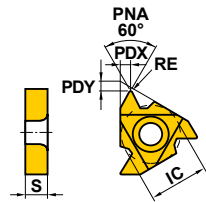
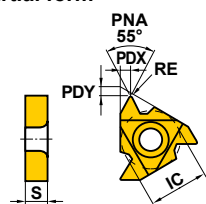
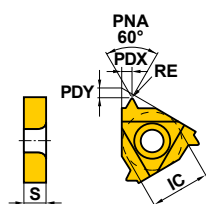
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|--------------------|------------------------------------------|--------------------|---------------------|-------------------|------------|--------------------------------------|---------------------------------|----------|---------------------------------------|
| <b>MMT</b>         | <b>16</b>                                | <b>E</b>           | <b>R</b>            | <b>100</b>        | <b>ISO</b> | <b>-</b>                             | <b>S</b>                        | <b>s</b> | M-class inserts with 3-D chipbreakers |
| <b>Designation</b> |                                          |                    |                     |                   |            |                                      |                                 |          |                                       |
|                    | <b>Diameter of Inscribed Circle (mm)</b> | <b>Application</b> |                     |                   |            |                                      |                                 |          |                                       |
|                    | <b>11</b> 6.35                           | <b>E</b> External  |                     |                   |            |                                      |                                 |          |                                       |
|                    | <b>16</b> 9.525                          | <b>I</b> Internal  |                     |                   |            |                                      |                                 |          |                                       |
|                    |                                          |                    | <b>Hand of Tool</b> |                   |            |                                      |                                 |          |                                       |
|                    |                                          |                    | <b>R</b> Right      |                   |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>Pitch</b>      |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>100</b> 1.0mm  | <b>A</b>   | 0.5—1.5mm<br>or<br>48—16 thread/inch |                                 |          |                                       |
|                    |                                          |                    |                     | <b>125</b> 1.25mm |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>150</b> 1.5mm  |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>175</b> 1.75mm | <b>G</b>   | 1.75—3.0mm<br>or<br>14—8 thread/inch |                                 |          |                                       |
|                    |                                          |                    |                     | <b>200</b> 2.0mm  |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>250</b> 2.5mm  |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     | <b>300</b> 3.0mm  | <b>AG</b>  | 0.5—3.0mm<br>or<br>48—8 thread/inch  |                                 |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      |                                 |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>Threading Type</b>           |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>60</b> Partial Profile 60°   |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>55</b> Partial Profile 55°   |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>ISO</b> ISO Metric           |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>W</b> Whitworth for BSW, BSP |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>BSPT</b> BSPT                |          |                                       |
|                    |                                          |                    |                     |                   |            |                                      | <b>UN</b> American UN           |          |                                       |

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(5 inserts in one case)



# MMT G-CLASS GROUND INSERTS

## INSERTS

| Type                | Thread Tolerance | Order Number  | Coated |        | Pitch    |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry                                                                                                   |
|---------------------|------------------|---------------|--------|--------|----------|-------------|-----------------|------|-----|-----|------|--------------------------|------------------------------------------------------------------------------------------------------------|
|                     |                  |               | VP10MF | VP15TF |          |             | IC              | S    | PDY | PDX | RE   |                          |                                                                                                            |
|                     |                  |               |        |        | mm       | thread/inch |                 |      |     |     |      |                          |                                                                                                            |
| Partial Profile 60° | —                | MMT16ERA60    | ●      | ●      | 0.5—1.5  | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.05 | —                        | <b>Partial form</b><br> |
|                     |                  | MMT16ERG60    | ●      | ●      | 1.75—3.0 | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.27 | —                        |                                                                                                            |
|                     |                  | MMT16ERAG60   | ●      |        | 0.5—3.0  | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.08 | —                        |                                                                                                            |
|                     |                  | MMT22ERN60    | ●      |        | 3.5—5.0  | 7—5         | 12.7            | 4.64 | 1.7 | 2.5 | 0.53 | —                        |                                                                                                            |
| Partial Profile 55° | —                | MMT16ERA55    | ●      | ●      |          | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.05 | —                        | <b>Partial form</b><br> |
|                     |                  | MMT16ERG55    | ●      | ●      |          | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.21 | —                        |                                                                                                            |
|                     |                  | MMT16ERAG55   | ●      |        |          | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.07 | —                        |                                                                                                            |
|                     |                  | MMT22ERN55    | ●      |        |          | 7—5         | 12.7            | 4.64 | 1.7 | 2.5 | 0.44 | —                        |                                                                                                            |
| ISO Metric          | 6g               | MMT16ER050ISO | ●      |        | 0.5      |             | 9.525           | 3.44 | 0.6 | 0.4 | 0.06 | 0.31                     | <b>Full form</b><br>  |
|                     |                  | MMT16ER075ISO | ●      |        | 0.75     |             | 9.525           | 3.44 | 0.6 | 0.6 | 0.10 | 0.46                     |                                                                                                            |
|                     |                  | MMT16ER100ISO | ●      | ●      | 1.0      |             | 9.525           | 3.44 | 0.7 | 0.7 | 0.16 | 0.61                     |                                                                                                            |
|                     |                  | MMT16ER125ISO | ●      | ●      | 1.25     |             | 9.525           | 3.44 | 0.8 | 0.9 | 0.19 | 0.77                     |                                                                                                            |
|                     |                  | MMT16ER150ISO | ●      | ●      | 1.5      |             | 9.525           | 3.44 | 0.8 | 1.0 | 0.23 | 0.92                     |                                                                                                            |
|                     |                  | MMT16ER175ISO | ●      | ●      | 1.75     |             | 9.525           | 3.44 | 0.9 | 1.2 | 0.21 | 1.07                     |                                                                                                            |
|                     |                  | MMT16ER200ISO | ●      | ●      | 2.0      |             | 9.525           | 3.44 | 1.0 | 1.3 | 0.31 | 1.23                     |                                                                                                            |
|                     |                  | MMT16ER250ISO | ●      | ●      | 2.5      |             | 9.525           | 3.44 | 1.1 | 1.5 | 0.32 | 1.53                     |                                                                                                            |
|                     |                  | MMT16ER300ISO | ●      | ●      | 3.0      |             | 9.525           | 3.44 | 1.2 | 1.6 | 0.46 | 1.84                     |                                                                                                            |
|                     |                  | MMT22ER350ISO | ●      |        | 3.5      |             | 12.7            | 4.64 | 1.6 | 2.3 | 0.45 | 2.15                     |                                                                                                            |
|                     |                  | MMT22ER400ISO | ●      |        | 4.0      |             | 12.7            | 4.64 | 1.6 | 2.3 | 0.52 | 2.45                     |                                                                                                            |
|                     |                  | MMT22ER450ISO | ●      |        | 4.5      |             | 12.7            | 4.64 | 1.7 | 2.4 | 0.58 | 2.76                     |                                                                                                            |
|                     |                  | MMT22ER500ISO | ●      |        | 5.0      |             | 12.7            | 4.64 | 1.7 | 2.5 | 0.63 | 3.07                     |                                                                                                            |
|                     |                  |               |        |        |          |             |                 |      |     |     |      |                          |                                                                                                            |
|                     |                  |               |        |        |          |             |                 |      |     |     |      |                          |                                                                                                            |

G

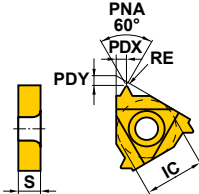
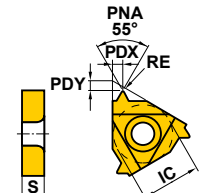
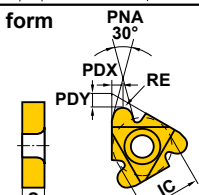
THREADING

## IDENTIFICATION

|                    |                                          |                   |                     |                   |                                       |
|--------------------|------------------------------------------|-------------------|---------------------|-------------------|---------------------------------------|
| <b>MMT</b>         | <b>16</b>                                | <b>E</b>          | <b>R</b>            | <b>050</b>        | <b>ISO</b>                            |
| <b>Designation</b> |                                          |                   |                     |                   |                                       |
|                    | <b>Diameter of Inscribed Circle (mm)</b> |                   | <b>Hand of Tool</b> | <b>Pitch</b>      | <b>Threading Type</b>                 |
|                    | <b>11</b> 6.35                           | <b>E</b> External | <b>R</b> Right      | <b>050</b> 0.5mm  | <b>60</b> Partial Profile 60°         |
|                    | <b>16</b> 9.525                          | <b>I</b> Internal |                     | <b>075</b> 0.75mm | <b>55</b> Partial Profile 55°         |
|                    | <b>22</b> 12.7                           |                   |                     | <b>100</b> 1.0mm  | <b>ISO</b> ISO Metric                 |
|                    |                                          |                   |                     | <b>125</b> 1.25mm | <b>W</b> Whitworth for BSW, BSP       |
|                    |                                          |                   |                     | <b>150</b> 1.5mm  | <b>BSPT</b> BSPT                      |
|                    |                                          |                   |                     | <b>175</b> 1.75mm | <b>UN</b> American UN                 |
|                    |                                          |                   |                     | <b>200</b> 2.0mm  | <b>RD</b> Round DIN 405               |
|                    |                                          |                   |                     | <b>250</b> 2.5mm  | <b>TR</b> ISO Trapezoidal 30°         |
|                    |                                          |                   |                     | <b>300</b> 3.0mm  | <b>ACME</b> American ACME             |
|                    |                                          |                   |                     | <b>350</b> 3.5mm  | <b>UNJ</b> UNJ                        |
|                    |                                          |                   |                     | <b>400</b> 4.0mm  | <b>APBU</b> API Buttress Casing       |
|                    |                                          |                   |                     | <b>450</b> 4.5mm  | <b>APRD</b> API Round Casing & Tubing |
|                    |                                          |                   |                     | <b>500</b> 5.0mm  | <b>NPT</b> NPT                        |
|                    |                                          |                   |                     |                   | <b>NPTF</b> NPTF                      |

# MMT G-CLASS GROUND INSERTS

## INSERTS

| Type                   | Thread Tolerance | Order Number | Coated        |                | Pitch |             | Dimensions (mm) |      |       |      |      | Total Cutting Depth (mm) | Geometry                                                                                                   |
|------------------------|------------------|--------------|---------------|----------------|-------|-------------|-----------------|------|-------|------|------|--------------------------|------------------------------------------------------------------------------------------------------------|
|                        |                  |              | VP10MF        | VP15TF         |       |             | IC              | S    | PDY   | PDX  | RE   |                          |                                                                                                            |
|                        |                  |              |               |                | mm    | thread/inch |                 |      |       |      |      |                          |                                                                                                            |
| American UN            | 2A               | MMT16ER320UN | ●             |                |       | 32          | 9.525           | 3.44 | 0.6   | 0.6  | 0.09 | 0.49                     | <div>Full form</div>    |
|                        |                  | MMT16ER280UN | ●             |                |       | 28          | 9.525           | 3.44 | 0.6   | 0.7  | 0.10 | 0.56                     |                                                                                                            |
|                        |                  | MMT16ER240UN | ●             |                |       | 24          | 9.525           | 3.44 | 0.7   | 0.8  | 0.16 | 0.65                     |                                                                                                            |
|                        |                  | MMT16ER200UN | ●             |                |       | 20          | 9.525           | 3.44 | 0.8   | 0.9  | 0.19 | 0.78                     |                                                                                                            |
|                        |                  | MMT16ER180UN | ●             |                |       | 18          | 9.525           | 3.44 | 0.8   | 1.0  | 0.21 | 0.87                     |                                                                                                            |
|                        |                  | MMT16ER160UN | ●             | ●              |       | 16          | 9.525           | 3.44 | 0.9   | 1.1  | 0.24 | 0.97                     |                                                                                                            |
|                        |                  | MMT16ER140UN | ●             | ●              |       | 14          | 9.525           | 3.44 | 1.0   | 1.2  | 0.22 | 1.11                     |                                                                                                            |
|                        |                  | MMT16ER130UN | ★             |                |       | 13          | 9.525           | 3.44 | 1.0   | 1.3  | 0.24 | 1.20                     |                                                                                                            |
|                        |                  | MMT16ER120UN | ●             | ●              |       | 12          | 9.525           | 3.44 | 1.1   | 1.4  | 0.32 | 1.30                     |                                                                                                            |
|                        |                  | MMT16ER110UN | ★             |                |       | 11          | 9.525           | 3.44 | 1.1   | 1.5  | 0.29 | 1.42                     |                                                                                                            |
|                        |                  | MMT16ER100UN | ●             |                |       | 10          | 9.525           | 3.44 | 1.1   | 1.5  | 0.32 | 1.56                     |                                                                                                            |
|                        |                  | MMT16ER090UN | ★             |                |       | 9           | 9.525           | 3.44 | 1.2   | 1.7  | 0.35 | 1.73                     |                                                                                                            |
|                        |                  | MMT16ER080UN | ●             |                |       | 8           | 9.525           | 3.44 | 1.2   | 1.6  | 0.48 | 1.95                     |                                                                                                            |
|                        |                  | MMT22ER070UN | ●             |                |       | 7           | 12.7            | 4.64 | 1.6   | 2.3  | 0.47 | 2.22                     |                                                                                                            |
|                        |                  | MMT22ER060UN | ●             |                |       | 6           | 12.7            | 4.64 | 1.6   | 2.3  | 0.53 | 2.60                     |                                                                                                            |
|                        |                  | MMT22ER050UN | ●             |                |       | 5           | 12.7            | 4.64 | 1.7   | 2.5  | 0.64 | 3.12                     |                                                                                                            |
| Whitworth for BSW, BSP | Medium Class A   | MMT16ER280W  | ●             |                |       | 28          | 9.525           | 3.44 | 0.6   | 0.7  | 0.09 | 0.58                     | <div>Full form</div>  |
|                        |                  | MMT16ER260W  | ●             |                |       | 26          | 9.525           | 3.44 | 0.7   | 0.8  | 0.10 | 0.63                     |                                                                                                            |
|                        |                  | MMT16ER200W  | ●             |                |       | 20          | 9.525           | 3.44 | 0.8   | 0.9  | 0.18 | 0.81                     |                                                                                                            |
|                        |                  | MMT16ER190W  | ●             | ●              |       | 19          | 9.525           | 3.44 | 0.8   | 1.0  | 0.19 | 0.86                     |                                                                                                            |
|                        |                  | MMT16ER180W  | ●             |                |       | 18          | 9.525           | 3.44 | 0.8   | 1.0  | 0.20 | 0.90                     |                                                                                                            |
|                        |                  | MMT16ER160W  | ●             |                |       | 16          | 9.525           | 3.44 | 0.9   | 1.1  | 0.23 | 1.02                     |                                                                                                            |
|                        |                  | MMT16ER140W  | ●             | ●              |       | 14          | 9.525           | 3.44 | 1.0   | 1.2  | 0.26 | 1.16                     |                                                                                                            |
|                        |                  | MMT16ER120W  | ★             |                |       | 12          | 9.525           | 3.44 | 1.1   | 1.4  | 0.30 | 1.36                     |                                                                                                            |
|                        |                  | MMT16ER110W  | ●             | ●              |       | 11          | 9.525           | 3.44 | 1.1   | 1.5  | 0.33 | 1.48                     |                                                                                                            |
|                        |                  | MMT16ER100W  | ★             |                |       | 10          | 9.525           | 3.44 | 1.1   | 1.5  | 0.37 | 1.63                     |                                                                                                            |
|                        |                  | MMT16ER090W  | ★             |                |       | 9           | 9.525           | 3.44 | 1.2   | 1.7  | 0.34 | 1.81                     |                                                                                                            |
|                        |                  | MMT16ER080W  | ●             |                |       | 8           | 9.525           | 3.44 | 1.2   | 1.5  | 0.39 | 2.03                     |                                                                                                            |
|                        |                  | MMT22ER070W  | ●             |                |       | 7           | 12.7            | 4.64 | 1.6   | 2.3  | 0.46 | 2.32                     |                                                                                                            |
|                        |                  | MMT22ER060W  | ●             |                |       | 6           | 12.7            | 4.64 | 1.6   | 2.3  | 0.53 | 2.71                     |                                                                                                            |
|                        |                  | MMT22ER050W  | ●             |                |       | 5           | 12.7            | 4.64 | 1.7   | 2.4  | 0.66 | 3.25                     |                                                                                                            |
|                        |                  | BSPT         | Standard BSPT | MMT16ER280BSPT | ●     |             |                 | 28   | 9.525 | 3.44 | 0.6  | 0.6                      |                                                                                                            |
| MMT16ER190BSPT         | ●                |              |               | ●              |       | 19          | 9.525           | 3.44 | 0.8   | 0.9  | 0.14 | 0.86                     |                                                                                                            |
| MMT16ER140BSPT         | ●                |              |               | ●              |       | 14          | 9.525           | 3.44 | 1.0   | 1.2  | 0.26 | 1.16                     |                                                                                                            |
| MMT16ER110BSPT         | ●                |              |               | ●              |       | 11          | 9.525           | 3.44 | 1.1   | 1.5  | 0.33 | 1.48                     |                                                                                                            |
| Round DIN 405          | 7h               | MMT16ER100RD | ●             |                |       | 10          | 9.525           | 3.44 | 1.1   | 1.2  | 0.60 | 1.27                     | <div>Full form</div>  |
|                        |                  | MMT16ER080RD | ●             |                |       | 8           | 9.525           | 3.44 | 1.4   | 1.3  | 0.75 | 1.59                     |                                                                                                            |
|                        |                  | MMT16ER060RD | ●             |                |       | 6           | 9.525           | 3.44 | 1.5   | 1.7  | 1.00 | 2.12                     |                                                                                                            |
|                        |                  | MMT22ER040RD | ●             |                |       | 4           | 9.525           | 3.44 | 2.2   | 2.3  | 1.51 | 3.18                     |                                                                                                            |

● : Inventory maintained. ★ : Inventory maintained in Japan.

(5 inserts in one case)

## INSERTS

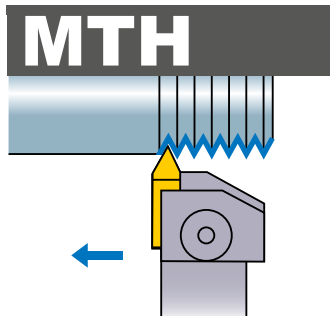
| Type                      | Thread Tolerance | Order Number   | Coated | Pitch |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry |
|---------------------------|------------------|----------------|--------|-------|-------------|-----------------|------|-----|-----|------|--------------------------|----------|
|                           |                  |                | VP10MF | mm    | thread/inch | IC              | S    | PDY | PDX | RE   |                          |          |
| ISO Trapezoidal 30°       | 7e               | MMT16ER150TR   | ●      | 1.5   |             | 9.525           | 3.44 | 1.0 | 1.1 | 0.08 | 0.90                     |          |
|                           |                  | MMT16ER200TR   | ●      | 2.0   |             | 9.525           | 3.44 | 1.1 | 1.3 | 0.15 | 1.25                     |          |
|                           |                  | MMT16ER300TR   | ●      | 3.0   |             | 9.525           | 3.44 | 1.3 | 1.5 | 0.15 | 1.75                     |          |
|                           |                  | MMT22ER400TR   | ●      | 4.0   |             | 12.7            | 4.64 | 1.7 | 1.9 | 0.15 | 2.25                     |          |
|                           |                  | MMT22ER500TR   | ●      | 5.0   |             | 12.7            | 4.64 | 2.1 | 2.5 | 0.15 | 2.75                     |          |
|                           |                  |                |        |       |             |                 |      |     |     |      |                          |          |
| American ACME             | 3G               | MMT16ER120ACME | ●      |       | 12          | 9.525           | 3.44 | 1.1 | 1.2 | 0.08 | 1.19                     |          |
|                           |                  | MMT16ER100ACME | ●      |       | 10          | 9.525           | 3.44 | 1.3 | 1.4 | 0.08 | 1.52                     |          |
|                           |                  | MMT16ER080ACME | ●      |       | 8           | 9.525           | 3.44 | 1.4 | 1.5 | 0.10 | 1.84                     |          |
|                           |                  | MMT22ER060ACME | ●      |       | 6           | 12.7            | 4.64 | 1.8 | 2.1 | 0.10 | 2.37                     |          |
|                           |                  | MMT22ER050ACME | ●      |       | 5           | 12.7            | 4.64 | 2.0 | 2.3 | 0.10 | 2.79                     |          |
|                           |                  |                |        |       |             |                 |      |     |     |      |                          |          |
| UNJ                       | 3A               | MMT16ER320UNJ  | ●      |       | 32          | 9.525           | 3.44 | 0.6 | 0.7 | 0.13 | 0.46                     |          |
|                           |                  | MMT16ER280UNJ  | ●      |       | 28          | 9.525           | 3.44 | 0.7 | 0.7 | 0.14 | 0.52                     |          |
|                           |                  | MMT16ER240UNJ  | ●      |       | 24          | 9.525           | 3.44 | 0.7 | 0.8 | 0.17 | 0.61                     |          |
|                           |                  | MMT16ER200UNJ  | ●      |       | 20          | 9.525           | 3.44 | 0.8 | 0.9 | 0.20 | 0.73                     |          |
|                           |                  | MMT16ER180UNJ  | ●      |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.22 | 0.81                     |          |
|                           |                  | MMT16ER160UNJ  | ●      |       | 16          | 9.525           | 3.44 | 0.9 | 1.1 | 0.25 | 0.92                     |          |
|                           |                  | MMT16ER140UNJ  | ●      |       | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.29 | 1.05                     |          |
|                           |                  | MMT16ER120UNJ  | ●      |       | 12          | 9.525           | 3.44 | 1.1 | 1.3 | 0.33 | 1.22                     |          |
|                           |                  | MMT16ER100UNJ  | ★      |       | 10          | 9.525           | 3.44 | 1.2 | 1.5 | 0.40 | 1.47                     |          |
|                           |                  | MMT16ER080UNJ  | ★      |       | 8           | 9.525           | 3.44 | 1.2 | 1.6 | 0.51 | 1.83                     |          |
| API Buttress Casing       | Standard API     | MMT22ER050APBU | ★      |       | 5           | 12.7            | 4.64 | 3.1 | 1.9 | 0.18 | 1.55                     |          |
|                           |                  |                |        |       |             |                 |      |     |     |      |                          |          |
| API Round Casing & Tubing | Standard API RD  | MMT16ER100APRD | ●      |       | 10          | 9.525           | 3.44 | 1.2 | 1.4 | 0.34 | 1.41                     |          |
|                           |                  | MMT16ER080APRD | ●      |       | 8           | 9.525           | 3.44 | 1.3 | 1.5 | 0.41 | 1.81                     |          |
| American NPT              | Standard NPT     | MMT16ER270NPT  | ★      |       | 27          | 9.525           | 3.44 | 0.7 | 0.8 | 0.04 | 0.66                     |          |
|                           |                  | MMT16ER180NPT  | ●      |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.08 | 1.01                     |          |
|                           |                  | MMT16ER140NPT  | ●      |       | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.09 | 1.33                     |          |
|                           |                  | MMT16ER115NPT  | ●      |       | 11.5        | 9.525           | 3.44 | 1.1 | 1.5 | 0.11 | 1.64                     |          |
|                           |                  | MMT16ER080NPT  | ●      |       | 8           | 9.525           | 3.44 | 1.3 | 1.8 | 0.14 | 2.42                     |          |
|                           |                  |                |        |       |             |                 |      |     |     |      |                          |          |
| American NPTF             | Class 2          | MMT16ER270NPTF | ★      |       | 27          | 9.525           | 3.44 | 0.7 | 0.8 | 0.04 | 0.64                     |          |
|                           |                  | MMT16ER180NPTF | ●      |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.04 | 1.00                     |          |
|                           |                  | MMT16ER140NPTF | ●      |       | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.04 | 1.35                     |          |
|                           |                  | MMT16ER115NPTF | ●      |       | 11.5        | 9.525           | 3.44 | 1.1 | 1.5 | 0.04 | 1.63                     |          |
|                           |                  | MMT16ER080NPTF | ●      |       | 8           | 9.525           | 3.44 | 1.3 | 1.8 | 0.04 | 2.38                     |          |
|                           |                  |                |        |       |             |                 |      |     |     |      |                          |          |

THREADING

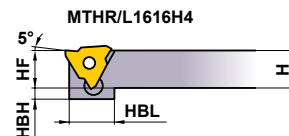
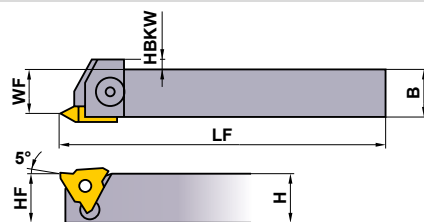
# EXTERNAL THREADING

## MT HOLDER

- Clamp-on type.
- Positive insert suffers from negligible chattering and thus produces good finished surfaces.
- Thread pitch  $\leq 4.5\text{mm}$ .



### External threading



Right hand tool holder shown.

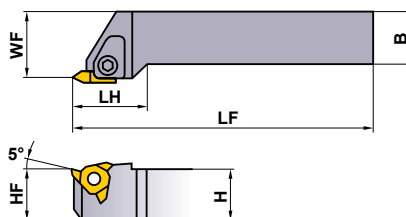
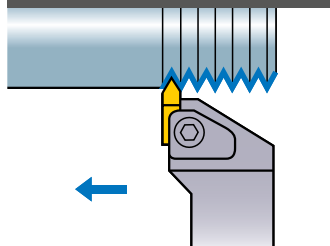
Note 1) Cutting in the opposite direction is not possible.

| Order Number | Stock |   | Insert Number | Dimensions (mm) |    |     |    |      |      |     |     | Clamp Bridge | Clamp Screw * | Spring | Wrench |
|--------------|-------|---|---------------|-----------------|----|-----|----|------|------|-----|-----|--------------|---------------|--------|--------|
|              | R     | L |               | H               | B  | LF  | HF | WF   | HBKW | HBH | HBL |              |               |        |        |
| MTHR/L1616H4 | ★     | ★ | MTTR/L43○○○○  | 16              | 16 | 100 | 16 | 13.8 | 3    | 3   | 21  | MTK1R/L      | HBH06020      | MES3   | HKY40R |
| MTHR/L2020K4 | ●     | ★ |               | 20              | 20 | 125 | 20 | 17.8 | —    | —   | —   | MTK1R/L      | HBH06020      | MES3   | HKY40R |
| MTHR/L2525M4 | ●     | ★ |               | 25              | 25 | 150 | 25 | 22.8 | —    | —   | —   | MTK1R/L      | HBH06020      | MES3   | HKY40R |

\* Clamp Torque (N • m) : HBH06020=7.0

## MT1

### External threading



Right hand tool holder shown.

Note 1) Cutting in the opposite direction is not possible.

| Order Number | Stock |   | Insert Number                                                                                | Dimensions (mm) |    |     |    |    |    |  |  * |  |  |
|--------------|-------|---|----------------------------------------------------------------------------------------------|-----------------|----|-----|----|----|----|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|              | R     | L |                                                                                              | H               | B  | LF  | LH | HF | WF | Clamp Bridge                                                                         | Clamp Screw                                                                             | Spring                                                                                | Wrench                                                                                |
| MT1R/L2020K4 | ★     | ★ | MTTR/L43  | 20              | 20 | 125 | 30 | 20 | 25 | MTK1R/L                                                                              | HBH06020                                                                                | MES3                                                                                  | HKY40R                                                                                |
| MT1R/L2525M4 | ★     | ★ |                                                                                              | 25              | 25 | 150 | 30 | 25 | 32 | MTK1R/L                                                                              | HBH06020                                                                                | MES3                                                                                  | HKY40R                                                                                |
| MT1R/L3232P4 | ★     | ★ |                                                                                              | 32              | 32 | 170 | 30 | 32 | 40 | MTK1R/L                                                                              | HBH06020                                                                                | MES3                                                                                  | HKY40R                                                                                |

\* Clamp Torque (N • m) : HBH06020=7.0

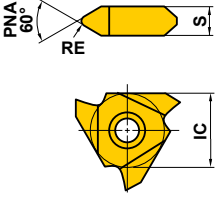
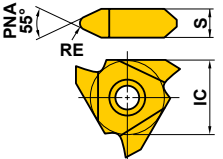
## RECOMMENDED CUTTING CONDITIONS

|   | Material                 | Hardness            | Grade  | Cutting Speed (m/min) |
|---|--------------------------|---------------------|--------|-----------------------|
| P | Mild Steel               | $\leq 180\text{HB}$ | UP20M  | 140 (100—180)         |
|   |                          |                     | NX2525 | 200 (150—250)         |
|   |                          |                     | UTi20T | 120 (100—150)         |
|   | Carbon Steel Alloy Steel | 180—280HB           | UP20M  | 120 (100—150)         |
|   |                          |                     | NX2525 | 170 (150—200)         |
|   |                          |                     | UTi20T | 100 (70—120)          |

|   | Material        | Hardness                              | Grade  | Cutting Speed (m/min) |
|---|-----------------|---------------------------------------|--------|-----------------------|
| M | Stainless Steel | $\leq 200\text{HB}$                   | UP20M  | 120 (80—150)          |
|   |                 |                                       | UTi20T | 100 (70—130)          |
| K | Gray Cast Iron  | Tensile Strength $\leq 350\text{MPa}$ | UP20M  | 80 (60—100)           |
|   |                 |                                       | UTi20T | 80 (60—100)           |
|   |                 |                                       | HTi10  | 100 (70—130)          |

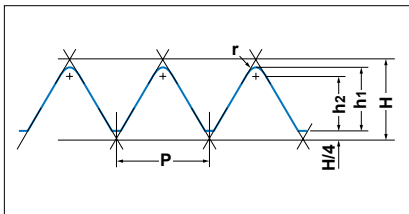
● : Inventory maintained. ★ : Inventory maintained in Japan.  
(10 inserts in one case)

## INSERTS

| Type                | Order Number | Class | Coated | Cermet | Carbide |       | ISO<br>Pitch mm<br>(thread/inch) | Dimensions (mm) |      |     | Geometry                                                                                                                              |
|---------------------|--------------|-------|--------|--------|---------|-------|----------------------------------|-----------------|------|-----|---------------------------------------------------------------------------------------------------------------------------------------|
|                     |              |       | UP20M  | NX2525 | UTi20T  | HTi10 |                                  | IC              | S    | RE  |                                                                                                                                       |
| Partial Profile 60° | MTTR436000   | G     |        | ●      | ●       |       | −0.8                             | 12.7            | 4.76 | 0   | <b>MTTR/L(60°)</b><br><br>Right hand insert shown. |
|                     | MTTR436001   | G     | ★      | ●      | ●       | ★     | 1.0–1.75                         | 12.7            | 4.76 | 0.1 |                                                                                                                                       |
|                     | MTTL436001   | G     | ★      |        | ●       | ★     | 1.0–1.75                         | 12.7            | 4.76 | 0.1 |                                                                                                                                       |
|                     | MTTR436002   | G     | ★      | ●      | ●       | ★     | 2.0–2.5                          | 12.7            | 4.76 | 0.2 |                                                                                                                                       |
|                     | MTTL436002   | G     |        | ●      | ●       |       | 2.0–2.5                          | 12.7            | 4.76 | 0.2 |                                                                                                                                       |
|                     | MTTR436003   | G     | ★      | ●      | ●       | ★     | 3.0–3.5                          | 12.7            | 4.76 | 0.3 |                                                                                                                                       |
|                     | MTTL436003   | G     |        | ●      | ●       |       | 3.0–3.5                          | 12.7            | 4.76 | 0.3 |                                                                                                                                       |
|                     | MTTR436004   | G     |        | ●      | ●       |       | 4.0–4.5                          | 12.7            | 4.76 | 0.4 |                                                                                                                                       |
| Partial Profile 55° | MTTR435501   | G     |        | ●      | ★       |       | (28–10)                          | 12.7            | 4.76 | 0.1 | <b>MTTR(55°)</b><br><br>Right hand insert only.    |
|                     | MTTR435502   | G     |        | ●      | ●       |       | (16–8)                           | 12.7            | 4.76 | 0.2 |                                                                                                                                       |
|                     | MTTR435503   | G     |        | ●      | ●       |       | (11–8)                           | 12.7            | 4.76 | 0.3 |                                                                                                                                       |
|                     |              |       |        |        |         |       |                                  |                 |      |     |                                                                                                                                       |

### STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When using cermet grades or cutting stainless steel, please increase the number of passes by 2–3 times.



### METRIC SCREW THREAD

| P (Pitch)         |    | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|-------------------|----|------|------|------|------|------|------|------|------|------|------|------|
| h1                |    | 0.46 | 0.61 | 0.77 | 0.92 | 1.07 | 1.23 | 1.53 | 1.84 | 2.15 | 2.45 | 2.76 |
| h2                |    | 0.35 | 0.47 | 0.59 | 0.70 | 0.82 | 0.94 | 1.17 | 1.41 | 1.65 | 1.87 | 2.11 |
| r (Corner Radius) |    | 0.11 | 0.14 | 0.18 | 0.22 | 0.25 | 0.29 | 0.36 | 0.43 | 0.50 | 0.58 | 0.65 |
| Number of Passes  | 1  | 0.18 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 | 0.30 | 0.35 | 0.35 | 0.40 |
|                   | 2  | 0.13 | 0.15 | 0.18 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 | 0.30 | 0.35 |
|                   | 3  | 0.10 | 0.10 | 0.12 | 0.15 | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 |
|                   | 4  | 0.05 | 0.10 | 0.12 | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 |
|                   | 5  |      | 0.06 | 0.10 | 0.10 | 0.12 | 0.15 | 0.15 | 0.20 | 0.20 | 0.25 | 0.25 |
|                   | 6  |      |      | 0.05 | 0.07 | 0.10 | 0.10 | 0.10 | 0.15 | 0.20 | 0.20 | 0.20 |
|                   | 7  |      |      |      |      | 0.05 | 0.08 | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
|                   | 8  |      |      |      |      |      | 0.05 | 0.10 | 0.10 | 0.15 | 0.15 | 0.15 |
|                   | 9  |      |      |      |      |      |      | 0.08 | 0.10 | 0.10 | 0.15 | 0.15 |
|                   | 10 |      |      |      |      |      |      | 0.05 | 0.09 | 0.10 | 0.10 | 0.15 |
|                   | 11 |      |      |      |      |      |      |      | 0.05 | 0.10 | 0.10 | 0.10 |
|                   | 12 |      |      |      |      |      |      |      |      | 0.05 | 0.10 | 0.10 |
|                   | 13 |      |      |      |      |      |      |      |      |      | 0.05 | 0.10 |
|                   | 14 |      |      |      |      |      |      |      |      |      |      | 0.06 |

Note 1) The first pass causes a high load on the cutting edge.  
In order to avoid damage, keep the depth of cut to 0.4–0.5mm maximum.

# INTERNAL THREADING

## MMTI TYPE BORING BARS

- Minimum cutting diameter 13mm.
- Various insert types.
- Precision class insert.
- Available with a wiper cutting edge to provide a precise thread geometry.
- Able to change lead angle by replacing the shim.

### MMTI

#### Internal threading

Fig.1 (Screw-on type)

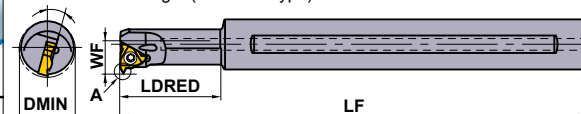


Fig.2 (Screw-on type)

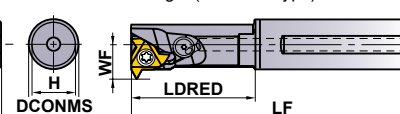


Fig.3 (Clamp-on type)

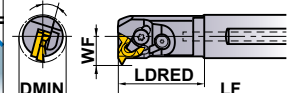
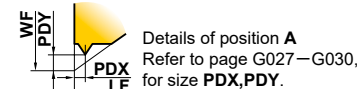
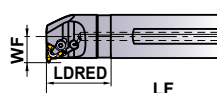


Fig.4 (Clamp-on type)



Right hand tool holder only.

| Order Number       | Stock<br>R | Insert<br>Number | Lead<br>Angle | Dimensions (mm) |     |       |      |      |      | Clamp<br>Bridge | Clamp<br>Screw | Stop<br>Ring | ① Shim Screw<br>② Embedded Seal Screw | Shim      | Wrench             | Fig |
|--------------------|------------|------------------|---------------|-----------------|-----|-------|------|------|------|-----------------|----------------|--------------|---------------------------------------|-----------|--------------------|-----|
|                    |            |                  |               | DCONMS          | LF  | LDRED | WF   | H    | DMIN |                 |                |              |                                       |           |                    |     |
| MMTIR1316AK11-SP15 | ●          | MMT111R          | 1.5°          | 16              | 125 | 25    | 8.7  | 15   | 13   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1316AK11-SP25 | ★          |                  | 2.5°          | 16              | 125 | 25    | 8.7  | 15   | 13   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1316AK11-SP35 | ★          |                  | 3.5°          | 16              | 125 | 25    | 8.7  | 15   | 13   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1516AM11-SP15 | ●          |                  | 1.5°          | 16              | 150 | 32    | 9.7  | 15   | 15   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1516AM11-SP25 | ★          |                  | 2.5°          | 16              | 150 | 32    | 9.7  | 15   | 15   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1516AM11-SP35 | ★          |                  | 3.5°          | 16              | 150 | 32    | 9.7  | 15   | 15   | —               | TS25           | —            | —                                     | —         | ①TKY08F            | 1   |
| MMTIR1916AM16-SP15 | ●          | MMT161R          | 1.5°          | 16              | 150 | 40    | 12.2 | 15   | 19   | —               | CS350860T      | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR1916AM16-SP25 | ★          |                  | 2.5°          | 16              | 150 | 40    | 12.2 | 15   | 19   | —               | CS350860T      | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR1916AM16-SP35 | ★          |                  | 3.5°          | 16              | 150 | 40    | 12.2 | 15   | 19   | —               | CS350860T      | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR2420AQ16-C    | ●          |                  | 1.5°          | 20              | 180 | 40    | 14.2 | 19   | 24   | SETK51          | SETS51         | CR4          | ①HFC03006<br>②TFS03006                | CTI32TP15 | ①TKY15F<br>②HKY20R | 3   |
| MMTIR2925AS16-C    | ●          |                  | 1.5°          | 25              | 250 | 60    | 16.7 | 23.4 | 29   | SETK51          | SETS51         | CR4          | ①HFC03006<br>②TFS03006                | CTI32TP15 | ①TKY15F<br>②HKY20R | 3   |
| MMTIR3732AS16-C    | ●          |                  | 1.5°          | 32              | 250 | 48    | 20.5 | 30.4 | 37   | SETK51          | SETS51         | CR4          | ①HFC03006<br>②TFS03006                | CTI32TP15 | ①TKY15F<br>②HKY20R | 4   |
| MMTIR2420AQ22-SP15 | ●          | MMT221R          | 1.5°          | 20              | 180 | 50    | 15.5 | 19   | 24   | —               | TS43           | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR2420AQ22-SP25 | ★          |                  | 2.5°          | 20              | 180 | 50    | 15.5 | 19   | 24   | —               | TS43           | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR2420AQ22-SP35 | ★          |                  | 3.5°          | 20              | 180 | 50    | 15.5 | 19   | 24   | —               | TS43           | —            | —                                     | —         | ①TKY15F            | 2   |
| MMTIR3025AR22-C    | ●          |                  | 1.5°          | 25              | 200 | 38    | 17.8 | 23.4 | 30   | SETK61          | SETS61         | CR5          | ①HFC04008<br>②TFS03006                | CTI43TP15 | ①TKY20F<br>②HKY25R | 4   |
| MMTIR3832AS22-C    | ●          |                  | 1.5°          | 32              | 250 | 48    | 21.8 | 30.4 | 38   | SETK61          | SETS61         | CR5          | ①HFC04008<br>②TFS03006                | CTI43TP15 | ①TKY20F<br>②HKY25R | 4   |
| MMTIR4640AT22-C    | ★          |                  | 1.5°          | 40              | 300 | 60    | 26.2 | 38   | 46   | SETK61          | SETS61         | CR5          | ①HFC04008<br>②TFS03006                | CTI43TP15 | ①TKY20F<br>②HKY25R | 4   |

Note 1) Select and use a shim as shown below (sold separately), dependant on the lead angle.

• A screw-on tool holder uses no shim. (The holder body has a lead angle.) Use a tool holder with the appropriate lead angle.

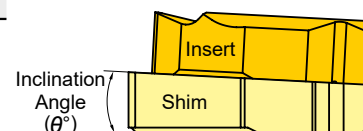
• Min. cutting diameter (DMIN) shows the internal hole diameter, not the thread diameter.

\* Clamp Torque (N · m) : TS25=1.0, CS350860T=3.5, SETS51=3.5, TS43=3.5, SETS61=5.0, HFC03006=1.5, HFC04008=2.2

### SHIM

| Lead Angle (α°) | Order Number | Stock<br>R | Inclination Angle (θ°) | Applicable Holder      |
|-----------------|--------------|------------|------------------------|------------------------|
| -1.5°           | CTI32TN15    | ●          | -3°                    | MMTIR<br>○○○○<br>○16-C |
| -0.5°           | CTI32TN05    | ●          | -2°                    |                        |
| 0.5°            | CTI32TP05    | ●          | -1°                    |                        |
| 1.5°            | CTI32TP15    | ●          | 0°                     |                        |
| 2.5°            | CTI32TP25    | ●          | 1°                     |                        |
| 3.5°            | CTI32TP35    | ●          | 2°                     |                        |
| 4.5°            | CTI32TP45    | ●          | 3°                     |                        |

| Lead Angle (α°) | Order Number | Stock<br>R | Inclination Angle (θ°) | Applicable Holder      |
|-----------------|--------------|------------|------------------------|------------------------|
| -1.5°           | CTI43TN15    | ●          | -3°                    | MMTIR<br>○○○○<br>○22-C |
| -0.5°           | CTI43TN05    | ●          | -2°                    |                        |
| 0.5°            | CTI43TP05    | ●          | -1°                    |                        |
| 1.5°            | CTI43TP15    | ●          | 0°                     |                        |
| 2.5°            | CTI43TP25    | ●          | 1°                     |                        |
| 3.5°            | CTI43TP35    | ●          | 2°                     |                        |
| 4.5°            | CTI43TP45    | ●          | 3°                     |                        |



Standard shim delivered with the holder.

### RECOMMENDED CUTTING CONDITIONS

|   | Material                 | Hardness                    | Grade  | Cutting Speed (m/min) |
|---|--------------------------|-----------------------------|--------|-----------------------|
| P | Mild Steel               | ≤180HB                      | MP9025 | 80 (60-100)           |
|   |                          |                             | VP10MF | 150 (70-230)          |
|   |                          |                             | VP15TF | 100 (60-140)          |
|   |                          |                             | VP20RT | 80 (60-100)           |
|   | Carbon Steel Alloy Steel | 180-280HB                   | MP9025 | 80 (60-100)           |
|   |                          |                             | VP10MF | 140 (80-200)          |
| M | Stainless Steel          | ≤200HB                      | VP15TF | 100 (60-140)          |
|   |                          |                             | VP20RT | 80 (60-100)           |
|   |                          |                             | MP9025 | 80 (40-120)           |
| K | Gray Cast Iron           | Tensile Strength<br>≤350MPa | VP10MF | 140 (80-200)          |
|   |                          |                             | VP15TF | 90 (60-120)           |

|   | Material             | Hardness | Grade  | Cutting Speed (m/min) |
|---|----------------------|----------|--------|-----------------------|
| S | Heat-Resistant Alloy | —        | MP9025 | 30 (20-40)            |
|   |                      |          | VP10MF | 45 (15-70)            |
|   |                      |          | VP15TF | 30 (20-40)            |
|   |                      |          | VP20RT | 30 (20-40)            |
|   |                      |          | MP9025 | 45 (25-65)            |
| H | Heat-Treated Alloy   | 45-55HRC | VP10MF | 60 (40-80)            |
|   |                      |          | VP15TF | 45 (25-65)            |
|   |                      |          | VP20RT | 45 (25-65)            |

HOW TO SELECT A SHIM ➤ G012

MMT SERIES ORDER NUMBER ➤ G018



# MMT M-CLASS INSERTS WITH 3-D CHIPBREAKERS

## INSERTS

| Type                   | Order Number     | Coated |        |        | Pitch    |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry                                               |
|------------------------|------------------|--------|--------|--------|----------|-------------|-----------------|------|-----|-----|------|--------------------------|--------------------------------------------------------|
|                        |                  | NEW    |        |        |          |             | IC              | S    | PDY | PDX | RE   |                          |                                                        |
|                        |                  | MP9025 | VP15TF | VP20RT | mm       | thread/inch |                 |      |     |     |      |                          |                                                        |
| Partial Profile 60°    | MMT11IRA60-S     | ●      | ●      | ●      | 0.5—1.5  | 48—16       | 6.35            | 3.04 | 0.8 | 0.9 | 0.03 | —                        | <div>Partial form</div> <div>PNA 60°</div> <div></div> |
|                        | MMT16IRAG60-S    | ●      | ●      | ●      | 0.5—3.0  | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.05 | —                        |                                                        |
|                        | MMT16IRA60-S     | ●      | ●      | ●      | 0.5—1.5  | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.03 | —                        |                                                        |
|                        | MMT16IRG60-S     | ●      | ●      | ●      | 1.75—3.0 | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.11 | —                        |                                                        |
| Partial Profile 55°    | MMT11IRA55-S     | ●      | ●      | ●      |          | 48—16       | 6.35            | 3.04 | 0.8 | 0.9 | 0.07 | —                        | <div>Partial form</div> <div>PNA 55°</div> <div></div> |
|                        | MMT16IRAG55-S    | ●      | ●      | ●      |          | 48—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.07 | —                        |                                                        |
|                        | MMT16IRA55-S     | ●      | ●      | ●      |          | 48—16       | 9.525           | 3.44 | 0.8 | 0.9 | 0.07 | —                        |                                                        |
|                        | MMT16IRG55-S     | ●      | ●      | ●      |          | 14—8        | 9.525           | 3.44 | 1.2 | 1.7 | 0.21 | —                        |                                                        |
| ISO Metric             | MMT11IR100ISO-S  | ★      | ●      | ★      | 1.0      |             | 6.35            | 3.04 | 0.6 | 0.7 | 0.06 | 0.58                     | <div>Full form</div> <div>PNA 60°</div> <div></div>    |
|                        | MMT11IR125ISO-S  | ★      | ●      | ★      | 1.25     |             | 6.35            | 3.04 | 0.8 | 0.9 | 0.08 | 0.72                     |                                                        |
|                        | MMT11IR150ISO-S  | ★      | ●      | ★      | 1.5      |             | 6.35            | 3.04 | 0.8 | 1.0 | 0.10 | 0.87                     |                                                        |
|                        | MMT16IR100ISO-S  | ●      | ●      | ●      | 1.0      |             | 9.525           | 3.44 | 0.6 | 0.7 | 0.06 | 0.58                     |                                                        |
|                        | MMT16IR125ISO-S  | ●      | ●      | ●      | 1.25     |             | 9.525           | 3.44 | 0.8 | 0.9 | 0.08 | 0.72                     |                                                        |
|                        | MMT16IR150ISO-S  | ●      | ●      | ●      | 1.5      |             | 9.525           | 3.44 | 0.8 | 1.0 | 0.10 | 0.87                     |                                                        |
|                        | MMT16IR175ISO-S  | ●      | ●      | ●      | 1.75     |             | 9.525           | 3.44 | 0.9 | 1.2 | 0.11 | 1.01                     |                                                        |
|                        | MMT16IR200ISO-S  | ●      | ●      | ●      | 2.0      |             | 9.525           | 3.44 | 1.0 | 1.3 | 0.13 | 1.15                     |                                                        |
|                        | MMT16IR250ISO-S  | ●      | ●      | ●      | 2.5      |             | 9.525           | 3.44 | 1.1 | 1.5 | 0.17 | 1.44                     |                                                        |
|                        | MMT16IR300ISO-S  | ●      | ●      | ●      | 3.0      |             | 9.525           | 3.44 | 1.1 | 1.5 | 0.20 | 1.73                     |                                                        |
| American UN            | MMT16IR160UN-S   | ★      | ●      | ★      |          | 16          | 9.525           | 3.44 | 0.9 | 1.1 | 0.11 | 0.92                     | <div>Full form</div> <div>PNA 60°</div> <div></div>    |
|                        | MMT16IR140UN-S   | ★      | ●      | ★      |          | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.12 | 1.05                     |                                                        |
|                        | MMT16IR120UN-S   | ★      | ●      | ★      |          | 12          | 9.525           | 3.44 | 1.1 | 1.4 | 0.14 | 1.22                     |                                                        |
| Whitworth for BSW, BSP | MMT16IR190W-S    | ●      | ●      | ●      |          | 19          | 9.525           | 3.44 | 0.8 | 1.0 | 0.18 | 0.86                     | <div>Full form</div> <div>PNA 55°</div> <div></div>    |
|                        | MMT16IR140W-S    | ●      | ●      | ●      |          | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.25 | 1.16                     |                                                        |
|                        | MMT16IR110W-S    | ●      | ●      | ●      |          | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.32 | 1.48                     |                                                        |
| BSPT                   | MMT16IR190BSPT-S | ★      | ●      | ★      |          | 19          | 9.525           | 3.44 | 0.8 | 0.9 | 0.18 | 0.86                     | <div>Full form</div> <div>PNA 55°</div> <div></div>    |
|                        | MMT16IR140BSPT-S | ★      | ●      | ★      |          | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.25 | 1.16                     |                                                        |
|                        | MMT16IR110BSPT-S | ★      | ●      | ★      |          | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.32 | 1.48                     |                                                        |

G

THREADING

## IDENTIFICATION

|                    |                                          |                    |                     |              |                          |          |          |                                       |
|--------------------|------------------------------------------|--------------------|---------------------|--------------|--------------------------|----------|----------|---------------------------------------|
| <b>MMT</b>         | <b>16</b>                                | <b>I</b>           | <b>R</b>            | <b>100</b>   | <b>ISO</b>               | <b>-</b> | <b>S</b> | M-class inserts with 3-D chipbreakers |
| <b>Designation</b> | <b>Diameter of Inscribed Circle (mm)</b> | <b>Application</b> | <b>Hand of Tool</b> | <b>Pitch</b> | <b>Threading Type</b>    |          |          |                                       |
|                    | 11 6.35                                  | E External         | R Right             | 100 1.0mm    | 60 Partial Profile 60°   |          |          |                                       |
|                    | 16 9.525                                 | I Internal         |                     | 125 1.25mm   | 55 Partial Profile 55°   |          |          |                                       |
|                    |                                          |                    |                     | 150 1.5mm    | ISO ISO Metric           |          |          |                                       |
|                    |                                          |                    |                     | 175 1.75mm   | W Whitworth for BSW, BSP |          |          |                                       |
|                    |                                          |                    |                     | 200 2.0mm    | BSPT BSPT                |          |          |                                       |
|                    |                                          |                    |                     | 250 2.5mm    | UN American UN           |          |          |                                       |
|                    |                                          |                    |                     | 300 3.0mm    |                          |          |          |                                       |



# MMT G-CLASS GROUND INSERTS

## INSERTS

| Type                | Thread<br>Tolerance | Order Number  | Coated |             | Pitch    |       | Dimensions (mm) |      |     |     |      | Total<br>Cutting<br>Depth<br>(mm) | Geometry |
|---------------------|---------------------|---------------|--------|-------------|----------|-------|-----------------|------|-----|-----|------|-----------------------------------|----------|
|                     |                     |               | VP10MF | VP15TF      |          |       | IC              | S    | PDY | PDX | RE   |                                   |          |
|                     |                     |               | mm     | thread/inch |          |       |                 |      |     |     |      |                                   |          |
| Partial Profile 60° | —                   | MMT11IRA60    | ●      | ●           | 0.5—1.5  | 48—16 | 6.35            | 3.04 | 0.8 | 0.9 | 0.05 | —                                 |          |
|                     |                     | MMT16IRA60    | ●      | ●           | 0.5—1.5  | 48—16 | 9.525           | 3.44 | 0.8 | 0.9 | 0.05 | —                                 |          |
|                     |                     | MMT16IRG60    | ●      | ●           | 1.75—3.0 | 14—8  | 9.525           | 3.44 | 1.2 | 1.7 | 0.16 | —                                 |          |
|                     |                     | MMT16IRAG60   | ●      | ●           | 0.5—3.0  | 48—8  | 9.525           | 3.44 | 1.2 | 1.7 | 0.05 | —                                 |          |
|                     |                     | MMT22IRN60    | ●      | ●           | 3.5—5.0  | 7—5   | 12.7            | 4.64 | 1.7 | 2.5 | 0.30 | —                                 |          |
|                     |                     |               |        |             |          |       |                 |      |     |     |      |                                   |          |
| Partial Profile 55° | —                   | MMT11IRA55    | ●      | ●           |          | 48—16 | 6.35            | 3.04 | 0.8 | 0.9 | 0.05 | —                                 |          |
|                     |                     | MMT16IRA55    | ●      | ●           |          | 48—16 | 9.525           | 3.44 | 0.8 | 0.9 | 0.05 | —                                 |          |
|                     |                     | MMT16IRG55    | ●      | ●           |          | 14—8  | 9.525           | 3.44 | 1.2 | 1.7 | 0.21 | —                                 |          |
|                     |                     | MMT16IRAG55   | ●      | ●           |          | 48—8  | 9.525           | 3.44 | 1.2 | 1.7 | 0.07 | —                                 |          |
|                     |                     | MMT22IRN55    | ●      | ●           |          | 7—5   | 12.7            | 4.64 | 1.7 | 2.5 | 0.44 | —                                 |          |
|                     |                     |               |        |             |          |       |                 |      |     |     |      |                                   |          |
| ISO Metric          | 6H                  | MMT11IR050ISO | ●      | ●           | 0.5      |       | 6.35            | 3.04 | 0.6 | 0.4 | 0.03 | 0.29                              |          |
|                     |                     | MMT11IR075ISO | ●      | ●           | 0.75     |       | 6.35            | 3.04 | 0.6 | 0.6 | 0.04 | 0.43                              |          |
|                     |                     | MMT11IR100ISO | ●      | ●           | 1.0      |       | 6.35            | 3.04 | 0.6 | 0.7 | 0.10 | 0.58                              |          |
|                     |                     | MMT11IR125ISO | ●      | ●           | 1.25     |       | 6.35            | 3.04 | 0.8 | 0.9 | 0.12 | 0.72                              |          |
|                     |                     | MMT11IR150ISO | ●      | ●           | 1.5      |       | 6.35            | 3.04 | 0.8 | 1.0 | 0.14 | 0.87                              |          |
|                     |                     | MMT11IR175ISO | ●      | ●           | 1.75     |       | 6.35            | 3.04 | 0.9 | 1.1 | 0.10 | 1.01                              |          |
|                     |                     | MMT11IR200ISO | ●      | ●           | 2.0      |       | 6.35            | 3.04 | 0.9 | 1.1 | 0.18 | 1.15                              |          |
|                     |                     | MMT16IR050ISO | ●      | ●           | 0.5      |       | 9.525           | 3.44 | 0.6 | 0.4 | 0.03 | 0.29                              |          |
|                     |                     | MMT16IR075ISO | ●      | ●           | 0.75     |       | 9.525           | 3.44 | 0.6 | 0.6 | 0.04 | 0.43                              |          |
|                     |                     | MMT16IR100ISO | ●      | ●           | 1.0      |       | 9.525           | 3.44 | 0.6 | 0.7 | 0.10 | 0.58                              |          |
|                     |                     | MMT16IR125ISO | ●      | ●           | 1.25     |       | 9.525           | 3.44 | 0.8 | 0.9 | 0.12 | 0.72                              |          |
|                     |                     | MMT16IR150ISO | ●      | ●           | 1.5      |       | 9.525           | 3.44 | 0.8 | 1.0 | 0.14 | 0.87                              |          |
|                     |                     | MMT16IR175ISO | ●      | ●           | 1.75     |       | 9.525           | 3.44 | 0.9 | 1.2 | 0.10 | 1.01                              |          |
|                     |                     | MMT16IR200ISO | ●      | ●           | 2.0      |       | 9.525           | 3.44 | 1.0 | 1.3 | 0.18 | 1.15                              |          |
|                     |                     | MMT16IR250ISO | ●      | ●           | 2.5      |       | 9.525           | 3.44 | 1.1 | 1.5 | 0.15 | 1.44                              |          |
|                     |                     | MMT16IR300ISO | ●      | ●           | 3.0      |       | 9.525           | 3.44 | 1.1 | 1.5 | 0.26 | 1.73                              |          |
|                     |                     | MMT22IR350ISO | ●      | ●           | 3.5      |       | 12.7            | 4.64 | 1.6 | 2.3 | 0.22 | 2.02                              |          |
|                     |                     | MMT22IR400ISO | ●      | ●           | 4.0      |       | 12.7            | 4.64 | 1.6 | 2.3 | 0.25 | 2.31                              |          |
|                     |                     | MMT22IR450ISO | ●      | ●           | 4.5      |       | 12.7            | 4.64 | 1.6 | 2.4 | 0.28 | 2.60                              |          |
|                     |                     | MMT22IR500ISO | ●      | ●           | 5.0      |       | 12.7            | 4.64 | 1.6 | 2.3 | 0.32 | 2.89                              |          |

## IDENTIFICATION

**Designation**

**Diameter of Inscribed Circle (mm)**

|    |       |
|----|-------|
| 11 | 6.35  |
| 16 | 9.525 |
| 22 | 12.7  |

**Application**

|   |          |
|---|----------|
| E | External |
| I | Internal |

**Hand of Tool**

|   |       |
|---|-------|
| R | Right |
|---|-------|

**Pitch**

|     |        |    |                                      |
|-----|--------|----|--------------------------------------|
| 050 | 0.5mm  | A  | 0.5—1.5mm<br>or<br>48—16 thread/inch |
| 075 | 0.75mm |    |                                      |
| 100 | 1.0mm  |    |                                      |
| 125 | 1.25mm | G  | 1.75—3.0mm<br>or<br>14—8 thread/inch |
| 150 | 1.5mm  |    |                                      |
| 175 | 1.75mm |    |                                      |
| 200 | 2.0mm  | AG | 0.5—3.0mm<br>or<br>48—8 thread/inch  |
| 250 | 2.5mm  |    |                                      |
| 300 | 3.0mm  |    |                                      |
| 350 | 3.5mm  | N  | 3.5—5.0mm<br>or<br>7—5 thread/inch   |
| 400 | 4.0mm  |    |                                      |
| 450 | 4.5mm  |    |                                      |
| 500 | 5.0mm  |    |                                      |

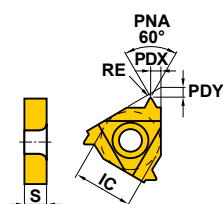
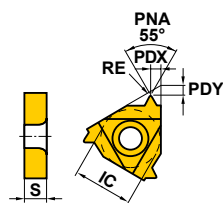
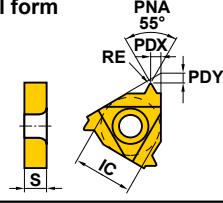
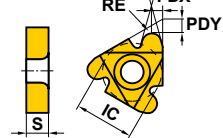
**Threading Type**

|      |                         |
|------|-------------------------|
| 60   | Partial Profile 60°     |
| 55   | Partial Profile 55°     |
| ISO  | ISO Metric              |
| W    | Whitworth for BSW, BSP  |
| BSPT | BSPT                    |
| UN   | American UN             |
| RD   | Round DIN 405           |
| TR   | ISO Trapezoidal 30°     |
| ACME | American ACME           |
| UNJ  | UNJ                     |
| APBU | API Buttress Casing     |
| APRD | API Round Casing&Tubing |
| NPT  | NPT                     |
| NPTF | NPTF                    |

● : Inventory maintained. ★ : Inventory maintained in Japan.

(5 inserts in one case)

## INSERTS

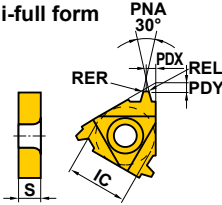
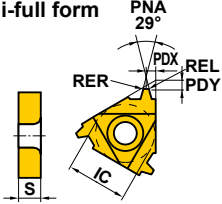
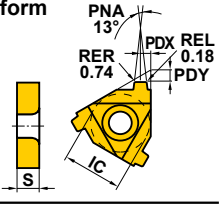
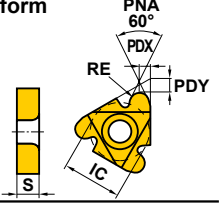
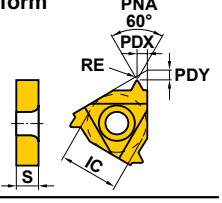
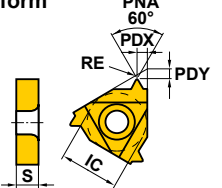
| Type                   | Thread Tolerance | Order Number   | Coated |        | Pitch |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry                                                                                                   |
|------------------------|------------------|----------------|--------|--------|-------|-------------|-----------------|------|-----|-----|------|--------------------------|------------------------------------------------------------------------------------------------------------|
|                        |                  |                | VP10MF | VP15TF |       |             | IC              | S    | PDY | PDX | RE   |                          |                                                                                                            |
|                        |                  |                |        |        | mm    | thread/inch |                 |      |     |     |      |                          |                                                                                                            |
| American UN            | 2B               | MMT11IR320UN   | ★      |        |       | 32          | 6.35            | 3.04 | 0.6 | 0.6 | 0.04 | 0.46                     | <div>Full form</div>    |
|                        |                  | MMT11IR280UN   | ★      |        |       | 28          | 6.35            | 3.04 | 0.6 | 0.7 | 0.05 | 0.52                     |                                                                                                            |
|                        |                  | MMT11IR240UN   | ●      |        |       | 24          | 6.35            | 3.04 | 0.7 | 0.8 | 0.09 | 0.61                     |                                                                                                            |
|                        |                  | MMT11IR200UN   | ●      |        |       | 20          | 6.35            | 3.04 | 0.8 | 0.9 | 0.11 | 0.73                     |                                                                                                            |
|                        |                  | MMT11IR180UN   | ●      |        |       | 18          | 6.35            | 3.04 | 0.8 | 1.0 | 0.12 | 0.81                     |                                                                                                            |
|                        |                  | MMT11IR160UN   | ●      |        |       | 16          | 6.35            | 3.04 | 0.9 | 1.1 | 0.14 | 0.92                     |                                                                                                            |
|                        |                  | MMT11IR140UN   | ●      |        |       | 14          | 6.35            | 3.04 | 0.9 | 1.1 | 0.11 | 1.05                     |                                                                                                            |
|                        |                  | MMT16IR320UN   | ●      |        |       | 32          | 9.525           | 3.44 | 0.6 | 0.6 | 0.04 | 0.46                     |                                                                                                            |
|                        |                  | MMT16IR280UN   | ●      |        |       | 28          | 9.525           | 3.44 | 0.6 | 0.7 | 0.05 | 0.52                     |                                                                                                            |
|                        |                  | MMT16IR240UN   | ●      |        |       | 24          | 9.525           | 3.44 | 0.7 | 0.8 | 0.09 | 0.61                     |                                                                                                            |
|                        |                  | MMT16IR200UN   | ●      |        |       | 20          | 9.525           | 3.44 | 0.8 | 0.9 | 0.11 | 0.73                     |                                                                                                            |
|                        |                  | MMT16IR180UN   | ●      |        |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.12 | 0.81                     |                                                                                                            |
|                        |                  | MMT16IR160UN   | ●      | ●      |       | 16          | 9.525           | 3.44 | 0.9 | 1.1 | 0.14 | 0.92                     |                                                                                                            |
|                        |                  | MMT16IR140UN   | ●      | ●      |       | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.11 | 1.05                     |                                                                                                            |
|                        |                  | MMT16IR130UN   | ●      |        |       | 13          | 9.525           | 3.44 | 1.0 | 1.3 | 0.10 | 1.13                     |                                                                                                            |
|                        |                  | MMT16IR120UN   | ●      | ●      |       | 12          | 9.525           | 3.44 | 1.1 | 1.4 | 0.18 | 1.22                     |                                                                                                            |
|                        |                  | MMT16IR110UN   | ●      |        |       | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.13 | 1.33                     |                                                                                                            |
|                        |                  | MMT16IR100UN   | ●      |        |       | 10          | 9.525           | 3.44 | 1.1 | 1.5 | 0.15 | 1.47                     |                                                                                                            |
|                        |                  | MMT16IR090UN   | ●      |        |       | 9           | 9.525           | 3.44 | 1.2 | 1.7 | 0.17 | 1.63                     |                                                                                                            |
|                        |                  | MMT16IR080UN   | ●      |        |       | 8           | 9.525           | 3.44 | 1.1 | 1.5 | 0.27 | 1.83                     |                                                                                                            |
|                        |                  | MMT22IR070UN   | ●      |        |       | 7           | 12.7            | 4.64 | 1.6 | 2.3 | 0.23 | 2.09                     |                                                                                                            |
|                        |                  | MMT22IR060UN   | ●      |        |       | 6           | 12.7            | 4.64 | 1.6 | 2.3 | 0.26 | 2.44                     |                                                                                                            |
|                        |                  | MMT22IR050UN   | ●      |        |       | 5           | 12.7            | 4.64 | 1.6 | 2.3 | 0.32 | 2.93                     |                                                                                                            |
| Whitworth for BSW, BSP | Medium Class A   | MMT11IR190W    | ●      |        |       | 19          | 6.35            | 3.04 | 0.8 | 1.0 | 0.19 | 0.86                     | <div>Full form</div>  |
|                        |                  | MMT11IR140W    | ●      |        |       | 14          | 6.35            | 3.04 | 0.9 | 1.1 | 0.26 | 1.16                     |                                                                                                            |
|                        |                  | MMT16IR280W    | ●      |        |       | 28          | 9.525           | 3.44 | 0.6 | 0.7 | 0.09 | 0.58                     |                                                                                                            |
|                        |                  | MMT16IR260W    | ●      |        |       | 26          | 9.525           | 3.44 | 0.7 | 0.8 | 0.10 | 0.63                     |                                                                                                            |
|                        |                  | MMT16IR200W    | ●      |        |       | 20          | 9.525           | 3.44 | 0.8 | 0.9 | 0.18 | 0.81                     |                                                                                                            |
|                        |                  | MMT16IR190W    | ●      | ●      |       | 19          | 9.525           | 3.44 | 0.8 | 1.0 | 0.19 | 0.86                     |                                                                                                            |
|                        |                  | MMT16IR180W    | ●      |        |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.20 | 0.90                     |                                                                                                            |
|                        |                  | MMT16IR160W    | ●      |        |       | 16          | 9.525           | 3.44 | 0.9 | 1.1 | 0.23 | 1.02                     |                                                                                                            |
|                        |                  | MMT16IR140W    | ●      | ●      |       | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.26 | 1.16                     |                                                                                                            |
|                        |                  | MMT16IR120W    | ●      |        |       | 12          | 9.525           | 3.44 | 1.1 | 1.4 | 0.30 | 1.36                     |                                                                                                            |
|                        |                  | MMT16IR110W    | ●      | ●      |       | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.33 | 1.48                     |                                                                                                            |
|                        |                  | MMT16IR100W    | ●      |        |       | 10          | 9.525           | 3.44 | 1.1 | 1.5 | 0.37 | 1.63                     |                                                                                                            |
|                        |                  | MMT16IR090W    | ●      |        |       | 9           | 9.525           | 3.44 | 1.2 | 1.7 | 0.34 | 1.81                     |                                                                                                            |
|                        |                  | MMT16IR080W    | ●      |        |       | 8           | 9.525           | 3.44 | 1.2 | 1.5 | 0.39 | 2.03                     |                                                                                                            |
|                        |                  | MMT22IR070W    | ●      |        |       | 7           | 12.7            | 4.64 | 1.6 | 2.3 | 0.46 | 2.32                     |                                                                                                            |
|                        |                  | MMT22IR060W    | ●      |        |       | 6           | 12.7            | 4.64 | 1.6 | 2.3 | 0.53 | 2.71                     |                                                                                                            |
|                        |                  | MMT22IR050W    | ●      |        |       | 5           | 12.7            | 4.64 | 1.7 | 2.4 | 0.66 | 3.25                     |                                                                                                            |
| BSPT                   | Standard BSPT    | MMT11IR190BSPT | ●      |        |       | 19          | 6.35            | 3.04 | 0.8 | 0.9 | 0.14 | 0.86                     | <div>Full form</div>  |
|                        |                  | MMT11IR140BSPT | ●      |        |       | 14          | 6.35            | 3.04 | 0.9 | 1.0 | 0.26 | 1.16                     |                                                                                                            |
|                        |                  | MMT16IR190BSPT | ★      | ★      |       | 19          | 9.525           | 3.44 | 0.8 | 0.9 | 0.14 | 0.86                     |                                                                                                            |
|                        |                  | MMT16IR140BSPT | ★      | ★      |       | 14          | 9.525           | 3.44 | 1.0 | 1.2 | 0.26 | 1.16                     |                                                                                                            |
|                        |                  | MMT16IR110BSPT | ★      | ★      |       | 11          | 9.525           | 3.44 | 1.1 | 1.5 | 0.33 | 1.48                     |                                                                                                            |
|                        |                  |                |        |        |       |             |                 |      |     |     |      |                          |                                                                                                            |
| Round DIN 405          | 7H               | MMT16IR100RD   | ●      |        |       | 10          | 9.525           | 3.44 | 1.1 | 1.2 | 0.55 | 1.27                     | <div>Full form</div>  |
|                        |                  | MMT16IR080RD   | ●      |        |       | 8           | 9.525           | 3.44 | 1.4 | 1.4 | 0.70 | 1.59                     |                                                                                                            |
|                        |                  | MMT16IR060RD   | ●      |        |       | 6           | 9.525           | 3.44 | 1.4 | 1.5 | 0.93 | 2.12                     |                                                                                                            |
|                        |                  | MMT22IR040RD   | ●      |        |       | 4           | 12.7            | 4.64 | 2.2 | 2.3 | 1.40 | 3.18                     |                                                                                                            |

G

THREADING

# MMT G-CLASS GROUND INSERTS

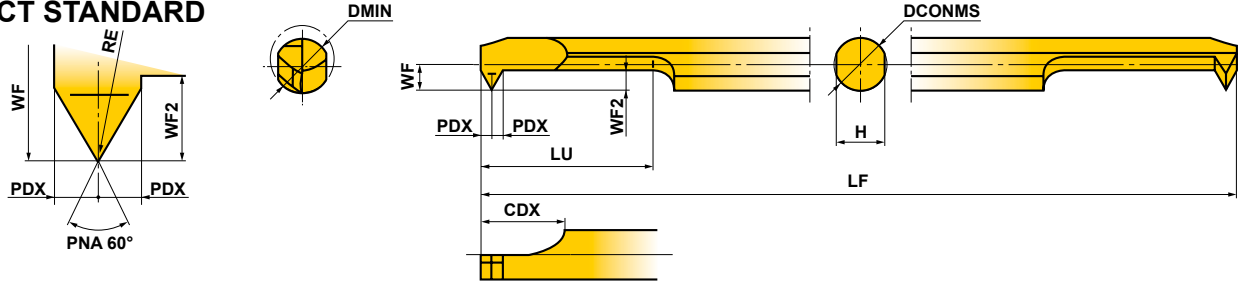
## INSERTS

| Type                    | Thread Tolerance | Order Number                                                                                                                                                                        | Coated | Pitch |             | Dimensions (mm) |      |     |     |      | Total Cutting Depth (mm) | Geometry                                                                              |
|-------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-------------|-----------------|------|-----|-----|------|--------------------------|---------------------------------------------------------------------------------------|
|                         |                  |                                                                                                                                                                                     | VP10MF | mm    | thread/inch | IC              | S    | PDY | PDX | RE   |                          |                                                                                       |
| ISO Trapezoidal 30°     | 7H               | MMT16IR150TR                                                                                                                                                                        | ●      | 1.5   |             | 9.525           | 3.44 | 1.0 | 1.1 | 0.08 | 0.90                     |    |
|                         |                  | MMT16IR200TR                                                                                                                                                                        | ●      | 2.0   |             | 9.525           | 3.44 | 1.1 | 1.3 | 0.15 | 1.25                     |                                                                                       |
|                         |                  | MMT16IR300TR                                                                                                                                                                        | ●      | 3.0   |             | 9.525           | 3.44 | 1.3 | 1.5 | 0.15 | 1.75                     |                                                                                       |
|                         |                  | MMT22IR400TR                                                                                                                                                                        | ●      | 4.0   |             | 12.7            | 4.64 | 1.7 | 1.9 | 0.15 | 2.25                     |                                                                                       |
|                         |                  | MMT22IR500TR                                                                                                                                                                        | ●      | 5.0   |             | 12.7            | 4.64 | 2.1 | 2.5 | 0.15 | 2.75                     |                                                                                       |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |
| American ACME           | 3G               | MMT16IR120ACME                                                                                                                                                                      | ●      |       | 12          | 9.525           | 3.44 | 1.2 | 1.3 | 0.05 | 1.19                     |    |
|                         |                  | MMT16IR100ACME                                                                                                                                                                      | ●      |       | 10          | 9.525           | 3.44 | 1.2 | 1.3 | 0.08 | 1.52                     |                                                                                       |
|                         |                  | MMT16IR080ACME                                                                                                                                                                      | ●      |       | 8           | 9.525           | 3.44 | 1.4 | 1.5 | 0.10 | 1.84                     |                                                                                       |
|                         |                  | MMT22IR060ACME                                                                                                                                                                      | ●      |       | 6           | 12.7            | 4.64 | 1.8 | 2.1 | 0.10 | 2.37                     |                                                                                       |
|                         |                  | MMT22IR050ACME                                                                                                                                                                      | ●      |       | 5           | 12.7            | 4.64 | 2.0 | 2.3 | 0.10 | 2.79                     |                                                                                       |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |
| UNJ                     |                  | When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with American UN 60°. In this case, a full form type insert cannot be used. |        |       |             |                 |      |     |     |      |                          |                                                                                       |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |
| API Buttress Casing     | Standard API     | MMT22IR050APBU                                                                                                                                                                      | ●      |       | 5           | 12.7            | 4.64 | 2.8 | 1.9 | 0.18 | 1.55                     |  |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |
| API Round Casing&Tubing | Standard API RD  | MMT16IR100APRD                                                                                                                                                                      | ●      |       | 10          | 9.525           | 3.44 | 1.2 | 1.4 | 0.34 | 1.41                     |  |
|                         |                  | MMT16IR080APRD                                                                                                                                                                      | ●      |       | 8           | 9.525           | 3.44 | 1.3 | 1.5 | 0.41 | 1.81                     |                                                                                       |
| American NPT            | Standard NPT     | MMT16IR270NPT                                                                                                                                                                       | ★      |       | 27          | 9.525           | 3.44 | 0.7 | 0.8 | 0.04 | 0.66                     |  |
|                         |                  | MMT16IR180NPT                                                                                                                                                                       | ★      |       | 18          | 9.525           | 3.44 | 0.8 | 1.0 | 0.08 | 1.01                     |                                                                                       |
|                         |                  | MMT16IR140NPT                                                                                                                                                                       | ●      |       | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.09 | 1.33                     |                                                                                       |
|                         |                  | MMT16IR115NPT                                                                                                                                                                       | ●      |       | 11.5        | 9.525           | 3.44 | 1.1 | 1.5 | 0.11 | 1.64                     |                                                                                       |
|                         |                  | MMT16IR080NPT                                                                                                                                                                       | ●      |       | 8           | 9.525           | 3.44 | 1.3 | 1.8 | 0.14 | 2.42                     |                                                                                       |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |
| American NPTF           | Class 2          | MMT16IR140NPTF                                                                                                                                                                      | ★      |       | 14          | 9.525           | 3.44 | 0.9 | 1.2 | 0.04 | 1.35                     |  |
|                         |                  | MMT16IR115NPTF                                                                                                                                                                      | ★      |       | 11.5        | 9.525           | 3.44 | 1.1 | 1.5 | 0.04 | 1.63                     |                                                                                       |
|                         |                  | MMT16IR080NPTF                                                                                                                                                                      | ★      |       | 8           | 9.525           | 3.44 | 1.3 | 1.8 | 0.04 | 2.38                     |                                                                                       |
|                         |                  |                                                                                                                                                                                     |        |       |             |                 |      |     |     |      |                          |                                                                                       |

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(5 inserts in one case)

# MICRO-MINI TWIN

## CT STANDARD



| Order Number    | Stock          |               |        |                     | Chipbreaker | Threads      |            |                                |                     | Dimensions (mm) |      |        |    |      |     |      |     |      |      |      |
|-----------------|----------------|---------------|--------|---------------------|-------------|--------------|------------|--------------------------------|---------------------|-----------------|------|--------|----|------|-----|------|-----|------|------|------|
|                 | Coated Carbide |               |        | Micro Grain Carbide |             | Metric Screw |            | Unified Coarse Screw           |                     | DMIN            | RE   | DCONMS | LF | LU   | CDX | WF   | PDX | WF2  | H    |      |
|                 | NEW<br>MS7025  | NEW<br>MS9025 | VP15TF |                     |             | Thread       | Pitch (mm) | Thread                         | Pitch (thread/inch) |                 |      |        |    |      |     |      |     |      |      |      |
|                 |                |               |        |                     |             |              |            |                                |                     |                 |      |        |    |      |     |      |     |      |      | TF15 |
| CT0305RS-M4     |                |               | ★      | ★                   | Without     | ≥ M4         | 0.5—1.0    | ≥ NO.8-32UNC                   | 36—24               | 3               | 0.03 | 3      | 50 | 5.2  | 6   | 1.3  | 0.6 | 1.2  | 2.7  |      |
| CT03RS-M4       |                |               | ●      | ●                   | Without     | ≥ M4         | 0.5—1.0    | ≥ NO.8-32UNC                   | 36—24               | 3               | 0.03 | 3      | 50 | 10.2 | 6   | 1.3  | 0.6 | 1.2  | 2.7  |      |
| CT03RS-M4B      | ●              | ●             | ●      | ●                   | With        | ≥ M4         | 0.5—1.0    | ≥ NO.8-36UNF                   | 36—24               | 3               | 0.03 | 3      | 50 | 10.2 | 6   | 1.3  | 0.6 | 1.2  | 2.7  |      |
| NEW CT035RS-M5B | ●              | ●             |        |                     | With        | ≥ M5         | 0.5—1.0    | ≥ NO.10-24UNC<br>≥ NO.10-32UNF | 32—24               | 4               | 0.03 | 3.5    | 60 | 10.4 | 6.5 | 1.55 | 0.7 | 1.45 | 3.15 |      |
| CT0407RS-M6     |                |               | ★      | ★                   | Without     | ≥ M6         | 0.75—1.25  | ≥ 1/4-20UNC                    | 28—20               | 4.5             | 0.05 | 4      | 60 | 7.6  | 7   | 1.8  | 0.8 | 1.7  | 3.6  |      |
| CT04RS-M6       |                |               | ●      | ●                   | Without     | ≥ M6         | 0.75—1.25  | ≥ 1/4-20UNC                    | 28—20               | 4.5             | 0.05 | 4      | 60 | 15.6 | 7   | 1.8  | 0.8 | 1.7  | 3.6  |      |
| CT04RS-M6B      | ●              | ●             | ●      | ●                   | With        | ≥ M6         | 0.75—1.25  | ≥ 1/4-28UNF                    | 28—20               | 4.5             | 0.05 | 4      | 60 | 15.6 | 7   | 1.8  | 0.8 | 1.7  | 3.6  |      |
| NEW CT045RS-M7B | ●              | ●             |        |                     | With        | ≥ M7         | 0.75—1.25  | ≥ 1/4-20UNC<br>≥ 1/4-28UNF     | 28—20               | 5               | 0.05 | 4.5    | 70 | 15.8 | 7.5 | 2.05 | 0.9 | 1.95 | 4.05 |      |
| CT0511RS-M8     |                |               | ★      | ★                   | Without     | ≥ M8         | 0.75—1.5   | ≥ 5/16-18UNC                   | 24—18               | 6               | 0.05 | 5      | 70 | 11   | 8   | 2.3  | 1   | 2.2  | 4.5  |      |
| CT05RS-M8       |                |               | ●      | ●                   | Without     | ≥ M8         | 0.75—1.5   | ≥ 5/16-18UNC                   | 24—18               | 6               | 0.05 | 5      | 70 | 21   | 8   | 2.3  | 1   | 2.2  | 4.5  |      |
| CT05RS-M8B      | ●              | ●             | ●      | ●                   | With        | ≥ M8         | 0.75—1.5   | ≥ 5/16-24UNF                   | 24—18               | 6               | 0.05 | 5      | 70 | 21   | 8   | 2.3  | 1   | 2.2  | 4.5  |      |
| CT0611RS-M10    |                |               | ★      | ★                   | Without     | ≥ M10        | 0.75—1.75  | ≥ 3/8-16UNC                    | 24—16               | 7               | 0.05 | 6      | 75 | 11   | 8   | 2.8  | 1   | 2.2  | 5.4  |      |
| CT06RS-M10      |                |               | ●      | ●                   | Without     | ≥ M10        | 0.75—1.75  | ≥ 3/8-16UNC                    | 24—16               | 7               | 0.05 | 6      | 75 | 21   | 8   | 2.8  | 1   | 2.2  | 5.4  |      |
| CT06RS-M10B     | ●              | ●             | ●      | ●                   | With        | ≥ M10        | 0.75—1.75  | ≥ 3/8-24UNF                    | 24—16               | 7               | 0.05 | 6      | 75 | 21   | 8   | 2.8  | 1   | 2.2  | 5.4  |      |

## RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Cutting Speed (m/min) | Recommended Tool Overhang (mm) |
|---|-----------------------------|-----------------------|--------------------------------|
| P | Carbon Steel<br>Alloy Steel | 50 (30—80)            |                                |
| M | Stainless Steel             | 50 (30—80)            |                                |
| K | Cast Iron                   | 50 (30—80)            |                                |
| N | Non-Ferrous Metal           | 80 (50—100)           |                                |
| S | Heat-Resistant Alloy        | 40 (30—60)            |                                |

(Note 1) Wet cutting is recommended.  
(Note 2) Pay special attention to machining of small diameters at high revolutions as the feed rate cannot keep up with the speed.

## STANDARD OF DEPTH OF CUT

● The chart on the right shows the cutting depths when machining external ISO metric screw threads.

### ● Metric

| P (Pitch)           |    | (mm) |      |      |      |      |      |
|---------------------|----|------|------|------|------|------|------|
|                     |    | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 |
| Total Cutting Depth |    | 0.29 | 0.43 | 0.58 | 0.72 | 0.87 | 1.01 |
| Number of Passes    | 1  | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 |
|                     | 2  | 0.05 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 |
|                     | 3  | 0.05 | 0.05 | 0.06 | 0.07 | 0.07 | 0.07 |
|                     | 4  | 0.04 | 0.05 | 0.05 | 0.07 | 0.07 | 0.07 |
|                     | 5  | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.07 |
|                     | 6  | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.06 |
|                     | 7  | 0.02 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 |
|                     | 8  | 0.01 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 |
|                     | 9  | —    | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 |
|                     | 10 | —    | 0.02 | 0.03 | 0.04 | 0.05 | 0.05 |
|                     | 11 | —    | 0.01 | 0.03 | 0.04 | 0.05 | 0.05 |
|                     | 12 | —    | —    | 0.03 | 0.03 | 0.04 | 0.05 |
|                     | 13 | —    | —    | 0.02 | 0.03 | 0.04 | 0.04 |
|                     | 14 | —    | —    | 0.01 | 0.02 | 0.03 | 0.04 |
|                     | 15 | —    | —    | —    | 0.01 | 0.03 | 0.04 |
|                     | 16 | —    | —    | —    | —    | 0.03 | 0.03 |
|                     | 17 | —    | —    | —    | —    | 0.02 | 0.03 |
|                     | 18 | —    | —    | —    | —    | 0.01 | 0.03 |
|                     | 19 | —    | —    | —    | —    | —    | 0.03 |
|                     | 20 | —    | —    | —    | —    | —    | 0.02 |
|                     | 21 | —    | —    | —    | —    | —    | 0.01 |

● : Inventory maintained. ★ : Inventory maintained in Japan.  
(MICRO-MINI TWIN is available in 1 piece in one pack.)

SPARE PARTS > N001  
TECHNICAL DATA > P001

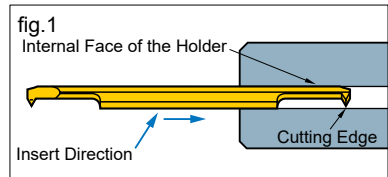
G031

# INTERNAL THREADING

## ■ PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

● When using a holder for general purpose / small automatic lathe:

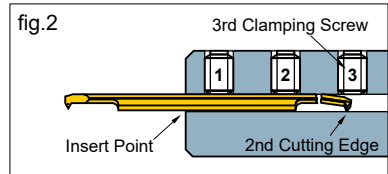
- ① To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.



- ② When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

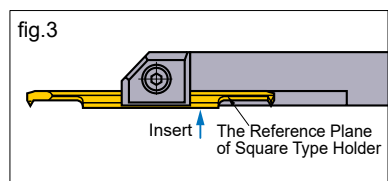
◎ When using Mitsubishi Materials holders

- When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for the clamping screw is 2.0 N • m.

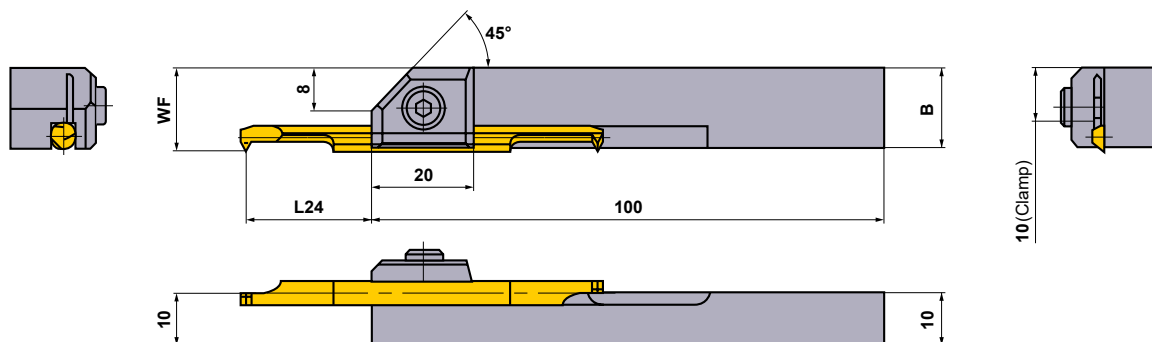


● When using a square type holder:

- ① When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.  
② Make sure that the clamping screws are tightened to the recommended values.  
③ Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.



## SQUARE TYPE HOLDER



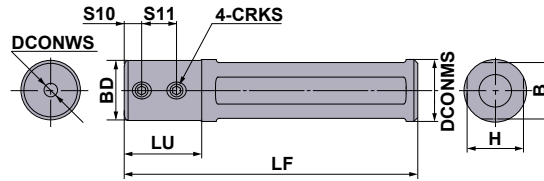
| Order Number | Stock | Dimensions (mm)    |      |               | Micro-Mini Twin<br>CT   | Clamp<br>Screw | Wrench | Torque<br>(N•m) |
|--------------|-------|--------------------|------|---------------|-------------------------|----------------|--------|-----------------|
|              |       | Micro-Mini Twin CT |      |               |                         |                |        |                 |
|              |       | B                  | WF   | L24 *         |                         |                |        |                 |
| SBH1030R     | ★     | 13.8               | 13.8 | 13—17.5(14)   | 0305RS-M4, 03RS-M4(B)   | HSC05012       | HKY40R | 9.5             |
| SBH1040R     | ★     | 14.7               | 14.8 | 18.5—22(19.5) | 0407RS-M6, 04RS-M6(B)   | HSC05012       | HKY40R | 9.5             |
| SBH1050R     | ★     | 15.6               | 15.8 | 24—26.5(25)   | 0511RS-M8, 05RS-M8(B)   | HSC05012       | HKY40R | 9.5             |
| SBH1060R     | ★     | 16.5               | 16.8 | 24—31.5(25)   | 0611RS-M10, 06RS-M10(B) | HSC05012       | HKY40R | 9.5             |

\* L24 is the length of overhang for sufficient clamping, and ( ) is the recommended length for machining of carbon and alloy steel.

● : Inventory maintained. ★ : Inventory maintained in Japan.

## ROUND TYPE HOLDER

**NEW**



| Order Number  | Stock | Dimensions (mm) |        |      |     |    |      |      |     |     |
|---------------|-------|-----------------|--------|------|-----|----|------|------|-----|-----|
|               |       | DCONMS          | DCONWS | BD   | LF  | LU | H    | B    | S10 | S11 |
| SLV190085025N | ●     | 19.05           | 2.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085035N | ●     | 19.05           | 3.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190085045N | ●     | 19.05           | 4.5    | 18.5 | 85  | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110025N | ●     | 19.05           | 2.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110035N | ●     | 19.05           | 3.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV190110045N | ●     | 19.05           | 4.5    | 18.5 | 110 | 20 | 17.8 | 17.8 | 4.5 | 9   |
| SLV200085025N | ●     | 20.0            | 2.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085035N | ●     | 20.0            | 3.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV200085045N | ●     | 20.0            | 4.5    | 19.0 | 85  | 20 | 18.8 | 18.8 | 4.5 | 9   |
| SLV220135025N | ●     | 22.0            | 2.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135035N | ●     | 22.0            | 3.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV220135045N | ●     | 22.0            | 4.5    | 20.0 | 135 | 20 | 20.8 | 20.8 | 4.5 | 9   |
| SLV250067025N | ●     | 25.0            | 2.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067035N | ●     | 25.0            | 3.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250067045N | ●     | 25.0            | 4.5    | 20.0 | 67  | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110025N | ●     | 25.0            | 2.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110035N | ●     | 25.0            | 3.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV250110045N | ●     | 25.0            | 4.5    | 20.0 | 110 | 20 | 23.9 | 23.9 | 4.5 | 9   |
| SLV254085025N | ●     | 25.4            | 2.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085035N | ●     | 25.4            | 3.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254085045N | ●     | 25.4            | 4.5    | 20.0 | 85  | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110025N | ●     | 25.4            | 2.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110035N | ●     | 25.4            | 3.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |
| SLV254110045N | ●     | 25.4            | 4.5    | 20.0 | 110 | 20 | 24.4 | 24.4 | 4.5 | 9   |

**G**  
THREADING

## MOUNTING CHART

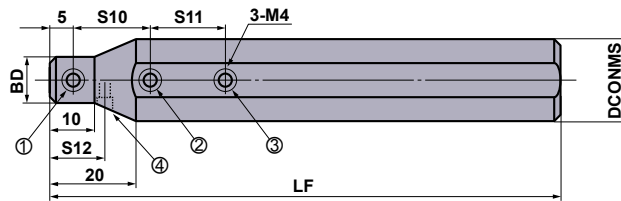
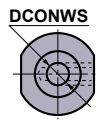
| Series          |           | Boring Bar Type |           | Holder Type   |
|-----------------|-----------|-----------------|-----------|---------------|
| MICRO-MINI TWIN | Threading | CT              | 035RS(-B) | SLV○○○○○○035N |
| MICRO-MINI TWIN | Threading | CT              | 045RS(-B) | SLV○○○○○○045N |

## SPARE PARTS

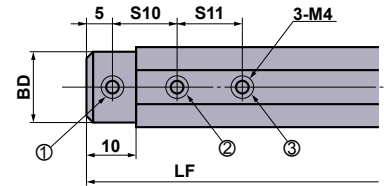
| Holder Type   | Clamp Screw | Wrench | Clamp Torque<br>(N • m) |
|---------------|-------------|--------|-------------------------|
| SLV○○○○○○025N | HSS04005    | HKY20R | 2.0                     |
| SLV○○○○○○035N | HSS04005    | HKY20R | 2.0                     |
| SLV○○○○○○045N | HSS04005    | HKY20R | 2.0                     |

# INTERNAL THREADING

## ROUND TYPE HOLDER



RBH2200N has a temporary set screw for different machine specifications.  
(Represented by number 4)



RBH15800N, RBH1600N,  
RBH1900N

| Order Number | Stock | Dimensions (mm) |        |    |     |     |     |      | Micro-Mini Twin<br>CT   | ★1 Clamp<br>Screw |   |   |   | Wrench | Torque<br>(N·m) |
|--------------|-------|-----------------|--------|----|-----|-----|-----|------|-------------------------|-------------------|---|---|---|--------|-----------------|
|              |       | DCONMS          | DCONWS | BD | LF  | S10 | S11 | S12  |                         | ①                 | ② | ③ | ④ |        |                 |
| RBH15830N    | ★     | 15.875          | 3      | 15 | 100 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH15840N    | ★     | 15.875          | 4      | 15 | 100 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH15850N    | ★     | 15.875          | 5      | 15 | 100 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH15860N    | ★     | 15.875          | 6      | 15 | 100 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | A                 | A | A | — | HKY20F | 2.0             |
| RBH1630N     | ●     | 16              | 3      | 15 | 100 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH1640N     | ●     | 16              | 4      | 15 | 100 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH1650N     | ●     | 16              | 5      | 15 | 100 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | A                 | A | A | — | HKY20F | 2.0             |
| RBH1660N     | ●     | 16              | 6      | 15 | 100 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | A                 | A | A | — | HKY20F | 2.0             |
| *2 RBH19030N | ★     | 19.05           | 3      | 18 | 125 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | B                 | B | B | — | HKY20F | 2.0             |
| *2 RBH19040N | ★     | 19.05           | 4      | 18 | 125 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | B                 | B | B | — | HKY20F | 2.0             |
| *2 RBH19050N | ★     | 19.05           | 5      | 18 | 125 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | B                 | B | B | — | HKY20F | 2.0             |
| *2 RBH19060N | ★     | 19.05           | 6      | 18 | 125 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | B                 | B | B | — | HKY20F | 2.0             |
| RBH2030N     | ★     | 20              | 3      | 12 | 125 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | A                 | A | B | — | HKY20F | 2.0             |
| RBH2040N     | ★     | 20              | 4      | 13 | 125 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | A                 | B | B | — | HKY20F | 2.0             |
| RBH2050N     | ★     | 20              | 5      | 14 | 125 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | A                 | B | B | — | HKY20F | 2.0             |
| RBH2060N     | ★     | 20              | 6      | 15 | 125 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | A                 | B | B | — | HKY20F | 2.0             |
| RBH2230N     | ★     | 22              | 3      | 12 | 125 | 10  | 10  | 10   | 0305RS-M4, 03RS-M4(B)   | A                 | B | C | A | HKY20F | 2.0             |
| RBH2240N     | ★     | 22              | 4      | 13 | 125 | 15  | 15  | 12.5 | 0407RS-M6, 04RS-M6(B)   | A                 | B | B | A | HKY20F | 2.0             |
| RBH2250N     | ★     | 22              | 5      | 14 | 125 | 15  | 15  | 12.5 | 0511RS-M8, 05RS-M8(B)   | A                 | B | B | A | HKY20F | 2.0             |
| RBH2260N     | ★     | 22              | 6      | 15 | 125 | 15  | 15  | 15   | 0611RS-M10, 06RS-M10(B) | A                 | B | B | A | HKY20F | 2.0             |
| RBH2530N     | ★     | 25              | 3      | 12 | 150 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | A                 | B | C | — | HKY20F | 2.0             |
| RBH2540N     | ★     | 25              | 4      | 13 | 150 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | A                 | C | C | — | HKY20F | 2.0             |
| RBH2550N     | ★     | 25              | 5      | 14 | 150 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | A                 | C | C | — | HKY20F | 2.0             |
| RBH2560N     | ★     | 25              | 6      | 15 | 150 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | A                 | C | C | — | HKY20F | 2.0             |
| RBH25430N    | ★     | 25.4            | 3      | 12 | 150 | 10  | 10  | —    | 0305RS-M4, 03RS-M4(B)   | A                 | B | C | — | HKY20F | 2.0             |
| RBH25440N    | ★     | 25.4            | 4      | 13 | 150 | 15  | 15  | —    | 0407RS-M6, 04RS-M6(B)   | A                 | C | C | — | HKY20F | 2.0             |
| RBH25450N    | ★     | 25.4            | 5      | 14 | 150 | 15  | 15  | —    | 0511RS-M8, 05RS-M8(B)   | A                 | C | C | — | HKY20F | 2.0             |
| RBH25460N    | ★     | 25.4            | 6      | 15 | 150 | 15  | 15  | —    | 0611RS-M10, 06RS-M10(B) | A                 | C | C | — | HKY20F | 2.0             |

★1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008

★2 Revised order number.

| Conventional Order<br>Number | Revised Order<br>Number |
|------------------------------|-------------------------|
| RBH1930N                     | RBH19030N               |
| RBH1940N                     | RBH19040N               |
| RBH1950N                     | RBH19050N               |
| RBH1960N                     | RBH19060N               |

● : Inventory maintained. ★ : Inventory maintained in Japan.

SPARE PARTS > N001  
TECHNICAL DATA > P001



This image shows a blank sheet of white paper designed as a memo template. At the top left, the word "Memo" is printed in a bold, black, sans-serif font. A thick horizontal line runs across the page just below the title. The rest of the page is filled with horizontal dashed lines, providing space for writing. The lines are evenly spaced and extend across the width of the page.

# HOW TO READ THE STANDARD OF HSK-T TOOLS

## ●How this section page is organised

- ①Organised by product series.  
(Refer to the index on the next page.)

FIGURE SHOWING THE TOOLING APPLICATION  
Uses illustrations and arrows to depict available machining applications along with cutting edge lead angles.

### PRODUCT TYPE

Indicates the first four letters of the order number, as well as cutting applications.

### TITLE OF PRODUCT SERIES

### PRODUCT SECTION

### GEOMETRY

### CHIPBREAKER BY CUTTING APPLICATION

**HSK-T TOOLS**

**HSK-T SYSTEM**

**PCLN**

External turning • Facing

Finish Light Medium

FP LP UP

Medium Medium Rough

Stainless PCBN

WT (12) (12) (12)

Right hand tool holder shown:

| Order Number         | Stock | Insert Number        | Dimensions (mm)   | #2       | #3   | #4       | #5          | #6          | #7      | #8     |
|----------------------|-------|----------------------|-------------------|----------|------|----------|-------------|-------------|---------|--------|
| R/L                  |       |                      | DC0N8 LF WF       | WT (kg)  | Shim | Shim Pin | Clamp Lever | Clamp Screw | Wrench  |        |
| * H83TH-PCLNR-L-DX12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 100 | 63 65 45 | 1.3  | LLSCN42  | LLP14       | LLCL14      | LLCS108 | HKY30R |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.  
\*1 Clamp Torque (N • m) : LLC5108 $\times$ 3  
\*2 WT : Tool Weight  
Note 1) Dimensions shown for insert corner RE 0.8.

**DCLN**

External turning • DOUBLE CLAMP type

Finish Light Medium

FP LP UP

Medium Medium Rough

Stainless PCBN

WT (12) (12) (12)

Right hand tool holder shown:

| Order Number        | Stock | Insert Number        | Dimensions (mm)   | #2       | #3   | #4       | #5           | #6      | #7          | #8     |
|---------------------|-------|----------------------|-------------------|----------|------|----------|--------------|---------|-------------|--------|
| R/L                 |       |                      | DC0N8 LF WF       | WT (kg)  | Shim | Shim Pin | Clamp Bridge | Spring  | Clamp Screw | Wrench |
| * H83TH-DCLNRL-DX12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 100 | 63 65 45 | 1.3  | LLSCN42  | LLP14        | DC0621T | TKY20F      |        |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.  
\*1 Clamp Torque (N • m) : DC0621T $\times$ 5.0  
\*2 WT : Tool Weight  
Note 1) Dimensions shown for insert corner RE 0.8.

**Legend for Stock Status Mark**

H006 ● : Inventory maintained.

**Legend for Applicable Inserts**

| Product Type                   | Applicable Inserts  |
|--------------------------------|---------------------|
| PCLN type Inserts              | > A898 - A195       |
| DCLN type Inserts              | > A898 - A195       |
| PCBN & PCD Inserts             | > B022 - B034, B049 |
| RECOMMENDED CUTTING CONDITIONS | > A876              |

**PCMN**

External turning • Facing

Finish Light Medium

FP LP UP

Medium Medium Rough

Stainless PCBN

WT (12) (12) (12)

Right hand tool holder shown:

| Order Number    | Stock | Insert Number        | Dimensions (mm)   | #2         | #3      | #4       | #5          | #6          | #7      | #8     |
|-----------------|-------|----------------------|-------------------|------------|---------|----------|-------------|-------------|---------|--------|
| R/L             |       |                      | DC0N8 LF          | WT (kg)    | Shim    | Shim Pin | Clamp Lever | Clamp Screw | Plug    | Wrench |
| H83TH-PCMNN-H12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 100 | 63 100 1.7 | LLSCN42 | LLP14    | LLCL14      | LLCS108     | HGMPT18 | HKY30R |
| H83TH-PCMNN-L12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 140 | 63 140 2.7 | LLSCN42 | LLP14    | LLCL14      | LLCS108     | HGMPT18 | HKY30R |

\*1 Clamp Torque (N • m) : LLC5108 $\times$ 3  
\*2 WT : Tool Weight  
Note 1) Dimensions shown for insert corner RE 0.8.

**DCMN**

External turning • DOUBLE CLAMP type

Finish Light Medium

FP LP UP

Medium Medium Rough

Stainless PCBN

WT (12) (12) (12)

Right hand tool holder shown:

| Order Number    | Stock | Insert Number        | Dimensions (mm)   | #2         | #3      | #4       | #5           | #6     | #7          | #8     |
|-----------------|-------|----------------------|-------------------|------------|---------|----------|--------------|--------|-------------|--------|
| R/L             |       |                      | DC0N8 LF          | WT (kg)    | Shim    | Shim Pin | Clamp Bridge | Spring | Clamp Screw | Wrench |
| H83TH-DCMNN-H12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 100 | 63 100 1.7 | LLSCN42 | LLP14    | DC0621T      | DCS1   | DC0621T     | TKY20F |
| H83TH-DCMNN-L12 | ●     | CNCA<br>CNCG<br>CNCM | 1204 $\times$ 140 | 63 140 2.7 | LLSCN42 | LLP14    | DC0621T      | DCS1   | DC0621T     | TKY20F |

\*1 Clamp Torque (N • m) : DC0621T $\times$ 5.0  
\*2 WT : Tool Weight  
Note 1) Dimensions shown for insert corner RE 0.8.

**Legend for Applicable Inserts**

| Product Type       | Applicable Inserts  |
|--------------------|---------------------|
| PCMN type Inserts  | > A898 - A195       |
| DCMN type Inserts  | > A898 - A195       |
| PCBN & PCD Inserts | > B022 - B034, B049 |

**Legend for Cutting Conditions**

| Product Type       | Applicable Conditions |
|--------------------|-----------------------|
| PCMN type Inserts  | > A876                |
| DCMN type Inserts  | > A876                |
| PCBN & PCD Inserts | > B022 - B034, B049   |

**Legend for Spare Parts**

| Product Type       | Applicable Spare Parts |
|--------------------|------------------------|
| PCMN type Inserts  | > N051                 |
| DCMN type Inserts  | > N051                 |
| PCBN & PCD Inserts | > N051                 |

LEGEND FOR STOCK STATUS MARK  
Is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS  
Indicates reference pages for details of inserts that are applicable to the product.

PRODUCT STANDARDS  
Indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

PAGE REFERENCE  
•SPARE PARTS  
•TECHNICAL DATA  
Indicates reference pages, including the above, on the right hand page of each double-page spread.

●To Order : Please specify  
①order number and hand of tool (right/left).

# HSK-T TOOLS

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| OVERVIEW OF HSK-T TOOLS .....               | H002 |
| CLASSIFICATION OF HSK-T TOOLS .....         | H004 |
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| CN <sup>○○</sup> INSERTS TOOL HOLDERS ..... | H006 |
| DN <sup>○○</sup> INSERTS TOOL HOLDERS ..... | H011 |
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| CN <sup>○○</sup> INSERTS TOOL HOLDERS ..... | H008 |
| EXTERNAL TURNING • COPYING                  |      |
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| THREADING                                   |      |
| MMT INSERTS TOOL HOLDERS .....              | H016 |
| MT INSERTS TOOL HOLDERS .....               | H017 |
| EXTERNAL TURNING TOOL HOLDERS .....         |      |
| BORING BAR HOLDERS .....                    | H021 |
| BORING BAR SLEEVES .....                    | H022 |

## ★Alphabetical order index

|      |                                   |      |                                 |
|------|-----------------------------------|------|---------------------------------|
| H022 | H100TH-B <sup>○○○○</sup>          | H014 | H63TH-MGHR/L-DX43 <sup>○○</sup> |
| H020 | H100TH-EN3232R/L-130              | H016 | H63TH-MMTENR-H/L16              |
| H019 | H100TH-EV3232R/L-180              | H016 | H63TH-MMTER-DX16                |
| H008 | H63TH-A <sup>○○○○</sup> DCLNR/L12 | H017 | H63TH-MTHR/L-DX43               |
| H021 | H63TH-B <sup>○○○○</sup>           | H006 | H63TH-PCLNR/L-DX12              |
| H008 | H63TH-DCLNL-L12-3                 | H007 | H63TH-PCMNN-H/L12               |
| H006 | H63TH-DCLNR/L-DX12                | H009 | H63TH-PDJNR/L-DX15              |
| H007 | H63TH-DCMNN-H/L12                 | H010 | H63TH-PDNNN-H/L15               |
| H011 | H63TH-DDJNL-L15-3                 | H012 | H63TH-PRDCN-H/L12               |
| H009 | H63TH-DDJNR/L-DX15                | H012 | H63TH-PRGCR/L-DX12              |
| H010 | H63TH-DDNNN-H/L15                 | H013 | H63TH-SVPBR/L-DX16              |
| H020 | H63TH-EN2525R/L-115               | H013 | H63TH-SVVBH-H/L16               |
| H021 | H63TH-EV2020R/L-105-3             | H022 | SL32 <sup>○○</sup> -90          |
| H019 | H63TH-EV2525R/L-112               |      |                                 |



Tooling system  
for turning on  
multi-task machines

# HSK TOOLS

## HSK-T System

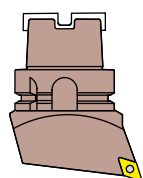
HSK-T is a new type of HSK system designed for turning on multi-task machines that are compatible with HSK-A type (ISO standard: ISO12164-1:2001). The HSK system was developed by a consortium of 17 Japanese manufacturers and registered in ISO standard (ISO12164-3:2008) under the name HSK-T type in 2008 and JIS standard (JIS B6064-3) in 2013.



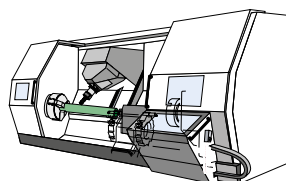
## High accuracy cutting edge positioning

The HSK-T type has a closer tolerance between the spindle key and tool holder keyway than the HSK-A type. This results in higher cutting edge positional accuracy. For milling, the conventional HSK-A type tools can be still used.

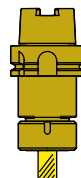
## Compatible with both multi-task machines and machining centres



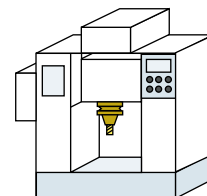
HSK-T  
Turning tool holder



HSK-T spindle  
Multi-task machines



HSK-A  
Rotating tool holder



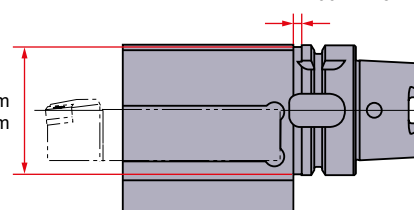
HSK-A spindle  
Machining centre

### \*Note

Short neck length from the flange with thick body of the HSK-T turning tool as shown in the figure at the left. Because there are machines which cannot be mounted depending on the ATC specifications of the multi-task machine (HSK-A type), please check beforehand. Also be careful of interference in the magazine with adjacent tools.

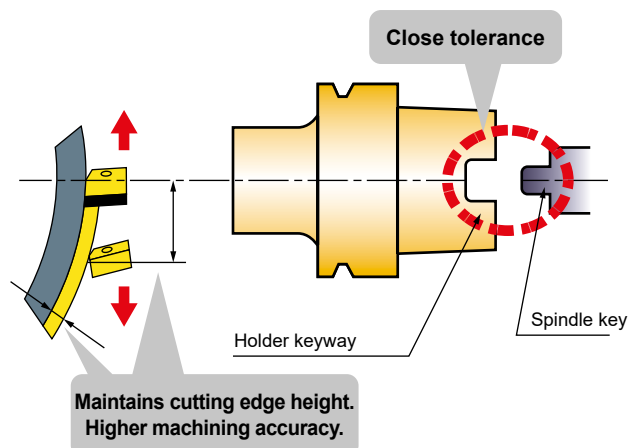
Neck length  
HSK-T63 Min.4mm  
HSK-T100 Min.5mm

Neck thickness  
HSK-T63 Max.62mm  
HSK-T100 Max.99mm



HSK-T turning tool standard (Example)

## Improved keyway tolerance



Tolerance comparison (Example) (mm)

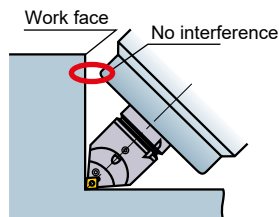
|         | 12.2                    | 12.3 | 12.4 | 12.5 | 12.6 |
|---------|-------------------------|------|------|------|------|
| HSK A63 | Key tolerance 0.10      |      |      |      |      |
|         | Minimum clearance 0.15  |      |      |      |      |
|         | Maximum clearance 0.33  |      |      |      |      |
|         | Keyway tolerance 12.5   |      |      |      |      |
| HSK T63 | Key tolerance 0.025     |      |      |      |      |
|         | Minimum clearance 0.015 |      |      |      |      |
|         | Maximum clearance 0.075 |      |      |      |      |
|         | Keyway tolerance 12.46  |      |      |      |      |

# High accuracy and rigidity HSK-T type tooling system developed for use on multi-task machines.

## Straight type tools suitable for use on multi-task machines

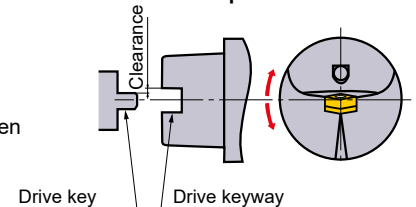
Avoid workpiece interference with improved tool accessibility.

By tilting the machines B spindle (main axis of the tool) at 45 deg, interference between the spindle, holder, workpiece and chuck can be avoided.



Improve centreline height by positioning the cutting edge at the centre of the spindle.

Increased stability and accuracy can be achieved because the cutting edge centreline height is not affected by the gap between the spindle and the key.



## New one-action type double clamp series

The double clamp mechanism offers high rigidity, accuracy and reliability for secure insert clamping. Making it suitable for difficult to machine materials such as stainless and heat resistant alloys.



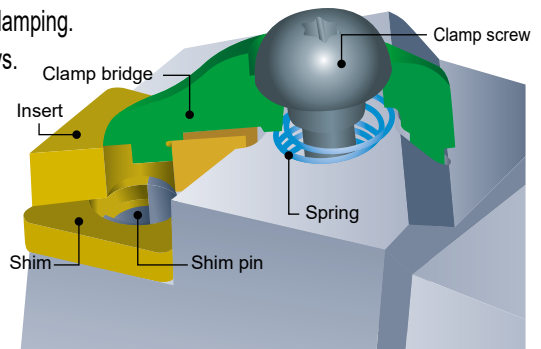
Handed type for turning and facing



Straight type for turning and facing



For turning, facing and boring



## 3 on 1 tool for process and tool consolidation

3 turning inserts of the same geometry can be installed on a single tool.

The same type of inserts can be installed for quick tool changes.

Different types of inserts can be installed for different applications (roughing, semi finishing and finishing)

Different grade inserts can be installed to cover various types of workpieces.



## New HSK-T100 size for large workpieces

Larger tool holder sizes for high efficiency machining.

Square shank holder type



Boring bar / Drill type

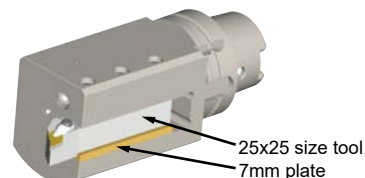


Sleeve



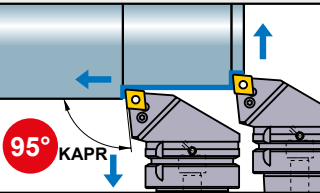
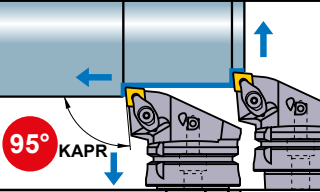
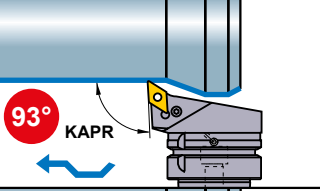
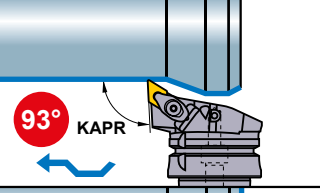
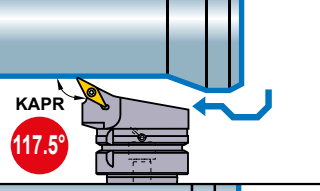
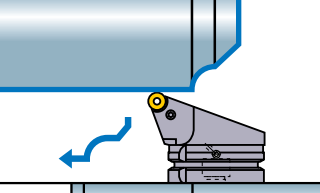
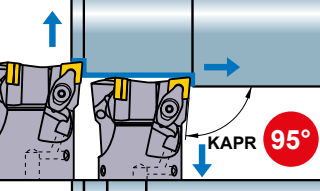
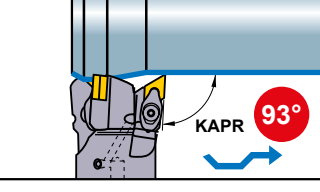
**A single tool can be used with different sized tool holders.**

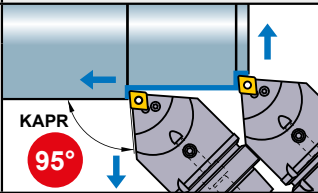
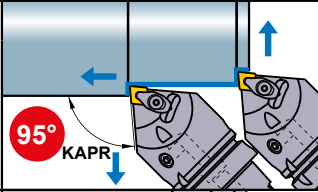
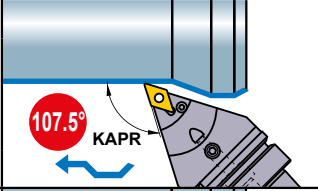
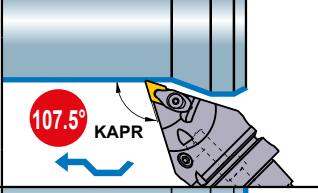
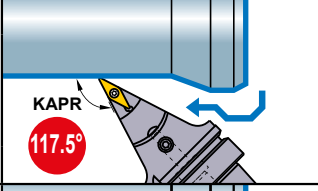
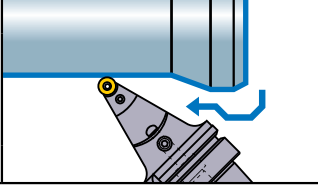
- Available for use with JIS B4126 (ISO 5610) 32 x 32 and 32 x 25 tools.
- Possible to fit a 25 x 25 tool by using a 7mm plate.
- \*Plate not supplied.



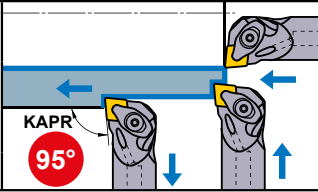
# CLASSIFICATION OF HSK-T TOOLS

## EXTERNAL TURNING • FACING • COPYING

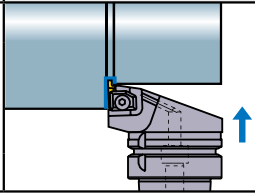
| Order Number                                                                                                        | Geometry                                                                            |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| H63TH-PCLNR/L-DX12<br><br>➔ H006   |    |
| H63TH-DCLNR/L-DX12<br><br>➔ H006   |    |
| H63TH-PDJNR/L-DX15<br><br>➔ H009   |    |
| H63TH-DDJNR/L-DX15<br><br>➔ H009  |   |
| H63TH-SVPBR/L-DX16<br><br>➔ H013 |  |
| H63TH-PRGCR/L-DX12<br><br>➔ H012 |  |
| H63TH-DCLNL-L12-3<br><br>➔ H008  |  |
| H63TH-DDJNL-L15-3<br><br>➔ H011  |  |

| Order Number                                                                                                        | Geometry                                                                              |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| H63TH-PCMNN-H/L12<br><br>➔ H007   |    |
| H63TH-DCMNN-H/L12<br><br>➔ H007   |    |
| H63TH-PDNNN-H/L15<br><br>➔ H010   |    |
| H63TH-DDNNN-H/L15<br><br>➔ H010  |   |
| H63TH-SVVBH-H/L16<br><br>➔ H013 |  |
| H63TH-PRDCN-H/L12<br><br>➔ H012 |  |

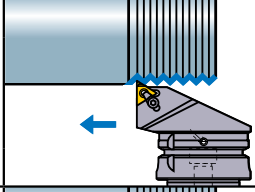
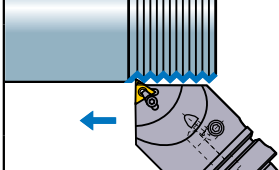
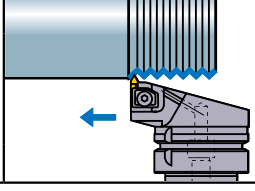
## EXTERNAL TURNING • FACING • BORING

| Order Number                                                                                                                                 | Geometry                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| H63TH-A25KDCLNR/L12<br>H63TH-A32LDCLNR/L12<br><br>➔ H008 |  |

## GROOVING

| Order Number                                                                                                                                                                                                                                                                            | Geometry |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>H63TH-MGHR/L-DX43</b><br><br><br> |          |

## THREADING

| Order Number                                                                                                                                                                                                                                                                                  | Geometry |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>H63TH-MMTER-DX16</b><br><br><br>        |          |
| <b>H63TH-MMTENR-H/L16</b><br><br><br>  |          |
| <b>H63TH-MTHR/L-DX43</b><br><br><br> |          |

## EXTERNAL TURNING TOOL HOLDERS

| Order Number                                                                                                                                                                                                   | Holder |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>H63TH-EV2525R/L-112</b><br><br>       |        |
| <b>H100TH-EV3232R/L-180</b><br><br>      |        |
| <b>H63TH-EN2525R/L-115</b><br><br>       |        |
| <b>H100TH-EN3232R/L-130</b><br><br>   |        |
| <b>H63TH-EV2020R/L-105-3</b><br><br> |        |

## BORING BAR HOLDERS

| Order Number                                                                                                                                                                                                 | Holder |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>H63TH-B</b><br><br>             |        |
| <b>H100TH-B</b><br><br>            |        |
| <b>SL32-90</b><br>(Sleeve)<br><br> |        |

Note 1) The HSK63A shank type has a built-in coolant pipe for installation.

\*1 Mitsubishi Materials is licensed for production and distribution of these tools from MORI SEIKI CO., LTD under Patent No.3720202.

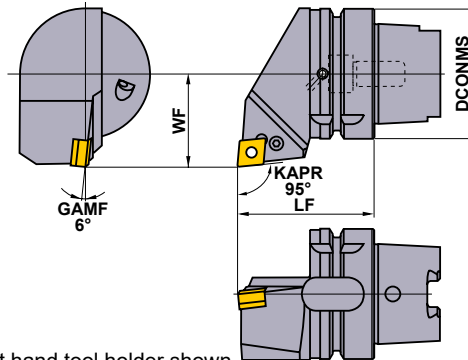
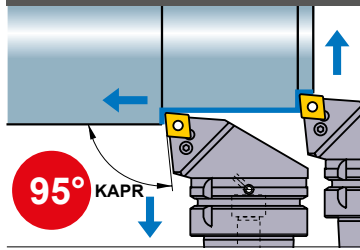
\*2 The SL32-90 sleeve is only for use with H100TH-B32-135.



# HSK-T SYSTEM

## PCLN

### External turning • Facing



Right hand tool holder shown.

| Finish                                                                                                         | Light                                                                                                             | Medium                                                                                                                |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| FP<br><br>(12)              | LP<br><br>(12)                 | MP<br><br>(12)                     |
| Medium<br>MK<br><br>(12)    | Medium<br>Standard<br><br>(12) | Medium—<br>Rough<br>RP<br><br>(12) |
| Stainless<br>MM<br><br>(12) | PCBN<br><br>(12)               |                                                                                                                       |

| Order Number         | Stock |   | Insert Number        |       | Dimensions (mm) |    |    | *2<br>WT<br>(kg) |  |  |  |  *1 |  |
|----------------------|-------|---|----------------------|-------|-----------------|----|----|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | R     | L |                      |       | DCONMS          | LF | WF |                  | Shim                                                                                | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                            | Wrench                                                                              |
| * H63TH-PCLNR/L-DX12 | ●     | ● | CN○A<br>CN○G<br>CN○M | 1204○ | 63              | 65 | 45 | 1.3              | LLSCN42                                                                             | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                                | HKY30R                                                                              |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N • m) : LLCS108=3.3

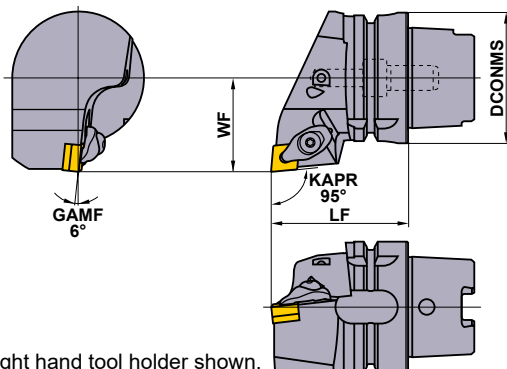
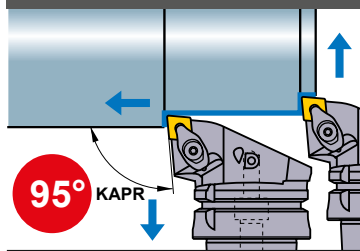
\*2 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

## DCLN

### External turning • Facing

### DOUBLE CLAMP type



Right hand tool holder shown.

| Finish                                                                                                           | Light                                                                                                               | Medium                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| FP<br><br>(12)              | LP<br><br>(12)                 | MP<br><br>(12)                     |
| Medium<br>MK<br><br>(12)    | Medium<br>Standard<br><br>(12) | Medium—<br>Rough<br>RP<br><br>(12) |
| Stainless<br>MM<br><br>(12) | PCBN<br><br>(12)               |                                                                                                                         |

| Order Number         | Stock |   | Insert Number        |       | Dimensions (mm) |    |    | *2<br>WT<br>(kg) |  |  |  |  |  *1 |  |
|----------------------|-------|---|----------------------|-------|-----------------|----|----|------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                      | R     | L |                      |       | DCONMS          | LF | WF |                  | Shim                                                                                  | Shim Pin                                                                              | Clamp Bridge                                                                          | Spring                                                                                | Clamp Screw                                                                              | Wrench                                                                                |
| * H63TH-DCLNR/L-DX12 | ●     | ● | CN○A<br>CN○G<br>CN○M | 1204○ | 63              | 65 | 45 | 1.3              | LLSCN42                                                                               | LLP14                                                                                 | DCK2613                                                                               | DCS1                                                                                  | DC0621T                                                                                  | TKY20F                                                                                |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

# PCMN

## External turning • Facing

| Finish                  | Light                      | Medium                     |
|-------------------------|----------------------------|----------------------------|
| FP<br>(12)              | LP<br>(12)                 | MP<br>(12)                 |
| Medium<br>MK<br>(12)    | Medium<br>Standard<br>(12) | Medium—Rough<br>RP<br>(12) |
| Stainless<br>MM<br>(12) | PCBN<br>(12)               |                            |

| Order Number    | Stock | Insert Number |      | Dimensions (mm) |     | *2<br>WT<br>(kg) |  |  |  |  |  |  |
|-----------------|-------|---------------|------|-----------------|-----|------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 |       |               |      | DCONMS          | LF  |                  | Shim                                                                               | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                         | Plug                                                                                | Wrench                                                                              |
| H63TH-PCMNN-H12 | ●     | CN○A          | 1204 | 63              | 100 | 1.7              | LLSCN42                                                                            | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                             | HGM-PT1/8                                                                           | HKY30R                                                                              |
| H63TH-PCMNN-L12 | ●     | CN○G          |      | 63              | 140 | 2.7              | LLSCN42                                                                            | LLP14                                                                               | LLCL14                                                                              | LLCS108                                                                             | HGM-PT1/8                                                                           | HKY30R                                                                              |

\*1 Clamp Torque (N • m) : LLCS108=3.3

\*2 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

# DCMN

## External turning • DOUBLE CLAMP type Facing

| Finish                  | Light                      | Medium                     |
|-------------------------|----------------------------|----------------------------|
| FP<br>(12)              | LP<br>(12)                 | MP<br>(12)                 |
| Medium<br>MK<br>(12)    | Medium<br>Standard<br>(12) | Medium—Rough<br>RP<br>(12) |
| Stainless<br>MM<br>(12) | PCBN<br>(12)               |                            |

| Order Number    | Stock | Insert Number |        | Dimensions (mm) |     | *2<br>WT<br>(kg) |  |  |  |  |  *1 |  |
|-----------------|-------|---------------|--------|-----------------|-----|------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                 |       |               |        | DCONMS          | LF  |                  | Shim                                                                                  | Shim Pin                                                                              | Clamp Bridge                                                                          | Spring                                                                                | Clamp Screw                                                                              | Wrench                                                                                |
| H63TH-DCMNN-H12 | ●     | CN○A          | 1204○○ | 63              | 100 | 1.7              | LLSCN42                                                                               | LLP14                                                                                 | DCK2613                                                                               | DCS1                                                                                  | DC0621T                                                                                  | TKY20F                                                                                |
| H63TH-DCMNN-L12 | ●     | CN○G<br>CN○M  |        | 63              | 140 | 2.7              | LLSCN42                                                                               | LLP14                                                                                 | DCK2613                                                                               | DCS1                                                                                  | DC0621T                                                                                  | TKY20F                                                                                |

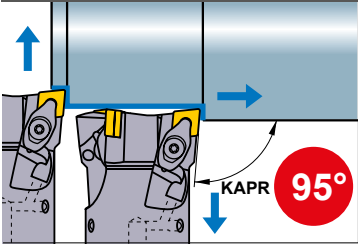
\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 WT : Tool Weight

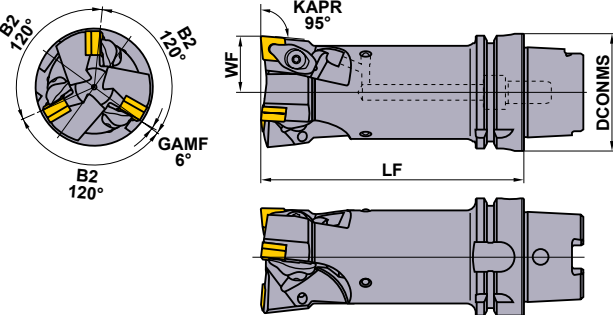
Note 1) Dimensions shown for insert corner RE 0.8.

# HSK-T SYSTEM

## DCLN



**External turning • Facing**



**DOUBLE CLAMP type**

| Finish                                                                                                         | Light                                                                                                             | Medium                                                                                                            |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| FP<br><br>(12)              | LP<br><br>(12)                 | MP<br><br>(12)                 |
| Medium<br>MK<br><br>(12)    | Medium<br>Standard<br><br>(12) | Medium—Rough<br>RP<br><br>(12) |
| Stainless<br>MM<br><br>(12) | PCBN<br><br>(12)               |                                                                                                                   |

Left hand tool holder only.

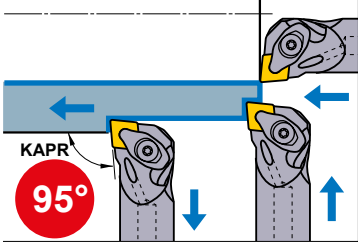
| Order Number      | Stock | Insert Number        |        | Dimensions (mm) |     |    | *2<br>WT<br>(kg) |  |  |  |  |  *1 |  |
|-------------------|-------|----------------------|--------|-----------------|-----|----|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                   | L     |                      |        | DCONMS          | LF  | WF |                  | Shim                                                                                | Shim Pin                                                                            | Clamp Bridge                                                                        | Spring                                                                              | Clamp Screw                                                                            | Wrench                                                                              |
| H63TH-DCLNL-L12-3 | ●     | CN◯A<br>CN◯G<br>CN◯M | 1204◯◯ | 63              | 140 | 30 | 2.2              | LLSCN42                                                                             | LLP14                                                                               | DCK2613                                                                             | DCS1                                                                                | DC0621T                                                                                | TKY20F                                                                              |

\*1 Clamp Torque (N • m) : DC0621T=5.0

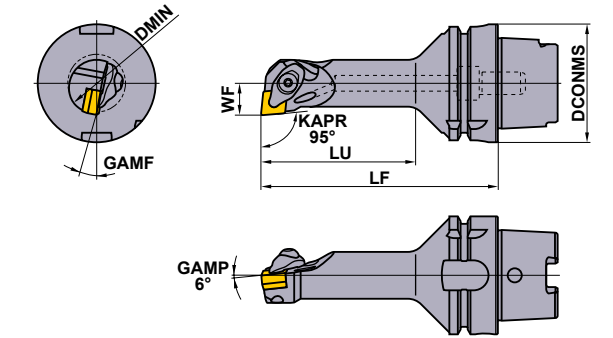
\*2 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

## DCLN



**External turning • Facing • Boring**



**DOUBLE CLAMP type**

| Finish                                                                                                           | Light                                                                                                               | Medium                                                                                                              |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| FP<br><br>(12)              | LP<br><br>(12)                 | MP<br><br>(12)                 |
| Medium<br>MK<br><br>(12)    | Medium<br>Standard<br><br>(12) | Medium—Rough<br>RP<br><br>(12) |
| Stainless<br>MM<br><br>(12) | PCBN<br><br>(12)               |                                                                                                                     |

Right hand tool holder shown.

| Order Number        | Stock |   | Insert Number                                                                    | Dimensions (mm) |     |     |    |      |      | *2<br>WT<br>(kg) |  |  |  |  |  |  |
|---------------------|-------|---|----------------------------------------------------------------------------------|-----------------|-----|-----|----|------|------|------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                     | R     | L |                                                                                  | DCONMS          | LF  | LU  | WF | GAMF | DMIN |                  | Shim                                                                                 | Shim Pin                                                                              | Clamp Bridge                                                                          | Spring                                                                                | Clamp Screw                                                                           | Wrench                                                                                |
| H63TH-A25KDCLNR/L12 | ●     | ● | CN $\bigcirc$ A<br>CN $\bigcirc$ G<br>CN $\bigcirc$ M<br>1204 $\bigcirc\bigcirc$ | 63              | 125 | 82  | 17 | 11°  | 32   | 1.1              | LLSCP42                                                                              | LLP14                                                                                 | DCK2613                                                                               | DCS1                                                                                  | DC0621T                                                                               | TKY20F                                                                                |
| H63TH-A32LDCLNR/L12 | ●     | ● |                                                                                  | 63              | 140 | 100 | 22 | 13°  | 40   | 1.4              | LLSCN42                                                                              | LLP14                                                                                 | DCK2613                                                                               | DCS1                                                                                  | DC0621T                                                                               | TKY20F                                                                                |

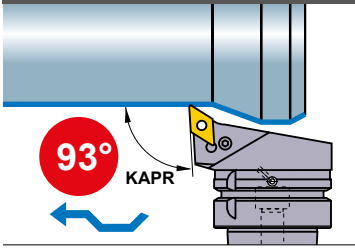
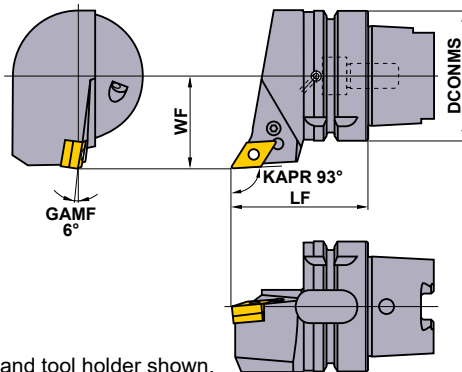
\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

● : Inventory maintained.

|                                |                   |
|--------------------------------|-------------------|
| DCLN type inserts              | ➤ A098—A105       |
| PCBN & PCD inserts             | ➤ B022—B024, B049 |
| RECOMMENDED CUTTING CONDITIONS | ➤ A076            |

| PDJN                                                                              |       | External turning • Copying                                                         |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | Finish                                                                              |                                                                                     | Light            |  | Medium    |  |
|-----------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------|----|----|------------------|------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|--|-----------|--|
|  |       |  |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | FP                                                                                  | LP                                                                                  | MP               |  |           |  |
|                                                                                   |       |                                                                                    |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | Medium                                                                              |                                                                                     | Medium—<br>Rough |  | Stainless |  |
|                                                                                   |       |                                                                                    |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | MK                                                                                  | RP                                                                                  | MM               |  |           |  |
|                                                                                   |       |                                                                                    |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | G Class                                                                             |                                                                                     | PCBN             |  |           |  |
|                                                                                   |       |                                                                                    |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | R/L                                                                                 |                                                                                     |                  |  |           |  |
|                                                                                   |       |                                                                                    |                                                                 |                 |    |    |                  |      |                                                                                   |                                                                                     |                                                                                     | Right hand tool holder shown.                                                       |                                                                                     |                  |  |           |  |
| Order Number                                                                      | Stock |                                                                                    | Insert Number                                                   | Dimensions (mm) |    |    | *3<br>WT<br>(kg) | *2   |  |  |  |  |  |                  |  |           |  |
|                                                                                   | R     | L                                                                                  |                                                                 | DCONMS          | LF | WF |                  | Shim | Shim Pin                                                                          | Clamp Lever                                                                         | Clamp Screw                                                                         | Wrench                                                                              |                                                                                     |                  |  |           |  |
| * H63TH-PDJNR/L-DX15                                                              | ●     | ●                                                                                  | <div>DN⊙A</div> <div>DN⊙G</div> <div>DN⊙M</div> <div>DNMX</div> | 1504            | 63 | 65 | 45               | 1.2  | LLSDN43<br>(LLSDN42)                                                              | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                             | HKY30R                                                                              |                  |  |           |  |

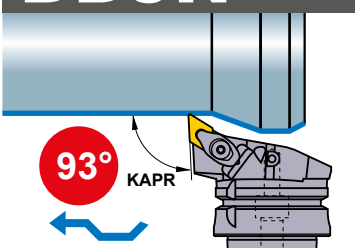
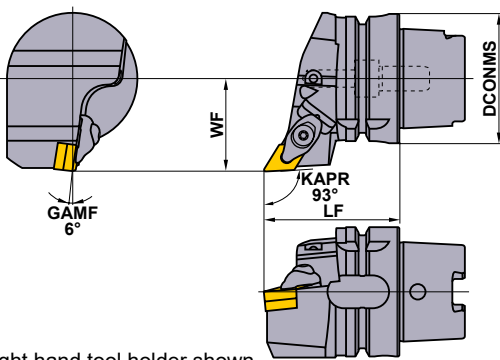
\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N • m) : LLC108=3.3

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

\*3 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

| DDJN                                                                                |  | External turning • Copying                                                           |  | DOUBLE CLAMP type            |  | Finish          |                  | Light     |  | Medium                                                                              |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|-------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------|--|------------------------------|--|-----------------|------------------|-----------|--|-------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|--------|--|
|  |  |  |  |                              |  | FP              | LP               | MP        |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  |                 |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  | Medium          | Medium—<br>Rough | Stainless |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  | MK              | RP               | MM        |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  |                 |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
| Right hand tool holder shown.                                                       |  |                                                                                      |  |                              |  | G Class         | PCBN             |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  | R/L             |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  |                 |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  |                 |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  |                                                                                      |  |                              |  |                 |                  |           |  |                                                                                     |  |                                                                                      |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
| Order Number                                                                        |  | Stock                                                                                |  | Insert Number                |  | Dimensions (mm) |                  | *3        |  | *2                                                                                  |  | *1                                                                                   |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |                                                                                       |  |        |  |
|                                                                                     |  | R L                                                                                  |  |                              |  | DCONMS LF WF    |                  | WT (kg)   |  |  |  |  |  |  |  |  |  |  |  |  |  |        |  |
| * H63TH-DDJNR/L-DX15                                                                |  | ● ●                                                                                  |  | DNOA<br>DNOG<br>DNOM<br>DNMX |  | 1504            |                  | 63 65 45  |  | 1.2                                                                                 |  | LLSDN43<br>(LLSDN42)                                                                 |  | LLP24                                                                                 |  | DCK2613                                                                               |  | DCS1                                                                                  |  | DC0621T                                                                               |  | TKY20F |  |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

\*3 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

H

HSK-T TOOLS

|                    |                   |
|--------------------|-------------------|
| PDJN type inserts  | ➤ A106—A112       |
| DDJN type inserts  | ➤ A106—A112       |
| PCBN & PCD inserts | ➤ B025—B028, B050 |

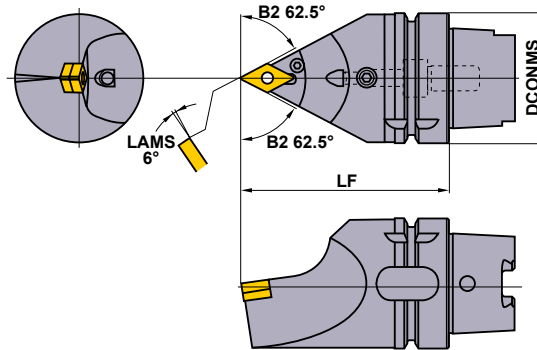
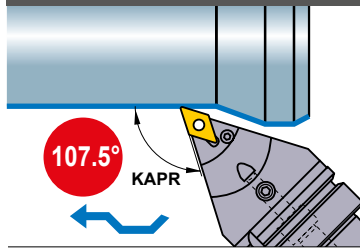
|                                |        |
|--------------------------------|--------|
| RECOMMENDED CUTTING CONDITIONS | ➤ A076 |
| SPARE PARTS                    | ➤ N001 |
| TECHNICAL DATA                 | ➤ P001 |

H009

# HSK-T SYSTEM

## PDNN

External turning • Copying



| Finish                                                                                                        | Light                                                                                                             | Medium                                                                                                         |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| FP<br><br>(15)             | LP<br><br>(15)                 | MP<br><br>(15)              |
| Medium<br>MK<br><br>(15)   | Medium—Rough<br>RP<br><br>(15) | Stainless<br>MM<br><br>(15) |
| G Class<br>R/L<br><br>(15) | PCBN<br><br>(15)               |                                                                                                                |

| Order Number    | Stock | Insert Number |        | Dimensions (mm) |     | *3<br>WT (kg) | *2  |  |  | *1  |  |  |
|-----------------|-------|---------------|--------|-----------------|-----|---------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 |       |               |        | DCONMS          | LF  |               | Shim                                                                                  | Shim Pin                                                                            | Clamp Lever                                                                         | Clamp Screw                                                                            | Plug                                                                                | Wrench                                                                              |
| H63TH-PDNNN-H15 | ●     | DN⊙A          | 1504⊙⊙ | 63              | 100 | 1.6           | LLSDN43 (LLSDN42)                                                                     | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                                | HGM-PT1/8                                                                           | HKY30R                                                                              |
| H63TH-PDNNN-L15 | ●     | DN⊙G<br>DN⊙M  |        | 63              | 140 | 2.5           | LLSDN43 (LLSDN42)                                                                     | LLP14                                                                               | LLCL24                                                                              | LLCS108                                                                                | HGM-PT1/8                                                                           | HKY30R                                                                              |

\*1 Clamp Torque (N • m) : LLC108=3.3

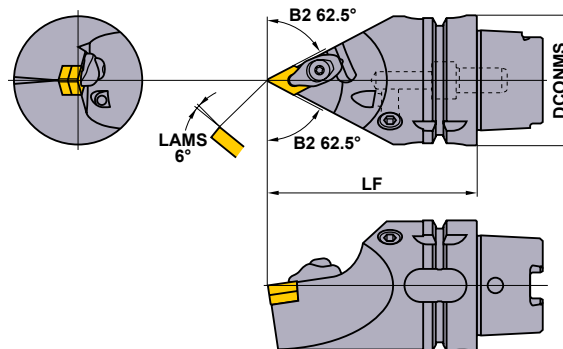
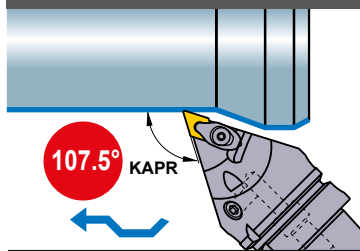
\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

\*3 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

## DDNN

External turning • Copying **DOUBLE CLAMP type**



| Finish                                                                                                          | Light                                                                                                               | Medium                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| FP<br><br>(15)             | LP<br><br>(15)                 | MP<br><br>(15)              |
| Medium<br>MK<br><br>(15)   | Medium—Rough<br>RP<br><br>(15) | Stainless<br>MM<br><br>(15) |
| G Class<br>R/L<br><br>(15) | PCBN<br><br>(15)               |                                                                                                                  |

| Order Number    | Stock | Insert Number |        | Dimensions (mm) |     | *3<br>WT (kg) | *2                |          |              |        |             |        | *1 |
|-----------------|-------|---------------|--------|-----------------|-----|---------------|-------------------|----------|--------------|--------|-------------|--------|----|
|                 |       |               |        | DCONMS          | LF  |               | Shim              | Shim Pin | Clamp Bridge | Spring | Clamp Screw | Wrench |    |
| H63TH-DDNNN-H15 | ●     | DN⊙A          | 1504⊙⊙ | 63              | 100 | 1.6           | LLSDN43 (LLSDN42) | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |    |
| H63TH-DDNNN-L15 | ●     | DN⊙M          |        | 63              | 140 | 2.5           | LLSDN43 (LLSDN42) | LLP24    | DCK2613      | DCS1   | DC0621T     | TKY20F |    |

\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

\*3 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

● : Inventory maintained.

|                                |                   |
|--------------------------------|-------------------|
| PDNN type inserts              | > A106—A112       |
| DDNN type inserts              | > A106—A112       |
| PCBN & PCD inserts             | > B025—B028, B050 |
| RECOMMENDED CUTTING CONDITIONS | > A076            |

# DDJN

External turning • Facing

## DOUBLE CLAMP type

| Finish       |    | Light     |
|--------------|----|-----------|
| FP           | LP |           |
|              |    | (15)      |
| Medium       |    | Medium    |
| MP           | MK |           |
|              |    | (15)      |
| Medium—Rough |    | Stainless |
| RP           | MM |           |
|              |    | (15)      |

Left hand tool holder only.

| Order Number      | Stock | Insert Number                                                                                                       |      | Dimensions (mm) |     |    | *3<br>WT<br>(kg) | *2  |  |  |  | *1  |  |
|-------------------|-------|---------------------------------------------------------------------------------------------------------------------|------|-----------------|-----|----|------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                   | L     |                                                                                                                     |      | DCONMS          | LF  | WF |                  | Shim                                                                                   | Shim Pin                                                                            | Clamp Bridge                                                                        | Spring                                                                              | Clamp Screw                                                                            | Wrench                                                                              |
| H63TH-DDJNL-L15-3 | ●     | <div><div>DN</div><div>OA</div><div>DN</div><div>OG</div><div>DN</div><div>OM</div><div>DN</div><div>MX</div></div> | 1504 | 63              | 140 | 30 | 2.2              | LLSDN43<br>(LLSDN42)                                                                   | LLP24                                                                               | DCK2613                                                                             | DCS1                                                                                | DC0621T                                                                                | TKY20F                                                                              |

\*1 Clamp Torque (N • m) : DC0621T=5.0

\*2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

\*3 WT : Tool Weight

Note 1) Dimensions shown for insert corner RE 0.8.

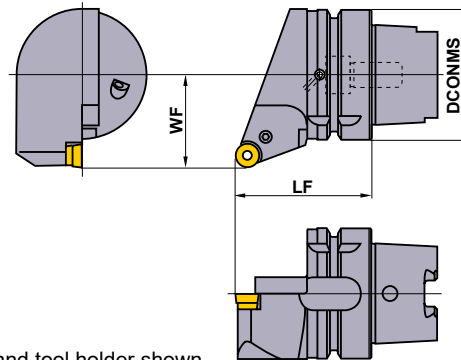
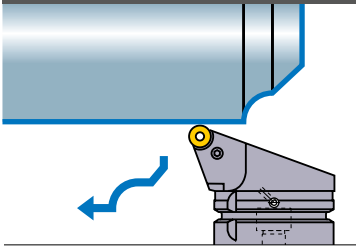


# HSK-T SYSTEM

## PRGC

External turning • Facing • Copying

Medium



Right hand tool holder shown.

| Order Number         | Stock |   | Insert Number | Dimensions (mm) |    |    | *2<br>WT<br>(kg) |          |       |         | *1      |        |
|----------------------|-------|---|---------------|-----------------|----|----|------------------|----------|-------|---------|---------|--------|
|                      | R     | L |               | DCONMS          | LF | WF |                  |          |       |         |         |        |
| * H63TH-PRGCR/L-DX12 | ●     | ● | RCMX 1204M0   | 63              | 65 | 45 | 1.2              | LLSRN123 | LLP13 | LLCL112 | LLCS106 | HKY25R |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

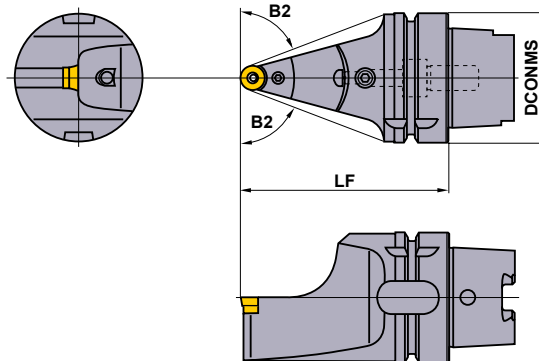
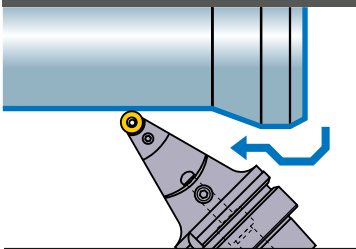
\*1 Clamp Torque (N • m) : LLCS106=2.2

\*2 WT : Tool Weight

## PRDC

External turning • Facing • Copying

Medium



| Order Number    | Stock | Insert Number | Dimensions (mm) |     |     | *2<br>WT<br>(kg) |          |       |         | *1      |           |        |
|-----------------|-------|---------------|-----------------|-----|-----|------------------|----------|-------|---------|---------|-----------|--------|
|                 |       |               | DCONMS          | LF  | B2  |                  |          |       |         |         |           |        |
| H63TH-PRDCN-H12 | ●     | RCMX 1204M0   | 63              | 100 | 69° | 1.4              | LLSRN123 | LLP13 | LLCL112 | LLCS106 | HGM-PT1/8 | HKY25R |
| H63TH-PRDCN-L12 | ●     |               | 63              | 140 | 75° | 2.3              | LLSRN123 | LLP13 | LLCL112 | LLCS106 | HGM-PT1/8 | HKY25R |

\*1 Clamp Torque (N • m) : LLCS106=2.2

\*2 WT : Tool Weight

## RECOMMENDED CUTTING CONDITIONS

|   | Material                 | Hardness    | Cutting Mode   | Chipbreaker | Grade  | Cutting Speed (m/min) |
|---|--------------------------|-------------|----------------|-------------|--------|-----------------------|
| P | Mild Steel               | ≤180HB      | Medium Cutting | Standard    | MC6115 | 245—440               |
|   | Carbon Steel Alloy Steel | 180HB—350HB | Medium Cutting | Standard    | MC6115 | 200—300               |
| M | Stainless Steel          | ≤200HB      | Medium Cutting | Standard    | US735  | 70—130                |

● : Inventory maintained.

PRGC type inserts > A160

PRDC type inserts > A160



# SVPB

## Facing • Copying

Right hand tool holder shown.

| Order Number         | Stock |   | Insert Number                        | Dimensions (mm) |    |    |     | *2<br>WT<br>(kg) | Shim | Shim Pin | Clamp Screw *1 | Wrench |        |
|----------------------|-------|---|--------------------------------------|-----------------|----|----|-----|------------------|------|----------|----------------|--------|--------|
|                      | R     | L |                                      | DCONMS          | LF | WF | WF2 |                  |      |          |                |        |        |
| * H63TH-SVPBR/L-DX16 | ●     | ● | VB <sup>OT</sup><br>VB <sup>OW</sup> | 1604            | 63 | 65 | 45  | 3.8              | 1.1  | SPSVN32  | BCP141         | TS35D  | TKY15F |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.  
 \*1 Clamp Torque (N • m) : TS35D=3.5  
 \*2 WT : Tool Weight  
 Note 1) Dimensions shown for insert corner RE 0.8.

# SVVB

## Facing • Copying

| Order Number    | Stock |   | Insert Number                        | Dimensions (mm) |    |     | *2<br>WT<br>(kg) | Shim | Shim Pin | Clamp Screw *1 | Plug  | Wrench    |        |
|-----------------|-------|---|--------------------------------------|-----------------|----|-----|------------------|------|----------|----------------|-------|-----------|--------|
|                 | R     | L |                                      | DCONMS          | LF | B2  |                  |      |          |                |       |           |        |
| H63TH-SVVBH-H16 | ●     | ● | VB <sup>OT</sup><br>VB <sup>OW</sup> | 1604            | 63 | 100 | 66.5°            | 1.3  | SPSVN32  | BCP141         | TS35D | HGM-PT1/8 | TKY15F |
| H63TH-SVVBH-L16 | ●     | ● | VB <sup>OT</sup><br>VB <sup>OW</sup> | 1604            | 63 | 140 | 72.5°            | 2.2  | SPSVN32  | BCP141         | TS35D | HGM-PT1/8 | TKY15F |

\*1 Clamp Torque (N • m) : TS35D=3.5  
 \*2 WT : Tool Weight  
 Note 1) Dimensions shown for insert corner RE 0.8.

## RECOMMENDED CUTTING CONDITIONS

|   | Material                 | Hardness                 | Cutting Mode   | Chipbreaker | Grade  | Cutting Speed (m/min) |
|---|--------------------------|--------------------------|----------------|-------------|--------|-----------------------|
| P | Mild Steel               | ≤180HB                   | Finish Cutting | F           | AP25N  | 250 (150–300)         |
|   |                          |                          | Medium Cutting | MP          | MC6115 | 250 (180–330)         |
|   | Carbon Steel Alloy Steel | 180HB–350HB              | Finish Cutting | F           | AP25N  | 210 (150–260)         |
|   |                          |                          | Medium Cutting | MP          | MC6125 | 210 (160–260)         |
| M | Stainless Steel          | ≤200HB                   | Medium Cutting | MM          | MP7035 | 100 (70–120)          |
| K | Cast Iron                | Tensile Strength ≤350MPa | Medium Cutting | MK          | MC5115 | 220 (160–290)         |

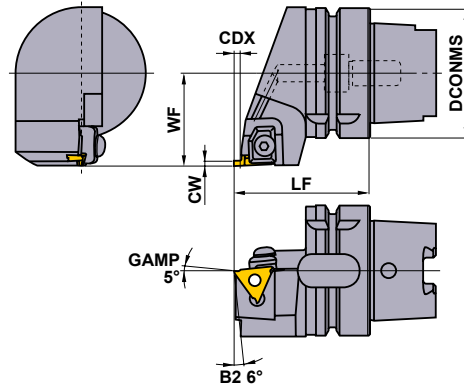
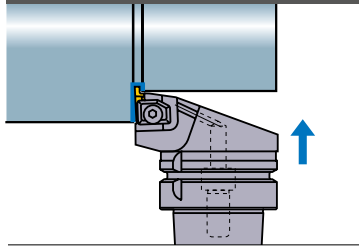
SVPB type inserts > A174–A176  
 SVVB type inserts > A174–A176  
 PCBN inserts > B045

SPARE PARTS > N001  
 TECHNICAL DATA > P001

# HSK-T SYSTEM

MG

Grooving



Right hand tool holder shown.

| Order Number          | Stock |   | Insert Number                 | Dimensions (mm) |                |     |    |    | *2<br>WT<br>(kg) |         | *1       |      |        |
|-----------------------|-------|---|-------------------------------|-----------------|----------------|-----|----|----|------------------|---------|----------|------|--------|
|                       | R     | L |                               | DCOMMS          | CW             | CDX | LF | WF |                  |         |          |      |        |
| * H63TH-MGHR/L-DX4315 | ★     | ★ | MGTR/L<br>43125<br> <br>43470 | 63              | 1.25           | 1.2 | 65 | 45 | 1.2              | MTK1R/L | HBH06020 | MES3 | HKY40R |
|                       |       |   |                               | 63              | 1.45           | 1.5 | 65 | 45 | 1.2              |         |          |      |        |
| * H63TH-MGHR/L-DX4323 | ★     | ★ |                               | 63              | 1.5 ≤ CW ≤ 2.3 | 3   | 65 | 45 | 1.2              |         |          |      |        |
|                       |       |   |                               | 63              | 2.3 < CW ≤ 3.3 | 4.5 | 65 | 45 | 1.2              |         |          |      |        |
| * H63TH-MGHR/L-DX4333 | ★     | ★ |                               | 63              | 3.3 < CW ≤ 4.7 | 4.5 | 65 | 45 | 1.2              |         |          |      |        |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

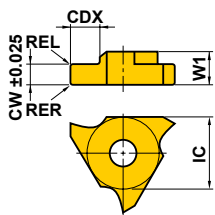
\*1 Clamp Torque (N • m) : HBH06020=7.0

\*2 WT : Tool Weight

## RECOMMENDED CUTTING CONDITIONS

|   | Material                    | Hardness                 | Grade  | Cutting Speed (m/min) | Feed (mm/rev)    |
|---|-----------------------------|--------------------------|--------|-----------------------|------------------|
| P | Carbon Steel<br>Alloy Steel | 180—350HB                | VP20MF | 120 (100—140)         | 0.10 (0.03—0.18) |
|   |                             |                          | NX2525 | 130 (100—160)         | 0.12 (0.03—0.2)  |
| M | Stainless Steel             | ≤200HB                   | VP20MF | 120 (100—140)         | 0.10 (0.03—0.18) |
| K | Cast Iron                   | Tensile Strength ≤350MPa | VP20MF | 120 (100—140)         | 0.10 (0.03—0.18) |

## INSERTS

| Order Number | Stock  |   |        |   |         |   | Dimensions (mm) |     |      |      |       |     | Geometry                                                                                                            |
|--------------|--------|---|--------|---|---------|---|-----------------|-----|------|------|-------|-----|---------------------------------------------------------------------------------------------------------------------|
|              | Coated |   | Cermet |   | Carbide |   | CW              | CDX | IC   | W1   | RER/L | LE  |                                                                                                                     |
|              | VP20MF |   | NX2525 |   | UTi20T  |   |                 |     |      |      |       |     |                                                                                                                     |
|              | R      | L | R      | L | R       | L |                 |     |      |      |       |     |                                                                                                                     |
| MGTR/L43125  | ★      | ★ | ★      | ★ | ●       | ● | 1.25            | 1.2 | 12.7 | 4.76 | 0.2   | 2.7 | <div>MGTR/L...</div> <div></div> |
| MGTR/L43145  | ★      | ★ |        | ★ | ●       | ★ | 1.45            | 1.5 | 12.7 | 4.76 | 0.2   | —   |                                                                                                                     |
| MGTR/L43150  | ★      | ★ | ★      | ● | ●       | ● | 1.5             | 3   | 12.7 | 4.76 | 0.2   | 2.7 |                                                                                                                     |
| MGTR/L43175  | ★      | ★ | ★      | ★ | ●       | ● | 1.75            | 3   | 12.7 | 4.76 | 0.2   | —   |                                                                                                                     |
| MGTR/L43200  | ★      | ★ | ★      | ● | ●       | ● | 2               | 3   | 12.7 | 4.76 | 0.2   | 2.7 |                                                                                                                     |
| MGTR/L43230  | ★      | ★ | ●      | ★ | ●       | ● | 2.3             | 3   | 12.7 | 4.76 | 0.2   | —   |                                                                                                                     |
| MGTR/L43250  | ★      | ★ | ★      | ★ | ●       | ● | 2.5             | 4.5 | 12.7 | 4.76 | 0.3   | 2.7 |                                                                                                                     |
| MGTR/L43260  | ★      | ★ | ★      |   | ●       | ● | 2.6             | 4.5 | 12.7 | 4.76 | 0.3   | —   |                                                                                                                     |
| MGTR/L43270  | ★      | ★ |        |   | ●       | ★ | 2.7             | 4.5 | 12.7 | 4.76 | 0.3   | —   |                                                                                                                     |
| MGTR/L43280  |        | ★ |        | ★ | ●       | ● | 2.8             | 4.5 | 12.7 | 4.76 | 0.3   | —   |                                                                                                                     |
| MGTR/L43300  | ★      | ★ | ★      | ★ | ●       | ● | 3               | 4.5 | 12.7 | 4.76 | 0.3   | 2.7 |                                                                                                                     |
| MGTR/L43320  | ★      |   |        |   | ●       | ● | 3.2             | 4.5 | 12.7 | 4.76 | 0.3   | —   |                                                                                                                     |
| MGTR/L43330  |        | ★ |        | ★ | ●       | ● | 3.3             | 4.5 | 12.7 | 4.76 | 0.3   | —   |                                                                                                                     |
| MGTR/L43350  | ★      | ★ | ★      | ★ | ●       | ● | 3.5             | 4.5 | 12.7 | 4.76 | 0.3   | 2.7 |                                                                                                                     |
| MGTR/L43400  | ★      | ★ | ★      |   | ●       | ● | 4               | 4.5 | 12.7 | 4.76 | 0.3   | 2.7 |                                                                                                                     |
| MGTR/L43420  | ★      | ★ | ★      |   | ●       | ● | 4.2             | 4.5 | 12.7 | 4.76 | 0.4   | —   |                                                                                                                     |
| MGTR/L43430  | ★      | ★ | ★      |   | ●       | ● | 4.3             | 4.5 | 12.7 | 4.76 | 0.4   | —   |                                                                                                                     |
| MGTR/L43450  | ★      | ★ | ●      | ★ | ●       | ● | 4.5             | 4.5 | 12.7 | 4.76 | 0.4   | —   |                                                                                                                     |
| MGTR/L43470  | ★      | ★ | ★      | ★ | ●       | ★ | 4.7             | 4.5 | 12.7 | 4.76 | 0.4   | —   |                                                                                                                     |

Right hand tool holder shown.

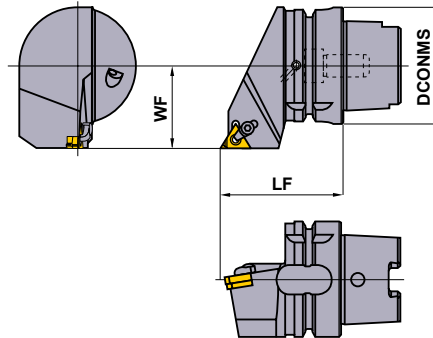
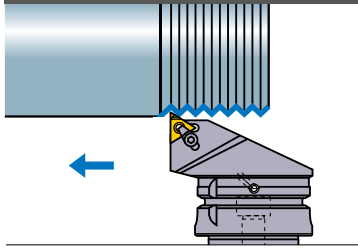
H

HSK-T TOOLS

# HSK-T SYSTEM

## MMTE

### Threading



Right hand tool holder only.

| Order Number       | Stock | Insert Number | Dimensions (mm) |    |    | *2<br>WT<br>(kg) |        | *1     |     |           | *1       | F<br>R           |
|--------------------|-------|---------------|-----------------|----|----|------------------|--------|--------|-----|-----------|----------|------------------|
|                    | R     |               | DCONMS          | LF | WF |                  |        |        |     |           |          |                  |
| * H63TH-MMTER-DX16 | ★     | MMT16ER       | 63              | 65 | 45 | 1.2              | SETK51 | SETS51 | CR4 | CTE32TP15 | HFC03008 | TKY15F<br>HKY20R |

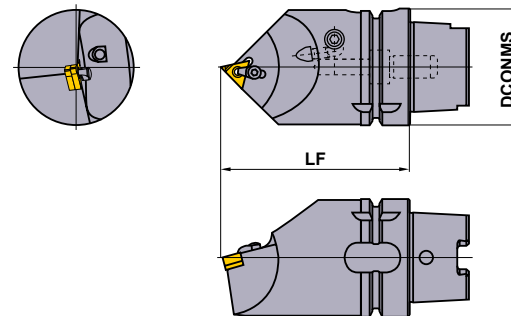
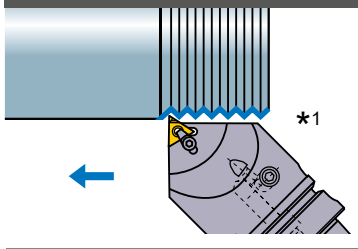
\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N · m) : SETS51=3.5, HFC03008=1.5

\*2 WT : Tool Weight

## MMTEN

### Threading



Tool holder for right hand insert only.

| Order Number     | Stock | Insert Number | Dimensions (mm) |     | *3<br>WT<br>(kg) |        | *2     |     |           | *2       |           | F<br>R           |
|------------------|-------|---------------|-----------------|-----|------------------|--------|--------|-----|-----------|----------|-----------|------------------|
|                  |       |               | DCONMS          | LF  |                  |        |        |     |           |          |           |                  |
| H63TH-MMTENR-H16 | ★     | MMT16ER       | 63              | 100 | 1.7              | SETK51 | SETS51 | CR4 | CTE32TP15 | HFC03008 | HGM-PT1/8 | TKY15F<br>HKY20R |
| H63TH-MMTENR-L16 | ★     |               | 63              | 140 | 2.7              | SETK51 | SETS51 | CR4 | CTE32TP15 | HFC03008 | HGM-PT1/8 | TKY15F<br>HKY20R |

\*1 For use with B axis tilted at 45 degrees.

\*2 Clamp Torque (N · m) : SETS51=3.5, HFC03008=1.5

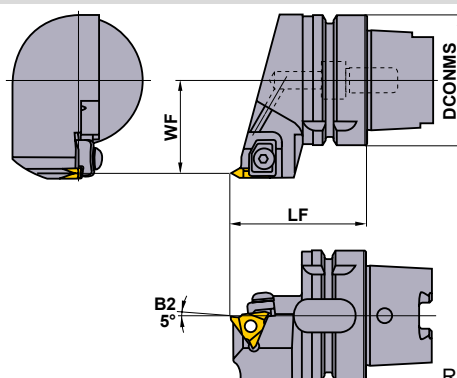
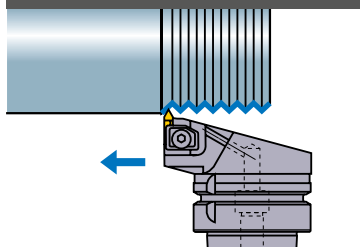
\*3 WT : Tool Weight

## RECOMMENDED CUTTING CONDITIONS

|   | Material                 | Hardness  | Grade  | Cutting Speed (m/min) |
|---|--------------------------|-----------|--------|-----------------------|
| P | Mild Steel               | ≤180HB    | MP9025 | 80 (60—100)           |
|   |                          |           | VP10MF | 150 (70—230)          |
|   |                          |           | VP15TF | 100 (60—140)          |
|   |                          |           | VP20RT | 80 (60—100)           |
|   | Carbon Steel Alloy Steel | 180—280HB | MP9025 | 80 (60—100)           |
|   |                          |           | VP10MF | 140 (80—200)          |
|   |                          |           | VP15TF | 100 (60—140)          |
|   |                          |           | VP20RT | 80 (60—100)           |

|   | Material        | Hardness                    | Grade  | Cutting Speed (m/min) |
|---|-----------------|-----------------------------|--------|-----------------------|
| M | Stainless Steel | ≤200HB                      | MP9025 | 80 (40—120)           |
|   |                 |                             | VP15TF | 80 (40—120)           |
|   |                 |                             | VP20RT | 80 (40—120)           |
| K | Cast Iron       | Tensile Strength<br>≤350MPa | VP10MF | 140 (80—200)          |
|   |                 |                             | VP15TF | 90 (60—120)           |

★ : Inventory maintained in Japan.

**MT****Threading**

| Order Number        | Stock |   | Insert Number |    | Dimensions (mm) |    |    | *2<br>WT (kg) |  |  *1 |  |  |
|---------------------|-------|---|---------------|----|-----------------|----|----|---------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                     | R     | L |               |    | D               | C  | N  |               | M                                                                                  | S                                                                                      | L                                                                                   | F                                                                                   |
| * H63TH-MTHR/L-DX43 | ★     | ★ | MTTR/L        | 43 | 63              | 65 | 45 | 1.2           | MTK1R/L                                                                            | HBH06020                                                                               | MES3                                                                                | HKY40R                                                                              |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 Clamp Torque (N • m) : HBH06020=7.0

\*2 WT : Tool Weight

**H**

HSK-T TOOLS

**RECOMMENDED CUTTING CONDITIONS**

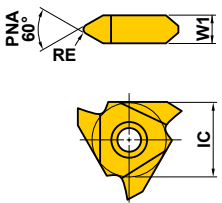
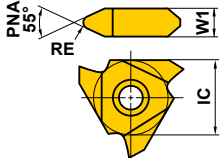
|          | Material                    | Hardness                 | Grade  | Cutting Speed (m/min) |
|----------|-----------------------------|--------------------------|--------|-----------------------|
| <b>P</b> | Mild Steel                  | ≤180HB                   | UP20M  | 140 (100—180)         |
|          |                             |                          | NX2525 | 200 (150—250)         |
|          |                             |                          | UTi20T | 120 (100—150)         |
|          | Carbon Steel<br>Alloy Steel | 180HB—350HB              | UP20M  | 120 (100—150)         |
|          |                             |                          | NX2525 | 170 (150—200)         |
|          |                             |                          | UTi20T | 100 (70—120)          |
| <b>M</b> | Stainless Steel             | ≤200HB                   | UP20M  | 120 (80—150)          |
|          |                             |                          | UTi20T | 100 (70—130)          |
| <b>K</b> | Cast Iron                   | Tensile Strength ≤350MPa | UP20M  | 80 (60—100)           |
|          |                             |                          | UTi20T | 80 (60—100)           |
|          |                             |                          | HTi10  | 100 (70—130)          |

APPLICABLE INSERT > H018  
 SPARE PARTS > N001  
 TECHNICAL DATA > P001

**H017**

# HSK-T SYSTEM

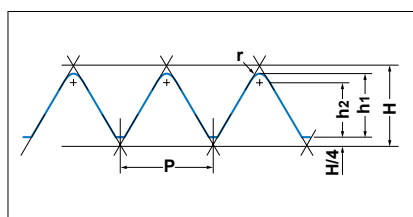
## INSERTS

| Type        | Order Number | Class | Coated | Cermet | Carbide |       | ISO<br>Pitch mm<br>(thread/inch) | Dimensions (mm) |      |     | Geometry                                                                                                                                        |
|-------------|--------------|-------|--------|--------|---------|-------|----------------------------------|-----------------|------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------|
|             |              |       | UP20M  | NX2525 | UT120T  | HT110 |                                  | IC              | W1   | RE  |                                                                                                                                                 |
| General 60° | MTTR436000   | G     |        | ●      | ●       |       | —0.8                             | 12.7            | 4.76 | 0   | <b>MTTR/L(60°) (G Class)</b><br><br>Right hand insert shown. |
|             | MTTR436001   | G     | ★      | ●      | ●       | ★     | 1.0—1.75                         | 12.7            | 4.76 | 0.1 |                                                                                                                                                 |
|             | MTTL436001   | G     | ★      |        | ●       | ★     | 1.0—1.75                         | 12.7            | 4.76 | 0.1 |                                                                                                                                                 |
|             | MTTR436002   | G     | ★      | ●      | ●       | ★     | 2.0—2.5                          | 12.7            | 4.76 | 0.2 |                                                                                                                                                 |
|             | MTTL436002   | G     |        | ●      | ●       |       | 2.0—2.5                          | 12.7            | 4.76 | 0.2 |                                                                                                                                                 |
|             | MTTR436003   | G     | ★      | ●      | ●       | ★     | 3.0—3.5                          | 12.7            | 4.76 | 0.3 |                                                                                                                                                 |
|             | MTTL436003   | G     |        | ●      | ●       |       | 3.0—3.5                          | 12.7            | 4.76 | 0.3 |                                                                                                                                                 |
|             | MTTR436004   | G     |        | ●      | ●       |       | 4.0—4.5                          | 12.7            | 4.76 | 0.4 |                                                                                                                                                 |
| General 55° | MTTR435501   | G     |        | ●      | ★       |       | (28—10)                          | 12.7            | 4.76 | 0.1 | <b>MTTR(55°) (G Class)</b><br><br>Right hand insert shown.   |
|             | MTTR435502   | G     |        | ●      | ●       |       | (16—8)                           | 12.7            | 4.76 | 0.2 |                                                                                                                                                 |
|             | MTTR435503   | G     |        | ●      | ●       |       | (11—8)                           | 12.7            | 4.76 | 0.3 |                                                                                                                                                 |
|             |              |       |        |        |         |       |                                  |                 |      |     |                                                                                                                                                 |

## STANDARD OF DEPTH OF CUT ● METRIC SCREW THREAD

Unit : mm

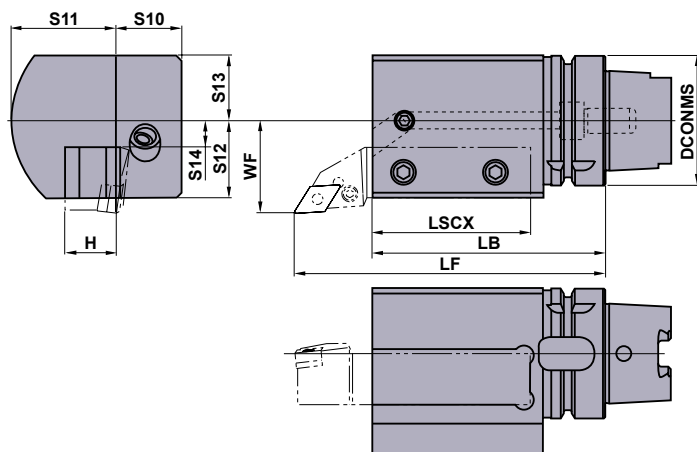
- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When using cermet grades or cutting stainless steel, please increase the number of passes by 2—3 times.



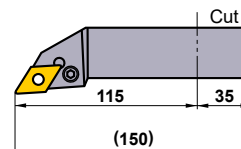
| P (Pitch)        |    | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 |
|------------------|----|------|------|------|------|------|------|------|------|------|------|------|
| h1               |    | 0.46 | 0.61 | 0.77 | 0.92 | 1.07 | 1.23 | 1.53 | 1.84 | 2.15 | 2.45 | 2.76 |
| h2               |    | 0.35 | 0.47 | 0.59 | 0.70 | 0.82 | 0.94 | 1.17 | 1.41 | 1.65 | 1.87 | 2.11 |
| r (Nose Radius)  |    | 0.11 | 0.14 | 0.18 | 0.22 | 0.25 | 0.29 | 0.36 | 0.43 | 0.50 | 0.58 | 0.65 |
| Number of Passes | 1  | 0.18 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 | 0.30 | 0.35 | 0.35 | 0.40 |
|                  | 2  | 0.13 | 0.15 | 0.18 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 | 0.30 | 0.35 |
|                  | 3  | 0.10 | 0.10 | 0.12 | 0.15 | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 | 0.25 | 0.30 |
|                  | 4  | 0.05 | 0.10 | 0.12 | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 |
|                  | 5  |      | 0.06 | 0.10 | 0.10 | 0.12 | 0.15 | 0.15 | 0.20 | 0.20 | 0.25 | 0.25 |
|                  | 6  |      |      | 0.05 | 0.07 | 0.10 | 0.10 | 0.10 | 0.15 | 0.20 | 0.20 | 0.20 |
|                  | 7  |      |      |      |      | 0.05 | 0.08 | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
|                  | 8  |      |      |      |      |      | 0.05 | 0.10 | 0.10 | 0.15 | 0.15 | 0.15 |
|                  | 9  |      |      |      |      |      |      | 0.08 | 0.10 | 0.10 | 0.15 | 0.15 |
|                  | 10 |      |      |      |      |      |      | 0.05 | 0.09 | 0.10 | 0.10 | 0.15 |
|                  | 11 |      |      |      |      |      |      |      | 0.05 | 0.10 | 0.10 | 0.10 |
|                  | 12 |      |      |      |      |      |      |      |      | 0.05 | 0.10 | 0.10 |
|                  | 13 |      |      |      |      |      |      |      |      |      | 0.05 | 0.10 |
|                  | 14 |      |      |      |      |      |      |      |      |      |      | 0.06 |

Note 1) The first pass causes a high load on the cutting edge.  
In order to avoid damage, restrict the depth of cut to a maximum of 0.4—0.5mm.

# EXTERNAL TURNING TOOL HOLDERS External turning • Facing



■ This holder is for 25×25 size tools.  
Please shorten the tool as shown below before use.



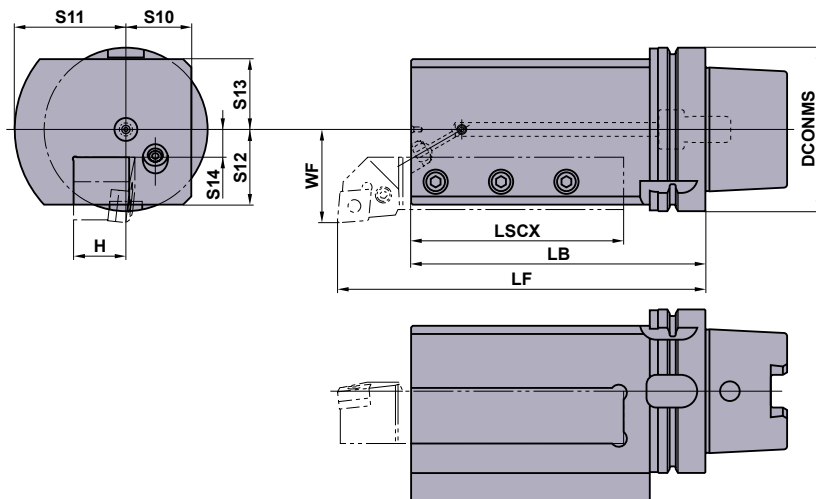
Right hand tool holder shown.

| Order Number          | Stock |   | Dimensions (mm) |     |     |      |    |     |     |    |     |     |     | ★1<br>WT<br>(kg) |  |  |
|-----------------------|-------|---|-----------------|-----|-----|------|----|-----|-----|----|-----|-----|-----|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                       | R     | L | DCONMS          | LF  | LB  | LSCX | H  | S10 | S11 | WF | S14 | S12 | S13 |                  | Clamp Screw                                                                         | Plug                                                                                |
| * H63TH-EV2525R/L-112 | ★     | ★ | 63              | 150 | 112 | 77   | 25 | 32  | 53  | 45 | 13  | 38  | 32  | 3.9              | HSS12025                                                                            | HGM-PT1/8                                                                           |

★ The tools marked ★ in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

★1 WT : Tool Weight

# EXTERNAL TURNING TOOL HOLDERS External turning • Facing



■ This holder is for 32×32 and 32×25 size tools.

Right hand tool holder shown.

| Order Number           | Stock |   | Dimensions (mm) |     |     |      |    |     |     |    |     |     |     | ★1<br>WT<br>(kg) |  |  |
|------------------------|-------|---|-----------------|-----|-----|------|----|-----|-----|----|-----|-----|-----|------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                        | R     | L | DCONMS          | LF  | LB  | LSCX | H  | S10 | S11 | WF | S14 | S12 | S13 |                  | Clamp Screw                                                                           | Plug                                                                                  |
| * H100TH-EV3232R/L-180 | ★     | ★ | 100             | 220 | 180 | 130  | 32 | 40  | 68  | 57 | 17  | 46  | 43  | 11.7             | HSS14035                                                                              | HSS06006                                                                              |

★ The tools marked ★ in the table cannot be fitted on the Yamazaki Mazak INTEGREX e, i series.

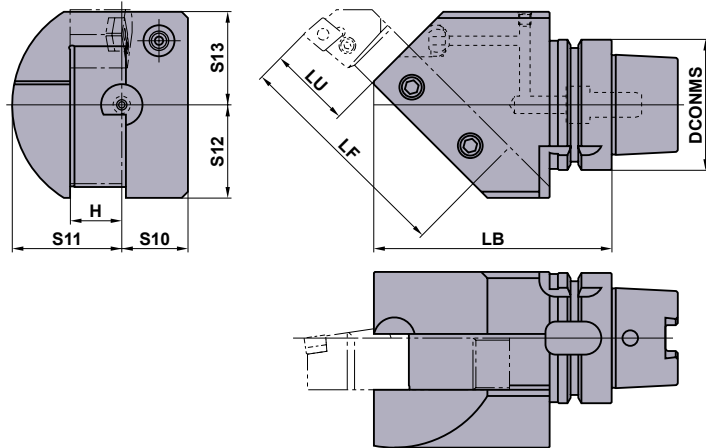
★1 WT : Tool Weight

Note 1) Can be used with 32 x 32 and 32 x 25 tool holders. Possible to fit a 25 x 25 tool by using a 7mm plate.

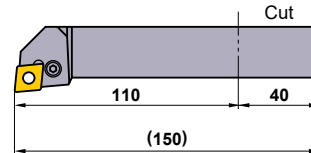


# HSK-T SYSTEM

## EXTERNAL TURNING TOOL HOLDERS External turning • Facing



■ This holder is for 25×25 size tools.  
Please shorten the tool as shown below before use.



Mitsubishi Materials is licensed to produce and distribute these tools by MORI SEIKI CO., LTD under Patent No.3720202.

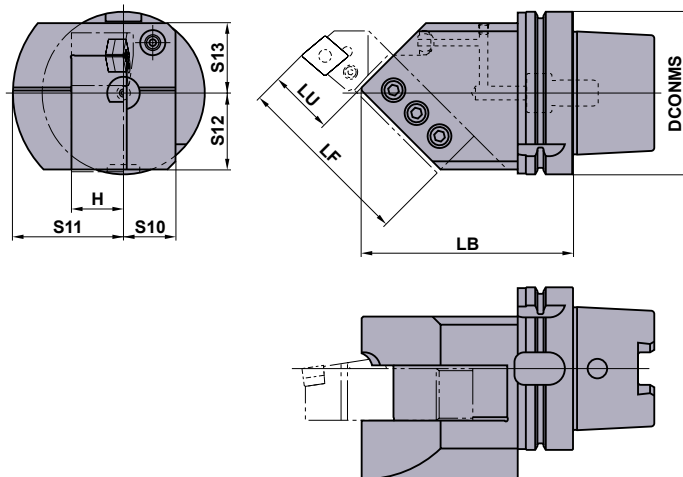
Right hand tool holder shown.

| Order Number          | Stock |   | Dimensions (mm) |     |    |     |    |     |     |     |     | ★1<br>WT<br>(kg) |             |          |
|-----------------------|-------|---|-----------------|-----|----|-----|----|-----|-----|-----|-----|------------------|-------------|----------|
|                       | R     | L | DCONMS          | LB  | LU | LF  | H  | S10 | S11 | S12 | S13 |                  | Clamp Screw | Plug     |
| * H63TH-EN2525R/L-115 | ★     | ★ | 63              | 115 | 40 | 110 | 25 | 32  | 53  | 45  | 45  | 3.7              | HSS12030    | HSS06006 |

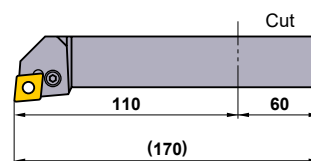
★ The tools marked ★ in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

★1 WT : Tool Weight

## EXTERNAL TURNING TOOL HOLDERS External turning • Facing



■ This holder is for 32×32 and 32×25 size tools.  
Please shorten the tool as shown below before use.



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Right hand tool holder shown.

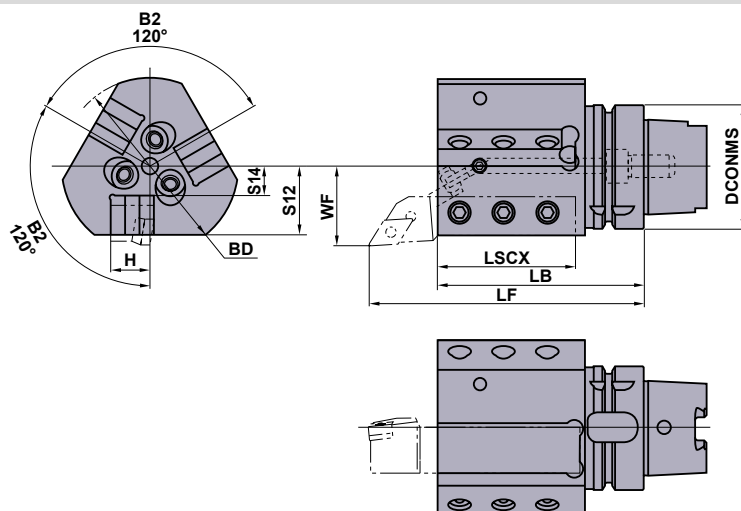
| Order Number           | Stock |   | Dimensions (mm) |     |    |     |    |     |     |     |     | ★1<br>WT<br>(kg) |             |          |
|------------------------|-------|---|-----------------|-----|----|-----|----|-----|-----|-----|-----|------------------|-------------|----------|
|                        | R     | L | DCONMS          | LB  | LU | LF  | H  | S10 | S11 | S12 | S13 |                  | Clamp Screw | Plug     |
| * H100TH-EN3232R/L-130 | ★     | ★ | 100             | 130 | 40 | 110 | 32 | 32  | 68  | 47  | 43  | 6.6              | HSS14030    | HSS06006 |

★ The tools marked ★ in the table cannot be fitted on the Yamazaki Mazak INTEGREX e, i series.

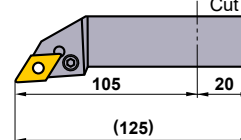
★1 WT : Tool Weight

Note 1) Can be used with 32 x 32 and 32 x 25 tool holders. Possible to fit a 25 x 25 tool by using a 7mm plate.

# EXTERNAL TURNING TOOL HOLDERS External turning • Facing



■ This holder is for 20×20 size tools.  
Please shorten the tool as shown below before use.



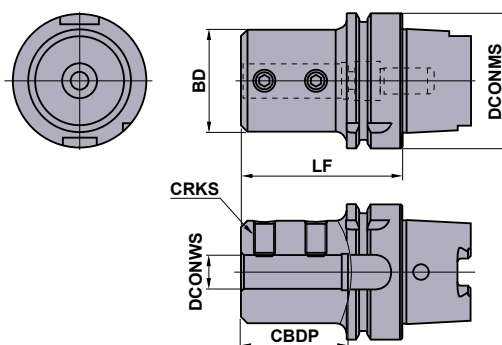
Right hand tool holder shown.

| Order Number            | Stock |   | Dimensions (mm) |     |     |      |    |    |    |     |     | *1<br>WT<br>(kg) |             |             |          |
|-------------------------|-------|---|-----------------|-----|-----|------|----|----|----|-----|-----|------------------|-------------|-------------|----------|
|                         | R     | L | DCONMS          | LF  | LB  | LSCX | H  | BD | WF | S14 | S12 |                  | Clamp Screw | Nozzle Plug | Plug     |
| * H63TH-EV2020R/L-105-3 | ★     | ★ | 63              | 140 | 105 | 70   | 20 | 90 | 40 | 15  | 35  | 2.9              | HSS12030    | HSS05012    | HSS06006 |

\* The tools marked \* in the table cannot be fitted on the Yamazaki Mazak INTEGREX i, j series.

\*1 WT : Tool Weight

# BORING BAR HOLDERS Boring



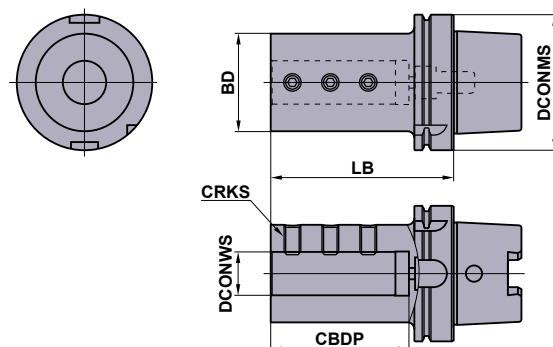
| Order Number | Stock | Dimensions (mm) |    |        |    |      |      | *<br>WT<br>(kg) |          |
|--------------|-------|-----------------|----|--------|----|------|------|-----------------|----------|
|              |       | DCONMS          | BD | DCONWS | LF | CBDP | CRKS |                 |          |
| H63TH-B08-65 | ★     | 63              | 28 | 8      | 65 | 40   | M8   | 0.9             | HSS08010 |
| H63TH-B10-70 | ★     | 63              | 35 | 10     | 70 | 45   | M8   | 1.0             | HSS08012 |
| H63TH-B12-70 | ★     | 63              | 42 | 12     | 70 | 45   | M8   | 1.1             | HSS08012 |
| H63TH-B16-75 | ★     | 63              | 48 | 16     | 75 | 50   | M10  | 1.3             | HSS10016 |
| H63TH-B20-75 | ★     | 63              | 52 | 20     | 75 | 50   | M10  | 1.4             | HSS10016 |
| H63TH-B25-83 | ★     | 63              | 62 | 25     | 83 | 58   | M12  | 1.7             | HSS12016 |
| H63TH-B32-87 | ★     | 63              | 62 | 32     | 87 | 62   | M12  | 1.7             | HSS12016 |
| H63TH-B40-97 | ★     | 63              | 65 | 40     | 97 | 72   | M16  | 1.8             | HSS16012 |

Note 1) Please cut the boring bar to adjust the shank length. This also applies to indexable type drills.

\* WT : Tool Weight

# HSK-T SYSTEM

## BORING BAR HOLDERS Boring

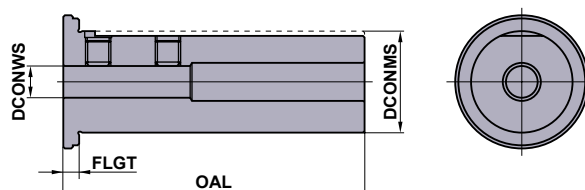


| Order Number   | Stock | Dimensions (mm) |    |        |     |      |      | *<br>WT<br>(kg) | <br>Clamp Screw |
|----------------|-------|-----------------|----|--------|-----|------|------|-----------------|----------------------------------------------------------------------------------------------------|
|                |       | DCONMS          | BD | DCONWS | LB  | CBDP | CRKS |                 |                                                                                                    |
| H100TH-B25-120 | ★     | 100             | 62 | 25     | 120 | 88   | M12  | 3.9             | HSS12016                                                                                           |
| H100TH-B32-135 | ★     | 100             | 72 | 32     | 135 | 102  | M12  | 4.8             | HSS12018                                                                                           |
| H100TH-B40-150 | ★     | 100             | 82 | 40     | 150 | 117  | M16  | 5.9             | HSS16020                                                                                           |
| H100TH-B50-180 | ★     | 100             | 92 | 50     | 180 | 147  | M16  | 7.7             | HSS16020                                                                                           |

Note 1) Available for use with a sleeve for small round-shank tool installation.

\* WT : Tool Weight

## BORING BAR SLEEVES FOR H100TH-B32-135



| Order Number | Stock | Dimensions (mm) |        |     |      | *<br>WT<br>(kg) | <br>Clamp Screw |
|--------------|-------|-----------------|--------|-----|------|-----------------|------------------------------------------------------------------------------------------------------|
|              |       | DCONWS          | DCONMS | OAL | FLGT |                 |                                                                                                      |
| SL3208-90    | ★     | 8               | 32     | 95  | 5    | 0.6             | HSS06008                                                                                             |
| SL3210-90    | ★     | 10              | 32     | 95  | 5    | 0.5             | HSS08008                                                                                             |
| SL3212-90    | ★     | 12              | 32     | 95  | 5    | 0.5             | HSS08008                                                                                             |
| SL3216-90    | ★     | 16              | 32     | 95  | 5    | 0.5             | HSS08006                                                                                             |
| SL3220-90    | ★     | 20              | 32     | 95  | 5    | 0.4             | HSS08005                                                                                             |

Note 1) These sleeves are only compatible with H100TH-B32-135 holder.

\* WT : Tool Weight

# SPARE PARTS

IDENTIFICATION ..... N002

## SPARE PARTS

CLAMP SCREW ..... N003

SET BOLT ..... N008

ADJUSTMENT SCREW / NUT ..... N009

SHIM ..... N010

SHIM PIN AND CLAMP LEVER ..... N013

LOCK PIN ..... N014

CLAMP BRIDGE ..... N014

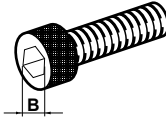
BREAKER PIECE ..... N016

ANTI SEIZE LUBRICANT ..... N017



# IDENTIFICATION

## IDENTIFICATION OF CLAMP SCREW (Metric coarse right hand screw thread)



**H** **SC** **060** **05**

Length

| Example |    |
|---------|----|
| Symbol  | L  |
| 05      | 5  |
| 10      | 10 |
| 20      | 20 |
| 30      | 30 |

Screw Diameter

| Example |    |
|---------|----|
| Symbol  | d  |
| 050     | M5 |
| 060     | M6 |

### Hexagonal Hole Dimensions

| Diameter | Pitch | B Dimensions |     |     |     |
|----------|-------|--------------|-----|-----|-----|
|          |       | HBH          | HFC | HSC | HS  |
| M2       | 0.4   | —            | —   | 1.5 | 0.9 |
| M2.5     | 0.45  | —            | —   | 2   | 1.3 |
| M3       | 0.5   | 2            | 2   | 2.5 | 1.5 |
| M4       | 0.7   | 2.5          | 2.5 | 3   | 2   |
| M5       | 0.8   | 3            | 3   | 4   | 2.5 |
| M6       | 1     | 4            | 4   | 5   | 3   |
| M8       | 1.25  | 5            | 5   | 6   | 4   |
| M10      | 1.5   | 6            | 6   | 8   | 5   |

Screw Head

| Symbol | Geometry |
|--------|----------|
| H      |          |
| S      |          |
| C      |          |

Hexagonal Hole Dimensions

With Slot

With Cross Hole

BH

BHA

FC

SC

PM

FM

SD

SP

SR

SS

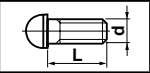
CHUUBURASHI CO.

UNBRAKO CO.

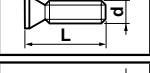
CHUUBURASHI CO.

JIS  
Standard

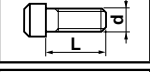
Button Head



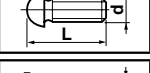
Flat Head



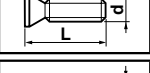
Socket Head



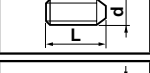
Pan Head



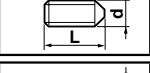
Flat Head



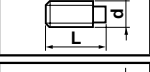
Set Screw (Cut Point)



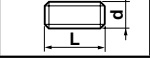
Set Screw (Cone Point)



Set Screw (Dog Point)



Set Screw (Flat Point)



## IDENTIFICATION OF WRENCH

**HKY** **15** **R**

| Symbol | Wrench           |
|--------|------------------|
| HKY    | Hexagonal Wrench |
| TKY    | Torx Wrench      |
| RKY    | R Wrench         |
| TIP    | Torx plus Wrench |

| Hexagonal Wrench |     |
|------------------|-----|
| Symbol           | B   |
| 15               | 1.5 |
| 20               | 2   |
| 25               | 2.5 |
| 30               | 3   |
| 35               | 3.5 |
| 40               | 4   |
| 50               | 5   |
| 60               | 6   |

| Torx Wrench |     |      |
|-------------|-----|------|
| Symbol      | B   | Size |
| 06          | 1.7 | T6   |
| 08          | 2.3 | T8   |
| 10          | 2.7 | T10  |
| 15          | 3.3 | T15  |
| 20          | 3.8 | T20  |
| 25          | 4.4 | T25  |
| 27          | 5.0 | T27  |
| 30          | 5.5 | T30  |

| Torx plus Wrench |     |      |
|------------------|-----|------|
| Symbol           | B   | Size |
| 06               | 1.8 | 6IP  |
| 07               | 2.1 | 7IP  |
| 08               | 2.4 | 8IP  |
| 10               | 2.8 | 10IP |
| 15               | 3.4 | 15IP |

|   |                   |  |
|---|-------------------|--|
| R | Standard L Wrench |  |
| L | Long L Wrench     |  |
| T | T Wrench          |  |
| F | Flag Wrench       |  |
| W | Flag Wrench       |  |
| D | Driver            |  |
| S | Wrench            |  |

**IMX** **10** - **WR**

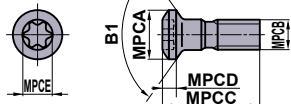
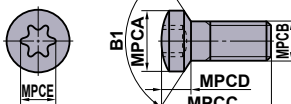
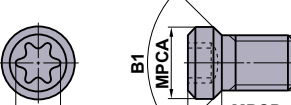
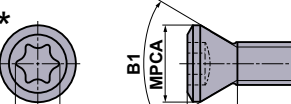
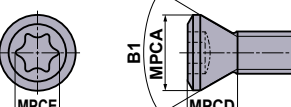
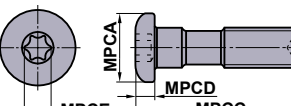
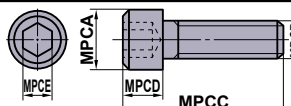
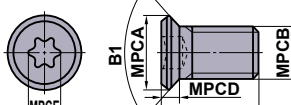
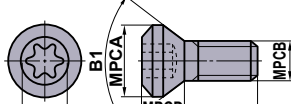
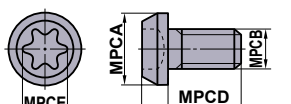
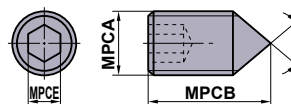
| Symbol | Wrench                |
|--------|-----------------------|
| IMX    | Wrench for iMX Series |

| Hexagonal Wrench |    |
|------------------|----|
| Symbol           | B  |
| 10               | 8  |
| 12               | 10 |
| 16               | 13 |
| 20               | 16 |
| 25               | 20 |



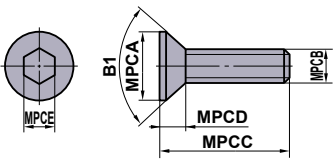
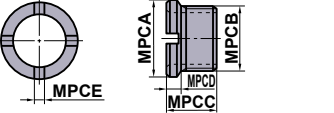
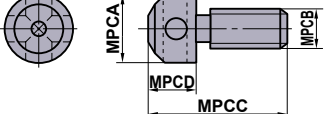
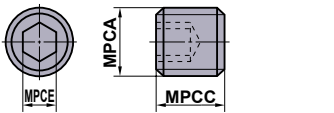
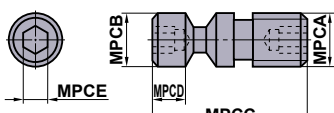
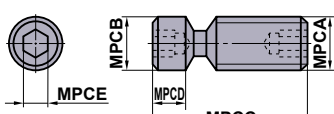
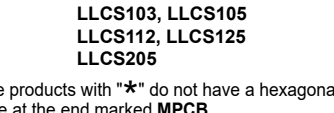
# SPARE PARTS

## CLAMP SCREW

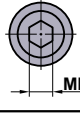
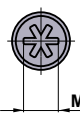
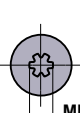
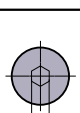
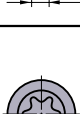
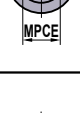
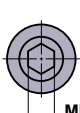
| Geometry                                                                                                                                                               | Order Number        | Dimensions (mm) |           |      |      |      | Angle | MPCDS | TQ<br>(N·m) | Tool Holder                                                              |                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|-----------|------|------|------|-------|-------|-------------|--------------------------------------------------------------------------|--------------------------------------------------------|
|                                                                                                                                                                        |                     | MPCA            | MPCB      | MPCC | MPCD | MPCE |       |       |             |                                                                          |                                                        |
|                                                                                       | <b>AJS3010T10</b>   | 5               | M3×0.5    | 10   | 1.5  | 2.8  | 120°  | T10   | 2.5         | <b>Profile Holder</b> (☉C032) <b>AJX</b> (☉K194)<br><b>AJX</b> (☉K194)   |                                                        |
|                                                                                                                                                                        | <b>AJS4012T15</b>   | 7               | M4×0.7    | 12   | 2.2  | 3.4  | 120°  | T15   | 3.5         |                                                                          |                                                        |
|                                                                                                                                                                        | <b>AJS5014T25</b>   | 8               | M5×0.8    | 14   | 2.7  | 4.5  | 120°  | T25   | 7.5         |                                                                          |                                                        |
|                                                                                                                                                                        |                     |                 |           |      |      |      |       |       |             |                                                                          |                                                        |
|                                                                                       | <b>BRS103</b>       | 5               | M3×0.5    | 9.9  | 2.9  | 3.4  | 120°  | T15   | 3.5         |                                                                          |                                                        |
|                                                                                                                                                                        | <b>BRS105</b>       | 8               | M5×0.8    | 13.8 | 3.8  | 4.5  | 120°  | T25   | 7.5         |                                                                          |                                                        |
| <br> | <b>CS200T</b>       | 3.2             | M2×0.4    | 5    | 1.6  | 1.8  | 90°   | T6    | 0.6         | <b>F Type Boring Bar</b> (☉E028)                                         |                                                        |
|                                                                                                                                                                        | <b>CS250T</b>       | 3.7             | M2.5×0.45 | 6    | 1.8  | 2.4  | 90°   | T8    | 1.0         | <b>Milling Tools Series</b> (☉K001)                                      |                                                        |
|                                                                                                                                                                        | * <b>CS250560T</b>  | 3.9             | M2.5×0.45 | 5.2  | 2.5  | 2.4  | 60°   | T8    | 1.0         | <b>BRP</b> (☉K206)                                                       |                                                        |
|                                                                                                                                                                        | <b>CS300590T</b>    | 4.1             | M3×0.5    | 5.5  | 2.1  | 2.4  | 90°   | T8    | 1.0         | <b>DCCC</b> (☉K216)                                                      |                                                        |
|                                                                                                                                                                        | <b>CS300890T</b>    | 4.1             | M3×0.5    | 8    | 2.1  | 2.4  | 90°   | T8    | 1.0         |                                                                          |                                                        |
|                                                                                                                                                                        | * <b>CS350860T</b>  | 5.5             | M3.5×0.6  | 8.4  | 4.0  | 3.4  | 60°   | T15   | 3.5         |                                                                          | <b>MMTI Type Boring Bar</b> (☉G026) <b>BRP</b> (☉K206) |
|                                                                                                                                                                        | <b>CS350990T</b>    | 4.8             | M3.5×0.6  | 9    | 2.4  | 2.8  | 90°   | T10   | 2.5         |                                                                          | <b>DCCC</b> (☉K216)                                    |
|                                                                                                                                                                        | <b>CS401160T</b>    | 5.7             | M4×0.7    | 11   | 4.5  | 3.4  | 60°   | T15   | 3.5         | <b>AL Type Holder</b> (☉C034)                                            |                                                        |
|                                                                                                                                                                        | <b>CS401990T</b>    | 6.0             | M4×0.7    | 19   | 3.0  | 3.9  | 90°   | T20   | 3.5         |                                                                          |                                                        |
|                                                                                                                                                                        | <b>CS451190T</b>    | 6.3             | M4.5×0.75 | 11   | 2.9  | 3.9  | 90°   | T20   | 5.0         |                                                                          |                                                        |
|                                                                                                                                                                        | * <b>CS5015060T</b> | 7.2             | M5×0.8    | 15   | 2.4  | 3.9  | 60°   | T20   | 5.0         |                                                                          | <b>AHX640S</b> (☉K042)                                 |
|                                                                                                                                                                        | <b>CS502190T</b>    | 8.5             | M5×0.8    | 21   | 4.0  | 5.1  | 90°   | T27   | 7.5         |                                                                          |                                                        |
|                                                                                     | <b>CSF401260T</b>   | 7.2             | M4×0.5    | 12   | 5.2  | 3.9  | 60°   | T20   | 5.0         | <b>PMR</b> (☉K252)                                                       |                                                        |
|                                                                                                                                                                        |                     |                 |           |      |      |      |       |       |             |                                                                          |                                                        |
|                                                                                     | <b>DC0520T</b>      | 8.5             | M5×0.8    | 22.5 | 2.5  | 3.4  | —     | T15   | 3.5         | <b>DOUBLE CLAMP Holder</b> (☉C008)                                       |                                                        |
|                                                                                                                                                                        | <b>DC0621T</b>      | 10.5            | M6×1.0    | 25   | 4    | 3.9  | —     | T20   | 5.0         | <b>DOUBLE CLAMP DIMPLE BAR</b> (☉E015)<br><b>HSK Tool Holder</b> (☉H001) |                                                        |
|                                                                                     | <b>DKS4</b>         | 5.6             | M4×0.7    | 18   | 3.5  | 3    | —     | —     | 3.3         |                                                                          |                                                        |
|                                                                                     | <b>FC400890T</b>    | 5.6             | M4×0.7    | 7.5  | 1.3  | 2.8  | 90°   | T10   | 2.5         | <b>AL Type Holder</b> (☉C035)<br><b>AL Type Boring Bar</b> (☉E043)       |                                                        |
|                                                                                                                                                                        |                     |                 |           |      |      |      |       |       |             |                                                                          |                                                        |
|                                                                                     | <b>GY05016S</b>     | 8.7             | M5×0.8    | 16   | 3.5  | 3.9  | 90°   | T20   | 5.0         | <b>GY Series</b> (☉F004)                                                 |                                                        |
|                                                                                                                                                                        |                     |                 |           |      |      |      |       |       |             |                                                                          |                                                        |
|                                                                                     | <b>GY06013M</b>     | 12              | M6×1      | 18   | 5    | 5.6  | —     | T30   | 6.0         | <b>GY Series</b> (☉F004)                                                 |                                                        |
|                                                                                                                                                                        |                     |                 |           |      |      |      |       |       |             |                                                                          |                                                        |
|                                                                                     | <b>HSP05008C</b>    | M5×0.8          | 8         | —    | —    | 2.5  | —     | —     | 2.5         | <b>MP Type Holder</b> (☉C019)                                            |                                                        |

# SPARE PARTS

## CLAMP SCREW

| Geometry                                                                                                                                                                                                                                                                                                        | Order Number | Dimensions (mm) |          |      |      |      | Angle<br>B1 | MPCDS | TQ<br>(N·m) | Tool Holder                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|----------|------|------|------|-------------|-------|-------------|------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                 |              | MPCA            | MPCB     | MPCC | MPCD | MPCF |             |       |             |                                                      |
|                                                                                                                                                                                                                                | HY-A1        | 4.4             | M3×0.5   | 7    | 2.1  | 2    | 82°         | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | HY-V1        | 5.5             | M3×0.5   | 7    | 2.5  | 2    | 82°         | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | HY2          | 5.5             | M3×0.5   | 10   | 2.5  | 2    | 82°         | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | HY3          | 7               | M3.5×0.6 | 12   | 2.9  | 2    | 82°         | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | HY4          | 9.3             | M5×0.8   | 16   | 3.6  | 3    | 82°         | —     | 3.3         |                                                      |
|                                                                                                                                                                                                                                | JSS6         | 6.9             | M6×0.75  | 4.5  | 1.5  | 0.8  | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                                                                                                 | JSS7         | 8               | M7×0.75  | 4.4  | 1.5  | 1    | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                | KS1          | 7               | M4×0.7   | 14   | 5    | —    | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                                                                                                 | KS2          | 10              | M6×1     | 18   | 7    | —    | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                                                                                                 | KS2S         | 10              | M6×1     | 18   | 7    | —    | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                | LLR1         | M5×0.8          | —        | 3.5  | —    | 2.5  | —           | —     | —           |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLR2         | M6×1            | —        | 5    | —    | 3    | —           | —     | —           |                                                      |
|  <p>LLCS103, LLCS105<br/>LLCS112, LLCS125<br/>LLCS205</p> <p>The products with "*" do not have a hexagonal hole at the end marked MPCB.</p> <p>The products with "☆" do not have a hexagonal hole at the end marked MPCA.</p> | ☆ LLCS103    | M3×0.5          | 4        | 11   | 4.6  | 2    | —           | —     | 1.5         | P Type Boring Bar (☉E038)<br>HSK Tool Holder (☉H001) |
|                                                                                                                                                                                                                                                                                                                 | * LLCS105    | M5×0.8          | M5×0.8   | 10   | 1.5  | 2    | —           | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS106      | M6×1            | 6        | 16.5 | 3.5  | 2.5  | —           | —     | 2.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LLCS106S   | M6×1            | 6        | 13.4 | 0.7  | 2.5  | —           | —     | 2.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS108      | M8×1.25         | 8        | 21   | 6.5  | 3    | —           | —     | 3.3         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LLCS108S   | M8×1.25         | 8        | 16.5 | 2    | 3    | —           | —     | 3.3         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS110      | M10×1.5         | 10       | 29   | 8    | 4    | —           | —     | 7.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS112      | M12×1           | 11.9     | 36.2 | 9    | 5    | —           | —     | 8.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS125      | M5×0.8          | M5×0.8   | 12   | 2    | 2    | —           | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS205      | M5×0.8          | M5×0.8   | 16   | 4    | 2    | —           | —     | 1.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS206      | M6×1            | 6        | 26   | 13   | 2.5  | —           | —     | 2.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS208      | M8×1.25         | 8        | 24   | 6.5  | 3    | —           | —     | 3.3         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS306      | M6×1            | 6        | 21   | 4    | 2.5  | —           | —     | 2.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS310      | M10×1           | 10       | 29   | 8    | 4    | —           | —     | 7.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LLCS410      | M10×1           | 10       | 30   | 6.6  | 4    | —           | —     | 7.0         |                                                      |
|  <p>Left-Hand Screw Right-Hand Screw</p> <p>☆Without Hexagonal Hole on Right-Hand Screw</p>                                                                                                                                  | LS1          | M6×1            | 22       | 8    | 8    | 3    | —           | —     | 5.0         | Milling Tools Series (☉K001)                         |
|                                                                                                                                                                                                                                                                                                                 | LS2          | M8×1            | 29       | 13   | 10   | 4    | —           | —     | 8.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS4        | M6×1            | 15       | 8    | 4    | 3    | —           | —     | 5.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS5        | M6×1            | 18       | 8    | 5    | 3    | —           | —     | 5.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS6        | M8×1            | 24       | 13   | 5    | 4    | —           | —     | 8.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS7        | M8×1            | 27       | 13   | 8    | 4    | —           | —     | 8.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS8        | M6×0.75         | 18       | 7    | 7    | 3    | —           | —     | 5.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS9        | M6×0.75         | 22       | 8    | 8    | 3    | —           | —     | 5.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS10       | M7×0.75         | 16       | 6    | 6    | 4    | —           | —     | 8.2         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS11       | M8×1            | 16       | 6    | 6    | 4    | —           | —     | 7.8         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS12       | M8×1            | 24       | 7    | 7    | 4    | —           | —     | 7.8         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS16       | M7×0.75         | 23       | 11   | 8    | 4    | —           | —     | 7.8         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS20       | M10×1.5         | 26       | 9    | 9    | 5    | —           | —     | 9.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | * LS21       | M10×1.5         | 32       | 12   | 12   | 5    | —           | —     | 9.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LS24         | M8×1.25         | 24       | 8.5  | 8.5  | 4    | —           | —     | 7.8         |                                                      |
|  <p>Left-Hand Screw Right-Hand Screw</p>                                                                                                                                                                                     | LS25         | M8×1            | 28.5     | 12.0 | 10.5 | 4    | —           | —     | 8.2         | DOUBLE CLAMP Holder (☉C009)                          |
|                                                                                                                                                                                                                                                                                                                 | LS14T        | M7×0.75         | 24       | 10   | 10   | 4.5  | —           | T25   | 8.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LS15T        | M7×0.75         | 18       | 7    | 7    | 4.5  | —           | T25   | 8.0         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LS10TS       | M7×0.75         | 13       | 6    | 4    | 4.5  | —           | T25   | 8.5         |                                                      |
|                                                                                                                                                                                                                                                                                                                 | LS0622T      | M6×0.75         | 22       | 8    | 8    | 3.4  | —           | T15   | 6.0         |                                                      |



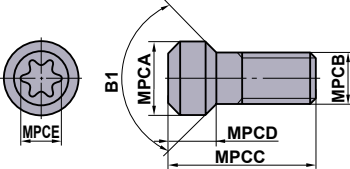
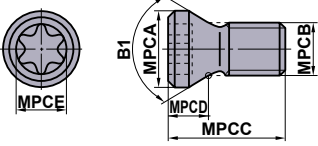
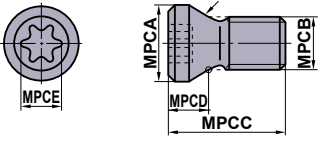
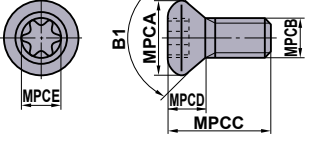
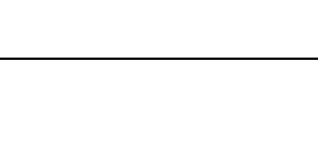
| Geometry                                                                            | Order Number                                                                                             | Dimensions (mm)                   |                                                                |                                       |                                    |                                        | Angle                                  | MPCCS                                 | TQ<br>(N·m)                             | Tool Holder                                                                                              |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------|---------------------------------------|------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------|
|                                                                                     |                                                                                                          | MPCA                              | MPCB                                                           | MPCC                                  | MPCD                               | MPCE                                   |                                        |                                       |                                         |                                                                                                          |
|    | <b>MGS6</b>                                                                                              | 10                                | M6×1                                                           | 26                                    | 4                                  | 5                                      | —                                      | —                                     | 9.0                                     | <b>APX3000</b> (⊕K146)                                                                                   |
|    | <b>MHT1</b>                                                                                              | 11                                | M8×1                                                           | 18.5                                  | 3.5                                | 4                                      | —                                      | —                                     | 8.7                                     |                                                                                                          |
|    | <b>NS251</b><br><b>NS401</b>                                                                             | 3.6<br>5.8                        | M2.5×0.45<br>M4×0.7                                            | 7<br>6                                | —<br>—                             | 2.2<br>3.6                             | 60°<br>60°                             | —<br>—                                | 0.7<br>3.5                              | <b>BT VH</b> (⊕D016)<br><b>CTAH-S</b> (⊕D020)                                                            |
|    | <b>NS402W</b><br><b>NS403W</b><br><b>NS404W</b>                                                          | 5.85<br>5.85<br>5.8               | M4×0.7<br>M4×0.7<br>M4×0.7                                     | 10<br>12<br>10                        | —<br>—<br>—                        | 2.2<br>2.2<br>2.2                      | 60°<br>60°<br>90°                      | —<br>—<br>—                           | 0.7<br>0.7<br>0.7                       | <b>CTAH</b> (⊕D020) <b>CTBH</b> (⊕D022)                                                                  |
|    | <b>NS501W</b><br><b>NS502W</b>                                                                           | 8<br>8                            | M5×0.8<br>M5×0.8                                               | 16<br>20                              | —<br>—                             | 2.5<br>2.5                             | 120°<br>120°                           | —<br>—                                | 2.2<br>2.2                              | <b>SMALL TOOLS</b> (⊕D001)                                                                               |
|  | <b>RS3008T</b><br><b>RS3510T</b><br><b>RS4015T</b><br><b>RS5020T</b><br><b>RS6025T</b><br><b>RS8030T</b> | 4.3<br>5<br>6<br>8.1<br>9.5<br>12 | M3×0.35<br>M3.5×0.35<br>M4×0.5<br>M5×0.5<br>M6×0.75<br>M8×0.75 | 8.6<br>10<br>14<br>16.4<br>21.5<br>25 | 2<br>2.3<br>2.7<br>3.6<br>4.2<br>5 | 2.4<br>2.8<br>3.4<br>3.9<br>4.5<br>5.6 | 61°<br>61°<br>61°<br>61°<br>61°<br>61° | T8<br>T10<br>T15<br>T20<br>T25<br>T30 | 1.5<br>2.5<br>3.3<br>5.0<br>7.5<br>10.0 | <b>SRF</b> (⊕K228) <b>SUF</b> (⊕K232)                                                                    |
|  | <b>S1</b><br><b>S3</b><br><b>S4</b><br><b>S5</b>                                                         | 3.5<br>4.5<br>5.3<br>6.8          | M2×0.4<br>M3×0.5<br>M4×0.7<br>M5×0.8                           | 5.5<br>7.7<br>8<br>9                  | 2.2<br>2.4<br>1.8<br>2.4           | 1.5<br>2<br>2.5<br>3                   | 92°<br>92°<br>62°<br>62°               | —<br>—<br>—<br>—                      | 0.6<br>1.5<br>2.2<br>3.3                |                                                                                                          |
|  | <b>SD32</b><br><b>SD40</b><br><b>SD50</b><br><b>SD63</b>                                                 | 12<br>12<br>16<br>16              | M8×1.25<br>M8×1.25<br>M10×1.5<br>M10×1.5                       | 28<br>36<br>46<br>61                  | 7.2<br>7.2<br>8.2<br>8.2           | 6<br>6<br>8<br>8                       | 50°<br>50°<br>50°<br>50°               | —<br>—<br>—<br>—                      | 9.5<br>9.5<br>1.0<br>1.0                |                                                                                                          |
|  | <b>SETS51</b><br><b>SETS61</b>                                                                           | 6.8<br>8                          | M5×0.8<br>M6×1                                                 | 14.8<br>20                            | 1.5<br>1.8                         | 3.4<br>3.9                             | —<br>—                                 | T15<br>T20                            | 3.5<br>5.0                              | <b>MMTE</b> Type Holder (⊕G019)<br><b>MMTI</b> Type Boring Bar (⊕G026)<br><b>HSK</b> Tool Holder (⊕H001) |
|  | <b>SLCS105</b><br><b>SLCS106</b>                                                                         | 10<br>12                          | M5×0.8<br>M6×1                                                 | 25<br>32                              | 6.3<br>6.2                         | 4<br>4                                 | 90°<br>90°                             | —<br>—                                | 7.0<br>7.0                              | <b>WP</b> Type Holder (⊕C017)                                                                            |
|  | <b>SPS1</b>                                                                                              | 8.5                               | M5×0.8                                                         | 16                                    | 4                                  | 4.5                                    | 70°                                    | T25                                   | 5.0                                     |                                                                                                          |
|  | <b>SRS5</b>                                                                                              | 6.7                               | M5×0.8                                                         | 16                                    | 3.5                                | 3.9                                    | —                                      | T20                                   | 5.0                                     |                                                                                                          |

**N**

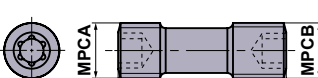
**SPARE PARTS**

# SPARE PARTS

## CLAMP SCREW

| Geometry                                                                            | Order Number | Dimensions (mm) |           |      |      |      | Angle | MPCD | TQ (N·m) | Tool Holder                                            |
|-------------------------------------------------------------------------------------|--------------|-----------------|-----------|------|------|------|-------|------|----------|--------------------------------------------------------|
|                                                                                     |              | MPCA            | MPCB      | MPCC | MPCD | MPCE |       |      |          |                                                        |
|    | * TS16       | 2.5             | M1.6×0.35 | 3.2  | 1.6  | 1.8  | 60°   | T6   | 0.6      | MICRO-DEX (☺E018)                                      |
|                                                                                     | TS2          | 2.7             | M2×0.4    | 4.6  | 1.4  | 1.8  | 60°   | T6   | 0.6      |                                                        |
|                                                                                     | * TS2A       | 2.7             | M2×0.4    | 4.5  | 1.2  | 1.8  | 60°   | T6   | 0.6      | AQX (☺K186)                                            |
|                                                                                     | TS2C         | 2.7             | M2×0.4    | 3.8  | 1.4  | 1.8  | 60°   | T6   | 0.6      |                                                        |
|                                                                                     | ☆ TS2D       | 3.8             | M2×0.4    | 5.3  | 1.9  | 1.8  | 82°   | T6   | 0.6      | DIMPLE BAR (☺E007)                                     |
|                                                                                     | TS21         | 2.7             | M2×0.4    | 3.4  | 1.4  | 1.8  | 60°   | T6   | 0.6      | F Type Boring Bar (☺E030)                              |
|                                                                                     | * TS22       | 3.0             | M2.2×0.45 | 5    | 1.2  | 1.8  | 60°   | T6   | 0.6      | S Type Boring Bar (☺E031)                              |
|                                                                                     | * TS25       | 3.3             | M2.5×0.45 | 5.5  | 1.7  | 2.4  | 60°   | T8   | 1.0      | AQX (☺K186) AJX (☺K194)                                |
|                                                                                     | ☆ TS25D      | 4.4             | M2.5×0.45 | 6.2  | 2.2  | 2.4  | 82°   | T8   | 1.0      | MMTI Type Boring Bar (☺G026)                           |
|                                                                                     | * TS25H      | 3.6             | M2.5×0.45 | 5.5  | 2    | 2.4  | 60°   | T8   | 1.0      | SRM2 (☺K236)                                           |
|    | TS202        | 2.7             | M2×0.4    | 5.5  | 1.8  | 1.8  | 60°   | T6   | 0.6      |                                                        |
|                                                                                     | TS253        | 3.3             | M2.5×0.45 | 4.5  | 1.7  | 2.4  | 60°   | T8   | 1.0      | Milling Tools Series (☺K001)                           |
|                                                                                     | TS254        | 3.3             | M2.5×0.45 | 7    | 1.7  | 2.4  | 60°   | T8   | 1.0      | SMALL TOOLS (☺D001) PMF (☺K250)                        |
|                                                                                     | * TS255      | 3.5             | M2.5×0.45 | 7.5  | 1.6  | 2.4  | 60°   | T8   | 1.0      | Profile Holder (☺C032)                                 |
|                                                                                     | TS3          | 3.9             | M3×0.5    | 6    | 2    | 2.4  | 60°   | T8   | 1.0      | TSMP (☺K248)                                           |
|                                                                                     | TS3D         | 5.0             | M3×0.5    | 6    | 2.3  | 2.8  | 82°   | T10  | 2.5      | DIMPLE BAR (☺E007)                                     |
|                                                                                     | * TS3SB      | 4.4             | M3×0.5    | 8    | 2    | 2.4  | 80°   | T8   | 1.5      | AXD4000 (☺K168)                                        |
|                                                                                     | TS3SBS       | 4.4             | M3×0.5    | 6.5  | 2    | 2.4  | 80°   | T8   | 1.5      | AXD4000 (☺K168)                                        |
|                                                                                     | ☆ TS31D      | 4.8             | M3×0.5    | 7.2  | 2.2  | 2.8  | 82°   | T10  | 2.5      | DIMPLE BAR (☺E007)                                     |
|                                                                                     | * TS32       | 3.9             | M3×0.5    | 7.5  | 2    | 2.4  | 60°   | T8   | 2.0      | SRM2 (☺K236)                                           |
|  | * TS33       | 3.9             | M3×0.5    | 6.7  | 2    | 2.4  | 60°   | T8   | 1.5      | AQX (☺K186) AJX (☺K194)                                |
|                                                                                     | TS35         | 4.8             | M3.5×0.6  | 6.5  | 2.4  | 2.8  | 60°   | T10  | 2.5      |                                                        |
|                                                                                     | * TS35D      | 5.3             | M3.5×0.6  | 12   | 2.8  | 3.4  | 60°   | T15  | 3.5      | HSK Tool Holder (☺H001)                                |
|                                                                                     | ★ TS35R      | 5.7             | M3.5×0.6  | 10   | 2.1  | 3.4  | —     | T15  | 3.5      | AHX440S (☺K034) AHX475S (☺K038)                        |
|                                                                                     | TS351        | 4.8             | M3.5×0.6  | 7.2  | 2.4  | 2.8  | 60°   | T10  | 2.5      | AJX (☺K194) SRM2 (☺K236)                               |
|                                                                                     | TS352        | 4.8             | M3.5×0.6  | 10   | 3    | 2.8  | 60°   | T10  | 2.5      | VFX5 (☺K208)                                           |
|                                                                                     | * TS4SB      | 5.8             | M4×0.7    | 9    | 2.7  | 3.4  | 80°   | T15  | 3.5      | AXD7000 (☺K180)                                        |
|                                                                                     | * TS4SBL     | 5.8             | M4×0.7    | 10.5 | 2.7  | 3.4  | 80°   | T15  | 3.5      | GY SERIES (☺F004) AXD7000 (☺K180)                      |
|                                                                                     | TS4          | 5.4             | M4×0.7    | 8    | 2.6  | 3.4  | 60°   | T15  | 3.5      | CE/CF/CGSP (☺K246) TSMP (☺K248)                        |
|                                                                                     | TS4D         | 5.6             | M4×0.7    | 7.7  | 2.5  | 3.4  | 82°   | T15  | 3.5      | DIMPLE BAR (☺E007)                                     |
|  | TS42         | 5.4             | M4×0.7    | 6    | 2.6  | 3.4  | 60°   | T15  | 3.5      |                                                        |
|                                                                                     | TS43         | 5.4             | M4×0.7    | 10   | 2.6  | 3.4  | 60°   | T15  | 3.5      | AJX (☺K194) BRP (☺K206) SRM2 (☺K236)                   |
|                                                                                     | TS44         | 5.4             | M4×0.7    | 12   | 2.6  | 3.4  | 60°   | T15  | 3.5      |                                                        |
|                                                                                     | TS406        | 5.4             | M4×0.7    | 15.5 | 2.6  | 3.4  | 60°   | T15  | 3.5      |                                                        |
|                                                                                     | TS407        | 5.4             | M4×0.7    | 9    | 2.6  | 3.4  | 60°   | T15  | 3.5      | AQX (☺K186) AJX (☺K194)                                |
|                                                                                     | TS450        | 5.9             | M4.5×0.75 | 13   | 3.6  | 3.9  | 60°   | T20  | 5.0      | VFX6 (☺K212)                                           |
|                                                                                     | TS5S         | 6.8             | M5×0.8    | 9    | 2.9  | 4.5  | 80°   | T25  | 7.5      |                                                        |
|                                                                                     | TS5          | 6.8             | M5×0.8    | 9    | 3.2  | 4.5  | 60°   | T25  | 7.5      | SP Holder (☺C024) CE/CF/CGSP (☺K246) TSMP (☺K248)      |
|                                                                                     | TS5L         | 6.8             | M5×0.8    | 15   | 2.9  | 4.5  | 80°   | T25  | 7.5      |                                                        |
|                                                                                     | ★ TS5R       | 6.9             | M5×0.8    | 12   | 3.5  | 3.9  | —     | T20  | 5.0      | WWX400 (☺K067) WJX (☺K085)                             |
|  | TS52         | 6.8             | M5×0.8    | 8    | 3.2  | 4.5  | 60°   | T25  | 7.5      | CE/CF/CGSP (☺K246)                                     |
|                                                                                     | TS53         | 6.8             | M5×0.8    | 16   | 3.2  | 4.5  | 60°   | T25  | 7.5      |                                                        |
|                                                                                     | TS54         | 6.8             | M5×0.8    | 12   | 3.2  | 4.5  | 60°   | T25  | 7.5      | AJX (☺K194)                                            |
|                                                                                     | TS55         | 6.8             | M5×0.8    | 10.5 | 3.2  | 4.5  | 60°   | T25  | 7.5      | GY SERIES (☺F004) AQX (☺K186) SPX (☺K219) SRM2 (☺K236) |
|                                                                                     | * TS6S       | 8.5             | M6×1.0    | 13   | 4.4  | 5.6  | 60°   | T30  | 10.0     | AQX (☺K186) SRM2 (☺K236)                               |
|                                                                                     | * TS6        | 8.5             | M6×1.0    | 16   | 4.4  | 5.6  | 60°   | T30  | 10.0     | SRM2 (☺K236)                                           |

| Geometry | Order Number | Dimensions (mm) |           |      |      |      | Angle | MPCDS | TQ<br>(N·m) | Tool Holder                               |
|----------|--------------|-----------------|-----------|------|------|------|-------|-------|-------------|-------------------------------------------|
|          |              | MPCA            | MPCB      | MPCC | MPCD | MPCE | B1    |       |             |                                           |
|          | TPS20-1      | 2.65            | M2×0.4    | 4.7  | 2.4  | 1.8  | 60°   | 6IP   | 0.6         | MOVX (⌀M158)                              |
|          | TPS25        | 3.3             | M2.5×0.45 | 5.5  | 1.7  | 2.1  | 60°   | 7IP   | 1.0         | APX3000 (⌀K146) MOVX (⌀M158)              |
|          | TPS25-1      | 3.3             | M2.5×0.45 | 6.5  | 1.7  | 2.1  | 60°   | 7IP   | 1.0         | APX3000 (⌀K146)                           |
|          | TPS27F1      | 3.7             | M2.7×0.35 | 6.5  | 1.8  | 2.1  | 60°   | 7IP   | 1.0         | VPX200 (⌀K099)                            |
|          | TPS27F2      | 3.7             | M2.7×0.35 | 8.0  | 1.8  | 2.1  | 60°   | 7IP   | 1.0         | VPX300 (⌀K113)                            |
|          | TPS3         | 3.9             | M3×0.5    | 6.7  | 1.4  | 2.82 | 60°   | 10IP  | 1.0         | MOVX (⌀M158)                              |
|          | * TPS3R      | 4.6             | M3×0.5    | 8.5  | 1.4  | 2.82 | —     | 10IP  | 2.0         | WJX09 (⌀K085)                             |
|          | TPS3SB       | 4.4             | M3×0.5    | 8    | 2.0  | 2.82 | 80°   | 10IP  | 3.0         | AXD4000A (⌀K176)                          |
|          | TPS35        | 5.3             | M3.5×0.6  | 11.5 | 2.8  | 3.4  | 60°   | 15IP  | 3.5         | ASX445 (⌀K026) ASX400 (⌀K080) PMR (⌀K252) |
|          | TPS351       | 4.8             | M3.5×0.6  | 7.2  | 1.4  | 2.82 | 60°   | 10IP  | 2.5         | MOVX (⌀M158)                              |
|          | TPS351B      | 5.1             | M3.5×0.6  | 7.2  | 1.4  | 2.82 | 60°   | 10IP  | 2.5         | ARP (⌀K254)                               |
|          | TPS4         | 5.3             | M4×0.7    | 8    | 2.6  | 3.4  | 60°   | 15IP  | 3.5         | APX4000 (⌀K153) ARP (⌀K254) MOVX (⌀M158)  |
|          | TPS40F1      | 5.3             | M4×0.5    | 10.5 | 2.8  | 3.4  | 60°   | 15IP  | 3.0         | VPX300 (⌀K113)                            |
|          | TPS43        | 5.3             | M4×0.7    | 10   | 2.6  | 3.4  | 60°   | 15IP  | 4.0         | APX4000 (⌀K153) MOVX (⌀M158)              |
|          | * TPS4R      | 6.4             | M4×0.7    | 10.6 | 2.9  | 3.4  | —     | 15IP  | 3.5         | WSX445 (⌀K016)                            |
|          | TPS54        | 6.8             | M5×0.8    | 12   | 3.2  | 4.5  | 60°   | 25IP  | 7.5         | MOVX (⌀M158)                              |
|          | TSS04005     | —               | M4×0.7    | 5    | —    | 2.4  | —     | T8    | —           | PMF (⌀K250)                               |
|          | TSS04505S    | —               | M4.5×0.7  | 5    | —    | 3.5  | —     | T10   | 3.5         | FMAX (⌀K056)                              |
|          | TSS05006     | —               | M5×0.8    | 6    | —    | 2.8  | —     | T10   | —           |                                           |
|          | TSS06010     | —               | M6×1      | 10   | —    | 3.9  | —     | T20   | —           |                                           |
|          | WCS503507H   | 6.3             | M5×0.5    | 7    | 3.3  | 3.5  | —     | —     | 5.0         | ASX445 (⌀K026) ASX400 (⌀K080) PMR (⌀K252) |
|          | WCS604010H   | 7.8             | M6×0.75   | 10   | 4.1  | 4.0  | —     | —     | 7.0         | PMR (⌀K252)                               |
|          | WS203107TPS  | 3.1             | M2×0.25   | 7.3  | 1.7  | 1.8  | 60°   | 6IP   | 1.0         | STAW (⌀M139)                              |
|          | WS203108TPS  | 3.1             | M2×0.25   | 8.3  | 1.9  | 1.8  | 60°   | 6IP   | 1.0         |                                           |
|          | WS253909TPS  | 3.9             | M2.5×0.35 | 9.5  | 2.4  | 2.4  | 60°   | 8IP   | 2.0         |                                           |
|          | WS304912TPS  | 4.9             | M3×0.35   | 12   | 3.25 | 2.82 | 60°   | 10IP  | 2.5         |                                           |
|          | WS254012T    | 4               | M2.5×0.45 | 11.5 | 2.2  | 2.4  | 80°   | T8    | 2.0         | TAW (⌀M148)                               |
|          | WS254013T    | 4               | M2.5×0.45 | 12.5 | 2.2  | 2.4  | 80°   | T8    | 2.0         |                                           |
|          | WS254014T    | 4               | M2.5×0.45 | 13.5 | 2.2  | 2.4  | 80°   | T8    | 2.0         |                                           |
|          | WS254015T    | 4               | M2.5×0.45 | 14.5 | 2.2  | 2.4  | 80°   | T8    | 2.0         |                                           |
|          | WS254016T    | 4               | M2.5×0.45 | 15.5 | 2.2  | 2.4  | 80°   | T8    | 2.0         |                                           |
|          | WS304517T    | 4.5             | M3×0.5    | 16.5 | 3.4  | 2.8  | 60°   | T10   | 3.5         |                                           |
|          | WS304518T    | 4.5             | M3×0.5    | 17.5 | 3.4  | 2.8  | 60°   | T10   | 3.5         |                                           |
|          | WS355520T    | 5.5             | M3.5×0.6  | 19.5 | 3.9  | 3.4  | 60°   | T15   | 5.5         |                                           |
|          | WS355521T    | 5.5             | M3.5×0.6  | 20.5 | 3.9  | 3.4  | 60°   | T15   | 5.5         |                                           |
|          | WS406023T    | 6               | M4×0.7    | 22.0 | 4.4  | 4.5  | 60°   | T25   | 8.5         |                                           |
|          | WS406024T    | 6               | M4×0.7    | 23.0 | 4.4  | 4.5  | 60°   | T25   | 8.5         |                                           |
|          | WS508026T    | 8               | M5×0.8    | 25.0 | 5.2  | 5.1  | 60°   | T27   | 12.0        |                                           |
|          | WS508027T    | 8               | M5×0.8    | 26.0 | 5.2  | 5.1  | 60°   | T27   | 12.0        |                                           |

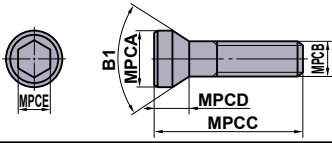
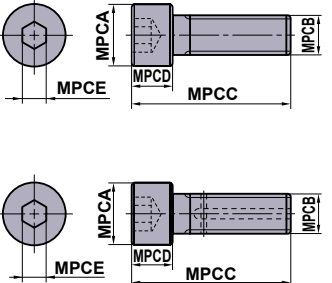
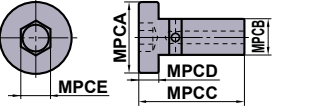
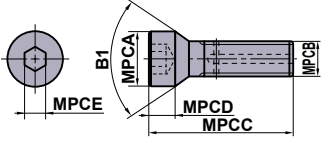
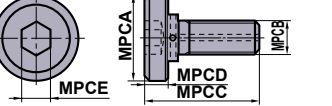
| Geometry                                                                            | Order Number       | Dimensions (mm) |          |      |      |      | Angle | MPCDS | TQ<br>(N·m) | Tool Holder         |
|-------------------------------------------------------------------------------------|--------------------|-----------------|----------|------|------|------|-------|-------|-------------|---------------------|
|                                                                                     |                    | MPCA            | MPCB     | MPCC | MPCF | MPCG | B1    |       |             |                     |
|  | <b>RX1ST8TP1</b>   | M4×0.7          | M4×0.5   | 16.5 | 7.0  | 7.0  | —     | TX8   | 2.0         | <b>RX1S</b> (⊙M197) |
|                                                                                     | <b>RX1ST10TP23</b> | M5×0.8          | M5×0.5   | 17.0 | 7.5  | 7.0  | —     | TX10  | 3.0         |                     |
|                                                                                     | <b>RX1ST15TP45</b> | M6×1.0          | M6×0.75  | 18.0 | 6.5  | 8.5  | —     | TX15  | 6.5         |                     |
|                                                                                     | <b>RX1ST25TP6</b>  | M10×1.5         | M10×1.25 | 30.0 | 7.5  | 9.5  | —     | TX25  | 15.0        |                     |

N

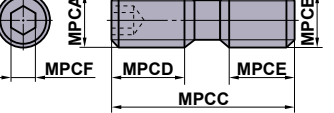
SPARE PARTS

# SPARE PARTS

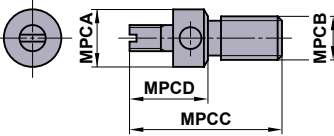
## SET BOLT

| Geometry                                                                            | Order Number | Dimensions (mm) |          |      |      |      | Angle | MPCDS | TQ<br>(N·m)             | Tool Holder                                                                                          |
|-------------------------------------------------------------------------------------|--------------|-----------------|----------|------|------|------|-------|-------|-------------------------|------------------------------------------------------------------------------------------------------|
|                                                                                     |              | MPCA            | MPCB     | MPCC | MPCD | MPCE |       |       |                         |                                                                                                      |
|    | BOES101      | 15              | M10×1.5  | 45   | 10   | 8    | 60°   | —     | 10.0                    |                                                                                                      |
|   | * HSC08025H  | 13              | M8×1.25  | 33   | 8    | 5    | —     | —     | 24                      | VPX200/300 (☉K099,K113) ARP (☉K254)                                                                  |
|                                                                                     | HSC05030     | 8.5             | M5×0.8   | 35   | 5    | 4    | —     | —     | 10                      | APX3000/4000 (☉K146,K153)                                                                            |
|                                                                                     | * HSC08030H  | 13              | M8×1.25  | 38   | 8    | 5    | —     | —     | 24                      | WSX445 (☉K016)                                                                                       |
|                                                                                     | HSC08045     | 13              | M8×1.25  | 53   | 8    | 5    | —     | —     | 24                      | VPX200/300 (☉K099,K113)                                                                              |
|                                                                                     | HSC08040     | 13              | M8×1.25  | 48   | 8    | 5    | —     | —     | 24                      | WSX445 (☉K016)                                                                                       |
|                                                                                     | HSC08050     | 13              | M8×1.25  | 58   | 8    | 5    | —     | —     | 24                      | VPX200/300 (☉K099,K113)                                                                              |
|                                                                                     | * HSC10030H  | 16              | M10×1.5  | 40   | 10   | 6    | —     | —     | 40                      | APX3000/4000 (☉K146,K153) AJX (☉K194) WSX445 (☉K016)                                                 |
|                                                                                     | HSC10035     | 16              | M10×1.5  | 45   | 10   | 6    | —     | —     | 44                      | VFX5 (☉K208) VFX6 (☉K212)                                                                            |
|                                                                                     | HSC10050     | 16              | M10×1.5  | 60   | 10   | 8    | —     | —     | 44                      | APX3000/4000 (☉K146,K153) VPX200/300 (☉K099,K113)                                                    |
|                                                                                     | HSC10055     | 16              | M10×1.5  | 65   | 10   | 8    | —     | —     | 44                      | VFX5 (☉K208)                                                                                         |
|                                                                                     | HSC10060     | 16              | M10×1.5  | 70   | 10   | 8    | —     | —     | 44                      | VPX200/300 (☉K099,K113)                                                                              |
|                                                                                     | HSC10070     | 16              | M10×1.5  | 80   | 10   | 8    | —     | —     | 44                      | VPX200/300 (☉K099,K113) ASPX (☉K224)                                                                 |
|                                                                                     | HSC12035     | 18              | M12×1.75 | 47   | 12   | 10   | —     | —     | 80                      | WSX445 (☉K016)                                                                                       |
|                                                                                     | * HSC12035H  | 18              | M12×1.75 | 47   | 12   | 10   | —     | —     | 80                      | APX3000/4000 (☉K146,K153) AJX (☉K194)                                                                |
|                                                                                     | HSC12040     | 18              | M12×1.75 | 52   | 12   | 10   | —     | —     | 80                      |                                                                                                      |
|                                                                                     | HSC12045     | 18              | M12×1.75 | 57   | 12   | 10   | —     | —     | 80                      | WSX445 (☉K016)                                                                                       |
|                                                                                     | HSC12060     | 18              | M12×1.75 | 72   | 12   | 10   | —     | —     | 80                      | VPX200/300 (☉K099,K113)                                                                              |
|                                                                                     | HSC12070     | 18              | M12×1.75 | 82   | 12   | 10   | —     | —     | 80                      | APX3000/4000 (☉K146,K153) AJX (☉K194) WSX445 (☉K016)                                                 |
|                                                                                     | HSC16040     | 24              | M16×2    | 56   | 16   | 14   | —     | —     | 150                     | WSX445 (☉K016)                                                                                       |
|                                                                                     | * HSC16040H  | 24              | M16×2    | 56   | 16   | 14   | —     | —     | 150                     | APX3000/4000 (☉K146,K153) AJX (☉K194)                                                                |
| HSC16055                                                                            | 24           | M16×2           | 71       | 16   | 14   | —    | —     | 150   | VPX200/300 (☉K099,K113) |                                                                                                      |
| HSC16065                                                                            | 24           | M16×2           | 81       | 16   | 14   | —    | —     | 150   | VPX200/300 (☉K099,K113) |                                                                                                      |
| HSC16080                                                                            | 24           | M16×2           | 96       | 16   | 14   | —    | —     | 150   |                         |                                                                                                      |
| HSC20040                                                                            | 30           | M20×2.5         | 60       | 20   | 17   | —    | —     | 320   |                         |                                                                                                      |
| HSC20090                                                                            | 30           | M20×2.5         | 110      | 20   | 17   | —    | —     | 320   |                         |                                                                                                      |
|  | HSCX12030H   | 24              | M12×1.75 | 37   | 7    | 8    | —     | —     | 40                      | FMAX (☉K056)                                                                                         |
|                                                                                     | HSCX16035H   | 30              | M16×2    | 44   | 9    | 12   | —     | —     | 100                     |                                                                                                      |
|                                                                                     | HSCX20035H   | 36              | M20×2.5  | 46   | 11   | 14   | —     | —     | 180                     |                                                                                                      |
|  | HFF08033H    | 11              | M8×1.25  | 33   | 5    | 5    | 90°   | —     | 8.2                     | WJX09 (☉K085)                                                                                        |
|                                                                                     | HFF08043H    | 11              | M8×1.25  | 43   | 5    | 5    | 90°   | —     | 8.2                     | AXD4000 (☉K168)                                                                                      |
|  | MBA16033H    | 40              | M16×2    | 43   | 10   | 14   | —     | —     | 150                     | AHX640 (For φ100) (☉K042) WSX445 (☉K016)                                                             |
|                                                                                     | MBA20040H    | 50              | M20×2.5  | 54   | 14   | 17   | —     | —     | 320                     | APX4000 (☉K153)<br>AHX475S (☉K038) AHX640S (☉K042)<br>AXD4000 (☉K168) AXD7000 (☉K180)<br>AJX (☉K194) |

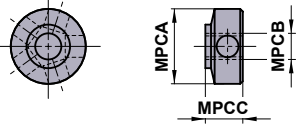
\* With coolant hole.

| Geometry                                                                            | Order Number | Dimensions (mm) |         |      |      |      |      | TQ (N·m) | Tool Holder |
|-------------------------------------------------------------------------------------|--------------|-----------------|---------|------|------|------|------|----------|-------------|
|                                                                                     |              | MPCA            | MPCB    | MPCC | MPCD | MPCE | MPCF |          |             |
|  | HDS08030     | M8×0.75         | M8×1.25 | 30   | 13.5 | 11.5 | 4    | 8.2      | BRP (⊙K206) |
|                                                                                     | HDS10031     | M10×1.0         | M10×1.5 | 31   | 14   | 12   | 5    | 9.0      | PMF (⊙K250) |

## LARGE ADJUSTMENT SCREW

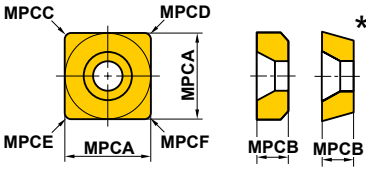
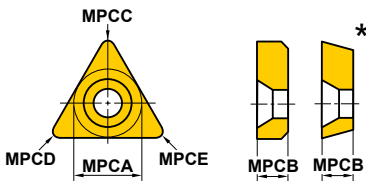
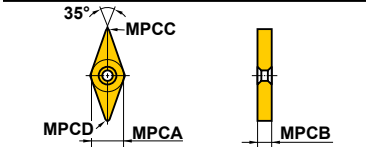
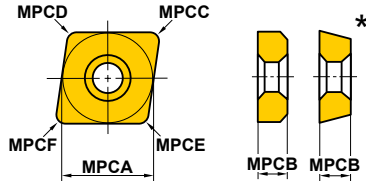
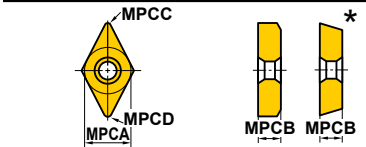
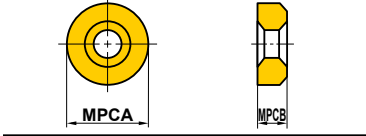
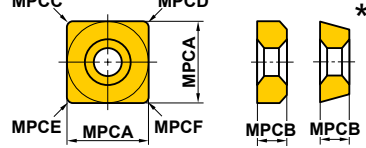
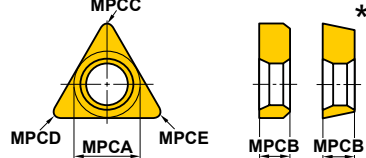
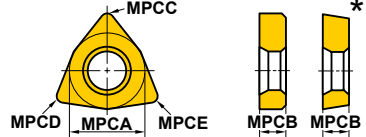
| Geometry                                                                          | Order Number | Dimensions (mm) |        |      |      |      | Angle | MPCCS | TQ<br>(N·m) | Tool Holder        |
|-----------------------------------------------------------------------------------|--------------|-----------------|--------|------|------|------|-------|-------|-------------|--------------------|
|                                                                                   |              | MPCA            | MPCB   | MPCC | MPCD | MPCE | B1    |       |             |                    |
|  | <b>KSS2</b>  | 6.6             | M5×0.8 | 17.5 | 9    | —    | —     | —     | —           | <b>FMAX</b> (K056) |
|                                                                                   |              |                 |        |      |      |      |       |       |             |                    |

## MICRO ADJUSTMENT NUT

| Geometry                                                                          | Order Number | Dimensions (mm) |         |      |      |      | Angle | MPCCS | TQ<br>(N·m) | Tool Holder        |
|-----------------------------------------------------------------------------------|--------------|-----------------|---------|------|------|------|-------|-------|-------------|--------------------|
|                                                                                   |              | MPCA            | MPCB    | MPCC | MPCD | MPCE | B1    |       |             |                    |
|  | <b>KSN3</b>  | 8.6             | M3×0.35 | 4.3  | —    | —    | —     | —     | —           | <b>FMAX</b> (K056) |
|                                                                                   |              |                 |         |      |      |      |       |       |             |                    |

# SPARE PARTS

## SHIM

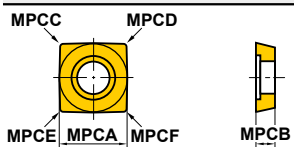
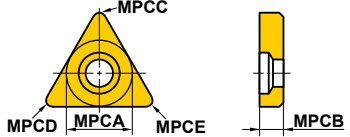
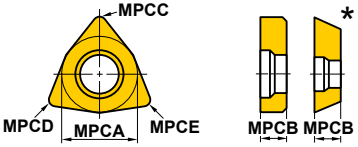
| Geometry                                                                            | Order Number               | Dimensions (mm)       |                      |                   |                   |                   |             | Tool Holder                                                    |
|-------------------------------------------------------------------------------------|----------------------------|-----------------------|----------------------|-------------------|-------------------|-------------------|-------------|----------------------------------------------------------------|
|                                                                                     |                            | MPCA                  | MPCB                 | MPCC              | MPCD              | MPCE              | MPCF        |                                                                |
|    | * PS42                     | 11.46                 | 3.18                 | 0.2               | 0.2               | 0.6               | 1.0         |                                                                |
|    | * PT21<br>* PT32<br>* PT42 | 5.11<br>8.28<br>10.85 | 2.38<br>3.18<br>3.18 | 0.2<br>0.2<br>0.3 | 0.2<br>0.2<br>0.3 | 0.6<br>0.6<br>0.7 | —<br>—<br>— | F Type Boring Bar (☺E029)                                      |
|    | DCSVN32                    | 9.52                  | 3.18                 | 0.8               | 1.2               | —                 | —           | DOUBLE CLAMP Holder (☺C019)<br>DOUBLE CLAMP DIMPLE BAR (☺E017) |
|   | LLSCN3T3                   | 9.52                  | 3.97                 | 0.4               | 0.4               | 0.8               | 0.8         | LL Type Holder (☺C008)                                         |
|                                                                                     | LLSCN33                    | 9.52                  | 4.76                 | 0.4               | 0.4               | 0.8               | 0.8         | LL Type Holder (☺C008)                                         |
|                                                                                     | LLSCN42                    | 12.70                 | 3.18                 | 0.8               | 0.8               | 1.2               | 1.2         | DOUBLE CLAMP DIMPLE BAR (☺E015)                                |
|                                                                                     | LLSCN53                    | 15.87                 | 4.76                 | 1.2               | 1.2               | 1.6               | 1.6         | P Type Boring Bar (☺E039)                                      |
|                                                                                     | LLSCN63                    | 19.05                 | 4.76                 | 1.2               | 1.2               | 1.6               | 1.6         | HSK Tool Holder (☺H001)                                        |
|                                                                                     | * LLSCP42                  | 12.70                 | 3.18                 | 0.8               | 0.8               | 1.2               | 1.2         | DOUBLE CLAMP DIMPLE BAR (☺E015)                                |
|  | * LLSCP63                  | 19.05                 | 4.76                 | 1.2               | 1.2               | 1.6               | 1.6         | P Type Boring Bar (☺E039)                                      |
|                                                                                     |                            |                       |                      |                   |                   |                   |             | HSK Tool Holder (☺H001)                                        |
|                                                                                     | LLSDN32                    | 9.52                  | 3.18                 | 0.8               | 1.2               | —                 | —           | DOUBLE CLAMP Holder (☺C010)                                    |
|                                                                                     | LLSDN42                    | 12.70                 | 3.18                 | 0.8               | 1.2               | —                 | —           | LL Type Holder (☺C010)                                         |
|                                                                                     | LLSDN43                    | 12.70                 | 4.76                 | 0.8               | 1.2               | —                 | —           | DOUBLE CLAMP DIMPLE BAR (☺E015)                                |
|                                                                                     | LLSDN53                    | 15.87                 | 4.76                 | 1.2               | 1.6               | —                 | —           | P Type Boring Bar (☺E039)                                      |
|  | * LLSDP42                  | 12.70                 | 3.18                 | 0.8               | 1.2               | —                 | —           | HSK Tool Holder (☺H001)                                        |
|                                                                                     | LLSRN103                   | 8.3                   | 3.18                 | —                 | —                 | —                 | —           | DOUBLE CLAMP DIMPLE BAR (☺E015)                                |
|                                                                                     | LLSRN123                   | 9.8                   | 3.18                 | —                 | —                 | —                 | —           | LL Type Holder (☺C026)                                         |
|                                                                                     | LLSRN164                   | 13.6                  | 4.76                 | —                 | —                 | —                 | —           | HSK Tool Holder (☺H001)                                        |
|                                                                                     | LLSRN204                   | 17.3                  | 4.76                 | —                 | —                 | —                 | —           |                                                                |
|                                                                                     | LLSRN326                   | 28.0                  | 6.35                 | —                 | —                 | —                 | —           |                                                                |
|  | LLSSN33                    | 9.52                  | 4.76                 | 0.8               | 0.8               | 1.2               | 1.2         | DOUBLE CLAMP DIMPLE BAR (☺C014)                                |
|                                                                                     | LLSSN42                    | 12.70                 | 3.18                 | 0.8               | 0.8               | 1.2               | 1.6         | P Type Boring Bar (☺E038)                                      |
|                                                                                     | LLSSN53                    | 15.87                 | 4.76                 | 1.2               | 1.2               | 1.6               | 1.6         |                                                                |
|                                                                                     | LLSSN63                    | 19.05                 | 4.76                 | 1.2               | 1.2               | 1.6               | 2.0         |                                                                |
|                                                                                     | LLSSN84                    | 25.40                 | 6.35                 | 1.6               | 1.6               | 2.4               | 2.4         |                                                                |
|                                                                                     | * LLSSP42                  | 12.70                 | 3.18                 | 0.8               | 0.8               | 1.2               | 1.6         | DOUBLE CLAMP DIMPLE BAR (☺E016)                                |
|  | LLSTE32                    | 7.6                   | 3.18                 | 0.4               | 0.4               | 0.4               | —           | LL Type Holder (☺C016)                                         |
|                                                                                     | LLSTN32                    | 9.52                  | 3.18                 | 0.4               | 0.8               | 1.2               | —           | DOUBLE CLAMP DIMPLE BAR (☺E016)                                |
|                                                                                     | LLSTN33                    | 9.52                  | 4.76                 | 0.4               | 0.8               | 1.2               | —           | P Type Boring Bar (☺E038)                                      |
|                                                                                     | LLSTN42                    | 12.70                 | 3.18                 | 0.4               | 0.8               | 1.2               | —           |                                                                |
|                                                                                     | LLSTN53                    | 15.87                 | 4.76                 | 0.8               | 1.2               | 1.6               | —           |                                                                |
|                                                                                     | * LLSTP32                  | 9.52                  | 3.18                 | 0.4               | 0.8               | 1.2               | —           |                                                                |
|  | LLSWN32                    | 9.52                  | 3.18                 | 0.4               | 0.8               | 1.2               | —           | LL Type Holder (☺C022)                                         |
|                                                                                     | LLSWN3T3                   | 9.52                  | 3.97                 | 0.4               | 0.8               | 1.2               | —           | DOUBLE CLAMP Holder (☺C022)                                    |
|                                                                                     | LLSWN42                    | 12.70                 | 3.18                 | 0.4               | 0.8               | 1.2               | —           | DOUBLE CLAMP DIMPLE BAR (☺E017)                                |
|                                                                                     | * LLSWP32                  | 9.52                  | 3.18                 | 0.4               | 0.8               | 1.2               | —           |                                                                |
|                                                                                     | * LLSWP42                  | 12.70                 | 3.18                 | 0.4               | 0.8               | 1.2               | —           |                                                                |

| Geometry                                                 | Order Number                                 | Dimensions (mm)      |                      |                   |                   |             |             | Tool Holder                                                     |
|----------------------------------------------------------|----------------------------------------------|----------------------|----------------------|-------------------|-------------------|-------------|-------------|-----------------------------------------------------------------|
|                                                          |                                              | MPCA                 | MPCB                 | MPCC              | MPCD              | MPCE        | MPCF        |                                                                 |
|                                                          | <b>MHS532R</b>                               | 9.4                  | 15.7                 | 4.5               | 0.8               | 0.8         | —           |                                                                 |
| <p>Hole position of this item is offset from centre.</p> | <b>MLCP42</b>                                | 12.58                | 3.18                 | 1.2               | 1.2               | 1.2         | 1.2         | <b>P</b> Type Boring Bar (☛E039)                                |
| <p>Hole position of this item is offset from centre.</p> | <b>MLDP42</b>                                | 12.56                | 3.18                 | 1.2               | 1.2               | —           | —           | <b>P</b> Type Boring Bar (☛E039)                                |
| <p>Hole position of this item is offset from centre.</p> | <b>MLSP42</b>                                | 12.63                | 3.18                 | 1.2               | 1.2               | 1.2         | 1.2         | <b>P</b> Type Boring Bar (☛E038)                                |
| <p>Hole position of this item is offset from centre.</p> | <b>MLTP32</b>                                | 9.50                 | 3.18                 | 1.2               | 1.2               | 1.2         | —           | <b>P</b> Type Boring Bar (☛E038)                                |
|                                                          | <b>MSCN63</b>                                | 18.8                 | 4.76                 | 1.6               | 1.6               | 1.6         | 1.6         | <b>DOUBLE CLAMP</b> Holder (☛C009)<br>(For Heavy Cutting)       |
|                                                          | <b>MSSN63</b>                                | 18.8                 | 4.76                 | 1.6               | 1.6               | 1.6         | 1.6         | <b>DOUBLE CLAMP</b> Holder (☛C012)<br>(For Heavy Cutting)       |
|                                                          | <b>* PT32T1R</b><br><b>* PT32T2R</b>         | 8.28<br>8.28         | 13.34<br>13.19       | 3.18<br>3.18      | —<br>—            | —<br>—      | —<br>—      |                                                                 |
|                                                          | <b>PV321</b><br><b>PV322</b><br><b>PV323</b> | 9.52<br>9.52<br>9.52 | 3.18<br>3.18<br>3.18 | 0.4<br>0.8<br>1.2 | 0.4<br>0.8<br>1.2 | —<br>—<br>— | —<br>—<br>— | <b>MP</b> Type Holder (☛C019)                                   |
|                                                          | <b>SPSVN32</b>                               | 8.06                 | 3.18                 | 0.3               | 0.3               | —           | —           | <b>SP</b> Type Holder (☛C030)<br><b>HSK</b> Tool Holder (☛H001) |

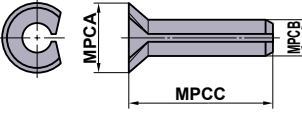
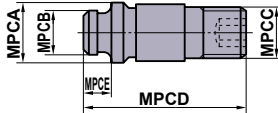
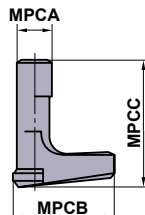
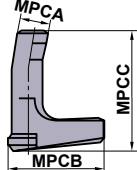
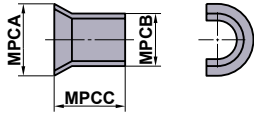
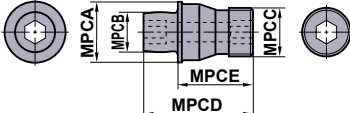


# SPARE PARTS

## SHIM

| Geometry                                                                          | Order Number | Dimensions (mm) |      |      |      |      |      | Tool Holder            |
|-----------------------------------------------------------------------------------|--------------|-----------------|------|------|------|------|------|------------------------|
|                                                                                   |              | MPCA            | MPCB | MPCC | MPCD | MPCE | MPCF |                        |
|  | STASX400N    | 11.00           | 3.00 | 0.4  | 0.4  | 0.4  | 0.4  | ASX400 (☯K080)         |
|                                                                                   |              |                 |      |      |      |      |      |                        |
|  | STASX445N    | 10.76           | 3.00 | —    | —    | —    | —    | ASX445 (☯K026)         |
|                                                                                   |              |                 |      |      |      |      |      |                        |
|  | WPSTN33      | 9.3             | 4.76 | 0.8  | 0.4  | 1.2  | —    | WP Type Holder (☯C017) |
|                                                                                   | WPSTN43      | 12.50           | 4.76 | 0.8  | 0.4  | 1.2  | —    |                        |
|  | * WPSWC43    | 12.50           | 4.76 | 0.4  | 0.8  | 1.2  | —    | WP Type Holder (☯C023) |
|                                                                                   | WPSWN43      | 12.50           | 4.76 | 0.4  | 0.8  | 1.2  | —    |                        |

## SHIM PIN AND CLAMP LEVER

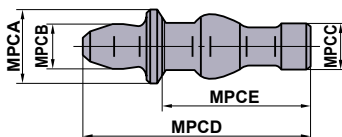
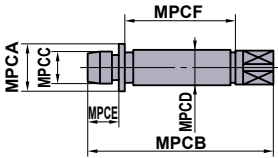
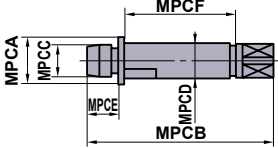
| Geometry                                                                            | Order Number   | Dimensions (mm) |       |        |      |      | Tool Holder                                                                                                                                                                         |
|-------------------------------------------------------------------------------------|----------------|-----------------|-------|--------|------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     |                | MPCA            | MPCB  | MPCC   | MPCD | MPCE |                                                                                                                                                                                     |
|    | <b>BCP141</b>  | 3.0             | 1.4   | 5.6    | —    | —    | <b>SP</b> Type Holder (☯C030)<br><b>F</b> Type Boring Bar (☯E029)<br><b>HSK</b> Tool Holder (☯H013)                                                                                 |
|                                                                                     | <b>BCP201</b>  | 4.3             | 2     | 7.4    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>BCP202</b>  | 4.3             | 2     | 6.4    | —    | —    |                                                                                                                                                                                     |
|                                                                                     |                |                 |       |        |      |      |                                                                                                                                                                                     |
|    | <b>CCP33</b>   | 6.5             | 3.66  | M5×0.8 | 18.5 | 3    | <b>WP</b> Holder (☯C017)                                                                                                                                                            |
|                                                                                     | <b>CCP34</b>   | 7.5             | 5.0   | M6×1.0 | 18.5 | 3    |                                                                                                                                                                                     |
|                                                                                     | <b>CCP44</b>   | 7.5             | 5.0   | M5×0.8 | 14.2 | 3    |                                                                                                                                                                                     |
|                                                                                     |                |                 |       |        |      |      |                                                                                                                                                                                     |
|    | <b>LLCL12S</b> | 2.1             | 9.3   | 5.6    | —    | —    | <b>LL</b> Type Holder (☯C016)<br><b>P</b> Type Boring Bar (☯E039)<br><b>HSK</b> Tool Holder (☯H001)                                                                                 |
|                                                                                     | <b>LLCL13</b>  | 3.6             | 10    | 12.5   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL13S</b> | 3.6             | 10    | 7.8    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL14</b>  | 4.7             | 13.4  | 13.2   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL14S</b> | 4.7             | 13.6  | 12.2   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL15</b>  | 6.0             | 19    | 17     | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL16</b>  | 7.5             | 20.8  | 21     | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL18</b>  | 8.6             | 25.4  | 25.2   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL23</b>  | 3.6             | 12.0  | 11.5   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL23S</b> | 3.6             | 11.6  | 9.5    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL24</b>  | 4.7             | 16.2  | 14.8   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL25</b>  | 6.0             | 17.1  | 17     | —    | —    |                                                                                                                                                                                     |
|  | <b>LLCL110</b> | 3.0             | 10.7  | 11.6   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL112</b> | 3.5             | 13    | 13.5   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL116</b> | 4.5             | 18.5  | 18     | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL120</b> | 5.6             | 20.3  | 19     | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL125</b> | 6               | 24    | 24     | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLCL132</b> | 8               | 30    | 27     | —    | —    |                                                                                                                                                                                     |
|                                                                                     |                |                 |       |        |      |      |                                                                                                                                                                                     |
|  | <b>LLP13</b>   | 5.55            | 4.85  | 5.3    | —    | —    | <b>LL</b> Type Holder (☯C008)<br><b>DOUBLE CLAMP</b> Holder (☯C008)<br><b>DOUBLE CLAMP DIMPLE BAR</b> (☯E015)<br><b>P</b> Type Boring Bar (☯E038)<br><b>HSK</b> Tool Holder (☯H001) |
|                                                                                     | <b>LLP14</b>   | 7.25            | 6.55  | 5.8    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLP15</b>   | 8.8             | 8.05  | 8.6    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLP16</b>   | 10.85           | 9.85  | 11.1   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLP18</b>   | 15.35           | 13.05 | 12.0   | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLP23</b>   | 5.55            | 4.85  | 6.8    | —    | —    |                                                                                                                                                                                     |
|                                                                                     | <b>LLP24</b>   | 7.25            | 6.55  | 9.1    | —    | —    |                                                                                                                                                                                     |
|  | <b>MP6</b>     | 11.9            | 7.8   | M10×1  | 22.1 | 15   | <b>DOUBLE CLAMP</b> Holder (☯C009)<br>(For Heavy Cutting)                                                                                                                           |
|                                                                                     |                |                 |       |        |      |      |                                                                                                                                                                                     |

**N**

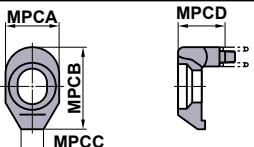
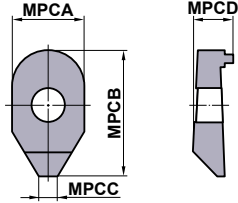
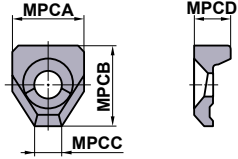
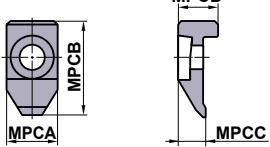
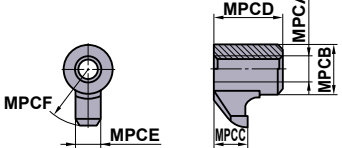
SPARE PARTS

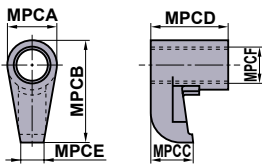
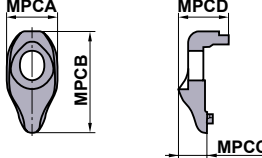
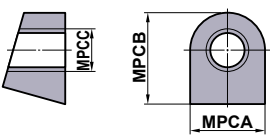
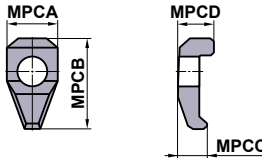
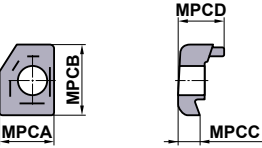
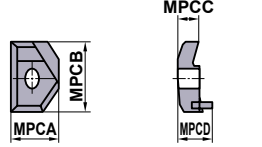
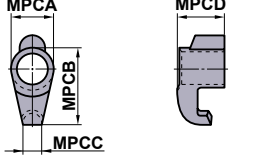
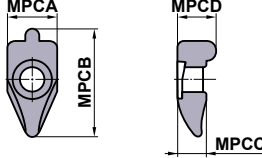
# SPARE PARTS

## LOCK PIN

| Geometry                                                                          | Order Number  | Dimensions (mm) |      |      |      |      |      | Tool Holder           |
|-----------------------------------------------------------------------------------|---------------|-----------------|------|------|------|------|------|-----------------------|
|                                                                                   |               | MPCA            | MPCB | MPCC | MPCD | MPCE | MPCF |                       |
|  | <b>P11S</b>   | 6               | 3.7  | 4    | 17   | 11.1 | —    | MP Type Holder (C019) |
|                                                                                   | <b>P21S</b>   | 7.5             | 4.9  | 4.5  | 17.2 | 11.5 | —    |                       |
|  | <b>P221US</b> | 4               | 18   | 2.11 | 3.5  | 3.3  | 7.7  |                       |
|  | <b>P333WS</b> | 5.75            | 24   | 3.64 | 5.0  | 4.9  | 11.3 |                       |
|                                                                                   | <b>P434W</b>  | 7.75            | 30   | 5.03 | 7.0  | 4.9  | 16.8 |                       |

## CLAMP BRIDGE

| Geometry                                                                            | Order Number | Dimensions (mm) |      |      |      |      |      | Tool Holder                         |
|-------------------------------------------------------------------------------------|--------------|-----------------|------|------|------|------|------|-------------------------------------|
|                                                                                     |              | MPCA            | MPCB | MPCC | MPCD | MPCE | MPCF |                                     |
|  | <b>AMS3</b>  | 7               | 12   | 3    | 3.3  | —    | —    | Profile Holder (C032)<br>AJX (K196) |
|                                                                                     | <b>AMS4</b>  | 9               | 13.5 | 3    | 3.8  | —    | —    |                                     |
|                                                                                     | <b>AMS5</b>  | 10              | 15   | 3.5  | 5    | —    | —    |                                     |
|  | <b>CA161</b> | 13              | 20   | 6    | 8    | —    | —    |                                     |
|  | <b>CCK13</b> | 15              | 18.5 | 6    | 9    | —    | —    | WP Type Holder (C017)               |
|                                                                                     | <b>CCK14</b> | 19              | 22   | 8    | 9.5  | —    | —    |                                     |
|  | <b>CCTC1</b> | 13              | 25   | 7    | 10.2 | —    | —    |                                     |
|  | <b>CK231</b> | M6×1            | 8    | 4    | 7.5  | 4.5  | 9.5  |                                     |
|                                                                                     | <b>CK232</b> | M6×1            | 8    | 4.5  | 8    | 4.5  | 11.5 |                                     |
|                                                                                     | <b>CK341</b> | M8×1            | 11   | 5.5  | 13.5 | 6    | 13.5 |                                     |
|                                                                                     | <b>CK342</b> | M8×1            | 11   | 6    | 14   | 6    | 16.5 |                                     |

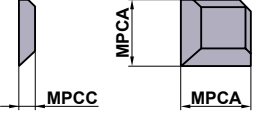
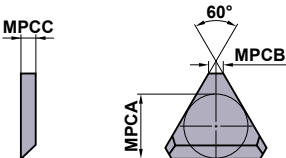
| Geometry                                                                            | Order Number   | Dimensions (mm) |      |         |      |      |      | Tool Holder                                                                                      |
|-------------------------------------------------------------------------------------|----------------|-----------------|------|---------|------|------|------|--------------------------------------------------------------------------------------------------|
|                                                                                     |                | MPCA            | MPCB | MPCC    | MPCD | MPCE | MPCF |                                                                                                  |
|    | <b>CKW6</b>    | 10.9            | 22.5 | 9.2     | 16.8 | 5    | M8×1 | <b>DOUBLE CLAMP</b> Holder (☯C009)<br>(For Heavy Cutting)                                        |
|    | <b>DCK2211</b> | 11              | 22   | 6.57    | 11.1 | —    | —    | <b>DOUBLE CLAMP</b> Holder (☯C008)                                                               |
|                                                                                     | <b>DCK2613</b> | 13              | 26.5 | 7.35    | 12.9 | —    | —    | <b>DOUBLE CLAMP DIMPLE BAR</b> (☯E015)                                                           |
|                                                                                     | <b>DCK3113</b> | 13              | 31   | 9       | 14.5 | —    | —    | <b>HSK</b> Tool Holder (☯H001)                                                                   |
|    | <b>KGC1</b>    | 12.0            | 15.0 | M7×0.75 | —    | —    | —    |                                                                                                  |
|   | <b>LK1</b>     | 8               | 14.3 | 4.5     | 5.9  | —    | —    |                                                                                                  |
|  | <b>MTK1R/L</b> | 13              | 17.5 | 5       | 12   | —    | —    | <b>MG</b> Type Holder (☯F132)<br><b>MT</b> Type Holder (☯G024)<br><b>HSK</b> Tool Holder (☯H001) |
|  | <b>MTK2R/L</b> | 18              | 28   | 7       | 14   | —    | —    |                                                                                                  |
|  | <b>SETK51</b>  | 6.8             | 14.5 | 2.9     | 8    | —    | —    | <b>MMTE</b> Type Holder (☯G019)                                                                  |
|                                                                                     | <b>SETK61</b>  | 8.9             | 18.1 | 4.1     | 8.6  | —    | —    | <b>MMTI</b> Type Holder (☯G026)<br><b>HSK</b> Tool Holder (☯H001)                                |
|  | <b>SRK1R</b>   | 9.4             | 21   | 5.5     | 7.5  | —    | —    |                                                                                                  |

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SPARE PARTS

# SPARE PARTS

## BREAKER PIECE

| Geometry                                                                          | Order Number | Dimensions (mm) |      |      |       |     | Tool Holder                                                                                                               |
|-----------------------------------------------------------------------------------|--------------|-----------------|------|------|-------|-----|---------------------------------------------------------------------------------------------------------------------------|
|                                                                                   |              | MPCA            | MPCB | MPCC | IC    | LBB |                                                                                                                           |
|  | <b>CBS3D</b> | 8.0             | —    | 1.5  | 9.525 | 1.5 |                                                                                                                           |
|                                                                                   | <b>CBS4D</b> | 10.2            | —    | 2.5  | 12.70 | 2.5 |                                                                                                                           |
|                                                                                   |              |                 |      |      |       |     |                                                                                                                           |
|  | <b>CBT2N</b> | 5.67            | 1.4  | 1.5  | 6.35  | 1.0 | <b>F</b> Type Boring Bar (E029)<br>*For positive inserts, the breaker width is 0.5mm larger than the figures in the list. |
|                                                                                   | <b>CBT3F</b> | 8.53            | 1.4  | 2.5  | 9.525 | 1.5 |                                                                                                                           |
|                                                                                   | <b>CBT4N</b> | 11.07           | 1.4  | 2.5  | 12.70 | 2.5 |                                                                                                                           |
|                                                                                   |              |                 |      |      |       |     |                                                                                                                           |

# ANTI SEIZE LUBRICANT

## ANTI SEIZE LUBRICANT

| Shape                                                                             | Order Number | Stock | Volume (g) |
|-----------------------------------------------------------------------------------|--------------|-------|------------|
|  | MK1K         | ★     | 20         |
|  | MK1KS        | ★     | 3          |

N

SPARE PARTS

★ : Inventory maintained in Japan.





# TECHNICAL DATA

|                                                 |      |
|-------------------------------------------------|------|
| ISO13399 COMPLIANCE .....                       | P002 |
| TROUBLE SHOOTING FOR TURNING .....              | P006 |
| CHIP CONTROL FOR TURNING .....                  | P008 |
| EFFECTS OF CUTTING CONDITIONS FOR TURNING ..... | P009 |
| FUNCTION OF THE TOOL FEATURES FOR TURNING ..... | P011 |
| FORMULAE FOR CUTTING POWER .....                | P015 |
| TROUBLE SHOOTING FOR THREADING .....            | P016 |
| THREADING METHODS .....                         | P017 |
| METALLIC MATERIALS CROSS REFERENCE LIST .....   | P020 |
| SURFACE ROUGHNESS .....                         | P024 |
| HARDNESS COMPARISON TABLE .....                 | P025 |
| FIT TOLERANCE TABLE (HOLE) .....                | P026 |
| FIT TOLERANCE TABLE (SHAFT) .....               | P028 |
| INTERNATIONAL SYSTEM OF UNITS .....             | P030 |
| TOOL WEAR AND DAMAGE .....                      | P031 |
| CUTTING TOOL MATERIALS .....                    | P032 |
| GRADE CHAIN .....                               | P033 |
| GRADES COMPARISON TABLE .....                   | P034 |
| INSERT CHIPBREAKER COMPARISON TABLE .....       | P040 |



# ISO13399 COMPLIANCE

## List of Property Symbols Complying with ISO13399

Alphabetical

Source: ISO13399 standard

URL : <https://www.iso.org/search/x/query/13399>

| ISO13399<br>Property Symbols | Content                               |
|------------------------------|---------------------------------------|
| <b>ADJLX</b>                 | Adjustment limit maximum              |
| <b>ADJRG</b>                 | Adjustment range                      |
| <b>ALF</b>                   | Clearance angle radial                |
| <b>ALP</b>                   | Clearance angle axial                 |
| <b>AN</b>                    | Clearance angle major                 |
| <b>ANN</b>                   | Clearance angle minor                 |
| <b>APMX</b>                  | Depth of cut maximum                  |
| <b>AS</b>                    | Clearance angle wiper edge            |
| <b>ASP</b>                   | Adjusting screw protrusion            |
| <b>AZ</b>                    | Plunge depth maximum                  |
| <b>B</b>                     | Shank width                           |
| <b>BBD</b>                   | Balanced by design                    |
| <b>BCH</b>                   | Corner chamfer length                 |
| <b>BD</b>                    | Body diameter                         |
| <b>BDX</b>                   | Body diameter maximum                 |
| <b>BHCC</b>                  | Bolt hole circle count                |
| <b>BHTA</b>                  | Body half taper angle                 |
| <b>BMC</b>                   | Body material code                    |
| <b>BS</b>                    | Wiper edge length                     |
| <b>BSR</b>                   | Wiper edge radius                     |
| <b>CASC</b>                  | Cartridge size code                   |
| <b>CB</b>                    | Chipbreaker face count                |
| <b>CBDP</b>                  | Connection bore depth                 |
| <b>CBMD</b>                  | Chipbreaker manufacturers designation |
| <b>CBP</b>                   | Chipbreaker property                  |
| <b>CCMS</b>                  | Connection code machine side          |
| <b>CCWS</b>                  | Connection code workpiece side        |
| <b>CCP</b>                   | Chamfer corner property               |
| <b>CDI</b>                   | Insert cutting diameter               |
| <b>CDX</b>                   | Cutting depth maximum                 |
| <b>CEATC</b>                 | Tool cutting edge angle type code     |
| <b>CECC</b>                  | Cutting edge condition code           |
| <b>CEDC</b>                  | Cutting edge count                    |
| <b>CF</b>                    | Spot chamfer                          |
| <b>CHW</b>                   | Corner chamfer width                  |
| <b>CICT</b>                  | Cutting item count                    |
| <b>CNC</b>                   | Corner count                          |
| <b>CND</b>                   | Coolant entry diameter                |
| <b>CNSC</b>                  | Coolant entry style code              |
| <b>CNT</b>                   | Coolant entry thread size             |
| <b>CP</b>                    | Coolant pressure                      |
| <b>CRE</b>                   | Spot radius                           |
| <b>CRKS</b>                  | Connection retention knob thread size |
| <b>CSP</b>                   | Coolant supply property               |
| <b>CTP</b>                   | Coating property                      |
| <b>CTX</b>                   | Cutting point translation X-direction |
| <b>CTY</b>                   | Cutting point translation Y-direction |
| <b>CUTDIA</b>                | Work piece parting diameter maximum   |
| <b>CUB</b>                   | Connection unit basis                 |
| <b>CW</b>                    | Cutting width                         |
| <b>CWX</b>                   | Cutting width maximum                 |
| <b>CXD</b>                   | Coolant exit diameter                 |

| ISO13399<br>Property Symbols | Content                               |
|------------------------------|---------------------------------------|
| <b>CXSC</b>                  | Coolant exit style code               |
| <b>CZC</b>                   | Connection size code                  |
| <b>D1</b>                    | Fixing hole diameter                  |
| <b>DAH</b>                   | Diameter access hole                  |
| <b>DAXN</b>                  | Axial groove outside diameter minimum |
| <b>DAXX</b>                  | Axial groove outside diameter maximum |
| <b>DBC</b>                   | Diameter bolt circle                  |
| <b>DC</b>                    | Cutting diameter                      |
| <b>DCB</b>                   | Connection bore diameter              |
| <b>DCBN</b>                  | Connection bore diameter minimum      |
| <b>DCBX</b>                  | Connection bore diameter maximum      |
| <b>DCC</b>                   | Design configuration style code       |
| <b>DCCB</b>                  | Counterbore diameter connection bore  |
| <b>DCIN</b>                  | Cutting diameter internal             |
| <b>DCINN</b>                 | Cutting diameter internal minimum     |
| <b>DCINX</b>                 | Cutting diameter internal maximum     |
| <b>DCN</b>                   | Cutting diameter minimum              |
| <b>DCON</b>                  | Connection diameter                   |
| <b>DCONMS</b>                | Connection diameter machine side      |
| <b>DCONWS</b>                | Connection diameter workpiece side    |
| <b>DCSC</b>                  | Cutting diameter size code            |
| <b>DCSFMS</b>                | Contact surface diameter machine side |
| <b>DCX</b>                   | Cutting diameter maximum              |
| <b>DF</b>                    | Flange diameter                       |
| <b>DHUB</b>                  | Hub diameter                          |
| <b>DMIN</b>                  | Minimum bore diameter                 |
| <b>DMM</b>                   | Shank diameter                        |
| <b>DN</b>                    | Neck diameter                         |
| <b>DRVA</b>                  | Drive angle                           |
| <b>EPSR</b>                  | Insert included angle                 |
| <b>FHA</b>                   | Flute helix angle                     |
| <b>FHCSA</b>                 | Fixing hole countersunk angle         |
| <b>FHCSD</b>                 | Fixing hole countersunk diameter      |
| <b>FLGT</b>                  | Flange thickness                      |
| <b>FMT</b>                   | Form type                             |
| <b>FXHLP</b>                 | Fixing hole property                  |
| <b>GAMF</b>                  | Rake angle radial                     |
| <b>GAMN</b>                  | Rake angle normal                     |
| <b>GAMO</b>                  | Rake angle orthogonal                 |
| <b>GAMP</b>                  | Rake angle axial                      |
| <b>GAN</b>                   | Insert rake angle                     |
| <b>H</b>                     | Shank height                          |
| <b>HA</b>                    | Thread height theoretical             |
| <b>HAND</b>                  | Hand                                  |
| <b>HBH</b>                   | Head bottom offset height             |
| <b>HBKL</b>                  | Head back offset length               |
| <b>HBKW</b>                  | Head back offset width                |
| <b>HBL</b>                   | Head bottom offset length             |
| <b>HC</b>                    | Thread height actual                  |
| <b>HF</b>                    | Functional height                     |
| <b>HHUB</b>                  | Hub height                            |
| <b>HTB</b>                   | Body height                           |
| <b>IC</b>                    | Inscribed circle diameter             |
| <b>IFS</b>                   | Insert mounting style code            |
| <b>IIC</b>                   | Insert interface code                 |
| <b>INSL</b>                  | Insert length                         |
| <b>KAPR</b>                  | Tool cutting edge angle               |
| <b>KCH</b>                   | Corner chamfer angle                  |

# TECHNICAL DATA

| ISO13399<br>Property Symbols | Content                                                                                                         |
|------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>KRINS</b>                 | Cutting edge angle major                                                                                        |
| <b>KWW</b>                   | Keyway width                                                                                                    |
| <b>KYP</b>                   | Keyway property                                                                                                 |
| <b>L</b>                     | Cutting edge length                                                                                             |
| <b>LAMS</b>                  | Inclination angle                                                                                               |
| <b>LB</b>                    | Body length                                                                                                     |
| <b>LBB</b>                   | Chipbreaker width                                                                                               |
| <b>LBX</b>                   | Body length maximum                                                                                             |
| <b>LCCB</b>                  | Counterbore depth connection bore                                                                               |
| <b>LCF</b>                   | Length chip flute                                                                                               |
| <b>LDRED</b>                 | Reduced body diameter length                                                                                    |
| <b>LE</b>                    | Cutting edge effective length                                                                                   |
| <b>LF</b>                    | Functional length                                                                                               |
| <b>LFA</b>                   | a dimension on lf                                                                                               |
| <b>LH</b>                    | Head length                                                                                                     |
| <b>LPR</b>                   | Protruding length                                                                                               |
| <b>LS</b>                    | Shank length                                                                                                    |
| <b>LSC</b>                   | Clamping length                                                                                                 |
| <b>LSCN</b>                  | Clamping length minimum                                                                                         |
| <b>LSCX</b>                  | Clamping length maximum                                                                                         |
| <b>LTA</b>                   | LTA length (length from MCS to CRP)                                                                             |
| <b>LU</b>                    | Usable length                                                                                                   |
| <b>LUX</b>                   | Usable length maximum                                                                                           |
| <b>M</b>                     | m-dimension                                                                                                     |
| <b>M2</b>                    | Distance between the nominal inscribed circle and the corner of an insert that has the secondary included angle |
| <b>MHA</b>                   | Mounting hole angle                                                                                             |
| <b>MHD</b>                   | Mounting hole distance                                                                                          |
| <b>MHH</b>                   | Mounting hole height                                                                                            |
| <b>MIID</b>                  | Master insert identification                                                                                    |
| <b>MTP</b>                   | Clamping type code                                                                                              |
| <b>NCE</b>                   | Cutting end count                                                                                               |
| <b>NOF</b>                   | Flute count                                                                                                     |
| <b>NOI</b>                   | Insert index count                                                                                              |
| <b>NT</b>                    | Tooth count                                                                                                     |
| <b>OAH</b>                   | Overall height                                                                                                  |
| <b>OAL</b>                   | Overall length                                                                                                  |
| <b>OAW</b>                   | Overall width                                                                                                   |
| <b>PDPT</b>                  | Profile depth insert                                                                                            |
| <b>PDX</b>                   | Profile distance ex                                                                                             |
| <b>PDY</b>                   | Profile distance ey                                                                                             |
| <b>PFS</b>                   | Profile style code                                                                                              |
| <b>PL</b>                    | Point length                                                                                                    |
| <b>PNA</b>                   | Profile included angle                                                                                          |
| <b>PRFRAD</b>                | Profile radius                                                                                                  |
| <b>PSIR</b>                  | Tool lead angle                                                                                                 |
| <b>PSIRL</b>                 | Cutting edge angle major left hand                                                                              |
| <b>PSIRR</b>                 | Cutting edge angle major right hand                                                                             |
| <b>RAL</b>                   | Relief angle left hand                                                                                          |
| <b>RAR</b>                   | Relief angle right hand                                                                                         |
| <b>RCP</b>                   | Rounded corner property                                                                                         |
| <b>RE</b>                    | Corner radius                                                                                                   |
| <b>REL</b>                   | Corner radius left hand                                                                                         |
| <b>RER</b>                   | Corner radius right hand                                                                                        |
| <b>RMPX</b>                  | Ramping angle maximum                                                                                           |
| <b>RPMX</b>                  | Rotational speed maximum                                                                                        |
| <b>S</b>                     | Insert thickness                                                                                                |
| <b>S1</b>                    | Insert thickness total                                                                                          |
| <b>SC</b>                    | Insert shape code                                                                                               |
| <b>SDL</b>                   | Step diameter length                                                                                            |
| <b>SIG</b>                   | Point angle                                                                                                     |

| ISO13399<br>Property Symbols | Content                                                                                      |
|------------------------------|----------------------------------------------------------------------------------------------|
| <b>SSC</b>                   | Insert seat size code                                                                        |
| <b>SX</b>                    | Shank cross section shape code                                                               |
| <b>TC</b>                    | Tolerance class insert                                                                       |
| <b>TCE</b>                   | Tipped cutting edge code                                                                     |
| <b>TCTR</b>                  | Thread tolerance class                                                                       |
| <b>TD</b>                    | Thread diameter                                                                              |
| <b>THFT</b>                  | Thread form type                                                                             |
| <b>THL</b>                   | Threading length                                                                             |
| <b>THLGTH</b>                | Thread length                                                                                |
| <b>THSC</b>                  | Tool holder shape code                                                                       |
| <b>THUB</b>                  | Hub thickness                                                                                |
| <b>TP</b>                    | Thread pitch                                                                                 |
| <b>TPI</b>                   | Threads per inch                                                                             |
| <b>TPIN</b>                  | Threads per inch minimum                                                                     |
| <b>TPIX</b>                  | Threads per inch maximum                                                                     |
| <b>TPN</b>                   | Thread pitch minimum                                                                         |
| <b>TPT</b>                   | Thread profile type                                                                          |
| <b>TPX</b>                   | Thread pitch maximum                                                                         |
| <b>TQ</b>                    | Torque                                                                                       |
| <b>TSYC</b>                  | Tool style code                                                                              |
| <b>TTP</b>                   | Thread type                                                                                  |
| <b>ULDR</b>                  | Usable length diameter ratio                                                                 |
| <b>UST</b>                   | Unit system                                                                                  |
| <b>W1</b>                    | Insert width                                                                                 |
| <b>WEP</b>                   | Wiper edge property                                                                          |
| <b>WF</b>                    | Functional width                                                                             |
| <b>WF2</b>                   | Distance between the cutting reference point and the front seating surface of a turning tool |
| <b>WFS</b>                   | Functional width secondary                                                                   |
| <b>WT</b>                    | Weight of item                                                                               |
| <b>ZEFF</b>                  | Face effective cutting edge count                                                            |
| <b>ZEFP</b>                  | Peripheral effective cutting edge count                                                      |
| <b>ZNC</b>                   | Cutting edge center count                                                                    |
| <b>ZNF</b>                   | Face mounted insert count                                                                    |
| <b>ZNP</b>                   | Peripheral mounted insert count                                                              |

## List of Reference Symbols Complying with ISO13399

| ISO13399<br>Reference Symbols | Content                          |
|-------------------------------|----------------------------------|
| <b>CIP</b>                    | Coordinate system In Process     |
| <b>CRP</b>                    | Cutting Reference Point          |
| <b>CSW</b>                    | Coordinate System Workpiece side |
| <b>MCS</b>                    | Mounting Coordinate System       |
| <b>PCS</b>                    | Primary Coordinate System        |

# TROUBLE SHOOTING FOR TURNING

| <div>Trouble</div> <div>Solution</div> <div>Factors</div> |                                                                         |                                | Insert Grade Selection |                        |                                                     |                                                | Cutting Conditions |        |                                        |                                        | Style and Design of the Tool |                    |        |               |            |                                     | Machine, Installation of Tool |                              |                                                      |                          |                                     |
|-----------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------|------------------------|------------------------|-----------------------------------------------------|------------------------------------------------|--------------------|--------|----------------------------------------|----------------------------------------|------------------------------|--------------------|--------|---------------|------------|-------------------------------------|-------------------------------|------------------------------|------------------------------------------------------|--------------------------|-------------------------------------|
|                                                           |                                                                         |                                | Select a harder grade  | Select a tougher grade | Select a grade with better thermal shock resistance | Select a grade with better adhesion resistance | Cutting speed      | Feed   | Depth of cut                           | Coolant                                |                              | Select chipbreaker | Rake   | Corner radius | Lead angle | Honing strengthens the cutting edge | Class of insert               | Improve tool holder rigidity | Increase clamping rigidity of the tool and workpiece | Decrease holder overhang | Decrease power and machine backlash |
|                                                           |                                                                         |                                |                        |                        |                                                     |                                                |                    |        |                                        | Do not use water-soluble cutting fluid | Determine dry or wet cutting |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         |                                |                        |                        |                                                     |                                                | Up ↗               | Down ↘ | Do not use water-soluble cutting fluid | Determine dry or wet cutting           | Up ↗                         |                    | Down ↘ |               |            |                                     |                               |                              |                                                      |                          |                                     |
| Deterioration of Tool Life                                | Insert wear quickly generated                                           | Improper tool grade            | ●                      |                        |                                                     |                                                |                    |        |                                        |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |        |                                        |                                        | ●                            | ↗                  | ↗      | ↗             | ↘          |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting speed         |                        |                        |                                                     |                                                | ↘                  | ↗      |                                        | Wet                                    |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           | Chipping or fracturing of cutting edge                                  | Improper tool grade            |                        | ●                      |                                                     |                                                |                    |        |                                        |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting conditions    |                        |                        |                                                     |                                                |                    | ↘      | ↘                                      |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Lack of cutting edge strength. |                        |                        |                                                     |                                                |                    |        |                                        |                                        | ●                            |                    | ↗      |               | ↗          |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Thermal crack occurs           |                        |                        | ●                                                   |                                                | ↘                  | ↘      | ↘                                      | ●                                      | Dry                          |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Build-up edge occurs           |                        |                        |                                                     | ●                                              | ↗                  | ↗      |                                        | ●                                      | Wet                          |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Lack of rigidity               |                        |                        |                                                     |                                                |                    |        |                                        |                                        |                              |                    |        |               |            |                                     | ●                             | ●                            | ●                                                    | ●                        |                                     |
|                                                           | Out of Tolerance                                                        | Dimensions are not constant    | Poor insert accuracy   |                        |                                                     |                                                |                    |        |                                        |                                        |                              |                    |        |               |            | ●                                   |                               |                              |                                                      |                          |                                     |
| Large cutting resistance and cutting edge flank           |                                                                         |                                |                        |                        |                                                     |                                                |                    |        |                                        |                                        | ●                            | ●                  | ↘      | ↘             | ↘          |                                     | ●                             | ●                            | ●                                                    | ●                        |                                     |
| Necessary to adjust often because of over-size            |                                                                         | Improper tool grade            | ●                      |                        |                                                     |                                                |                    |        |                                        |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↗      |                                        |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
| Deterioration of Surface Finish                           | Poor finished surface                                                   | Welding occurs                 |                        |                        |                                                     |                                                | ↗                  |        |                                        | ●                                      | Wet                          |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |        |                                        |                                        | ●                            |                    | ↗      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Chattering                     |                        |                        |                                                     |                                                | ↘                  | ↘      | ↘                                      |                                        |                              |                    |        |               |            |                                     | ●                             | ●                            | ●                                                    | ●                        |                                     |
| Generation of Heat                                        | Workpiece over heating can cause poor accuracy and short life of insert | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↘      | ↘                                      |                                        |                              |                    |        |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                                                         | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |        |                                        |                                        | ●                            | ↗                  |        |               | ↘          |                                     |                               |                              |                                                      |                          |                                     |

| <div>Trouble</div> <div>Solution</div> <div>Factors</div> |                                   |                                | Insert Grade Selection |                        |                                                     |                                                | Cutting Conditions |      |                                        |                              | Style and Design of the Tool           |                    |      |               |            |                                     | Machine, Installation of Tool |                              |                                                      |                          |                                     |
|-----------------------------------------------------------|-----------------------------------|--------------------------------|------------------------|------------------------|-----------------------------------------------------|------------------------------------------------|--------------------|------|----------------------------------------|------------------------------|----------------------------------------|--------------------|------|---------------|------------|-------------------------------------|-------------------------------|------------------------------|------------------------------------------------------|--------------------------|-------------------------------------|
|                                                           |                                   |                                | Select a harder grade  | Select a tougher grade | Select a grade with better thermal shock resistance | Select a grade with better adhesion resistance | Cutting speed      | Feed | Depth of cut                           | Coolant                      |                                        | Select chipbreaker | Rake | Corner radius | Lead angle | Honing strengthens the cutting edge | Class of insert               | Improve tool holder rigidity | Increase clamping rigidity of the tool and workpiece | Decrease holder overhang | Decrease power and machine backlash |
|                                                           |                                   |                                |                        |                        |                                                     |                                                | Up ↗               |      |                                        | Down ↘                       | Do not use water-soluble cutting fluid |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   |                                |                        |                        |                                                     |                                                | Down ↘             | Up ↗ | Do not use water-soluble cutting fluid | Determine dry or wet cutting |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   |                                |                        |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
| Burrs, Chipping etc.                                      | Burrs<br>(Steel, Aluminium)       | Notch wear                     | ●                      |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↗    |                                        | Wet                          |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |      |                                        |                              | ●                                      | ↗                  | ↘    | ↘             | ↘          |                                     |                               |                              |                                                      |                          |                                     |
|                                                           | Workpiece chipping<br>(Cast iron) | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↘    |                                        |                              |                                        |                    | ↗    | ↗             |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |      |                                        |                              | ●                                      | ↗                  | ↗    | ↗             | ↘          |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Vibration occurs               |                        |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    |      |               |            |                                     | ●                             | ●                            | ●                                                    | ●                        |                                     |
|                                                           | Burrs<br>(Mild steel)             | Improper tool grade            |                        |                        | ●                                                   |                                                |                    |      |                                        |                              |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting conditions    |                        |                        |                                                     |                                                | ↗                  |      |                                        | Wet                          |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |      |                                        |                              | ●                                      | ↗                  |      |               | ↘          |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Vibration occurs               |                        |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    |      |               |            |                                     | ●                             | ●                            | ●                                                    | ●                        |                                     |
| Poor Chip Dispersal                                       | Long chips                        | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↗    | ↗                                      | Wet                          |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Large chip control range       |                        |                        |                                                     |                                                |                    |      |                                        |                              | ●                                      |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    | ↘    | ↘             |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           | Chips are short and scattered     | Improper cutting conditions    |                        |                        |                                                     |                                                | ↘                  | ↘    |                                        | Dry                          |                                        |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Small chip control range       |                        |                        |                                                     |                                                |                    |      |                                        |                              | ●                                      |                    |      |               |            |                                     |                               |                              |                                                      |                          |                                     |
|                                                           |                                   | Improper cutting edge geometry |                        |                        |                                                     |                                                |                    |      |                                        |                              |                                        |                    | ↗    | ↗             |            |                                     |                               |                              |                                                      |                          |                                     |



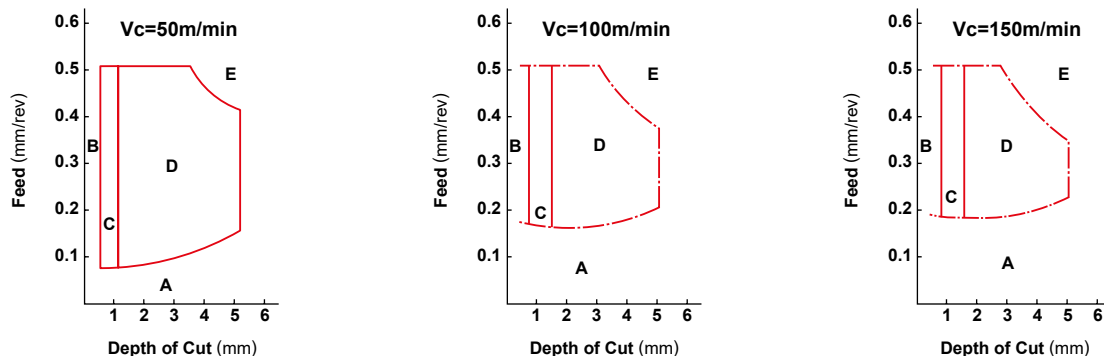
# CHIP CONTROL FOR TURNING

## CHIP BREAKING CONDITIONS IN STEEL TURNING

| Type                                        | A Type                                                                                                                     | B Type                                                                                             | C Type                           | D Type           | E Type                                                                                                                                        |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Small Depth of Cut<br>$d < 7\text{mm}$      |                                                                                                                            |                                                                                                    |                                  |                  |                                                                                                                                               |
| Large Depth of Cut<br>$d = 7 - 15\text{mm}$ |                                                                                                                            |                                                                                                    |                                  |                  |                                                                                                                                               |
| Curl Length<br>$l$                          | No curl                                                                                                                    | $l \geq 50\text{mm}$                                                                               | $l \leq 50\text{mm}$<br>1-5 Curl | $\approx 1$ Curl | Less Than 1<br>Curl Half a Curl                                                                                                               |
| Note                                        | <ul style="list-style-type: none"> <li>● Irregular continuous shape</li> <li>● Tangle around tool and workpiece</li> </ul> | <ul style="list-style-type: none"> <li>● Regular continuous shape</li> <li>● Long chips</li> </ul> | Good                             | Good             | <ul style="list-style-type: none"> <li>● Chip scattering</li> <li>● Chattering</li> <li>● Poor finished surface</li> <li>● Maximum</li> </ul> |

### Cutting speed and chip control range of chipbreaker

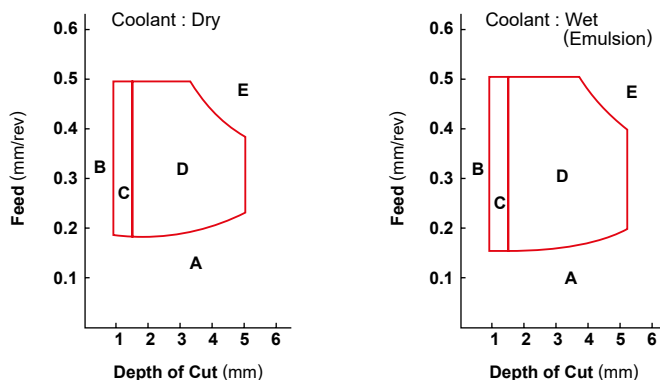
In general, when cutting speed increases, the chip control range tends to become narrower.



Workpiece : DIN Ck45(180HB) Tool : MTJNR2525M16N  
Insert : TNMG160408 Dry Cutting  
Grade : P10Cemented Carbide

### Effects of coolant on the chip control range of a chipbreaker

If the cutting speed is the same, the range of chip control differs according to whether coolant is used or not.



Workpiece : DIN Ck45  
Cutting Conditions :  $V_c = 100\text{m/min}$

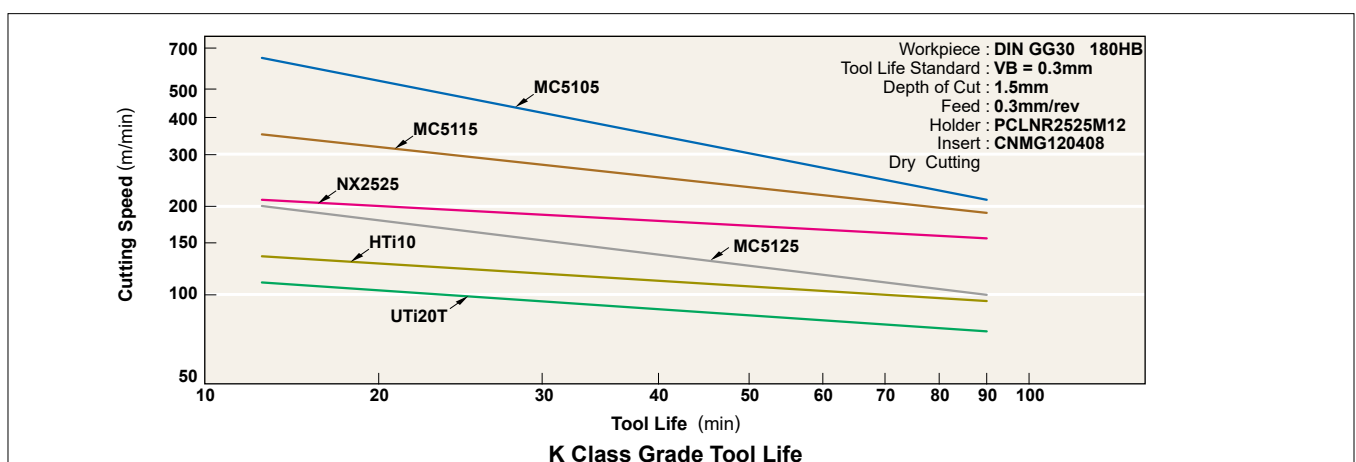
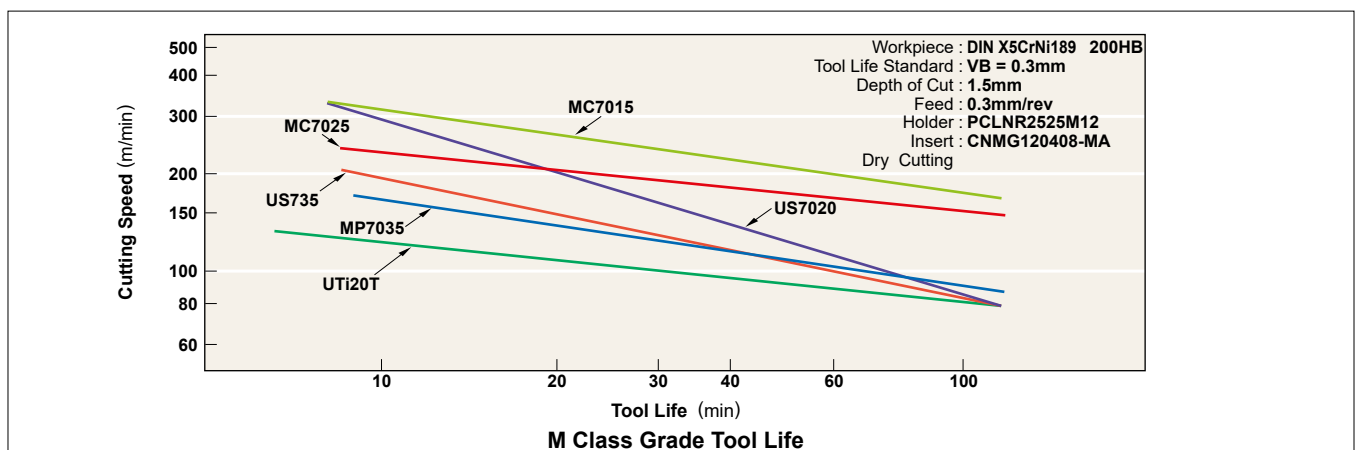
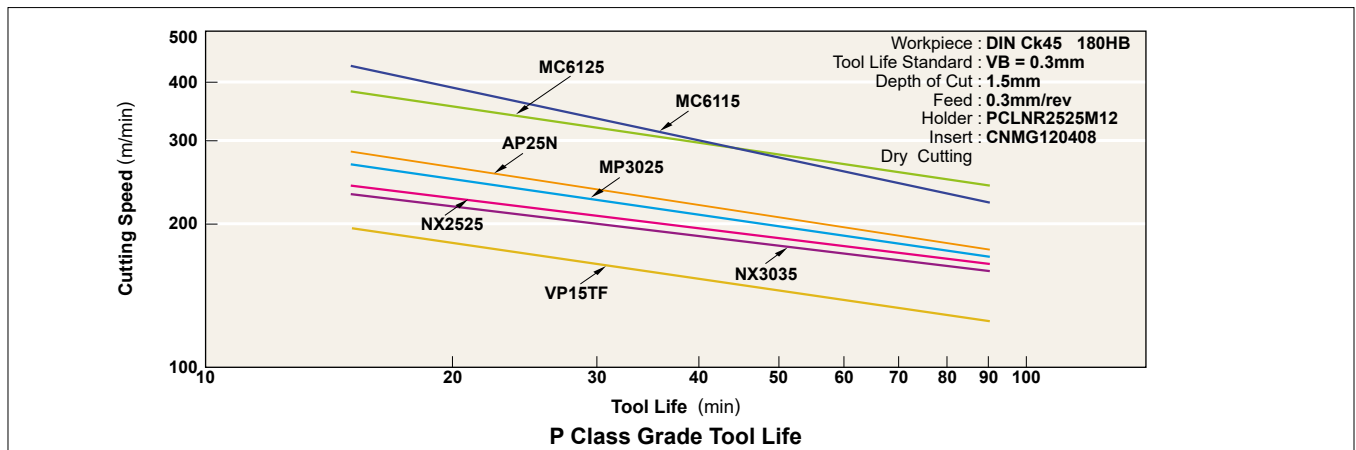
# EFFECTS OF CUTTING CONDITIONS FOR TURNING

## ■ EFFECTS OF CUTTING CONDITIONS

Ideal conditions for cutting are short cutting time, long tool life and high cutting accuracy. In order to obtain these conditions, a selection of efficient cutting conditions and tools, based on work material, hardness, shape and machine capability is necessary.

## ■ CUTTING SPEED

Cutting speed has severe impact on tool life. Increasing cutting speed increases cutting temperature and results in a shortened tool life. Cutting speed varies depending on the type and hardness of the material. Selecting a tool grade suitable for the cutting speed is necessary.



## ● Effects of Cutting Speed

1. Increasing cutting speed by 20% decreases tool life by 50%. Increasing cutting speed by 50% decreases tool life by 80%.
2. Cutting at low cutting speed (20–40m/min) tends to cause chattering. Thus, tool life is shortened.

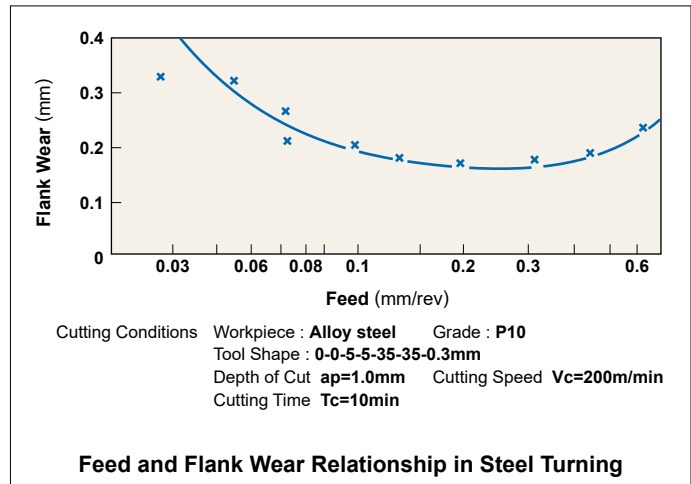
## EFFECTS OF CUTTING CONDITIONS FOR TURNING

### ■ FEED

When cutting with a general holder, feed is the distance a holder moves per workpiece revolution. In milling, feed is the distance a machine table moves per cutter revolution divided by the number of inserts. Thus, it is indicated as feed per tooth. Feed rate relates to finished surface roughness.

#### ● Effects of Feed

1. Decreasing feed rate results in flank wear and shortens tool life.
2. Increasing feed rate increases cutting temperature and flank wear. However, effects on the tool life is minimal compared to cutting speed.
3. Increasing feed rate improves machining efficiency.

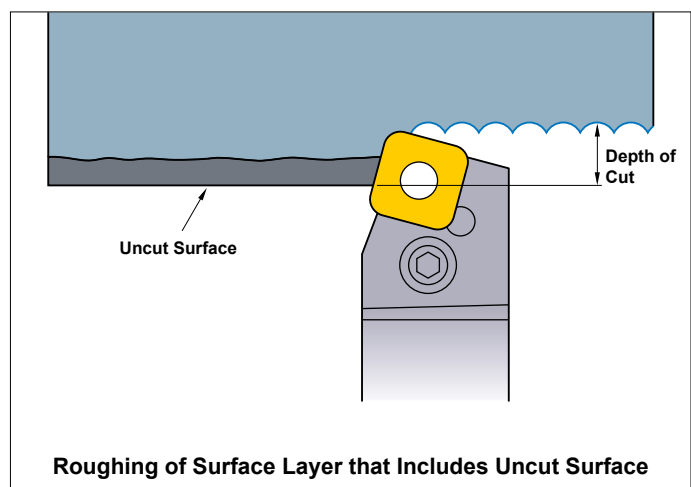
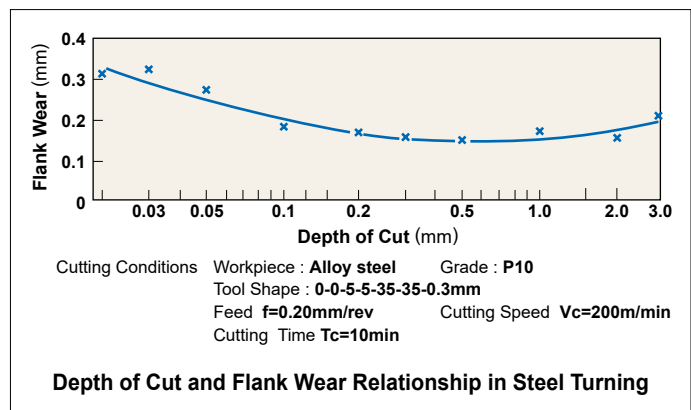


### ■ DEPTH OF CUT

Depth of cut is determined according to the required stock removal, shape of workpiece, power and rigidity of the machine and tool rigidity.

#### ● Effects of Depth of Cut

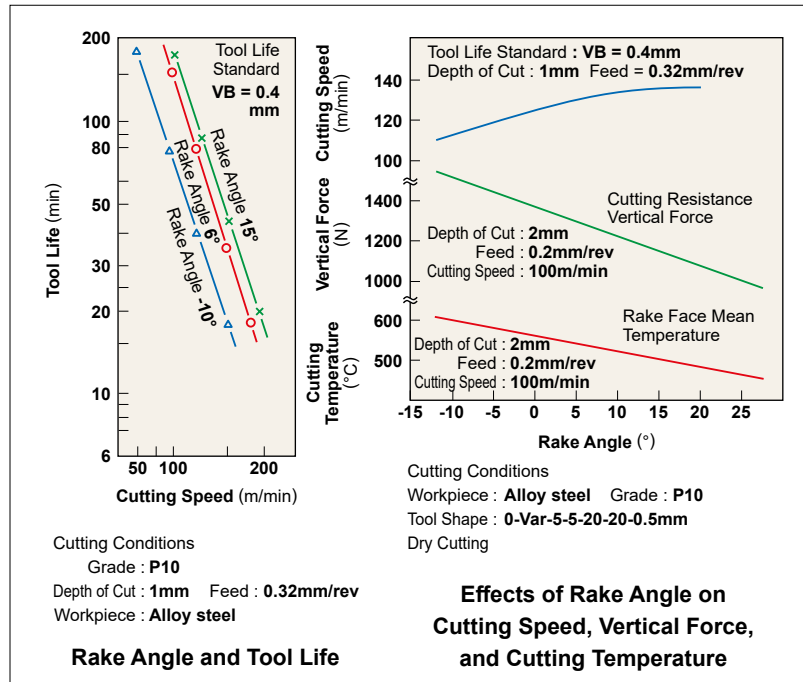
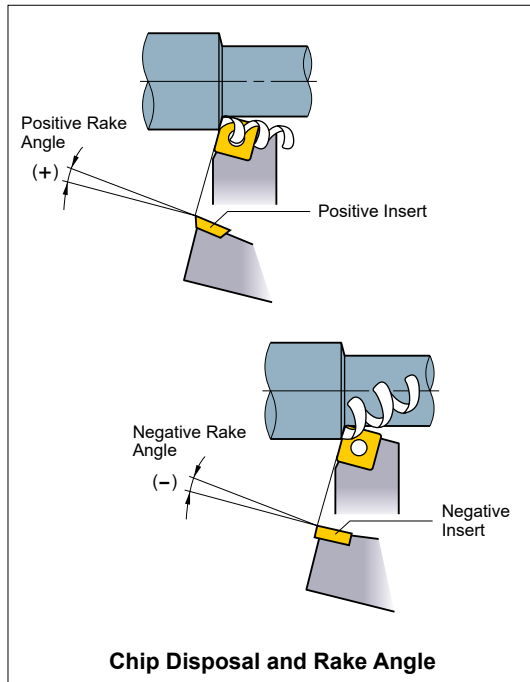
1. Changing depth of cut doesn't effect tool life greatly.
2. Small depths of cut result in friction when cutting the hardened layer of a workpiece. Thus tool life is shortened.
3. When cutting uncut surfaces or cast iron surfaces, the depth of cut needs to be increased as much as the machine power allows in order to avoid cutting the impure hard surface layer with the tip of cutting edge and therefore prevent chipping and abnormal wear.



# FUNCTION OF TOOL FEATURES FOR TURNING

## RAKE ANGLE

Rake angle is the cutting edge angle that has a large effect on cutting resistance, chip disposal, cutting temperature and tool life.



## Effects of Rake Angle

1. Increasing rake angle in the positive (+) direction improves sharpness.
2. Increasing rake angle by  $1^\circ$  in the positive (+) direction decreases cutting power by about 1%.
3. Increasing rake angle in the positive (+) direction lowers cutting edge strength and in the negative (-) direction increases cutting resistance.

### When to Increase Rake Angle in the Negative (-) Direction

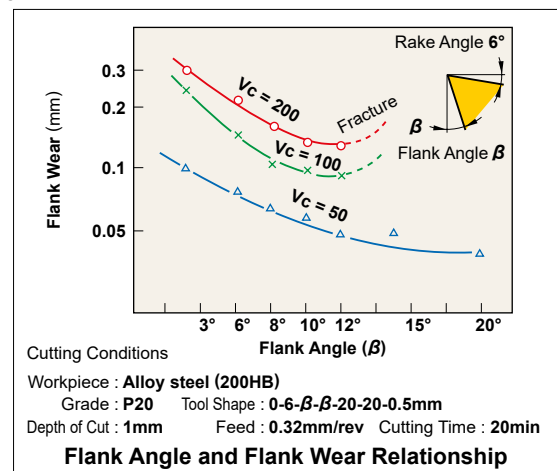
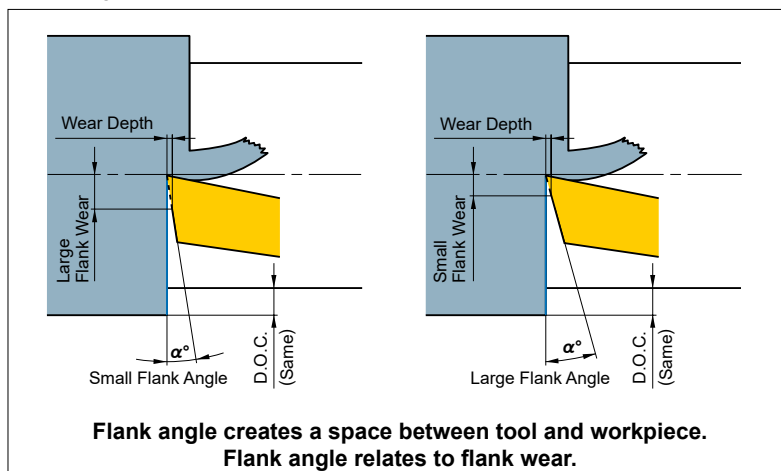
- ☐ Hard workpiece.
- ☐ When cutting edge strength is required such as in interrupted cutting and uncut surface cutting.

### When to Increase Rake Angle in the Positive (+) Direction

- ☐ Soft workpiece.
- ☐ Workpiece is easily machined.
- ☐ When the workpiece or the machine have poor rigidity.

## FLANK ANGLE

Flank angle prevents friction between the flank face and workpiece resulting in a smooth feed.



## Effects of Flank Angle

1. Increasing flank angle decreases flank wear occurrence.
2. Increasing flank angle lowers cutting edge strength.

### When to Decrease Flank Angle

- ☐ Hard workpieces.
- ☐ When cutting edge strength is required.

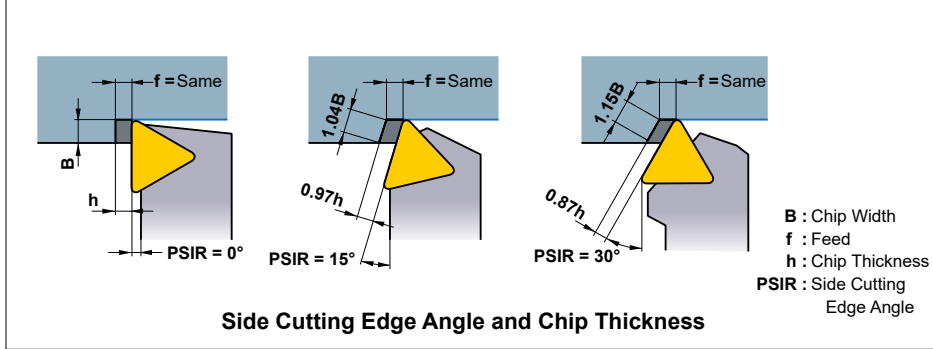
### When to Increase Flank Angle

- ☐ Soft workpieces.
- ☐ Workpieces suffer easily from work hardening.

# FUNCTION OF TOOL FEATURES FOR TURNING

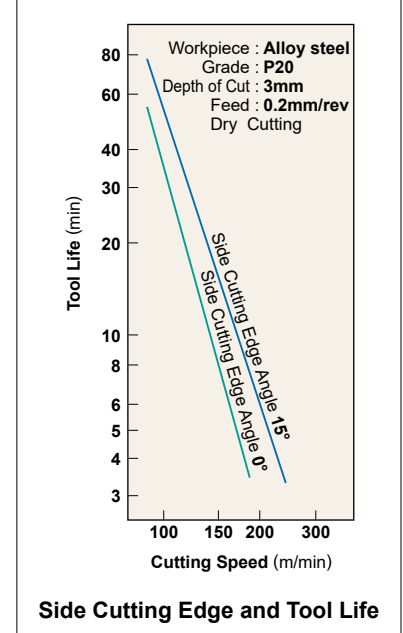
## ■ SIDE CUTTING EDGE ANGLE (LEAD ANGLE)

Side cutting edge angle and corner angle lower impact load and effect feed force, back force and chip thickness.



### ● Effects of Side Cutting Edge Angle (Lead Angle)

1. At the same feed rate, increasing the side cutting edge angle increases the chip contact length and decreases chip thickness. As a result, the cutting force is dispersed on a longer cutting edge and tool life is prolonged. (Refer to the chart.)
2. Increasing the side cutting edge angle increases force  $a'$ . Thus, thin, long workpieces can suffer from bending.
3. Increasing the side cutting edge angle decreases chip control.
4. Increasing the side cutting edge angle decreases the chip thickness and increases chip width. Thus, breaking the chips is difficult.

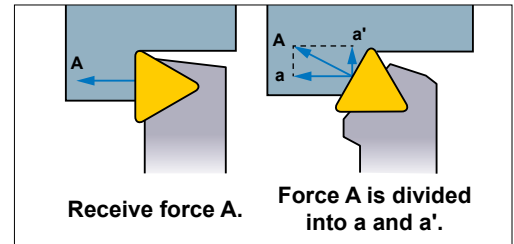


#### When to Decrease Lead Angle

- Finishing with a small depth of cut.
- Thin, long workpieces.
- When the machine has poor rigidity.

#### When to Increase Lead Angle

- Hard workpieces which produce high cutting temperature.
- When roughing a large diameter workpiece.
- When the machine has high rigidity.

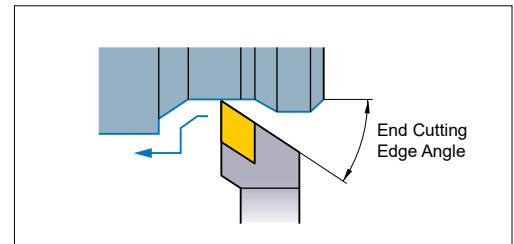


## ■ END CUTTING EDGE ANGLE

The end cutting edge angle avoids interference between the machined surface and the tool (end cutting edge). Usually  $5^\circ - 15^\circ$ .

### ● Effects of End Cutting Edge Angle

1. Decreasing the end cutting edge angle increases cutting edge strength, but it also increases cutting edge temperature.
2. Decreasing the end cutting edge angle increases the back force and can result in chattering and vibration while machining.
3. Small end cutting edge angle for roughing and a large angle when finishing are recommended.

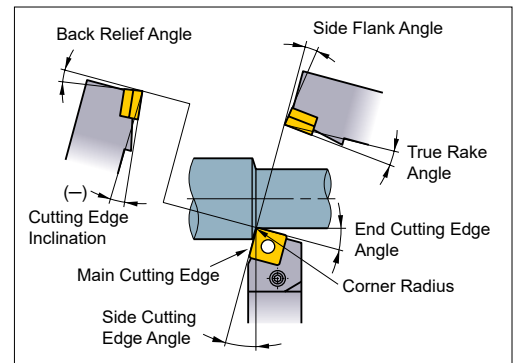


## ■ CUTTING EDGE INCLINATION

Cutting edge inclination indicates inclination of the rake face. When heavy cutting, the cutting edge receives an extremely large shock at the beginning of cutting. Cutting edge inclination keeps the cutting edge from receiving this shock and prevents fracturing.  $3^\circ - 5^\circ$  in turning and  $10^\circ - 15^\circ$  in milling are recommended.

### ● Effects of Cutting Edge Inclination

1. Negative (-) cutting edge inclination disposes chips in the workpiece direction, and positive (+) disposes chips in the opposite direction.
2. Negative (-) cutting edge inclination increases cutting edge strength, but it also increases back force of cutting resistance. Thus, chattering easily occurs.

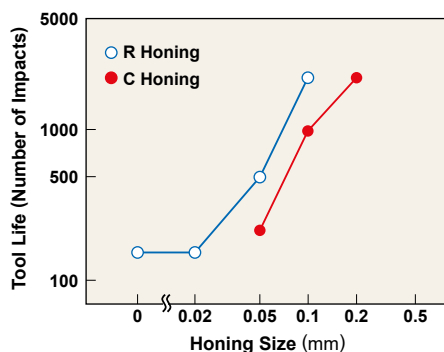
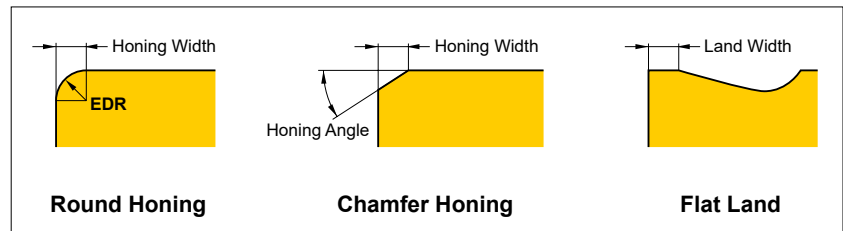


## ■ HONING AND LAND

Honing and land are cutting edge shapes that maintain cutting edge strength.

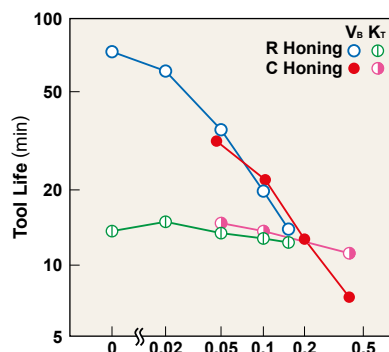
Honing can be round or chamfer type. The optimal honing width is approximately 1/2 of the feed.

Land is the narrow flat area on the rake or flank face.



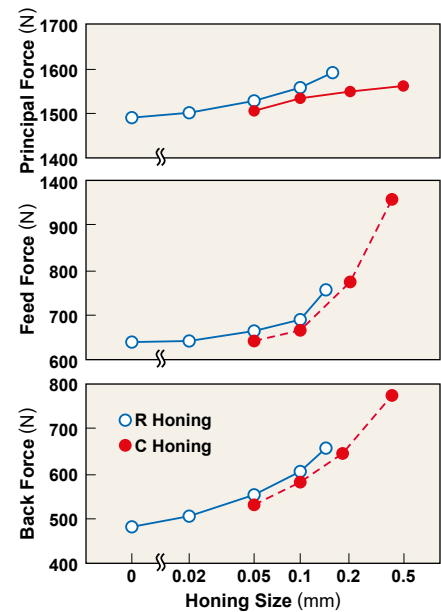
Workpiece : Alloy steel (280HB)  
Grade : P10  
Cutting Conditions :  $V_c=200\text{m/min}$   $a_p=1.5\text{mm}$   
 $f=0.335\text{mm/rev}$

**Honing Size and Tool Life  
Due to Fracturing**



Workpiece : Alloy steel (220HB)  
Grade : P10  
Cutting Conditions :  $V_c=160\text{m/min}$   $a_p=1.5\text{mm}$   
 $f=0.45\text{mm/rev}$

**Honing Size and Tool Life  
Due to Wear**



Workpiece : Alloy steel (220HB)  
Grade : P10  
Cutting Conditions :  $V_c=100\text{m/min}$   $a_p=1.5\text{mm}$   
 $f=0.425\text{mm/rev}$

**Honing Size and Cutting Resistance**

## ● Effects of Honing

1. Enlarging the honing increases cutting edge strength, tool life and reduces fracturing.
2. Enlarging the honing increases flank wear occurrence and shortens tool life. Honing size doesn't affect rake wear.
3. Enlarging the honing increases cutting resistance and chattering.

### When to Decrease Honing Size

- When finishing with a small depth of cut and small feed.
- Soft workpieces.
- When the workpiece and the machine have poor rigidity.

### When to Increase Honing Size

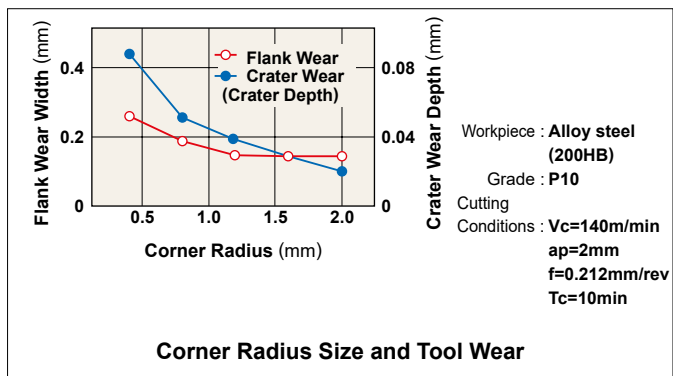
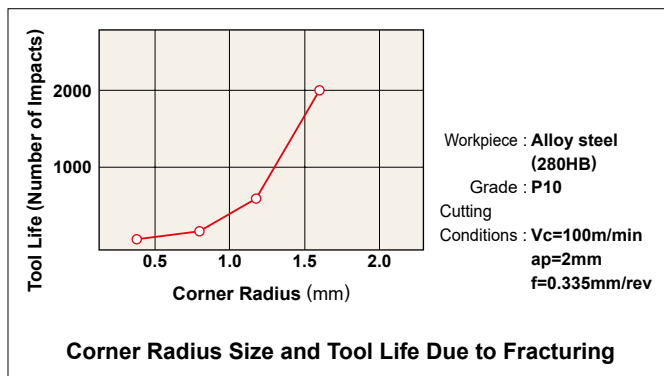
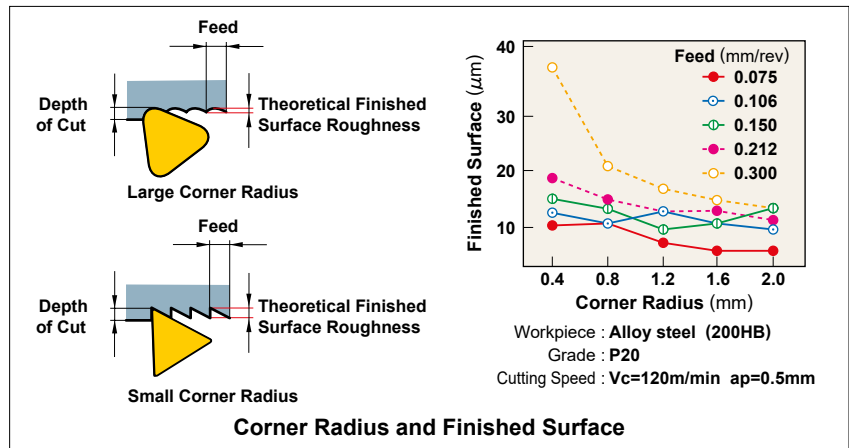
- Hard workpieces.
- When cutting edge strength is required for uncut surfaces and interrupted cutting.
- When the machine has high rigidity.

Note 1) Cemented carbide, UTi, coated diamond and indexable cermet inserts have round honing as standard already.

# FUNCTION OF TOOL FEATURES FOR TURNING

## ■ RADIUS

Radius effects the cutting edge strength and finished surface. In general, a corner radius 2–3 times the feed is recommended.



## ● Effects of Corner Radius

1. Increasing the corner radius improves the surface finish.
2. Increasing the corner radius improves cutting edge strength.
3. Increasing the corner radius too much increases the cutting resistance and causes chattering.
4. Increasing the corner radius decreases flank and rake wear.
5. Increasing the corner radius too much results in poor chip control.

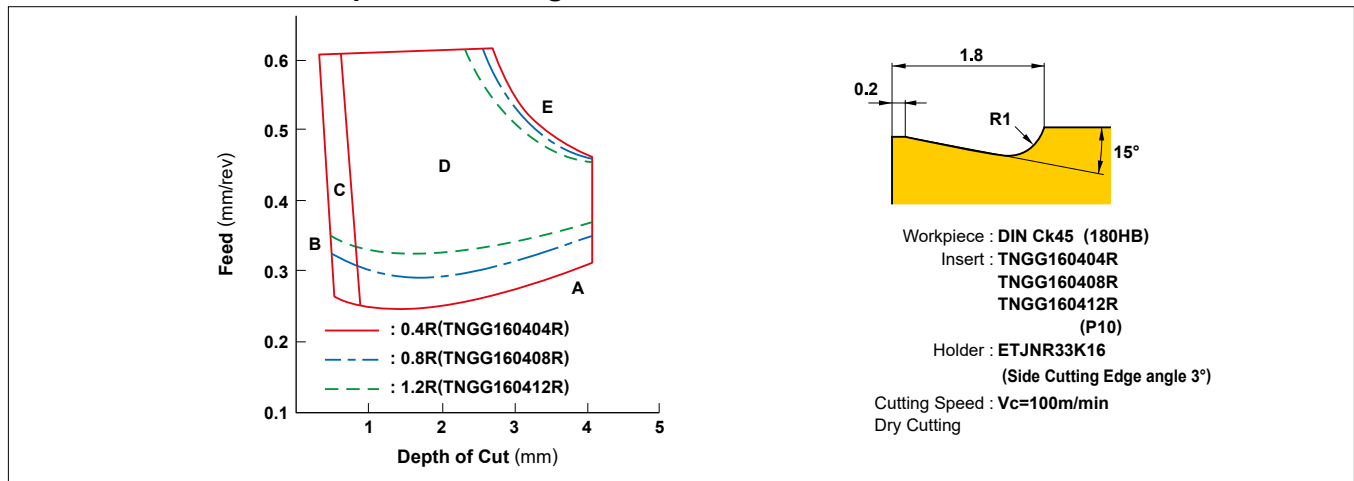
### When to Decrease Corner Radius

- Finishing with small depth of cut.
- Thin, long workpieces.
- When the machine has poor rigidity.

### When to Increase Corner Radius

- When cutting edge strength is required for interrupted cutting and uncut surface cutting.
- When roughing a workpiece with a large diameter.
- When the machine has high rigidity.

## ● Corner Radius and Chip Control Range



Note 1) Please refer to page P008 for chip shapes (A, B, C, D, E).



# FORMULAE FOR CUTTING POWER

## ■ CUTTING POWER (Pc)

$$P_c = \frac{a_p \cdot f \cdot V_c \cdot K_c}{60 \times 10^3 \times \eta} \text{ (kW)}$$

**P<sub>c</sub> (kW)** : Actual Cutting Power  
**f (mm/rev)** : Feed per Revolution  
**K<sub>c</sub> (MPa)** : Specific Cutting Force

**a<sub>p</sub> (mm)** : Depth of Cut  
**V<sub>c</sub> (m/min)** : Cutting Speed  
**η** : (Machine Coefficient)

(Example) What is the cutting power required for machining mild steel at cutting speed 120m/min with depth of cut 3mm and feed 0.2mm/rev (Machine coefficient 80%) ?  
 (Answer) Substitute the specific cutting force K<sub>c</sub>=3100MPa into the formula.

$$P_c = \frac{3 \times 0.2 \times 120 \times 3100}{60 \times 10^3 \times 0.8} = 4.65 \text{ (kW)}$$

### ● K<sub>c</sub>

| Material                       | Tensile Strength(MPa) and Hardness | Specific Cutting Force K <sub>c</sub> (MPa) |              |              |              |              |
|--------------------------------|------------------------------------|---------------------------------------------|--------------|--------------|--------------|--------------|
|                                |                                    | 0.1 (mm/rev)                                | 0.2 (mm/rev) | 0.3 (mm/rev) | 0.4 (mm/rev) | 0.6 (mm/rev) |
| Mild Steel                     | 520                                | 3610                                        | 3100         | 2720         | 2500         | 2280         |
| Medium Steel                   | 620                                | 3080                                        | 2700         | 2570         | 2450         | 2300         |
| Hard Steel                     | 720                                | 4050                                        | 3600         | 3250         | 2950         | 2640         |
| Tool Steel                     | 670                                | 3040                                        | 2800         | 2630         | 2500         | 2400         |
| Tool Steel                     | 770                                | 3150                                        | 2850         | 2620         | 2450         | 2340         |
| Chrome Manganese Steel         | 770                                | 3830                                        | 3250         | 2900         | 2650         | 2400         |
| Chrome Manganese Steel         | 630                                | 4510                                        | 3900         | 3240         | 2900         | 2630         |
| Chrome Molybdenum Steel        | 730                                | 4500                                        | 3900         | 3400         | 3150         | 2850         |
| Chrome Molybdenum Steel        | 600                                | 3610                                        | 3200         | 2880         | 2700         | 2500         |
| Nickel Chrome Molybdenum Steel | 900                                | 3070                                        | 2650         | 2350         | 2200         | 1980         |
| Nickel Chrome Molybdenum Steel | 352HB                              | 3310                                        | 2900         | 2580         | 2400         | 2200         |
| Hard Cast Iron                 | 46HRC                              | 3190                                        | 2800         | 2600         | 2450         | 2270         |
| Meehanite Cast Iron            | 360                                | 2300                                        | 1930         | 1730         | 1600         | 1450         |
| Grey Cast Iron                 | 200HB                              | 2110                                        | 1800         | 1600         | 1400         | 1330         |

## ■ CUTTING SPEED (V<sub>c</sub>)

$$V_c = \frac{\pi \cdot D_m \cdot n}{1000} \text{ (m/min)}$$

**V<sub>c</sub> (m/min)** : Cutting Speed  
**D<sub>m</sub> (mm)** : Workpiece Diameter  
**π (3.14)** : Pi  
**n (min<sup>-1</sup>)** : Main Axis Spindle Speed

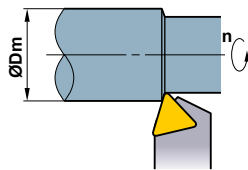
\*Divide by 1000 to change to m from mm.

(Example) What is the cutting speed when main axis spindle speed is 700min<sup>-1</sup> and external diameter is φ50 ?

(Answer) Substitute π=3.14, D<sub>m</sub>=50, n=700 into the formula.

$$V_c = \frac{\pi \cdot D_m \cdot n}{1000} = \frac{3.14 \times 50 \times 700}{1000} = 110 \text{ m/min}$$

Cutting speed is 110m/min.



## ■ FEED (f)

$$f = \frac{l}{n} \text{ (mm/rev)}$$

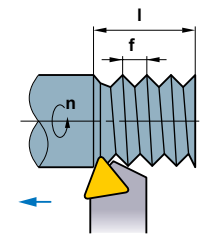
**f (mm/rev)** : Feed per Revolution  
**l (mm/min)** : Cutting Length per Min.  
**n (min<sup>-1</sup>)** : Main Axis Spindle Speed

(Example) What is the feed per revolution when main axis spindle speed is 500min<sup>-1</sup> and cutting length per minute is 120mm/min ?

(Answer) Substitute n=500, l=120 into the formula.

$$f = \frac{l}{n} = \frac{120}{500} = 0.24 \text{ mm/rev}$$

The answer is 0.24mm/rev.



## ■ CUTTING TIME (T<sub>c</sub>)

$$T_c = \frac{l_m}{f} \text{ (min)}$$

**T<sub>c</sub> (min)** : Cutting Time  
**l<sub>m</sub> (mm)** : Workpiece Length  
**f (mm/min)** : Cutting Length per Min.

(Example) What is the cutting time when 100mm workpiece is machined at 1000min<sup>-1</sup> with feed = 0.2mm/rev ?

(Answer) First, calculate the cutting length per min. from the feed and spindle speed.

$$l = f \times n = 0.2 \times 1000 = 200 \text{ mm/min}$$

Substitute the answer above into the formula.

$$T_c = \frac{l_m}{f} = \frac{100}{200} = 0.5 \text{ min}$$

0.5 x 60=30 (sec.) The answer is 30 sec.

## ■ THEORETICAL FINISHED SURFACE ROUGHNESS (h)

$$h = \frac{f^2}{8RE} \times 1000 (\mu\text{m})$$

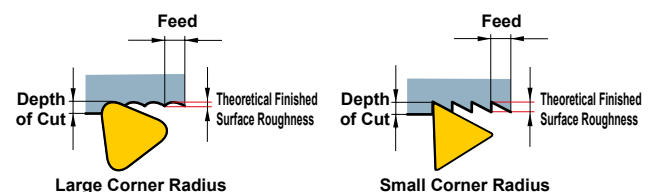
**h (μm)** : Finished Surface Roughness  
**f (mm/rev)** : Feed per Revolution  
**RE (mm)** : Insert Corner Radius

(Example) What is the theoretical finished surface roughness when the insert corner radius is 0.8mm and feed is 0.2mm/rev ?

(Answer) Substitute f=0.2mm/rev, RE=0.8 into the formula.

$$h = \frac{0.2^2}{8 \times 0.8} \times 1000 = 6.25 \mu\text{m}$$

The theoretical finished surface roughness is 6μm.

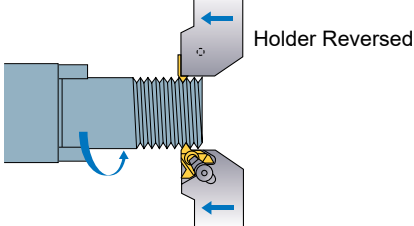
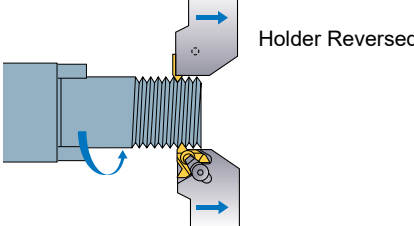
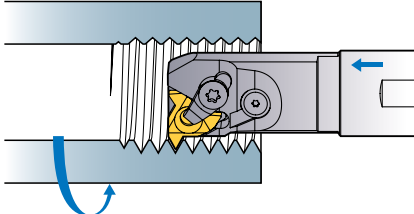
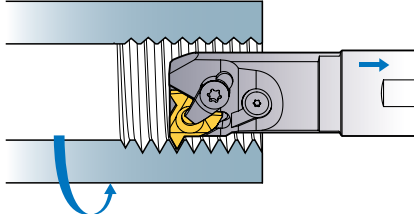


# TROUBLE SHOOTING FOR THREADING

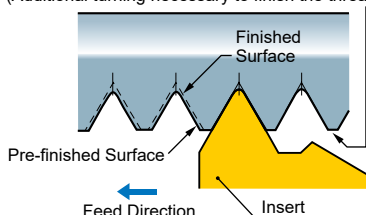
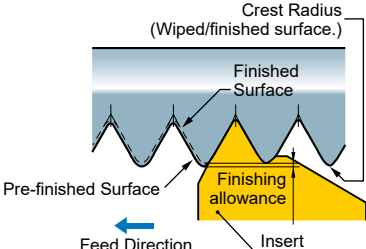
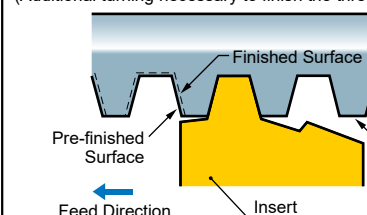
| Problems              | Observation                                                       | Causes                                                                      | Solutions                                                                                            |
|-----------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Low thread precision. | Threads do not mesh with each other.                              | Incorrect tool installation.                                                | Set the insert centre height at 0mm.                                                                 |
|                       |                                                                   |                                                                             | Check holder inclination (Lateral).                                                                  |
|                       | Shallow thread.                                                   | Incorrect depth of cut.                                                     | Modify the depth of cut.                                                                             |
|                       |                                                                   | Lack of insert wear or plastic deformation resistance.                      | Refer to "Quickly generated flank wear." and "Large plastic deformation." below.                     |
| Poor surface finish.  | Surface damage.                                                   | Chips wrap around or clog the work pieces.                                  | Change to flank infeed and control the chip discharge direction.                                     |
|                       |                                                                   |                                                                             | Change to an M-class insert with a 3-D chipbreaker.                                                  |
|                       |                                                                   | The side of the insert cutting edge interferes with the workpiece.          | Check the lead angle and select an appropriate shim.                                                 |
|                       | Surface tears.                                                    | Built-up edge (Welding).                                                    | Increase cutting speed.                                                                              |
|                       |                                                                   |                                                                             | Increase coolant pressure and volume.                                                                |
|                       |                                                                   | Cutting resistance too high.                                                | Decrease depth of cut per pass.                                                                      |
|                       | Surface vibrations.                                               | Cutting speed too high.                                                     | Decrease the cutting speed.                                                                          |
|                       |                                                                   | Insufficient work piece or tool clamping.                                   | Re-check work piece and tool clamping. (Chuck pressure, clamping allowance)                          |
|                       |                                                                   | Incorrect tool installation.                                                | Set the insert centre height at 0 mm.                                                                |
| Short tool life.      | Flank wear quickly generated.                                     | Cutting speed too high.                                                     | Decrease the cutting speed.                                                                          |
|                       |                                                                   | Too many passes causes abrasive wear.                                       | Reduce the number of passes.                                                                         |
|                       |                                                                   | Small depth of cut for the finishing pass.                                  | Do not re-cut at 0mm depth of cut, larger than 0.05mm depth of cut is recommended.                   |
|                       | Non-uniform wear of the right and left sides of the cutting edge. | The work piece lead angle and the tool lead angle do not match.             | Check the work piece lead angle and select an appropriate shim.                                      |
|                       | Chipping and fracture.                                            | Cutting speed too low.                                                      | Increase cutting speed.                                                                              |
|                       |                                                                   | Cutting resistance too high.                                                | Increase the number of passes and decrease the cutting resistance per pass.                          |
|                       |                                                                   | Unstable clamping.                                                          | Check work piece deflection.                                                                         |
|                       |                                                                   |                                                                             | Shorten tool overhang.                                                                               |
|                       |                                                                   |                                                                             | Re-check work piece and tool clamping. (Chuck pressure, clamping allowance)                          |
|                       |                                                                   | Chip packing.                                                               | Increase coolant pressure to blow away chips.                                                        |
|                       |                                                                   |                                                                             | Change the tool pass to control chips. (Lengthen each pass to allow the coolant to clear the chips.) |
|                       |                                                                   |                                                                             | Change from standard internal cutting to back turning to prevent chip jamming.                       |
|                       |                                                                   | Non-chamfered work pieces causes high resistance at the start of each pass. | Chamfer the workpiece entry and exit faces.                                                          |
|                       | Large plastic deformation.                                        | High cutting speed and large heat generation.                               | Decrease the cutting speed.                                                                          |
|                       |                                                                   | Lack of coolant supply.                                                     | Check coolant supply is sufficient.                                                                  |
|                       |                                                                   |                                                                             | Increase coolant pressure and volume.                                                                |
|                       |                                                                   | Cutting resistance too high.                                                | Increase the number of passes and decrease the cutting resistance per pass.                          |

# THREADING METHODS

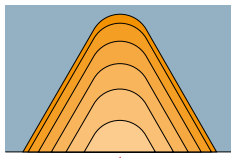
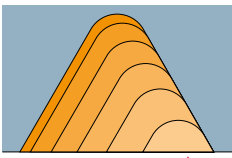
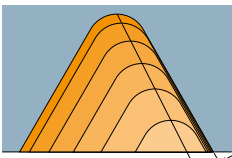
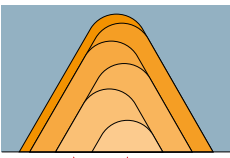
## THREADING METHODS

|          | Right Hand Thread                                                                                        | Left Hand Thread                                                                                           |
|----------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| EXTERNAL |  <p>Holder Reversed</p> |  <p>Holder Reversed</p> |
| INTERNAL |                         |                          |

## INSERT TYPES

| Partial Form                                                                                                                                                                                                                                                                       | Full Form                                                                                                                                                                                                                                                | Semi-Full Form (Trapezoidal threads only)                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>● The same insert can be used for a range of pitches.</li> <li>● Shorter tool life because the nose radius of the insert is smaller than that of the full form insert.</li> <li>● Finishing with another operation is necessary.</li> </ul> | <ul style="list-style-type: none"> <li>● No deburring needed after threading.</li> <li>● Requires different threading inserts.</li> </ul>                                                                                                                | <ul style="list-style-type: none"> <li>● No deburring needed after threading.</li> <li>● Requires different threading inserts.</li> <li>● Finishing with another operation is necessary.</li> </ul>                                                              |
| <p>Crest Radius<br/>(Additional turning necessary to finish the thread crest.)</p>  <p>Pre-finished Surface</p> <p>Finished Surface</p> <p>Feed Direction</p> <p>Insert</p>                     | <p>Crest Radius<br/>(Wiped/finished surface.)</p>  <p>Pre-finished Surface</p> <p>Finished Surface</p> <p>Feed Direction</p> <p>Insert</p> <p>Finishing allowance</p> | <p>Crest Radius<br/>(Additional turning necessary to finish the thread crest.)</p>  <p>Pre-finished Surface</p> <p>Finished Surface</p> <p>Feed Direction</p> <p>Insert</p> |

## INFEEED METHODS

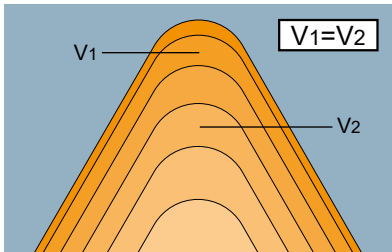
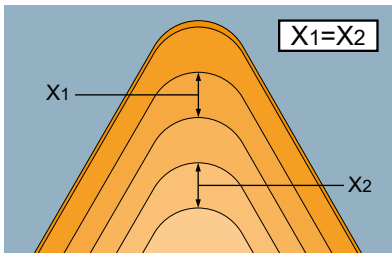
|               | Radial Infeed                                                                                                                                                                                                                                     | Flank Infeed                                                                                                                                                                                                                                                      | Modified Flank Infeed                                                                                                                                                                                                                                         | Incremental Infeed                                                                                                                                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Features      |  <p>Radial Infeed</p>                                                                                                                                          |  <p>Flank Infeed</p>                                                                                                                                                           |  <p>Modified Flank Infeed</p>                                                                                                                                             |  <p>Incremental Infeed</p>                                                                                                                      |
| Advantages    | <ul style="list-style-type: none"> <li>● Easiest to use. (Standard programme for threading)</li> <li>● Wide application. (Cutting conditions easy to change.)</li> <li>● Uniform wear of the right and left sides of the cutting edge.</li> </ul> | <ul style="list-style-type: none"> <li>● Relatively easy to use. (Semi-standard programme for threading.)</li> <li>● Reduced cutting force.</li> <li>● Suitable for large pitch threads or materials that peel easily.</li> <li>● Good chip discharge.</li> </ul> | <ul style="list-style-type: none"> <li>● Preventing flank wear on the right side of the cutting edge.</li> <li>● Reduced cutting force.</li> <li>● Suitable for large pitch threads or materials that peel easily.</li> <li>● Good chip discharge.</li> </ul> | <ul style="list-style-type: none"> <li>● Uniform flank wear of the right and left sides of the cutting edge.</li> <li>● Reduced cutting force.</li> <li>● Suitable for large pitch threads or materials that peel easily.</li> </ul> |
| Disadvantages | <ul style="list-style-type: none"> <li>● Difficult chip control.</li> <li>● Subject to vibration in the later in stages of cutting.</li> <li>● Ineffective for large pitch threading.</li> <li>● Heavy load on the nose radius.</li> </ul>        | <ul style="list-style-type: none"> <li>● Large flank wear on the right side of the cutting edge.</li> <li>● Relatively difficult to change cutting depth. (Re-programming necessary)</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>● Complex machining programming.</li> <li>● Difficult to change cutting depth. (Re-programming necessary)</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>● Complex machining programming.</li> <li>● Difficult to change cutting depth. (Re-programming necessary)</li> <li>● Difficult chip control.</li> </ul>                                       |

P

TECHNICAL DATA

# THREADING METHODS

## THREADING DEPTH

| Features                                                                                                     |                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                              | Advantages                                                                                                                                                                                                                                                                                           | Disadvantages                                                                                                                                                                                        |
|  <p>Fixed cut area</p>      | <ul style="list-style-type: none"> <li>● Easy to use. (Standard programme for threading.)</li> <li>● Superior resistance to vibration. (Constant cutting force.)</li> </ul>                                                                                                                          | <ul style="list-style-type: none"> <li>● Long chips generated during the final pass.</li> <li>● Complex calculation of cutting depth when changing the number of passes.</li> </ul>                  |
|  <p>Fixed cutting depth</p> | <ul style="list-style-type: none"> <li>● Reduced load on nose radius during the first half of the passes.</li> <li>● Easy chip control. (Optional setting of chip thickness)</li> <li>● Easy to calculate cutting depth when changing the number of passes.</li> <li>● Good chip control.</li> </ul> | <ul style="list-style-type: none"> <li>● Subject to vibration in the later stages of cutting. (Increased cutting force)</li> <li>● In some cases, changing the NC programme is necessary.</li> </ul> |

Note 1) It is recommended to set the depth of cut of the final pass to 0.05mm–0.025mm.  
Large cutting depths can cause vibration, leading to a poor surface finish.

## ■ FORMULAE

### ● Formulae to calculate infeed for each pass in a reduced series.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\Delta ap_n = \frac{ap}{\sqrt{n_{ap}-1}} \times \sqrt{b}$ <p> <math>\Delta ap_n</math> : Depth of cut<br/> <math>n</math> : Actual pass<br/> <math>ap</math> : Total depth of cut<br/> <math>n_{ap}</math> : Number of passes<br/> <math>b</math> : 1st pass 0.3<br/>                   2nd pass 2–1 = 1<br/>                   3rd pass 3–1 = 2<br/>                   .<br/>                   .<br/>                   nth pass n–1       </p> | <p>(Example)<br/>External threading (ISO Metric)<br/>Pitch : 1.0mm<br/>ap : 0.6mm<br/>nap : 5 passes</p> <p>1st Pass <math>\Delta ap_1 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{0.3} = 0.16 \rightarrow \mathbf{0.16} (\Delta ap_1)</math></p> <p>2nd Pass <math>\Delta ap_2 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{2-1} = 0.3 \rightarrow \mathbf{0.14} (\Delta ap_2 - \Delta ap_1)</math></p> <p>3rd Pass <math>\Delta ap_3 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{3-1} = 0.42 \rightarrow \mathbf{0.12} (\Delta ap_3 - \Delta ap_2)</math></p> <p>4th Pass <math>\Delta ap_4 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{4-1} = 0.52 \rightarrow \mathbf{0.1} (\Delta ap_4 - \Delta ap_3)</math></p> <p>5th Pass <math>\Delta ap_5 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{5-1} = 0.6 \rightarrow \mathbf{0.08} (\Delta ap_5 - \Delta ap_4)</math></p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## ■ NC PROGRAMME FOR MODIFIED FLANK INFEEED

### ● Example: M12×1.0 5 passes modified 5°

| External Threading                                                                                                                                                                                                       | Internal Threading                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G00 Z = 5.0<br>X = 14.0<br>G92 U–4.34 Z–13.0 F1.0<br>G00 W–0.07<br>G92 U–4.64 Z–13.0 F1.0<br>G00 W–0.06<br>G92 U–4.88 Z–13.0 F1.0<br>G00 W–0.05<br>G92 U–5.08 Z–13.0 F1.0<br>G00 W–0.03<br>G92 U–5.20 Z–13.0 F1.0<br>G00 | G00 Z = 5.0<br>X = 10.0<br>G92 U4.34 Z–13.0 F1.0<br>G00 W–0.07<br>G92 U4.64 Z–13.0 F1.0<br>G00 W–0.05<br>G92 U4.84 Z–13.0 F1.0<br>G00 W–0.04<br>G92 U5.02 Z–13.0 F1.0<br>G00 W–0.03<br>G92 U5.14 Z–13.0 F1.0<br>G00 |

## SELECTING CUTTING CONDITIONS

|                   |                     | Priority       |               |                |                     |                 |                                |
|-------------------|---------------------|----------------|---------------|----------------|---------------------|-----------------|--------------------------------|
|                   |                     | Tool Life      | Cutting Force | Surface Finish | Precision of Thread | Chips Discharge | Efficiency<br>(Reduced Passes) |
| Threading Methods | Radial              | ○              |               | ○              | ○                   |                 | ○                              |
|                   | Flank               | (△ : Modified) | ○             | (△ : Modified) |                     | ○               |                                |
| Cutting Depth     | Fixed Cutting Depth |                |               |                |                     | ○               |                                |
|                   | Fixed Cut Area      | ○              | ○             | ○              | ○                   |                 | ○                              |

Note 1) Tool life and surface finish accuracy can be increased by changing the threading method from flank infeed to modified flank infeed.  
Chip control can be improved by increasing the cutting depth in the later half of passes.

## CUTTING DEPTH AND THE NUMBER OF PASSES

- **Selection of the appropriate cutting depth and the right number of passes is vital for threading.**
  - For most threading, use a "threading cycle program," which has originally been installed on machines, and specify "total cutting depth" and "cutting depth in the first or final pass."
  - Cutting depth and the number of passes are easy to change for the radial infeed method, thus making it easy to determine the appropriate cutting conditions.

## FEATURES AND BENEFITS OF MITSUBISHI MATERIALS PRODUCTS

- Insert grades with high wear and plastic deformation resistance, specially produced for threading tools, ensure highly efficient cutting by enabling high-speed machining and a reduced number of passes.



**Machining Cost Reduction**

## ADVICE ON IMPROVED THREADING

- **Increasing tool life**
  - To prevent damage to the nose radius - Recommended method - Modified flank infeed
  - To have uniform flank wear on both sides of a cutting edge - Recommended method - Radial infeed
  - To prevent crater wear - Recommended method - Flank infeed
- **Preventing chip problems**
  - Change to flank or modified infeed.
  - During radial infeed cutting, use an inverted holder and change the coolant supply to a downward direction.
  - When using the radial infeed method, set the minimum cutting depth at around 0.2mm to make the chips thicker.
- **To achieve highly efficient machining**
  - Increase cutting speed. (Dependant on the maximum revolution and rigidity of the machine.)
  - Reduce the number of passes. (Reduce by 30-40%.)
  - A reduced number of passes can improve chip discharge because of the thicker chips generated.
- **Preventing vibration**
  - Change to flank or modified infeed.
  - When using radial infeed, reduce cutting depth in the later half of passes and lower the cutting speed.
- **Increased surface finish accuracy**
  - A final wiping pass should be performed at the same depth of cut as the last regular pass.
  - When using the flank infeed method, change to radial infeed only during the final pass.

# METALLIC MATERIALS CROSS REFERENCE LIST

## ■ CARBON STEEL

| Germany |          | U.K.      |     | France    | Italy      | Spain             | Sweden | Japan                | USA      | China |
|---------|----------|-----------|-----|-----------|------------|-------------------|--------|----------------------|----------|-------|
| W-nr.   | DIN      | BS        | EN  | AFNOR     | UNI        | UNE               | SS     | JIS                  | AISI/SAE | GB    |
| 1.0038  | RSt.37-2 | 4360 40 C | —   | E 24-2 Ne | —          | —                 | 1311   | STKM 12A<br>STKM 12C | A570.36  | 15    |
| 1.0401  | C15      | 080M15    | —   | CC12      | C15, C16   | F.111             | 1350   | —                    | 1015     | 15    |
| 1.0402  | C22      | 050A20    | 2C  | CC20      | C20, C21   | F.112             | 1450   | —                    | 1020     | 20    |
| 1.0715  | 9SMn28   | 230M07    | 1A  | S250      | CF9SMn28   | F.2111<br>11SMn28 | 1912   | SUM22                | 1213     | Y15   |
| 1.0718  | 9SMnPb28 | —         | —   | S250Pb    | CF9SMnPb28 | 11SMnPb28         | 1914   | SUM22L               | 12L13    | —     |
| 1.0722  | 10SPb20  | —         | —   | 10PbF2    | CF10Pb20   | 10SPb20           | —      | —                    | —        | —     |
| 1.0736  | 9SMn36   | 240M07    | 1B  | S300      | CF9SMn36   | 12SMn35           | —      | —                    | 1215     | Y13   |
| 1.0737  | 9SMnPb36 | —         | —   | S300Pb    | CF9SMnPb36 | 12SMnP35          | 1926   | —                    | 12L14    | —     |
| 1.1141  | Ck15     | 080M15    | 32C | XC12      | C16        | C15K              | 1370   | S15C                 | 1015     | 15    |
| 1.1158  | Ck25     | —         | —   | —         | —          | —                 | —      | S25C                 | 1025     | 25    |
| 1.8900  | StE380   | 4360 55 E | —   | —         | FeE390KG   | —                 | 2145   | —                    | A572-60  | —     |
| 1.0501  | C35      | 060A35    | —   | CC35      | C35        | F.113             | 1550   | —                    | 1035     | 35    |
| 1.0503  | C45      | 080M46    | —   | CC45      | C45        | F.114             | 1650   | —                    | 1045     | 45    |
| 1.0726  | 35S20    | 212M36    | 8M  | 35MF4     | —          | F210G             | 1957   | —                    | 1140     | —     |
| 1.1157  | 40Mn4    | 150M36    | 15  | 35M5      | —          | —                 | —      | —                    | 1039     | 40Mn  |
| 1.1167  | 36Mn5    | —         | —   | 40M5      | —          | 36Mn5             | 2120   | SMn438(H)            | 1335     | 35Mn2 |
| 1.1170  | 28Mn6    | 150M28    | 14A | 20M5      | C28Mn      | —                 | —      | SCMn1                | 1330     | 30Mn  |
| 1.1183  | Cf35     | 060A35    | —   | XC38TS    | C36        | —                 | 1572   | S35C                 | 1035     | 35Mn  |
| 1.1191  | Ck45     | 080M46    | —   | XC42      | C45        | C45K              | 1672   | S45C                 | 1045     | Ck45  |
| 1.1213  | C50      | 060A52    | —   | XC48TS    | C53        | —                 | 1674   | S50C                 | 1050     | 50    |
| 1.0535  | C55      | 070M55    | 9   | —         | C55        | —                 | 1655   | —                    | 1055     | 55    |
| 1.0601  | C60      | 080A62    | 43D | CC55      | C60        | —                 | —      | —                    | 1060     | 60    |
| 1.1203  | Ck55     | 070M55    | —   | XC55      | C50        | C55K              | —      | S55C                 | 1055     | 55    |
| 1.1221  | Ck60     | 080A62    | 43D | XC60      | C60        | —                 | 1678   | S58C                 | 1060     | 60Mn  |
| 1.1274  | Ck101    | 060A96    | —   | XC100     | —          | F.5117            | 1870   | —                    | 1095     | —     |
| 1.1545  | C105W1   | BW1A      | —   | Y105      | C36KU      | F.5118            | 1880   | SK3                  | W1       | —     |
| 1.1545  | C105W1   | BW2       | —   | Y120      | C120KU     | F.515             | 2900   | SUP4                 | W210     | —     |

## ■ ALLOY STEEL

| Germany |            | U.K.         |      | France | Italy              | Spain      | Sweden | Japan                    | USA           | China     |
|---------|------------|--------------|------|--------|--------------------|------------|--------|--------------------------|---------------|-----------|
| W-nr.   | DIN        | BS           | EN   | AFNOR  | UNI                | UNE        | SS     | JIS                      | AISI/SAE      | GB        |
| 1.0144  | St.44.2    | 4360 43 C    | —    | E28-3  | —                  | —          | 1412   | SM400A, SM400B<br>SM400C | A573-81       | —         |
| 1.0570  | St52-3     | 4360 50 B    | —    | E36-3  | Fe52BFN<br>Fe52CFN | —          | 2132   | SM490A, SM490B<br>SM490C | —             | —         |
| 1.0841  | St52-3     | 150M19       | —    | 20MC5  | Fe52               | F.431      | 2172   | —                        | 5120          | —         |
| 1.0904  | 55Si7      | 250A53       | 45   | 55S7   | 55Si8              | 56Si7      | 2085   | —                        | 9255          | 55Si2Mn   |
| 1.0961  | 60SiCr7    | —            | —    | 60SC7  | 60SiCr8            | 60SiCr8    | —      | —                        | 9262          | —         |
| 1.3505  | 100Cr6     | 534A99       | 31   | 100C6  | 100Cr6             | F.131      | 2258   | SUJ2                     | ASTM 52100    | Gr15, 45G |
| 1.5415  | 15Mo3      | 1501-240     | —    | 15D3   | 16Mo3KW            | 16Mo3      | 2912   | —                        | ASTM A204Gr.A | —         |
| 1.5423  | 16Mo5      | 1503-245-420 | —    | —      | 16Mo5              | 16Mo5      | —      | —                        | 4520          | —         |
| 1.5622  | 14Ni6      | —            | —    | 16N6   | 14Ni6              | 15Ni6      | —      | —                        | ASTM A350LF5  | —         |
| 1.5662  | X8Ni9      | 1501-509-510 | —    | —      | X10Ni9             | XBNI09     | —      | —                        | ASTM A353     | —         |
| 1.5710  | 36NiCr6    | 640A35       | 111A | 35NC6  | —                  | —          | —      | SNC236                   | 3135          | —         |
| 1.5732  | 14NiCr10   | —            | —    | 14NC11 | 16NiCr11           | 15NiCr11   | —      | SNC415(H)                | 3415          | —         |
| 1.5752  | 14NiCr14   | 655M13       | 36A  | 12NC15 | —                  | —          | —      | SNC815(H)                | 3415, 3310    | —         |
| 1.6523  | 21NiCrMo2  | 805M20       | 362  | 20NCD2 | 20NiCrMo2          | 20NiCrMo2  | 2506   | SNCM220(H)               | 8620          | —         |
| 1.6546  | 40NiCrMo22 | 311-Type 7   | —    | —      | 40NiCrMo2(KB)      | 40NiCrMo2  | —      | SNCM240                  | 8740          | —         |
| 1.6587  | 17CrNiMo6  | 820A16       | —    | 18NCD6 | —                  | 14NiCrMo13 | —      | —                        | —             | —         |
| 1.7015  | 15Cr3      | 523M15       | —    | 12C3   | —                  | —          | —      | SCr415(H)                | 5015          | 15Cr      |

| Germany |                          | U.K.                 |     | France             | Italy                        | Spain       | Sweden | Japan               | USA                   | China              |
|---------|--------------------------|----------------------|-----|--------------------|------------------------------|-------------|--------|---------------------|-----------------------|--------------------|
| W-nr.   | DIN                      | BS                   | EN  | AFNOR              | UNI                          | UNE         | SS     | JIS                 | AISI/SAE              | GB                 |
| 1.7045  | 42Cr4                    | –                    | –   | –                  | –                            | 42Cr4       | 2245   | SCr440              | 5140                  | 40Cr               |
| 1.7176  | 55Cr3                    | 527A60               | 48  | 55C3               | –                            | –           | –      | SUP9(A)             | 5155                  | 20CrMn             |
| 1.7262  | 15CrMo5                  | –                    | –   | 12CD4              | –                            | 12CrMo4     | 2216   | SCM415(H)           | –                     | –                  |
| 1.7335  | 13CrMo4 4                | 1501-620Gr27         | –   | 15CD3.5<br>15CD4.5 | 14CrMo45                     | 14CrMo45    | –      | –                   | ASTM A182<br>F11, F12 | –                  |
| 1.7380  | 10CrMo910                | 1501-622<br>Gr31, 45 | –   | 12CD9<br>12CD10    | 12CrMo9<br>12CrMo10          | TU.H        | 2218   | –                   | ASTM A182<br>F.22     | –                  |
| 1.7715  | 14MoV63                  | 1503-660-440         | –   | –                  | –                            | 13MoCrV6    | –      | –                   | –                     | –                  |
| 1.8523  | 39CrMoV13 9              | 897M39               | 40C | –                  | 36CrMoV12                    | –           | –      | –                   | –                     | –                  |
| 1.6511  | 36CrNiMo4                | 816M40               | 110 | 40NCD3             | 38NiCrMo4(KB)                | 35NiCrMo4   | –      | –                   | 9840                  | –                  |
| 1.6582  | 34CrNiMo6                | 817M40               | 24  | 35NCD6             | 35NiCrMo6(KB)                | –           | 2541   | –                   | 4340                  | 40CrNiMoA          |
| 1.7033  | 34Cr4                    | 530A32               | 18B | 32C4               | 34Cr4(KB)                    | 35Cr4       | –      | SCr430(H)           | 5132                  | 35Cr               |
| 1.7035  | 41Cr4                    | 530M40               | 18  | 42C4               | 41Cr4                        | 42Cr4       | –      | SCr440(H)           | 5140                  | 40Cr               |
| 1.7131  | 16MnCr5                  | (527M20)             | –   | 16MC5              | 16MnCr5                      | 16MnCr5     | 2511   | –                   | 5115                  | 18CrMn             |
| 1.7218  | 25CrMo4                  | 1717CDS110<br>708M20 | –   | 25CD4              | 25CrMo4(KB)                  | 55Cr3       | 2225   | SCM420<br>SCM430    | 4130                  | 30CrMn             |
| 1.7220  | 34CrMo4                  | 708A37               | 19B | 35CD4              | 35CrMo4                      | 34CrMo4     | 2234   | SCM432<br>SCCRM3    | 4137<br>4135          | 35CrMo             |
| 1.7223  | 41CrMo4                  | 708M40               | 19A | 42CD4TS            | 41CrMo4                      | 42CrMo4     | 2244   | SCM 440             | 4140<br>4142          | 40CrMoA            |
| 1.7225  | 42CrMo4                  | 708M40               | 19A | 42CD4              | 42CrMo4                      | 42CrMo4     | 2244   | SCM440(H)           | 4140                  | 42CrMo<br>42CrMnMo |
| 1.7361  | 32CrMo12                 | 722M24               | 40B | 30CD12             | 32CrMo12                     | F.124.A     | 2240   | –                   | –                     | –                  |
| 1.8159  | 50CrV4                   | 735A50               | 47  | 50CV4              | 50CrV4                       | 51CrV4      | 2230   | SUP10               | 6150                  | 50CrVA             |
| 1.8509  | 41CrAlMo7                | 905M39               | 41B | 40CAD6<br>40CAD2   | 41CrAlMo7                    | 41CrAlMo7   | 2940   | –                   | –                     | –                  |
| 1.2067  | 100Cr6                   | BL3                  | –   | Y100C6             | –                            | 100Cr6      | –      | –                   | L3                    | CrV, 9SiCr         |
| 1.2419  | 105WCr6                  | –                    | –   | 105WC13            | 100WCr6<br>107WCr5KU         | 105WCr5     | 2140   | SKS31<br>SKS2, SKS3 | –                     | CrWMo              |
| 1.2713  | 55NiCrMoV6               | BH224/5              | –   | 55NCDV7            | –                            | F.520.S     | –      | SKT4                | L6                    | 5CrNiMo            |
| 1.5662  | X8Ni9                    | 1501-509             | –   | –                  | X10Ni9                       | XBNI09      | –      | –                   | ASTM A353             | –                  |
| 1.5680  | 12Ni19                   | –                    | –   | Z18N5              | –                            | –           | –      | –                   | 2515                  | –                  |
| 1.6657  | 14NiCrMo134              | 832M13               | 36C | –                  | 15NiCrMo13                   | 14NiCrMo131 | –      | –                   | –                     | –                  |
| 1.2080  | X210Cr12                 | BD3                  | –   | Z200C12            | X210Cr13KU<br>X250Cr12KU     | X210Cr12    | –      | SKD1                | D3<br>ASTM D3         | Cr12               |
| 1.2601  | X153CrMoV12              | BD2                  | –   | –                  | X160CrMoV12                  | –           | –      | SKD11               | D2                    | Cr12MoV            |
| 1.2363  | X100CrMoV5               | BA2                  | –   | Z100CDV5           | X100CrMoV5                   | F.5227      | 2260   | SKD12               | A2                    | Cr5Mo1V            |
| 1.2344  | X40CrMoV51<br>X40CrMoV51 | BH13                 | –   | Z40CDV5            | X35CrMoV05KU<br>X40CrMoV51KU | X40CrMoV5   | 2242   | SKD61               | H13<br>ASTM H13       | 40CrMoV5           |
| 1.2436  | X210CrW12                | –                    | –   | –                  | X215CrW121KU                 | X210CrW12   | 2312   | SKD2                | –                     | –                  |
| 1.2542  | 45WCrV7                  | BS1                  | –   | –                  | 45WCrV8KU                    | 45WCrSi8    | 2710   | –                   | S1                    | –                  |
| 1.2581  | X30WCrV93                | BH21                 | –   | Z30WCV9            | X28W09KU                     | X30WCrV9    | –      | SKD5                | H21                   | 30WCrV9            |
| 1.2601  | X165CrMoV12              | –                    | –   | –                  | X165CrMoV12KU                | X160CrMoV12 | 2310   | –                   | –                     | –                  |
| 1.2833  | 100V1                    | BW2                  | –   | Y1105V             | –                            | –           | –      | SKS43               | W210                  | V                  |
| 1.3255  | S 18-1-2-5               | BT4                  | –   | Z80WKCV            | X78WCo1805KU                 | HS18-1-1-5  | –      | SKH3                | T4                    | W18Cr4VCo5         |
| 1.3355  | S 18-0-1                 | BT1                  | –   | Z80WCV             | X75W18KU                     | HS18-0-1    | –      | SKH2                | T1                    | –                  |
| 1.3401  | G-X120Mn12               | Z120M12              | –   | Z120M12            | XG120Mn12                    | X120MN12    | –      | SCMnH/1             | –                     | –                  |
| 1.4718  | X45CrSi93                | 401S45               | 52  | Z45CS9             | X45CrSi8                     | F.322       | –      | SUH1                | HW3                   | X45CrSi93          |
| 1.3343  | S6-5-2                   | 4959BA2              | –   | Z40CSD10           | 15NiCrMo13                   | –           | 2715   | SUH3                | D3                    | –                  |
| 1.3343  | S6/5/2                   | BM2                  | –   | Z85WDCV            | HS6-5-2-2                    | F.5603      | 2722   | SKH9, SKH51         | M2                    | –                  |
| 1.3348  | S 2-9-2                  | –                    | –   | –                  | HS2-9-2                      | HS2-9-2     | 2782   | –                   | M7                    | –                  |
| 1.3243  | S6/5/2/5                 | BM35                 | –   | 6-5-2-5            | HS6-5-2-5                    | F.5613      | 2723   | SKH55               | M35                   | –                  |



# METALLIC MATERIALS CROSS REFERENCE LIST

## ■ STAINLESS STEEL (FERRITIC, MARTENSITIC)

| Germany |               | U.K.   |     | France           | Italy         | Spain  | Sweden | Japan    | USA      | China          |
|---------|---------------|--------|-----|------------------|---------------|--------|--------|----------|----------|----------------|
| W-nr.   | DIN           | BS     | EN  | AFNOR            | UNI           | UNE    | SS     | JIS      | AISI/SAE | GB             |
| 1.4000  | X7Cr13        | 403S17 | –   | Z6C13            | X6Cr13        | F.3110 | 2301   | SUS403   | 403      | OCr13<br>1Cr12 |
| 1.4001  | X7Cr14        | –      | –   | –                | –             | F.8401 | –      | –        | –        | –              |
| 1.4005  | X12CrS13      | 416S21 | –   | Z11CF13          | X12CrS13      | F.3411 | 2380   | SUS416   | 416      | –              |
| 1.4006  | X10Cr13       | 410S21 | 56A | Z10C14           | X12Cr13       | F.3401 | 2302   | SUS410   | 410      | 1Cr13          |
| 1.4016  | X8Cr17        | 430S15 | 60  | Z8C17            | X8Cr17        | F.3113 | 2320   | SUS430   | 430      | 1Cr17          |
| 1.4027  | G-X20Cr14     | 420C29 | 56B | Z20C13M          | –             | –      | –      | SCS2     | –        | –              |
| 1.4034  | X46Cr13       | 420S45 | 56D | Z40CM<br>Z38C13M | X40Cr14       | F.3405 | 2304   | SUS420J2 | –        | 4Cr13          |
| 1.4003  | –             | 405S17 | –   | Z8CA12           | X6CrAl13      | –      | –      | –        | 405      | –              |
| 1.4021  | –             | 420S37 | –   | Z8CA12           | X20Cr13       | –      | 2303   | –        | 420      | –              |
| 1.4057  | X22CrNi17     | 431S29 | 57  | Z15CNi6.02       | X16CrNi16     | F.3427 | 2321   | SUS431   | 431      | 1Cr17Ni2       |
| 1.4104  | X12CrMoS17    | –      | –   | Z10CF17          | X10CrS17      | F.3117 | 2383   | SUS430F  | 430F     | Y1Cr17         |
| 1.4113  | X6CrMo17      | 434S17 | –   | Z8CD17.01        | X8CrMo17      | –      | 2325   | SUS434   | 434      | 1Cr17Mo        |
| 1.4313  | X5CrNi134     | 425C11 | –   | Z4CND13.4M       | (G)X6CrNi304  | –      | 2385   | SCS5     | CA6-NM   | –              |
| 1.4724  | X10CrA113     | 403S17 | –   | Z10C13           | X10CrA112     | F.311  | –      | SUS405   | 405      | OCr13Al        |
| 1.4742  | X10CrA118     | 430S15 | 60  | Z10CAS18         | X8Cr17        | F.3113 | –      | SUS430   | 430      | Cr17           |
| 1.4747  | X80CrNiSi20   | 443S65 | 59  | Z80CSN20.02      | X80CrSiNi20   | F.320B | –      | SUH4     | HNv6     | –              |
| 1.4762  | X10CrA124     | –      | –   | Z10CAS24         | X16Cr26       | –      | 2322   | SUH446   | 446      | 2Cr25N         |
| 1.4871  | X53CrMnNiN219 | 349S54 | –   | Z52CMN21.09      | X53CrMnNiN219 | –      | –      | SUH35    | EV8      | 5Cr2Mn9Ni4N    |
| 1.4521  | X1CrMoTi182   | –      | –   | –                | –             | –      | 2326   | –        | S44400   | –              |
| 1.4922  | X20CrMoV12-1  | –      | –   | –                | X20CrMoNi1201 | –      | 2317   | –        | –        | –              |
| 1.4542  | –             | –      | –   | Z7CNU17-04       | –             | –      | –      | –        | 630      | –              |

## ■ STAINLESS STEEL (AUSTENITIC)

| Germany |                  | U.K.   |     | France        | Italy          | Spain                      | Sweden     | Japan            | USA            | China         |
|---------|------------------|--------|-----|---------------|----------------|----------------------------|------------|------------------|----------------|---------------|
| W-nr.   | DIN              | BS     | EN  | AFNOR         | UNI            | UNE                        | SS         | JIS              | AISI/SAE       | GB            |
| 1.4306  | X2CrNi1911       | 304S11 | –   | Z2CN18.10     | X2CrNi18.11    | –                          | 2352       | SUS304L          | 304L           | OCr19Ni10     |
| 1.4350  | X5CrNi189        | 304S11 | 58E | Z6CN18.09     | X5CrNi1810     | F.3551<br>F.3541<br>F.3504 | 2332       | SUS304           | 304            | OCr18Ni9      |
| 1.4305  | X12CrNiS188      | 303S21 | 58M | Z10CNF18.09   | X10CrNiS18.09  | F.3508                     | 2346       | SUS303           | 303            | 1Cr18Ni9MoZr  |
| –       | –                | 304C12 | –   | Z3CN19.10     | –              | –                          | 2333       | SUS304L          | –              | –             |
| 1.4306  | X2CrNi189        | 304S12 | –   | Z2CrNi1810    | X2CrNi18.11    | F.3503                     | 2352       | SCS19            | 304L           | –             |
| 1.4310  | X12CrNi177       | –      | –   | Z12CN17.07    | X12CrNi1707    | F.3517                     | 2331       | SUS301           | 301            | Cr17Ni7       |
| 1.4311  | X2CrNiN1810      | 304S62 | –   | Z2CN18.10     | –              | –                          | 2371       | SUS304LN         | 304LN          | –             |
| 1.4401  | X5CrNiMo1810     | 316S16 | 58J | Z6CND17.11    | X5CrNiMo1712   | F.3543                     | 2347       | SUS316           | 316            | OCr17Ni11Mo2  |
| 1.4308  | G-X6CrNi189      | 304C15 | –   | Z6CN18.10M    | –              | –                          | –          | SCS13            | –              | –             |
| 1.4408  | G-X6CrNiMo1810   | 316C16 | –   | –             | –              | F.8414                     | –          | SCS14            | –              | –             |
| 1.4581  | G-X5CrNiMoNb1810 | 318C17 | –   | Z4CNDNb1812M  | XG8CrNiMo1811  | –                          | –          | SCS22            | –              | –             |
| 1.4429  | X2CrNiMoN1813    | –      | –   | Z2CND17.13    | –              | –                          | 2375       | SUS316LN         | 316LN          | OCr17Ni13Mo   |
| 1.4404  | –                | 316S13 | –   | Z2CND17.12    | X2CrNiMo1712   | –                          | 2348       | –                | 316L           | –             |
| 1.4435  | X2CrNiMo1812     | 316S13 | –   | Z2CND17.12    | X2CrNiMo1712   | –                          | 2353       | SCS16<br>SUS316L | 316L           | OCr27Ni12Mo3  |
| 1.4436  | –                | 316S13 | –   | Z6CND18-12-03 | X8CrNiMo1713   | –                          | 2343, 2347 | –                | 316            | –             |
| 1.4438  | X2CrNiMo1816     | 317S12 | –   | Z2CND19.15    | X2CrNiMo1816   | –                          | 2367       | SUS317L          | 317L           | OCr19Ni13Mo   |
| 1.4539  | X1NiCrMo         | –      | –   | Z6CNT18.10    | –              | –                          | 2562       | –                | UNS V<br>0890A | –             |
| 1.4541  | X10CrNiTi189     | 321S12 | 58B | Z6CNT18.10    | X6CrNiTi1811   | F.3553<br>F.3523           | 2337       | SUS321           | 321            | 1Cr18Ni9Ti    |
| 1.4550  | X10CrNiNb189     | 347S17 | 58F | Z6CNNb18.10   | X6CrNiNb1811   | F.3552<br>F.3524           | 2338       | SUS347           | 347            | 1Cr18Ni11Nb   |
| 1.4571  | X10CrNiMoTi1810  | 320S17 | 58J | Z6CNDT17.12   | X6CrNiMoTi1712 | F.3535                     | 2350       | –                | 316Ti          | Cr18Ni12Mo2T  |
| 1.4583  | X10CrNiMoNb1812  | –      | –   | Z6CNDNb1713B  | X6CrNiMoNb1713 | –                          | –          | –                | 318            | Cr17Ni12Mo3Mb |

| Germany |               | U.K.    |          | France                              | Italy         | Spain  | Sweden       | Japan  | USA              | China      |
|---------|---------------|---------|----------|-------------------------------------|---------------|--------|--------------|--------|------------------|------------|
| W-nr.   | DIN           | BS      | EN       | AFNOR                               | UNI           | UNE    | SS           | JIS    | AISI/SAE         | GB         |
| 1.4828  | X15CrNiSi2012 | 309S24  | —        | Z15CNS20.12                         | X6CrNi2520    | —      | —            | SUH309 | 309              | 1Cr23Ni13  |
| 1.4845  | X12CrNi2521   | 310S24  | —        | Z12CN2520                           | X6CrNi2520    | F.331  | 2361         | SUH310 | 310S             | OCr25Ni20  |
| 1.4406  | X10CrNi18.08  | —       | 58C      | Z1NC DU25.20                        | —             | F.8414 | 2370         | SCS17  | 308              | —          |
| 1.4418  | X4CrNiMo165   | —       | —        | Z6CND16-04-01                       | —             | —      | —            | —      | —                | —          |
| 1.4568  | —             | 316S111 | —        | Z8CNA17-07                          | X2CrNiMo1712  | —      | —            | —      | 17-7PH           | —          |
| 1.4504  | —             | —       | —        | —                                   | —             | —      | —            | —      | —                | —          |
| 1.4563  | —             | —       | —        | Z1NC DU31-27-03<br>Z1CNDU20-18-06AZ | —             | —      | 2584<br>2378 | —      | NO8028<br>S31254 | —          |
| 1.4878  | X12CrNiTi189  | 321S32  | 58B, 58C | Z6CNT18.12B                         | X6CrNiTi18.11 | F.3523 | —            | SUS321 | 321              | 1Cr18Ni9Ti |

## ■ HEAT RESISTANT STEELS

| Germany |                 | U.K.   |    | France      | Italy        | Spain | Sweden | Japan  | USA       | China |
|---------|-----------------|--------|----|-------------|--------------|-------|--------|--------|-----------|-------|
| W-nr.   | DIN             | BS     | EN | AFNOR       | UNI          | UNE   | SS     | JIS    | AISI/SAE  | GB    |
| 1.4864  | X12NiCrSi3616   | —      | —  | Z12NCS35.16 | —            | —     | —      | SUH330 | 330       | —     |
| 1.4865  | G-X40NiCrSi3818 | 330C11 | —  | —           | XG50NiCr3919 | —     | —      | SCH15  | HT, HT 50 | —     |

## ■ GRAY CAST IRON

| Germany |             | U.K.        |    | France   | Italy | Spain | Sweden | Japan | USA         | China |
|---------|-------------|-------------|----|----------|-------|-------|--------|-------|-------------|-------|
| W-nr.   | DIN         | BS          | EN | AFNOR    | UNI   | UNE   | SS     | JIS   | AISI/SAE    | GB    |
| —       | —           | —           | —  | —        | —     | —     | 0100   | —     | —           | —     |
| —       | GG 10       | —           | —  | Ft 10 D  | —     | —     | 0110   | FC100 | No 20 B     | —     |
| 0.6015  | GG 15       | Grade 150   | —  | Ft 15 D  | G15   | FG15  | 0115   | FC150 | No 25 B     | HT150 |
| 0.6020  | GG 20       | Grade 220   | —  | Ft 20 D  | G20   | —     | 0120   | FC200 | No 30 B     | HT200 |
| 0.6025  | GG 25       | Grade 260   | —  | Ft 25 D  | G25   | FG25  | 0125   | FC250 | No 35 B     | HT250 |
| —       | —           | —           | —  | —        | —     | —     | —      | —     | No 40 B     | —     |
| 0.6030  | GG 30       | Grade 300   | —  | Ft 30 D  | G30   | FG30  | 0130   | FC300 | No 45 B     | HT300 |
| 0.6035  | GG 35       | Grade 350   | —  | Ft 35 D  | G35   | FG35  | 0135   | FC350 | No 50 B     | HT350 |
| 0.6040  | GG 40       | Grade 400   | —  | Ft 40 D  | —     | —     | 0140   | —     | No 55 B     | HT400 |
| 0.6660  | GGL NiCr202 | L-NiCuCr202 | —  | L-NC 202 | —     | —     | 0523   | —     | A436 Type 2 | —     |

## ■ DUCTILE CAST IRON

| Germany |             | U.K.       |    | France     | Italy     | Spain     | Sweden   | Japan  | USA       | China    |
|---------|-------------|------------|----|------------|-----------|-----------|----------|--------|-----------|----------|
| W-nr.   | DIN         | BS         | EN | AFNOR      | UNI       | UNE       | SS       | JIS    | AISI/SAE  | GB       |
| 0.7040  | GGG 40      | SNG 420/12 | —  | FCS 400-12 | GS 370-17 | FGE 38-17 | 07 17-02 | FCD400 | 60-40-18  | QT400-18 |
| —       | GGG 40.3    | SNG 370/17 | —  | FGS 370-17 | —         | —         | 07 17-12 | —      | —         | —        |
| 0.7033  | GGG 35.3    | —          | —  | —          | —         | —         | 07 17-15 | —      | —         | —        |
| 0.7050  | GGG 50      | SNG 500/7  | —  | FGS 500-7  | GS 500    | FGE 50-7  | 07 27-02 | FCD500 | 80-55-06  | QT500-7  |
| 0.7660  | GGG NiCr202 | Grade S6   | —  | S-NC202    | —         | —         | 07 76    | —      | A43D2     | —        |
| —       | GGG NiMn137 | L-NiMn 137 | —  | L-MN 137   | —         | —         | 07 72    | —      | —         | —        |
| —       | GGG 60      | SNG 600/3  | —  | FGS 600-3  | —         | —         | 07 32-03 | FCD600 | —         | QT600-3  |
| 0.7070  | GGG 70      | SNG 700/2  | —  | FGS 700-2  | GS 700-2  | FGE 70-2  | 07 37-01 | FCD700 | 100-70-03 | QT700-18 |

## ■ MALLEABLE CAST IRON

| Germany |           | U.K.     |    | France   | Italy  | Spain | Sweden | Japan   | USA        | China |
|---------|-----------|----------|----|----------|--------|-------|--------|---------|------------|-------|
| W-nr.   | DIN       | BS       | EN | AFNOR    | UNI    | UNE   | SS     | JIS     | AISI/SAE   | GB    |
| —       | —         | 8 290/6  | —  | MN 32-8  | —      | —     | 08 14  | FCMB310 | —          | —     |
| —       | GTS-35    | B 340/12 | —  | MN 35-10 | —      | —     | 08 15  | FCMW330 | 32510      | —     |
| 0.8145  | GTS-45    | P 440/7  | —  | Mn 450   | GMN45  | —     | 08 52  | FCMW370 | 40010      | —     |
| 0.8155  | GTS-55    | P 510/4  | —  | MP 50-5  | GMN55  | —     | 08 54  | FCMP490 | 50005      | —     |
| —       | GTS-65    | P 570/3  | —  | MP 60-3  | —      | —     | 08 58  | FCMP540 | 70003      | —     |
| 0.8165  | GTS-65-02 | P 570/3  | —  | Mn 650-3 | GMN 65 | —     | 08 56  | FCMP590 | A220-70003 | —     |
| —       | GTS-70-02 | P 690/2  | —  | Mn 700-2 | GMN 70 | —     | 08 62  | FCMP690 | A220-80002 | —     |

# SURFACE ROUGHNESS

## SURFACE ROUGHNESS

(From JIS B 0601-1994)

| Type                        | Code  | Determination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Determination Example (Figure)                                                                                                                                                                                                                                                                                                                      |
|-----------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arithmetical Mean Roughness | Ra    | <p>Ra means the value obtained by the following formula and expressed in micrometer (<math>\mu\text{m}</math>) when sampling only the reference length from the roughness curve in the direction of the mean line, taking X-axis in the direction of mean line and Y-axis in the direction of longitudinal magnification of this sampled part and the roughness curve is expressed by <math>y=f(x)</math>:</p> $Ra = \frac{1}{l} \int_0^l  f(x)  dx$                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                     |
| Maximum Height              | Rz    | <p>Rz shall be that only when the reference length is sampled from the roughness curve in the direction of the mean line, the distance between the top profile peak line and the bottom profile valley line on this sampled portion is measured in the longitudinal magnification direction of roughness curve and the obtained value is expressed in micrometer (<math>\mu\text{m}</math>).</p> <p>Note: When finding Rz, a portion without an exceptionally high peak or low valley, which may be regarded as a flaw, is selected as the sampling length.</p> $Rz = R_p + R_v$ |                                                                                                                                                                                                                                                                                                                                                     |
| Ten-Point Mean Roughness    | RzJIS | <p>RzJIS shall be that only when the reference length is sampled from the roughness curve in the direction of its mean line, the sum of the average value of absolute values of the heights of five highest profile peaks (Yp) and the depths of five deepest profile valleys (Yv) measured in the vertical magnification direction from the mean line of this sampled portion and this sum is expressed in micrometer (<math>\mu\text{m}</math>).</p> $RzJIS = \frac{(Y_{p1} + Y_{p2} + Y_{p3} + Y_{p4} + Y_{p5}) + (Y_{v1} + Y_{v2} + Y_{v3} + Y_{v4} + Y_{v5})}{5}$           | <p><math>Y_{p1}, Y_{p2}, Y_{p3}, Y_{p4}, Y_{p5}</math> : altitudes of the five highest profile peaks of the sampled portion corresponding to the reference length l.</p> <p><math>Y_{v1}, Y_{v2}, Y_{v3}, Y_{v4}, Y_{v5}</math> : altitudes of the five deepest profile valleys of the sampled portion corresponding to the reference length l.</p> |

## RELATIONSHIP BETWEEN ARITHMETICAL MEAN (Ra) AND CONVENTIONAL DESIGNATION (REFERENCE DATA)

| Arithmetical Mean Roughness<br>Ra |                         | Max. Height<br>Rz | Ten-Point Mean Roughness<br>RzJIS | Sampling Length for<br>Rz • RzJIS<br>l (mm) | Conventional Finish<br>Mark |
|-----------------------------------|-------------------------|-------------------|-----------------------------------|---------------------------------------------|-----------------------------|
| Standard Series                   | Cutoff Value<br>λc (mm) | Standard Series   |                                   |                                             |                             |
| 0.012 a                           | 0.08                    | 0.05s             | 0.05z                             | 0.08                                        | ▽▽▽▽                        |
| 0.025 a                           | 0.25                    | 0.1 s             | 0.1 z                             | 0.25                                        |                             |
| 0.05 a                            |                         | 0.2 s             | 0.2 z                             |                                             |                             |
| 0.1 a                             |                         | 0.4 s             | 0.4 z                             |                                             |                             |
| 0.2 a                             | 0.8                     | 0.8 s             | 0.8 z                             | 0.8                                         |                             |
| 0.4 a                             |                         | 1.6 s             | 1.6 z                             |                                             |                             |
| 0.8 a                             |                         | 3.2 s             | 3.2 z                             |                                             |                             |
| 1.6 a                             |                         | 6.3 s             | 6.3 z                             |                                             |                             |
| 3.2 a                             | 2.5                     | 12.5 s            | 12.5 z                            | 2.5                                         | ▽▽                          |
| 6.3 a                             |                         | 25 s              | 25 z                              |                                             |                             |
| 12.5 a                            | 8                       | 50 s              | 50 z                              | 8                                           | ▽                           |
| 25 a                              |                         | 100 s             | 100 z                             |                                             |                             |
| 50 a                              |                         | 200 s             | 200 z                             |                                             |                             |
| 100 a                             | —                       | 400 s             | 400 z                             | —                                           | —                           |

Note 1) The correlation among the three is shown for convenience and is not exact.

Note 2) Ra: The evaluation length of Rz and RzJIS is the cutoff value and sampling length multiplied by 5, respectively.

# HARDNESS COMPARISON TABLE

## HARDNESS CONVERSION NUMBERS OF STEEL

| Brinell Hardness (HB),<br>10mm Ball, Load: 3000kgf |                             | Vickers<br>Hardness | Rockwell Hardness                            |                                         |                                               |                                               | Shore<br>Hardness | Tensile<br>Strength<br>(Approx.)<br>MPa | Brinell Hardness (HB),<br>10mm Ball, Load: 3000kgf |                             | Vickers<br>Hardness | Rockwell Hardness                            |                                         |                                               |                                               | Shore<br>Hardness | Tensile<br>Strength<br>(Approx.)<br>MPa |
|----------------------------------------------------|-----------------------------|---------------------|----------------------------------------------|-----------------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------|-----------------------------------------|----------------------------------------------------|-----------------------------|---------------------|----------------------------------------------|-----------------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------|-----------------------------------------|
| Standard<br>Ball                                   | Tungsten<br>Carbide<br>Ball |                     | A Scale,<br>Load: 60kgf,<br>Diamond<br>Point | B Scale,<br>Load: 100kgf,<br>1/16" Ball | C Scale,<br>Load: 150kgf,<br>Diamond<br>Point | D Scale,<br>Load: 100kgf,<br>Diamond<br>Point |                   |                                         | Standard<br>Ball                                   | Tungsten<br>Carbide<br>Ball |                     | A Scale,<br>Load: 60kgf,<br>Diamond<br>Point | B Scale,<br>Load: 100kgf,<br>1/16" Ball | C Scale,<br>Load: 150kgf,<br>Diamond<br>Point | D Scale,<br>Load: 100kgf,<br>Diamond<br>Point |                   |                                         |
| (HV)                                               | (HRA)                       | (HRB)               | (HRC)                                        | (HRD)                                   | (HS)                                          |                                               |                   |                                         | (HV)                                               | (HRA)                       | (HRB)               | (HRC)                                        | (HRD)                                   | (HS)                                          |                                               |                   |                                         |
| —                                                  | —                           | 940                 | 85.6                                         | —                                       | 68.0                                          | 76.9                                          | 97                | —                                       | 429                                                | 429                         | 455                 | 73.4                                         | —                                       | 45.7                                          | 59.7                                          | 61                | 1510                                    |
| —                                                  | —                           | 920                 | 85.3                                         | —                                       | 67.5                                          | 76.5                                          | 96                | —                                       | 415                                                | 415                         | 440                 | 72.8                                         | —                                       | 44.5                                          | 58.8                                          | 59                | 1460                                    |
| —                                                  | —                           | 900                 | 85.0                                         | —                                       | 67.0                                          | 76.1                                          | 95                | —                                       | 401                                                | 401                         | 425                 | 72.0                                         | —                                       | 43.1                                          | 57.8                                          | 58                | 1390                                    |
| —                                                  | (767)                       | 880                 | 84.7                                         | —                                       | 66.4                                          | 75.7                                          | 93                | —                                       | 388                                                | 388                         | 410                 | 71.4                                         | —                                       | 41.8                                          | 56.8                                          | 56                | 1330                                    |
| —                                                  | (757)                       | 860                 | 84.4                                         | —                                       | 65.9                                          | 75.3                                          | 92                | —                                       | 375                                                | 375                         | 396                 | 70.6                                         | —                                       | 40.4                                          | 55.7                                          | 54                | 1270                                    |
| —                                                  | (745)                       | 840                 | 84.1                                         | —                                       | 65.3                                          | 74.8                                          | 91                | —                                       | 363                                                | 363                         | 383                 | 70.0                                         | —                                       | 39.1                                          | 54.6                                          | 52                | 1220                                    |
| —                                                  | (733)                       | 820                 | 83.8                                         | —                                       | 64.7                                          | 74.3                                          | 90                | —                                       | 352                                                | 352                         | 372                 | 69.3                                         | (110.0)                                 | 37.9                                          | 53.8                                          | 51                | 1180                                    |
| —                                                  | (722)                       | 800                 | 83.4                                         | —                                       | 64.0                                          | 73.8                                          | 88                | —                                       | 341                                                | 341                         | 360                 | 68.7                                         | (109.0)                                 | 36.6                                          | 52.8                                          | 50                | 1130                                    |
| —                                                  | (712)                       | —                   | —                                            | —                                       | —                                             | —                                             | —                 | —                                       | 331                                                | 331                         | 350                 | 68.1                                         | (108.5)                                 | 35.5                                          | 51.9                                          | 48                | 1095                                    |
| —                                                  | (710)                       | 780                 | 83.0                                         | —                                       | 63.3                                          | 73.3                                          | 87                | —                                       | 321                                                | 321                         | 339                 | 67.5                                         | (108.0)                                 | 34.3                                          | 51.0                                          | 47                | 1060                                    |
| —                                                  | (698)                       | 760                 | 82.6                                         | —                                       | 62.5                                          | 72.6                                          | 86                | —                                       | —                                                  | —                           | —                   | —                                            | —                                       | —                                             | —                                             | —                 | —                                       |
| —                                                  | (684)                       | 740                 | 82.2                                         | —                                       | 61.8                                          | 72.1                                          | —                 | —                                       | 311                                                | 311                         | 328                 | 66.9                                         | (107.5)                                 | 33.1                                          | 50.0                                          | 46                | 1025                                    |
| —                                                  | (682)                       | 737                 | 82.2                                         | —                                       | 61.7                                          | 72.0                                          | 84                | —                                       | 302                                                | 302                         | 319                 | 66.3                                         | (107.0)                                 | 32.1                                          | 49.3                                          | 45                | 1005                                    |
| —                                                  | (670)                       | 720                 | 81.8                                         | —                                       | 61.0                                          | 71.5                                          | 83                | —                                       | 293                                                | 293                         | 309                 | 65.7                                         | (106.0)                                 | 30.9                                          | 48.3                                          | 43                | 970                                     |
| —                                                  | (656)                       | 700                 | 81.3                                         | —                                       | 60.1                                          | 70.8                                          | —                 | —                                       | 285                                                | 285                         | 301                 | 65.3                                         | (105.5)                                 | 29.9                                          | 47.6                                          | —                 | 950                                     |
| —                                                  | (653)                       | 697                 | 81.2                                         | —                                       | 60.0                                          | 70.7                                          | 81                | —                                       | 277                                                | 277                         | 292                 | 64.6                                         | (104.5)                                 | 28.8                                          | 46.7                                          | 41                | 925                                     |
| —                                                  | (647)                       | 690                 | 81.1                                         | —                                       | 59.7                                          | 70.5                                          | —                 | —                                       | 269                                                | 269                         | 284                 | 64.1                                         | (104.0)                                 | 27.6                                          | 45.9                                          | 40                | 895                                     |
| —                                                  | (638)                       | 680                 | 80.8                                         | —                                       | 59.2                                          | 70.1                                          | 80                | —                                       | 262                                                | 262                         | 276                 | 63.6                                         | (103.0)                                 | 26.6                                          | 45.0                                          | 39                | 875                                     |
| —                                                  | 630                         | 670                 | 80.6                                         | —                                       | 58.8                                          | 69.8                                          | —                 | —                                       | 255                                                | 255                         | 269                 | 63.0                                         | (102.0)                                 | 25.4                                          | 44.2                                          | 38                | 850                                     |
| —                                                  | 627                         | 667                 | 80.5                                         | —                                       | 58.7                                          | 69.7                                          | 79                | —                                       | 248                                                | 248                         | 261                 | 62.5                                         | (101.0)                                 | 24.2                                          | 43.2                                          | 37                | 825                                     |
| —                                                  | —                           | —                   | —                                            | —                                       | —                                             | —                                             | —                 | —                                       | 241                                                | 241                         | 253                 | 61.8                                         | 100                                     | 22.8                                          | 42.0                                          | 36                | 800                                     |
| —                                                  | —                           | 677                 | 80.7                                         | —                                       | 59.1                                          | 70.0                                          | —                 | —                                       | 235                                                | 235                         | 247                 | 61.4                                         | 99.0                                    | 21.7                                          | 41.4                                          | 35                | 785                                     |
| —                                                  | 601                         | 640                 | 79.8                                         | —                                       | 57.3                                          | 68.7                                          | 77                | —                                       | 229                                                | 229                         | 241                 | 60.8                                         | 98.2                                    | 20.5                                          | 40.5                                          | 34                | 765                                     |
| —                                                  | —                           | 640                 | 79.8                                         | —                                       | 57.3                                          | 68.7                                          | —                 | —                                       | 223                                                | 223                         | 234                 | —                                            | 97.3                                    | (18.8)                                        | —                                             | —                 | —                                       |
| —                                                  | 578                         | 615                 | 79.1                                         | —                                       | 56.0                                          | 67.7                                          | 75                | —                                       | 217                                                | 217                         | 228                 | —                                            | 96.4                                    | (17.5)                                        | —                                             | 33                | 725                                     |
| —                                                  | —                           | 607                 | 78.8                                         | —                                       | 55.6                                          | 67.4                                          | —                 | —                                       | 212                                                | 212                         | 222                 | —                                            | 95.5                                    | (16.0)                                        | —                                             | —                 | 705                                     |
| —                                                  | 555                         | 591                 | 78.4                                         | —                                       | 54.7                                          | 66.7                                          | 73                | 2055                                    | 207                                                | 207                         | 218                 | —                                            | 94.6                                    | (15.2)                                        | —                                             | 32                | 690                                     |
| —                                                  | —                           | 579                 | 78.0                                         | —                                       | 54.0                                          | 66.1                                          | —                 | 2015                                    | 201                                                | 201                         | 212                 | —                                            | 93.8                                    | (13.8)                                        | —                                             | 31                | 675                                     |
| —                                                  | 534                         | 569                 | 77.8                                         | —                                       | 53.5                                          | 65.8                                          | 71                | 1985                                    | 197                                                | 197                         | 207                 | —                                            | 92.8                                    | (12.7)                                        | —                                             | 30                | 655                                     |
| —                                                  | —                           | 533                 | 77.1                                         | —                                       | 52.5                                          | 65.0                                          | —                 | 1915                                    | 192                                                | 192                         | 202                 | —                                            | 91.9                                    | (11.5)                                        | —                                             | 29                | 640                                     |
| —                                                  | 514                         | 547                 | 76.9                                         | —                                       | 52.1                                          | 64.7                                          | 70                | 1890                                    | 187                                                | 187                         | 196                 | —                                            | 90.7                                    | (10.0)                                        | —                                             | —                 | 620                                     |
| (495)                                              | —                           | 539                 | 76.7                                         | —                                       | 51.6                                          | 64.3                                          | —                 | 1855                                    | 183                                                | 183                         | 192                 | —                                            | 90.0                                    | (9.0)                                         | —                                             | 28                | 615                                     |
| —                                                  | —                           | 530                 | 76.4                                         | —                                       | 51.1                                          | 63.9                                          | —                 | 1825                                    | 179                                                | 179                         | 188                 | —                                            | 89.0                                    | (8.0)                                         | —                                             | 27                | 600                                     |
| —                                                  | 495                         | 528                 | 76.3                                         | —                                       | 51.0                                          | 63.8                                          | 68                | 1820                                    | 174                                                | 174                         | 182                 | —                                            | 87.8                                    | (6.4)                                         | —                                             | —                 | 585                                     |
| (477)                                              | —                           | 516                 | 75.9                                         | —                                       | 50.3                                          | 63.2                                          | —                 | 1780                                    | 170                                                | 170                         | 178                 | —                                            | 86.8                                    | (5.4)                                         | —                                             | 26                | 570                                     |
| —                                                  | —                           | 508                 | 75.6                                         | —                                       | 49.6                                          | 62.7                                          | —                 | 1740                                    | 167                                                | 167                         | 175                 | —                                            | 86.0                                    | (4.4)                                         | —                                             | —                 | 560                                     |
| —                                                  | 477                         | 508                 | 75.6                                         | —                                       | 49.6                                          | 62.7                                          | 66                | 1740                                    | 143                                                | 143                         | 150                 | —                                            | 80.8                                    | —                                             | —                                             | 23                | 505                                     |
| (461)                                              | —                           | 495                 | 75.1                                         | —                                       | 48.8                                          | 61.9                                          | —                 | 1680                                    | 143                                                | 143                         | 150                 | —                                            | 78.7                                    | —                                             | —                                             | 22                | 490                                     |
| —                                                  | —                           | 491                 | 74.9                                         | —                                       | 48.5                                          | 61.7                                          | —                 | 1670                                    | 137                                                | 137                         | 143                 | —                                            | 76.4                                    | —                                             | —                                             | 21                | 460                                     |
| —                                                  | 461                         | 491                 | 74.9                                         | —                                       | 48.5                                          | 61.7                                          | 65                | 1670                                    | 131                                                | 131                         | 137                 | —                                            | 74.0                                    | —                                             | —                                             | —                 | 450                                     |
| 444                                                | —                           | 474                 | 74.3                                         | —                                       | 47.2                                          | 61.0                                          | —                 | 1595                                    | 126                                                | 126                         | 132                 | —                                            | 72.0                                    | —                                             | —                                             | 20                | 435                                     |
| —                                                  | —                           | 472                 | 74.2                                         | —                                       | 47.1                                          | 60.8                                          | —                 | 1585                                    | 121                                                | 121                         | 127                 | —                                            | 69.8                                    | —                                             | —                                             | 19                | 415                                     |
| —                                                  | 444                         | 472                 | 74.2                                         | —                                       | 47.1                                          | 60.8                                          | 63                | 1585                                    | 116                                                | 116                         | 122                 | —                                            | 67.6                                    | —                                             | —                                             | 18                | 400                                     |
| —                                                  | —                           | —                   | —                                            | —                                       | —                                             | —                                             | —                 | —                                       | 111                                                | 111                         | 117                 | —                                            | 65.7                                    | —                                             | —                                             | 15                | 385                                     |

Note 1) The above list is the same as that of AMS Metals Hand book with tensile strength in approximate metric value and Brinell hardness over a recommended range.

Note 2) 1MPa=1N/mm<sup>2</sup>

Note 3) Figures in ( ) are rarely used and are included for reference. This list has been taken from JIS Handbook Steel I.

# FIT TOLERANCE TABLE (HOLE)

| Classification of Standard Dimensions (mm) |     | Class of Geometrical Tolerance Zone of Holes |              |              |              |              |              |              |              |              |             |             |             |            |            |          |          |
|--------------------------------------------|-----|----------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|------------|------------|----------|----------|
| >                                          | ≤   | B10                                          | C9           | C10          | D8           | D9           | D10          | E7           | E8           | E9           | F6          | F7          | F8          | G6         | G7         | H6       | H7       |
| —                                          | 3   | +180<br>+140                                 | +85<br>+60   | +100<br>+60  | +34<br>+20   | +45<br>+20   | +60<br>+20   | +24<br>+14   | +28<br>+14   | +39<br>+14   | +12<br>+6   | +16<br>+6   | +20<br>+6   | +8<br>+2   | +12<br>+2  | +6<br>0  | +10<br>0 |
| 3                                          | 6   | +188<br>+140                                 | +100<br>+70  | +118<br>+70  | +48<br>+30   | +60<br>+30   | +78<br>+30   | +32<br>+20   | +38<br>+20   | +50<br>+20   | +18<br>+10  | +22<br>+10  | +28<br>+10  | +12<br>+4  | +16<br>+4  | +8<br>0  | +12<br>0 |
| 6                                          | 10  | +208<br>+150                                 | +116<br>+80  | +138<br>+80  | +62<br>+40   | +76<br>+40   | +98<br>+40   | +40<br>+25   | +47<br>+25   | +61<br>+25   | +22<br>+13  | +28<br>+13  | +35<br>+13  | +14<br>+5  | +20<br>+5  | +9<br>0  | +15<br>0 |
| 10                                         | 14  | +220<br>+150                                 | +138<br>+95  | +165<br>+95  | +77<br>+50   | +93<br>+50   | +120<br>+50  | +50<br>+32   | +59<br>+32   | +75<br>+32   | +27<br>+16  | +34<br>+16  | +43<br>+16  | +17<br>+6  | +24<br>+6  | +11<br>0 | +18<br>0 |
| 14                                         | 18  |                                              |              |              |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 18                                         | 24  | +244<br>+160                                 | +162<br>+110 | +194<br>+110 | +98<br>+65   | +117<br>+65  | +149<br>+65  | +61<br>+40   | +73<br>+40   | +92<br>+40   | +33<br>+20  | +41<br>+20  | +53<br>+20  | +20<br>+7  | +28<br>+7  | +13<br>0 | +21<br>0 |
| 24                                         | 30  |                                              |              |              |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 30                                         | 40  | +270<br>+170                                 | +182<br>+120 | +220<br>+120 | +119<br>+80  | +142<br>+80  | +180<br>+80  | +75<br>+50   | +89<br>+50   | +112<br>+50  | +41<br>+25  | +50<br>+25  | +64<br>+25  | +25<br>+9  | +34<br>+9  | +16<br>0 | +25<br>0 |
| 40                                         | 50  | +280<br>+180                                 | +192<br>+130 | +230<br>+130 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 50                                         | 65  | +310<br>+190                                 | +214<br>+140 | +260<br>+140 | +146<br>+100 | +174<br>+100 | +220<br>+100 | +90<br>+60   | +106<br>+60  | +134<br>+60  | +49<br>+30  | +60<br>+30  | +76<br>+30  | +29<br>+10 | +40<br>+10 | +19<br>0 | +30<br>0 |
| 65                                         | 80  | +320<br>+200                                 | +224<br>+150 | +270<br>+150 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 80                                         | 100 | +360<br>+220                                 | +257<br>+170 | +310<br>+170 | +174<br>+120 | +207<br>+120 | +260<br>+120 | +107<br>+72  | +126<br>+72  | +159<br>+72  | +58<br>+36  | +71<br>+36  | +90<br>+36  | +34<br>+12 | +47<br>+12 | +22<br>0 | +35<br>0 |
| 100                                        | 120 | +380<br>+240                                 | +267<br>+180 | +320<br>+180 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 120                                        | 140 | +420<br>+260                                 | +300<br>+200 | +360<br>+200 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 140                                        | 160 | +440<br>+280                                 | +310<br>+210 | +370<br>+210 | +208<br>+145 | +245<br>+145 | +305<br>+145 | +125<br>+85  | +148<br>+85  | +185<br>+85  | +68<br>+43  | +83<br>+43  | +106<br>+43 | +39<br>+14 | +54<br>+14 | +25<br>0 | +40<br>0 |
| 160                                        | 180 | +470<br>+310                                 | +330<br>+230 | +390<br>+230 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 180                                        | 200 | +525<br>+340                                 | +355<br>+240 | +425<br>+240 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 200                                        | 225 | +565<br>+380                                 | +375<br>+260 | +445<br>+260 | +242<br>+170 | +285<br>+170 | +355<br>+170 | +146<br>+100 | +172<br>+100 | +215<br>+100 | +79<br>+50  | +96<br>+50  | +122<br>+50 | +44<br>+15 | +61<br>+15 | +29<br>0 | +46<br>0 |
| 225                                        | 250 | +605<br>+420                                 | +395<br>+280 | +465<br>+280 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 250                                        | 280 | +690<br>+480                                 | +430<br>+300 | +510<br>+300 | +271<br>+190 | +320<br>+190 | +400<br>+190 | +162<br>+110 | +191<br>+110 | +240<br>+110 | +88<br>+56  | +108<br>+56 | +137<br>+56 | +49<br>+17 | +69<br>+17 | +32<br>0 | +52<br>0 |
| 280                                        | 315 | +750<br>+540                                 | +460<br>+330 | +540<br>+330 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 315                                        | 355 | +830<br>+600                                 | +500<br>+360 | +590<br>+360 | +299<br>+210 | +350<br>+210 | +440<br>+210 | +182<br>+125 | +214<br>+125 | +265<br>+125 | +98<br>+62  | +119<br>+62 | +151<br>+62 | +54<br>+18 | +75<br>+18 | +36<br>0 | +57<br>0 |
| 355                                        | 400 | +910<br>+680                                 | +540<br>+400 | +630<br>+400 |              |              |              |              |              |              |             |             |             |            |            |          |          |
| 400                                        | 450 | +1010<br>+760                                | +595<br>+440 | +690<br>+440 | +327<br>+230 | +385<br>+230 | +480<br>+230 | +198<br>+135 | +232<br>+135 | +290<br>+135 | +108<br>+68 | +131<br>+68 | +165<br>+68 | +60<br>+20 | +83<br>+20 | +40<br>0 | +63<br>0 |
| 450                                        | 500 | +1090<br>+840                                | +635<br>+480 | +730<br>+480 |              |              |              |              |              |              |             |             |             |            |            |          |          |

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.

Units :  $\mu\text{m}$ 

Class of Geometrical Tolerance Zone of Holes

| H8       | H9        | H10       | JS6        | JS7      | K6        | K7         | M6         | M7        | N6         | N7         | P6         | P7          | R7                                        | S7                                           | T7                                           | U7                           | X7                       |
|----------|-----------|-----------|------------|----------|-----------|------------|------------|-----------|------------|------------|------------|-------------|-------------------------------------------|----------------------------------------------|----------------------------------------------|------------------------------|--------------------------|
| +14<br>0 | +25<br>0  | +40<br>0  | $\pm 3$    | $\pm 5$  | 0<br>-6   | 0<br>-10   | -2<br>-8   | -2<br>-12 | -4<br>-10  | -4<br>-14  | -6<br>-12  | -6<br>-16   | -10<br>-20                                | -14<br>-24                                   | —                                            | -18<br>-28                   | -20<br>-30               |
| +18<br>0 | +30<br>0  | +48<br>0  | $\pm 4$    | $\pm 6$  | +2<br>-6  | +3<br>-9   | -1<br>-9   | 0<br>-12  | -5<br>-13  | -4<br>-16  | -9<br>-17  | -8<br>-20   | -11<br>-23                                | -15<br>-27                                   | —                                            | -19<br>-31                   | -24<br>-36               |
| +22<br>0 | +36<br>0  | +58<br>0  | $\pm 4.5$  | $\pm 7$  | +2<br>-7  | +5<br>-10  | -3<br>-12  | 0<br>-15  | -7<br>-16  | -4<br>-19  | -12<br>-21 | -9<br>-24   | -13<br>-28                                | -17<br>-32                                   | —                                            | -22<br>-37                   | -28<br>-43               |
| +27<br>0 | +43<br>0  | +70<br>0  | $\pm 5.5$  | $\pm 9$  | +2<br>-9  | +6<br>-12  | -4<br>-15  | 0<br>-18  | -9<br>-20  | -5<br>-23  | -15<br>-26 | -11<br>-29  | -16<br>-34                                | -21<br>-39                                   | —<br>—                                       | -26<br>-44                   | -33<br>-51<br>-38<br>-56 |
| +33<br>0 | +52<br>0  | +84<br>0  | $\pm 6.5$  | $\pm 10$ | +2<br>-11 | +6<br>-15  | -4<br>-17  | 0<br>-21  | -11<br>-24 | -7<br>-28  | -18<br>-31 | -14<br>-35  | -20<br>-41                                | -27<br>-48                                   | —<br>-33<br>-54                              | -33<br>-40<br>-61            | -46<br>-67<br>-56<br>-77 |
| +39<br>0 | +62<br>0  | +100<br>0 | $\pm 8$    | $\pm 12$ | +3<br>-13 | +7<br>-18  | -4<br>-20  | 0<br>-25  | -12<br>-28 | -8<br>-33  | -21<br>-37 | -17<br>-42  | -25<br>-50                                | -34<br>-59                                   | -39<br>-64<br>-45<br>-70                     | -51<br>-76<br>-61<br>-86     | —                        |
| +46<br>0 | +74<br>0  | +120<br>0 | $\pm 9.5$  | $\pm 15$ | +4<br>-15 | +9<br>-21  | -5<br>-24  | 0<br>-30  | -14<br>-33 | -9<br>-39  | -26<br>-45 | -21<br>-51  | -30<br>-60<br>-32<br>-62                  | -42<br>-72<br>-48<br>-78                     | -55<br>-85<br>-64<br>-94                     | -76<br>-106<br>-91<br>-121   | —                        |
| +54<br>0 | +87<br>0  | +140<br>0 | $\pm 11$   | $\pm 17$ | +4<br>-18 | +10<br>-25 | -6<br>-28  | 0<br>-35  | -16<br>-38 | -10<br>-45 | -30<br>-52 | -24<br>-59  | -38<br>-73<br>-41<br>-76                  | -58<br>-93<br>-66<br>-101                    | -78<br>-113<br>-91<br>-126                   | -111<br>-146<br>-131<br>-166 | —                        |
| +63<br>0 | +100<br>0 | +160<br>0 | $\pm 12.5$ | $\pm 20$ | +4<br>-21 | +12<br>-28 | -8<br>-33  | 0<br>-40  | -20<br>-45 | -12<br>-52 | -36<br>-61 | -28<br>-68  | -48<br>-88<br>-50<br>-90<br>-53<br>-93    | -77<br>-117<br>-85<br>-125<br>-93<br>-133    | -107<br>-147<br>-119<br>-159<br>-131<br>-171 | —                            | —                        |
| +72<br>0 | +115<br>0 | +185<br>0 | $\pm 14.5$ | $\pm 23$ | +5<br>-24 | +13<br>-33 | -8<br>-37  | 0<br>-46  | -22<br>-51 | -14<br>-60 | -41<br>-70 | -33<br>-79  | -60<br>-106<br>-63<br>-109<br>-67<br>-113 | -105<br>-151<br>-113<br>-159<br>-123<br>-169 | —                                            | —                            | —                        |
| +81<br>0 | +130<br>0 | +210<br>0 | $\pm 16$   | $\pm 26$ | +5<br>-27 | +16<br>-36 | -9<br>-41  | 0<br>-52  | -25<br>-57 | -14<br>-66 | -47<br>-79 | -36<br>-88  | -74<br>-126<br>-78<br>-130                | —                                            | —                                            | —                            | —                        |
| +89<br>0 | +140<br>0 | +230<br>0 | $\pm 18$   | $\pm 28$ | +7<br>-29 | +17<br>-40 | -10<br>-46 | 0<br>-57  | -26<br>-62 | -16<br>-73 | -51<br>-87 | -41<br>-98  | -87<br>-144<br>-93<br>-150                | —                                            | —                                            | —                            | —                        |
| +97<br>0 | +155<br>0 | +250<br>0 | $\pm 20$   | $\pm 31$ | +8<br>-32 | +18<br>-45 | -10<br>-50 | 0<br>-63  | -27<br>-67 | -17<br>-80 | -55<br>-95 | -45<br>-108 | -103<br>-166<br>-109<br>-172              | —                                            | —                                            | —                            | —                        |

# FIT TOLERANCE TABLE (SHAFT)

| Classification of Standard Dimensions (mm) |     | Class of Geometrical Tolerance Zone of Shafts |       |       |       |       |       |       |       |       |       |      |      |      |      |      |
|--------------------------------------------|-----|-----------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|
| >                                          | ≤   | b9                                            | c9    | d8    | d9    | e7    | e8    | e9    | f6    | f7    | f8    | g5   | g6   | h5   | h6   | h7   |
| —                                          | 3   | — 140                                         | — 60  | — 20  | — 20  | — 14  | — 14  | — 14  | — 6   | — 6   | — 6   | — 2  | — 2  | 0    | 0    | 0    |
|                                            |     | — 165                                         | — 85  | — 34  | — 45  | — 24  | — 28  | — 39  | — 12  | — 16  | — 20  | — 6  | — 8  | — 4  | — 6  | — 10 |
| 3                                          | 6   | — 140                                         | — 70  | — 30  | — 30  | — 20  | — 20  | — 20  | — 10  | — 10  | — 10  | — 4  | — 4  | 0    | 0    | 0    |
|                                            |     | — 170                                         | — 100 | — 48  | — 60  | — 32  | — 38  | — 50  | — 18  | — 22  | — 28  | — 9  | — 12 | — 5  | — 8  | — 12 |
| 6                                          | 10  | — 150                                         | — 80  | — 40  | — 40  | — 25  | — 25  | — 25  | — 13  | — 13  | — 13  | — 5  | — 5  | 0    | 0    | 0    |
|                                            |     | — 186                                         | — 116 | — 62  | — 76  | — 40  | — 47  | — 61  | — 22  | — 28  | — 35  | — 11 | — 14 | — 6  | — 9  | — 15 |
| 10                                         | 14  | — 150                                         | — 95  | — 50  | — 50  | — 32  | — 32  | — 32  | — 16  | — 16  | — 16  | — 6  | — 6  | 0    | 0    | 0    |
|                                            |     | — 193                                         | — 138 | — 77  | — 93  | — 50  | — 59  | — 75  | — 27  | — 34  | — 43  | — 14 | — 17 | — 8  | — 11 | — 18 |
| 14                                         | 18  | — 150                                         | — 95  | — 50  | — 50  | — 32  | — 32  | — 32  | — 16  | — 16  | — 16  | — 6  | — 6  | 0    | 0    | 0    |
|                                            |     | — 193                                         | — 138 | — 77  | — 93  | — 50  | — 59  | — 75  | — 27  | — 34  | — 43  | — 14 | — 17 | — 8  | — 11 | — 18 |
| 18                                         | 24  | — 160                                         | — 110 | — 65  | — 65  | — 40  | — 40  | — 40  | — 20  | — 20  | — 20  | — 7  | — 7  | 0    | 0    | 0    |
|                                            |     | — 212                                         | — 162 | — 98  | — 117 | — 61  | — 73  | — 92  | — 33  | — 41  | — 53  | — 16 | — 20 | — 9  | — 13 | — 21 |
| 24                                         | 30  | — 160                                         | — 110 | — 65  | — 65  | — 40  | — 40  | — 40  | — 20  | — 20  | — 20  | — 7  | — 7  | 0    | 0    | 0    |
|                                            |     | — 212                                         | — 162 | — 98  | — 117 | — 61  | — 73  | — 92  | — 33  | — 41  | — 53  | — 16 | — 20 | — 9  | — 13 | — 21 |
| 30                                         | 40  | — 170                                         | — 120 | — 80  | — 80  | — 50  | — 50  | — 50  | — 25  | — 25  | — 25  | — 9  | — 9  | 0    | 0    | 0    |
|                                            |     | — 232                                         | — 182 | — 119 | — 142 | — 75  | — 89  | — 112 | — 41  | — 50  | — 64  | — 20 | — 25 | — 11 | — 16 | — 25 |
| 40                                         | 50  | — 180                                         | — 130 | — 80  | — 80  | — 50  | — 50  | — 50  | — 25  | — 25  | — 25  | — 9  | — 9  | 0    | 0    | 0    |
|                                            |     | — 242                                         | — 192 | — 119 | — 142 | — 75  | — 89  | — 112 | — 41  | — 50  | — 64  | — 20 | — 25 | — 11 | — 16 | — 25 |
| 50                                         | 65  | — 190                                         | — 140 | — 100 | — 100 | — 60  | — 60  | — 60  | — 30  | — 30  | — 30  | — 10 | — 10 | 0    | 0    | 0    |
|                                            |     | — 264                                         | — 214 | — 146 | — 174 | — 90  | — 106 | — 134 | — 49  | — 60  | — 76  | — 23 | — 29 | — 13 | — 19 | — 30 |
| 65                                         | 80  | — 200                                         | — 150 | — 100 | — 100 | — 60  | — 60  | — 60  | — 30  | — 30  | — 30  | — 10 | — 10 | 0    | 0    | 0    |
|                                            |     | — 274                                         | — 224 | — 146 | — 174 | — 90  | — 106 | — 134 | — 49  | — 60  | — 76  | — 23 | — 29 | — 13 | — 19 | — 30 |
| 80                                         | 100 | — 220                                         | — 170 | — 120 | — 120 | — 72  | — 72  | — 72  | — 36  | — 36  | — 36  | — 12 | — 12 | 0    | 0    | 0    |
|                                            |     | — 307                                         | — 257 | — 174 | — 207 | — 107 | — 126 | — 159 | — 58  | — 71  | — 90  | — 27 | — 34 | — 15 | — 22 | — 35 |
| 100                                        | 120 | — 240                                         | — 180 | — 120 | — 120 | — 72  | — 72  | — 72  | — 36  | — 36  | — 36  | — 12 | — 12 | 0    | 0    | 0    |
|                                            |     | — 327                                         | — 267 | — 174 | — 207 | — 107 | — 126 | — 159 | — 58  | — 71  | — 90  | — 27 | — 34 | — 15 | — 22 | — 35 |
| 120                                        | 140 | — 260                                         | — 200 | — 145 | — 145 | — 85  | — 85  | — 85  | — 43  | — 43  | — 43  | — 14 | — 14 | 0    | 0    | 0    |
|                                            |     | — 360                                         | — 300 | — 208 | — 245 | — 125 | — 148 | — 185 | — 68  | — 83  | — 106 | — 32 | — 39 | — 18 | — 25 | — 40 |
| 140                                        | 160 | — 280                                         | — 210 | — 145 | — 145 | — 85  | — 85  | — 85  | — 43  | — 43  | — 43  | — 14 | — 14 | 0    | 0    | 0    |
|                                            |     | — 380                                         | — 310 | — 208 | — 245 | — 125 | — 148 | — 185 | — 68  | — 83  | — 106 | — 32 | — 39 | — 18 | — 25 | — 40 |
| 160                                        | 180 | — 310                                         | — 230 | — 145 | — 145 | — 85  | — 85  | — 85  | — 43  | — 43  | — 43  | — 14 | — 14 | 0    | 0    | 0    |
|                                            |     | — 410                                         | — 330 | — 208 | — 245 | — 125 | — 148 | — 185 | — 68  | — 83  | — 106 | — 32 | — 39 | — 18 | — 25 | — 40 |
| 180                                        | 200 | — 340                                         | — 240 | — 170 | — 170 | — 100 | — 100 | — 100 | — 50  | — 50  | — 50  | — 15 | — 15 | 0    | 0    | 0    |
|                                            |     | — 455                                         | — 355 | — 242 | — 285 | — 146 | — 172 | — 215 | — 79  | — 96  | — 122 | — 35 | — 44 | — 20 | — 29 | — 46 |
| 200                                        | 225 | — 380                                         | — 260 | — 170 | — 170 | — 100 | — 100 | — 100 | — 50  | — 50  | — 50  | — 15 | — 15 | 0    | 0    | 0    |
|                                            |     | — 495                                         | — 375 | — 242 | — 285 | — 146 | — 172 | — 215 | — 79  | — 96  | — 122 | — 35 | — 44 | — 20 | — 29 | — 46 |
| 225                                        | 250 | — 420                                         | — 280 | — 170 | — 170 | — 100 | — 100 | — 100 | — 50  | — 50  | — 50  | — 15 | — 15 | 0    | 0    | 0    |
|                                            |     | — 535                                         | — 395 | — 242 | — 285 | — 146 | — 172 | — 215 | — 79  | — 96  | — 122 | — 35 | — 44 | — 20 | — 29 | — 46 |
| 250                                        | 280 | — 480                                         | — 300 | — 190 | — 190 | — 110 | — 110 | — 110 | — 56  | — 56  | — 56  | — 17 | — 17 | 0    | 0    | 0    |
|                                            |     | — 610                                         | — 430 | — 271 | — 320 | — 162 | — 191 | — 240 | — 88  | — 108 | — 137 | — 40 | — 49 | — 23 | — 32 | — 52 |
| 280                                        | 315 | — 540                                         | — 330 | — 190 | — 190 | — 110 | — 110 | — 110 | — 56  | — 56  | — 56  | — 17 | — 17 | 0    | 0    | 0    |
|                                            |     | — 670                                         | — 460 | — 271 | — 320 | — 162 | — 191 | — 240 | — 88  | — 108 | — 137 | — 40 | — 49 | — 23 | — 32 | — 52 |
| 315                                        | 355 | — 600                                         | — 360 | — 210 | — 210 | — 125 | — 125 | — 125 | — 62  | — 62  | — 62  | — 18 | — 18 | 0    | 0    | 0    |
|                                            |     | — 740                                         | — 500 | — 299 | — 350 | — 182 | — 214 | — 265 | — 98  | — 119 | — 151 | — 43 | — 54 | — 25 | — 36 | — 57 |
| 355                                        | 400 | — 680                                         | — 400 | — 210 | — 210 | — 125 | — 125 | — 125 | — 62  | — 62  | — 62  | — 18 | — 18 | 0    | 0    | 0    |
|                                            |     | — 820                                         | — 540 | — 299 | — 350 | — 182 | — 214 | — 265 | — 98  | — 119 | — 151 | — 43 | — 54 | — 25 | — 36 | — 57 |
| 400                                        | 450 | — 760                                         | — 440 | — 230 | — 230 | — 135 | — 135 | — 135 | — 68  | — 68  | — 68  | — 20 | — 20 | 0    | 0    | 0    |
|                                            |     | — 915                                         | — 595 | — 327 | — 385 | — 198 | — 232 | — 290 | — 108 | — 131 | — 165 | — 47 | — 60 | — 27 | — 40 | — 63 |
| 450                                        | 500 | — 840                                         | — 480 | — 230 | — 230 | — 135 | — 135 | — 135 | — 68  | — 68  | — 68  | — 20 | — 20 | 0    | 0    | 0    |
|                                            |     | — 995                                         | — 635 | — 327 | — 385 | — 198 | — 232 | — 290 | — 108 | — 131 | — 165 | — 47 | — 60 | — 27 | — 40 | — 63 |

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.



Units :  $\mu\text{m}$ 

Class of Geometrical Tolerance Zone of Shafts

| h8        | h9         | js5        | js6        | js7      | k5        | k6        | m5         | m6         | n6         | p6          | r6                                        | s6                                           | t6                                           | u6                           | x6                       |
|-----------|------------|------------|------------|----------|-----------|-----------|------------|------------|------------|-------------|-------------------------------------------|----------------------------------------------|----------------------------------------------|------------------------------|--------------------------|
| 0<br>- 14 | 0<br>- 25  | $\pm 2$    | $\pm 3$    | $\pm 5$  | +4<br>0   | +6<br>0   | +6<br>+2   | +8<br>+2   | +10<br>+4  | +12<br>+6   | +16<br>+10                                | +20<br>+14                                   | —                                            | +24<br>+18                   | +26<br>+20               |
| 0<br>- 18 | 0<br>- 30  | $\pm 2.5$  | $\pm 4$    | $\pm 6$  | +6<br>+1  | +9<br>+1  | +9<br>+4   | +12<br>+4  | +16<br>+8  | +20<br>+12  | +23<br>+15                                | +27<br>+19                                   | —                                            | +31<br>+23                   | +36<br>+28               |
| 0<br>- 22 | 0<br>- 36  | $\pm 3$    | $\pm 4.5$  | $\pm 7$  | +7<br>+1  | +10<br>+1 | +12<br>+6  | +15<br>+6  | +19<br>+10 | +24<br>+15  | +28<br>+19                                | +32<br>+23                                   | —                                            | +37<br>+28                   | +43<br>+34               |
| 0<br>- 27 | 0<br>- 43  | $\pm 4$    | $\pm 5.5$  | $\pm 9$  | +9<br>+1  | +12<br>+1 | +15<br>+7  | +18<br>+7  | +23<br>+12 | +29<br>+18  | +34<br>+23                                | +39<br>+28                                   | —                                            | +44<br>+33                   | +51<br>+40<br>+56<br>+45 |
| 0<br>- 33 | 0<br>- 52  | $\pm 4.5$  | $\pm 6.5$  | $\pm 10$ | +11<br>+2 | +15<br>+2 | +17<br>+8  | +21<br>+8  | +28<br>+15 | +35<br>+22  | +41<br>+28                                | +48<br>+35                                   | —<br>+54<br>+41                              | +54<br>+41                   | +67<br>+54<br>+77<br>+64 |
| 0<br>- 39 | 0<br>- 62  | $\pm 5.5$  | $\pm 8$    | $\pm 12$ | +13<br>+2 | +18<br>+2 | +20<br>+9  | +25<br>+9  | +33<br>+17 | +42<br>+26  | +50<br>+34                                | +59<br>+43                                   | +64<br>+48<br>+70<br>+54                     | +76<br>+60<br>+86<br>+70     | —                        |
| 0<br>- 46 | 0<br>- 74  | $\pm 6.5$  | $\pm 9.5$  | $\pm 15$ | +15<br>+2 | +21<br>+2 | +24<br>+11 | +30<br>+11 | +39<br>+20 | +51<br>+32  | +60<br>+41<br>+62<br>+43                  | +72<br>+53<br>+78<br>+59                     | +85<br>+66<br>+94<br>+75                     | +106<br>+87<br>+121<br>+102  | —                        |
| 0<br>- 54 | 0<br>- 87  | $\pm 7.5$  | $\pm 11$   | $\pm 17$ | +18<br>+3 | +25<br>+3 | +28<br>+13 | +35<br>+13 | +45<br>+23 | +59<br>+37  | +73<br>+51<br>+76<br>+54                  | +93<br>+71<br>+101<br>+79                    | +113<br>+91<br>+126<br>+104                  | +146<br>+124<br>+166<br>+144 | —                        |
| 0<br>- 63 | 0<br>- 100 | $\pm 9$    | $\pm 12.5$ | $\pm 20$ | +21<br>+3 | +28<br>+3 | +33<br>+15 | +40<br>+15 | +52<br>+27 | +68<br>+43  | +88<br>+63<br>+90<br>+65<br>+93<br>+68    | +117<br>+92<br>+125<br>+100<br>+133<br>+108  | +147<br>+122<br>+159<br>+134<br>+171<br>+146 | —                            | —                        |
| 0<br>- 72 | 0<br>- 115 | $\pm 10$   | $\pm 14.5$ | $\pm 23$ | +24<br>+4 | +33<br>+4 | +37<br>+17 | +46<br>+17 | +60<br>+31 | +79<br>+50  | +106<br>+77<br>+109<br>+80<br>+113<br>+84 | +151<br>+122<br>+159<br>+130<br>+169<br>+140 | —                                            | —                            | —                        |
| 0<br>- 81 | 0<br>- 130 | $\pm 11.5$ | $\pm 16$   | $\pm 26$ | +27<br>+4 | +36<br>+4 | +43<br>+20 | +52<br>+20 | +66<br>+34 | +88<br>+56  | +126<br>+94<br>+130<br>+98                | —                                            | —                                            | —                            | —                        |
| 0<br>- 89 | 0<br>- 140 | $\pm 12.5$ | $\pm 18$   | $\pm 28$ | +29<br>+4 | +40<br>+4 | +46<br>+21 | +57<br>+21 | +73<br>+37 | +98<br>+62  | +144<br>+108<br>+150<br>+114              | —                                            | —                                            | —                            | —                        |
| 0<br>- 97 | 0<br>- 155 | $\pm 13.5$ | $\pm 20$   | $\pm 31$ | +32<br>+5 | +45<br>+5 | +50<br>+23 | +63<br>+23 | +80<br>+40 | +108<br>+68 | +166<br>+126<br>+172<br>+132              | —                                            | —                                            | —                            | —                        |

P

TECHNICAL DATA

# INTERNATIONAL SYSTEM OF UNITS

## UNIT CONVERSION TABLE for EASIER CHANGE into SI UNITS (Bold type Indicates SI unit)

### ● Pressure

| Pa                      | kPa                      | MPa                      | bar                      | kgf/cm <sup>2</sup>      | atm                      | mmH <sub>2</sub> O       | mmHg or Torr             |
|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1                       | 1×10 <sup>-3</sup>       | 1×10 <sup>-6</sup>       | 1×10 <sup>-5</sup>       | 1.01972×10 <sup>-5</sup> | 9.86923×10 <sup>-6</sup> | 1.01972×10 <sup>-1</sup> | 7.50062×10 <sup>-3</sup> |
| 1×10 <sup>3</sup>       | 1                        | 1×10 <sup>-3</sup>       | 1×10 <sup>-2</sup>       | 1.01972×10 <sup>-2</sup> | 9.86923×10 <sup>-3</sup> | 1.01972×10 <sup>2</sup>  | 7.50062                  |
| 1×10 <sup>6</sup>       | 1×10 <sup>3</sup>        | 1                        | 1×10                     | 1.01972×10               | 9.86923                  | 1.01972×10 <sup>5</sup>  | 7.50062×10 <sup>3</sup>  |
| 1×10 <sup>5</sup>       | 1×10 <sup>2</sup>        | 1×10 <sup>-1</sup>       | 1                        | 1.01972                  | 9.86923×10 <sup>-1</sup> | 1.01972×10 <sup>4</sup>  | 7.50062×10 <sup>2</sup>  |
| 9.80665×10 <sup>4</sup> | 9.80665×10               | 9.80665×10 <sup>-2</sup> | 9.80665×10 <sup>-1</sup> | 1                        | 9.67841×10 <sup>-1</sup> | 1×10 <sup>4</sup>        | 7.35559×10 <sup>2</sup>  |
| 1.01325×10 <sup>5</sup> | 1.01325×10 <sup>2</sup>  | 1.01325×10 <sup>-1</sup> | 1.01325                  | 1.03323                  | 1                        | 1.03323×10 <sup>4</sup>  | 7.60000×10 <sup>2</sup>  |
| 9.80665                 | 9.80665×10 <sup>-3</sup> | 9.80665×10 <sup>-6</sup> | 9.80665×10 <sup>-5</sup> | 1×10 <sup>-4</sup>       | 9.67841×10 <sup>-5</sup> | 1                        | 7.35559×10 <sup>-2</sup> |
| 1.33322×10 <sup>2</sup> | 1.33322×10 <sup>-1</sup> | 1.33322×10 <sup>-4</sup> | 1.33322×10 <sup>-3</sup> | 1.35951×10 <sup>-3</sup> | 1.31579×10 <sup>-3</sup> | 1.35951×10               | 1                        |

Note 1) 1Pa=1N/m<sup>2</sup>

### ● Force

| N                  | dyn                     | kgf                      |
|--------------------|-------------------------|--------------------------|
| 1                  | 1×10 <sup>5</sup>       | 1.01972×10 <sup>-1</sup> |
| 1×10 <sup>-5</sup> | 1                       | 1.01972×10 <sup>-6</sup> |
| 9.80665            | 9.80665×10 <sup>5</sup> | 1                        |

### ● Stress

| Pa                      | MPa or N/mm <sup>2</sup> | kgf/mm <sup>2</sup>      | kgf/cm <sup>2</sup>      |
|-------------------------|--------------------------|--------------------------|--------------------------|
| 1                       | 1×10 <sup>-6</sup>       | 1.01972×10 <sup>-7</sup> | 1.01972×10 <sup>-5</sup> |
| 1×10 <sup>6</sup>       | 1                        | 1.01972×10 <sup>-1</sup> | 1.01972×10               |
| 9.80665×10 <sup>6</sup> | 9.80665                  | 1                        | 1×10 <sup>2</sup>        |
| 9.80665×10 <sup>4</sup> | 9.80665×10 <sup>-2</sup> | 1×10 <sup>-2</sup>       | 1                        |

Note 1) 1Pa=1N/m<sup>2</sup>

### ● Work / Energy / Quantity of Heat

| J                       | kW•h                     | kgf•m                    | kcal                     |
|-------------------------|--------------------------|--------------------------|--------------------------|
| 1                       | 2.77778×10 <sup>-7</sup> | 1.01972×10 <sup>-1</sup> | 2.38889×10 <sup>-4</sup> |
| 3.600 ×10 <sup>6</sup>  | 1                        | 3.67098×10 <sup>5</sup>  | 8.6000 ×10 <sup>2</sup>  |
| 9.80665                 | 2.72407×10 <sup>-6</sup> | 1                        | 2.34270×10 <sup>-3</sup> |
| 4.18605×10 <sup>3</sup> | 1.16279×10 <sup>-3</sup> | 4.26858×10 <sup>2</sup>  | 1                        |

Note 1) 1J=1W•s, 1J=1N•m

1cal=4.18605J

(By the law of weights and measures)

### ● Power (Rate of Production / Motive Power) /Heat Flow Rate

| W                      | kgf•m/s                  | PS                       | kcal/h                   |
|------------------------|--------------------------|--------------------------|--------------------------|
| 1                      | 1.01972×10 <sup>-1</sup> | 1.35962×10 <sup>-3</sup> | 8.6000 ×10 <sup>-1</sup> |
| 9.80665                | 1                        | 1.33333×10 <sup>-2</sup> | 8.43371                  |
| 7.355 ×10 <sup>2</sup> | 7.5 ×10                  | 1                        | 6.32529×10 <sup>2</sup>  |
| 1.16279                | 1.18572×10 <sup>-1</sup> | 1.58095×10 <sup>-3</sup> | 1                        |

Note 1) 1W=1J/s, PS:French horse power

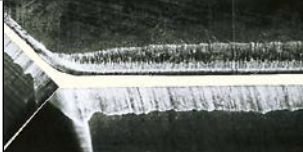
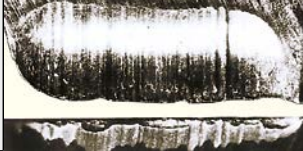
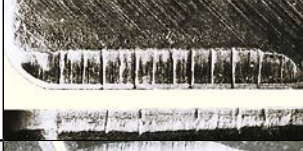
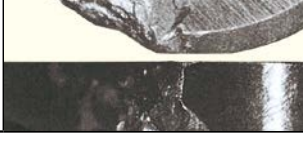
1PS=0.7355kW

1cal=4.18605J

(By the law of weights and measures)

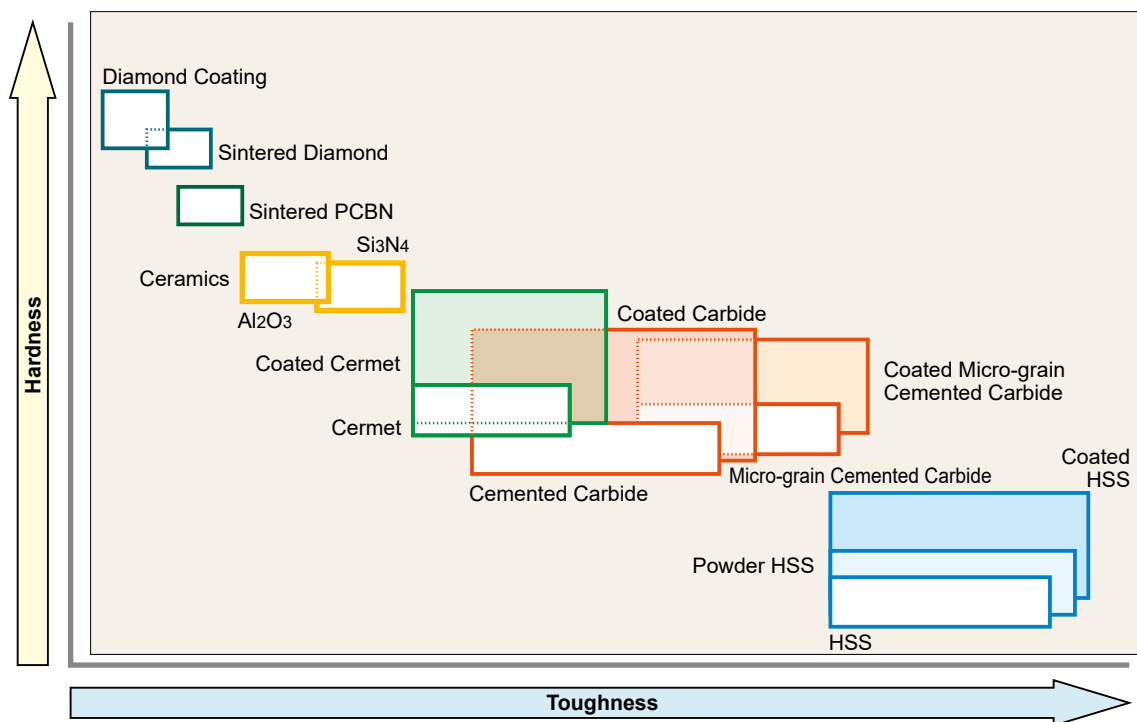
# TOOL WEAR AND DAMAGE

## CAUSES AND COUNTERMEASURES

| Tool Damage Form                                     |                                                                                     | Cause                                                                                                                                                                                                                | Countermeasure                                                                                                                                                                                                                              |
|------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flank Wear                                           |    | <ul style="list-style-type: none"> <li>• Tool grade is too soft.</li> <li>• Cutting speed is too high.</li> <li>• Flank angle is too small.</li> <li>• Feed rate is extremely low.</li> </ul>                        | <ul style="list-style-type: none"> <li>• Tool grade with high wear resistance.</li> <li>• Lower cutting speed.</li> <li>• Increase flank angle.</li> <li>• Increase feed rate.</li> </ul>                                                   |
| Crater Wear                                          |    | <ul style="list-style-type: none"> <li>• Tool grade is too soft.</li> <li>• Cutting speed is too high.</li> <li>• Feed rate is too high.</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>• Tool grade with high wear resistance.</li> <li>• Lower cutting speed.</li> <li>• Lower feed rate.</li> </ul>                                                                                       |
| Chipping                                             |    | <ul style="list-style-type: none"> <li>• Tool grade is too hard.</li> <li>• Feed rate is too high.</li> <li>• Lack of cutting edge strength.</li> <li>• Lack of shank or holder rigidity.</li> </ul>                 | <ul style="list-style-type: none"> <li>• Tool grade with high toughness.</li> <li>• Lower feed rate.</li> <li>• Increase honing size. (Round honing is to be changed to chamfer honing.)</li> <li>• Use a large tool shank size.</li> </ul> |
| Fracture                                             |    | <ul style="list-style-type: none"> <li>• Tool grade is too hard.</li> <li>• Feed rate is too high.</li> <li>• Lack of cutting edge strength.</li> <li>• Lack of shank or holder rigidity.</li> </ul>                 | <ul style="list-style-type: none"> <li>• Tool grade with high toughness.</li> <li>• Lower feed rate.</li> <li>• Increase honing. (Round honing is to be changed to chamfer honing.)</li> <li>• Use large shank size.</li> </ul>             |
| Plastic Deformation                                  |   | <ul style="list-style-type: none"> <li>• Tool grade is too soft.</li> <li>• Cutting speed is too high.</li> <li>• Depth of cut and feed rate are too large.</li> <li>• Cutting temperature is high.</li> </ul>       | <ul style="list-style-type: none"> <li>• Tool grade with high wear resistance.</li> <li>• Lower cutting speed.</li> <li>• Decrease depth of cut and feed rate.</li> <li>• Tool grade with high thermal conductivity.</li> </ul>             |
| Welding                                              |  | <ul style="list-style-type: none"> <li>• Cutting speed is low.</li> <li>• Poor sharpness.</li> <li>• Unsuitable grade.</li> </ul>                                                                                    | <ul style="list-style-type: none"> <li>• Increase cutting speed. (For DIN Ck45, cutting speed 80m/min.)</li> <li>• Increase rake angle.</li> <li>• Tool grade with low affinity. (Coated grade, cermet grade)</li> </ul>                    |
| Thermal Cracks                                       |  | <ul style="list-style-type: none"> <li>• Expansion or shrinkage due to cutting heat.</li> <li>• Tool grade is too hard.</li> <li>• *Especially in milling.</li> </ul>                                                | <ul style="list-style-type: none"> <li>• Dry cutting. (For wet cutting, flood workpiece with cutting fluid)</li> <li>• Tool grade with high toughness.</li> </ul>                                                                           |
| Notching                                             |  | <ul style="list-style-type: none"> <li>• Hard surfaces such as uncut surfaces, chilled parts and machining hardened layers.</li> <li>• Friction caused by jagged shape chips. (Caused by small vibration)</li> </ul> | <ul style="list-style-type: none"> <li>• Tool grade with high wear resistance.</li> <li>• Increase rake angle to improve sharpness.</li> </ul>                                                                                              |
| Flaking                                              |  | <ul style="list-style-type: none"> <li>• Cutting edge welding and adhesion.</li> <li>• Poor chip disposal.</li> </ul>                                                                                                | <ul style="list-style-type: none"> <li>• Increase rake angle to improve sharpness.</li> <li>• Enlarge chip pocket.</li> </ul>                                                                                                               |
| Flank Wear Fracture<br>*Damage for polycrystallines  |  | <ul style="list-style-type: none"> <li>• Damage due to the lack of strength of a curved cutting edge.</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>• Increase honing.</li> <li>• Tool grade with high toughness.</li> </ul>                                                                                                                             |
| Crater Wear Fracture<br>*Damage for polycrystallines |  | <ul style="list-style-type: none"> <li>• Tool grade is too soft.</li> <li>• Cutting resistance is too high and causes high cutting heat.</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>• Decrease honing.</li> <li>• Tool grade with high wear resistance.</li> </ul>                                                                                                                       |

# CUTTING TOOL MATERIALS

Cemented carbide (WC-Co) was developed in 1923 and was later improved by adding TiC and TaC. In 1969, CVD coating technology was developed and coated carbide has since been widely used. TiC-TiN based cermet was developed in 1974. Today, "Coated carbide grades for roughing and cermet for finishing" is a well established method.

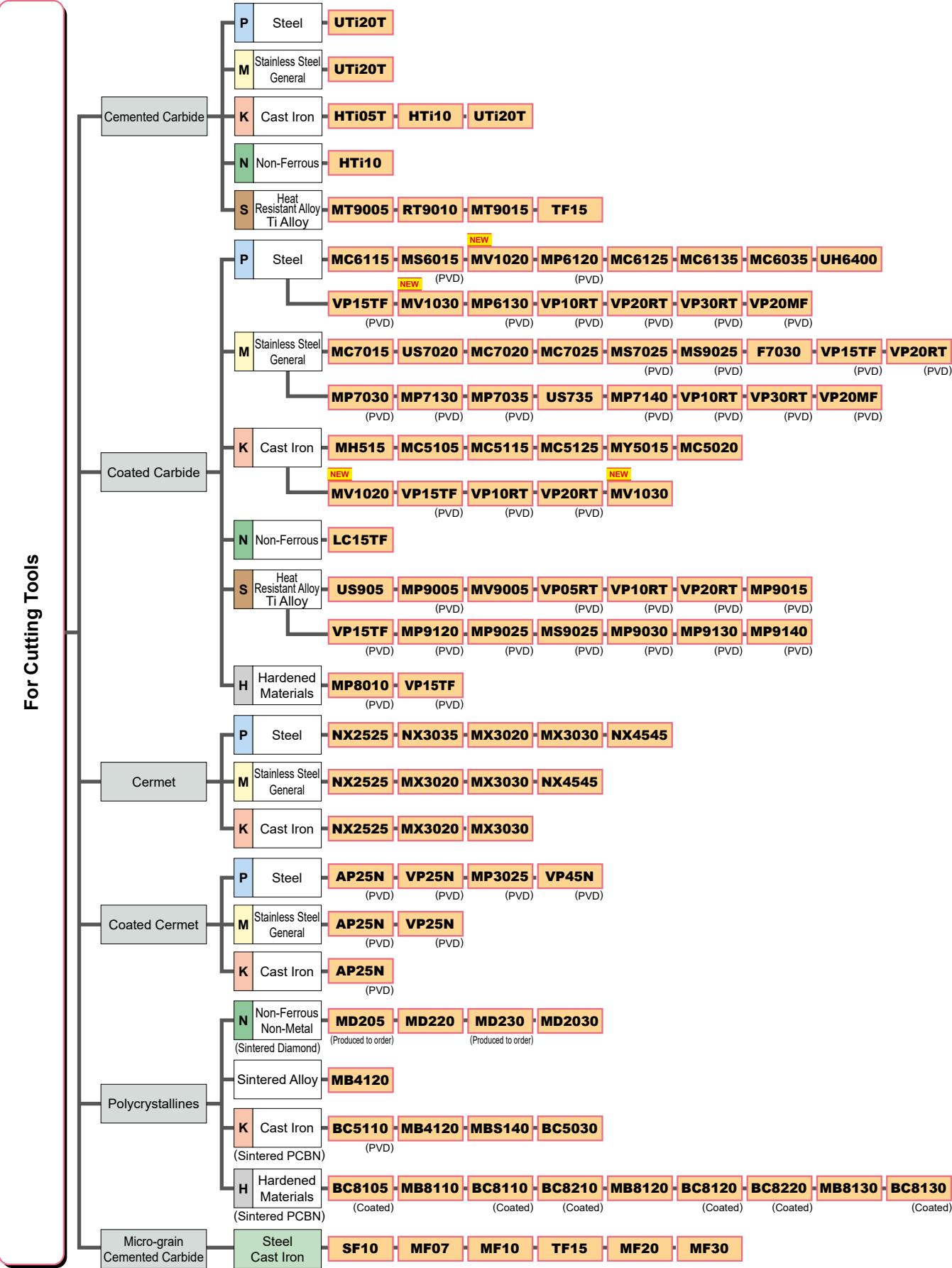


## GRADE CHARACTERISTICS

| Hard Materials                 | Hardness (HV) | Energy Formation (kcal/g·atom) | Solubility in Iron (%.1250°C) | Thermal Conductivity (W/m·k) | Thermal * Expansion (x 10 <sup>-6</sup> /k) | Tool Material                |
|--------------------------------|---------------|--------------------------------|-------------------------------|------------------------------|---------------------------------------------|------------------------------|
| Diamond                        | >9000         | —                              | Highly Soluble                | 2100                         | 3.1                                         | Sintered Diamond             |
| PCBN                           | >4500         | —                              | —                             | 1300                         | 4.7                                         | Sintered PCBN                |
| Si <sub>3</sub> N <sub>4</sub> | 1600          | —                              | —                             | 100                          | 3.4                                         | Ceramics                     |
| Al <sub>2</sub> O <sub>3</sub> | 2100          | -100                           | ≠0                            | 29                           | 7.8                                         | Ceramics<br>Cemented Carbide |
| TiC                            | 3200          | -35                            | < 0.5                         | 21                           | 7.4                                         | Cermet<br>Coated Carbide     |
| TiN                            | 2500          | -50                            | —                             | 29                           | 9.4                                         | Cermet<br>Coated Carbide     |
| TaC                            | 1800          | -40                            | 0.5                           | 21                           | 6.3                                         | Cemented Carbide             |
| WC                             | 2100          | -10                            | 7                             | 121                          | 5.2                                         | Cemented Carbide             |

\*1W/m·K=2.39×10<sup>-3</sup>cal/cm·sec·°C

# GRADE CHAIN



P

TECHNICAL DATA

GRADES COMPARISON TABLE

CEMENTED CARBIDE

|         | ISO            | Mitsubishi | Sandvik                    | Kennametal           | Seco                | Iscar                | Sumitomo              | Tungaloy      | Kyocera       | Dijet        | MOLDINO      |
|---------|----------------|------------|----------------------------|----------------------|---------------------|----------------------|-----------------------|---------------|---------------|--------------|--------------|
|         | Classification | Symbol     | Materials                  |                      | Tools               |                      | Electric              |               |               |              |              |
| Turning | P              | P01        |                            |                      |                     |                      |                       |               |               |              |              |
|         |                | P10        |                            |                      |                     | IC70                 | ST10P                 | TH10          |               |              | WS10         |
|         |                | P20        | UTi20T                     |                      |                     | IC70<br>IC50M        | ST20E                 | KS20          |               |              | EX35         |
|         |                | P30        | UTi20T                     |                      |                     | IC50M<br>IC54        | A30<br>A30N           | UX30<br>KS15F |               |              | EX35         |
|         |                | P40        |                            |                      |                     | IC54                 | ST40E                 | TX40          |               |              | EX35         |
|         | M              | M10        |                            | KU10<br>K313<br>K68  | 890                 | IC07                 | EH510                 | TH10          |               |              | WA10B        |
|         |                | M20        | UTi20T                     | KU10<br>K313<br>K68  | HX<br>883           | IC07<br>IC08<br>IC20 | EH520                 | KS20          |               |              | EX35         |
|         |                | M30        | UTi20T                     |                      |                     | IC08<br>IC20<br>IC28 | A30<br>A30N           | UX30          |               |              | EX35         |
|         |                | M40        |                            |                      |                     | IC28                 |                       | TU40          |               |              |              |
|         | K              | K01        | HTi05T                     | KU10<br>K313<br>K68  |                     |                      | H1<br>H2              | KS05F         |               |              | WH01<br>WH05 |
|         |                | K10        | HTi10                      | KU10<br>K313<br>K68  | 890                 | IC20                 | EH510                 | TH10          | KW10<br>GW15  | KT9          | WH10         |
|         |                | K20        | UTi20T                     | KU10<br>K313<br>K68  | HX                  | IC20                 | G10E<br>H10E<br>EH520 | KS15F<br>KS20 | GW25          | KT9          | WH20         |
|         |                | K30        | UTi20T                     |                      | 883                 |                      | G10E<br>H10E          |               |               |              |              |
|         | N              | N01        |                            |                      |                     |                      | H1<br>H2              | KS05F         | GW05<br>KW10  |              |              |
|         |                | N10        | HTi10                      | KU10<br>K313<br>K68  | 890                 | IC08<br>IC20         | EH510                 | TH10          | KW10<br>GW15  | KT9          | WH10         |
|         |                | N20        |                            | KU10<br>K313<br>K68  | HX<br>KX            | IC08<br>IC20         | G10E<br>EH520         | KS15F         |               | KT9          | WH20         |
|         |                | N30        |                            |                      | 883                 |                      |                       |               |               |              |              |
|         | S              | S01        | MT9005                     |                      |                     |                      |                       |               | SW05          |              |              |
|         |                | S10        | MT9005<br>RT9010<br>MT9015 | H10A<br>H10F<br>H13A | KU10<br>K313<br>K68 | HX<br>883            | IC07<br>IC08          | EH510         | KS05F<br>TH10 | SW10         | WH13S        |
|         |                | S20        | RT9010<br>TF15             |                      | KU10<br>K313<br>K68 | 883                  | IC07<br>IC08          | EH520         | KS15F<br>KS20 | SW25         |              |
|         |                | S30        | TF15                       |                      |                     |                      |                       |               |               |              |              |
| Milling | P              | P10        |                            |                      |                     |                      |                       |               |               |              |              |
|         |                | P20        | UTi20T                     |                      | K125M               |                      | IC50M<br>IC28         | A30N          |               |              | EX35         |
|         |                | P30        | UTi20T                     | SM30                 | GX                  |                      | IC50M<br>IC28         | A30N          | UX30          |              | EX35         |
|         |                | P40        |                            |                      |                     |                      | IC28                  |               |               |              | EX35         |
|         | M              | M10        |                            |                      |                     |                      |                       |               |               |              |              |
|         |                | M20        | UTi20T                     |                      |                     |                      | IC08<br>IC20          | A30N          |               |              | EX35         |
|         |                | M30        | UTi20T                     | SM30                 |                     |                      | IC08<br>IC28          | A30N          |               |              | EX35         |
|         |                | M40        |                            |                      |                     |                      | IC28                  |               |               |              |              |
|         | K              | K01        | HTi05T                     |                      | K115M,K313          |                      |                       |               |               |              |              |
|         |                | K10        | HTi10                      |                      | K115M<br>K313       |                      | IC20                  | G10E          | TH10          | KW10<br>GW25 | KT9<br>WH10  |
|         |                | K20        | UTi20T                     | H13A                 |                     | HX                   | IC20                  | G10E          |               | GW25         | FZ15<br>WH20 |
|         |                | K30        | UTi20T                     |                      |                     |                      |                       |               |               |              |              |

Note 1) The tables above are based on published data and not authorized by each manufacturer.

## MICRO GRAIN

|               | ISO<br>Classification | ISO<br>Symbol | Mitsubishi<br>Materials | Sandvik                    | Kennametal | Seco<br>Tools | Sumitomo<br>Electric | Tungaloy                | Kyocera | Dijet                | MOLDINO              |
|---------------|-----------------------|---------------|-------------------------|----------------------------|------------|---------------|----------------------|-------------------------|---------|----------------------|----------------------|
| Cutting Tools | Z                     | Z01           | SF10<br>MF07<br>MF10    | PN90<br>6UF,H3F<br>8UF,H6F |            |               | F0                   | F<br>MD05F<br>MD1508    |         | FZ05<br>FB05<br>FB10 | NM08                 |
|               |                       | Z10           | HTi10<br>MF20           | H10F                       |            | 890           | XF1<br>F1<br>AFU     | MD10<br>MD0508<br>MD07F | FW30    | FZ10<br>FZ15<br>FB15 | NM10<br>NM12<br>NM15 |
|               |                       | Z20           | TF15<br>MF30            | H15F                       |            | 890<br>883    | AF0<br>SF2<br>AF1    | EM10<br>MD20<br>G1F     |         | FZ15<br>FB15<br>FB20 | BRM20<br>EF20N       |
|               |                       | Z30           |                         |                            |            | 883           | A1<br>CC             |                         |         | FZ20<br>FB20         | NM25<br>NM40         |

## CERMET

|         | ISO<br>Classification | ISO<br>Symbol | Mitsubishi<br>Materials                         | Sandvik | Kennametal                           | Seco<br>Tools                   | Iscar                                         | Sumitomo<br>Electric                              | Tungaloy                              | Kyocera                                            | Dijet                          | MOLDINO                    |
|---------|-----------------------|---------------|-------------------------------------------------|---------|--------------------------------------|---------------------------------|-----------------------------------------------|---------------------------------------------------|---------------------------------------|----------------------------------------------------|--------------------------------|----------------------------|
| Turning | P                     | P01           | AP25N*<br>VP25N*                                |         |                                      |                                 | IC20N<br>IC520N*                              | T1000A                                            | NS520<br>GT720*                       | CCX*<br>TN610<br>PV710*<br>PV30*                   | LN10                           |                            |
|         |                       | P10           | NX2525<br>AP25N*<br>VP25N*                      | CT5015  | KT315<br>KTP10*<br>KT125             | TP1020<br>TP1030*<br>CM<br>CMP* | IC20N<br>IC520N*<br>IC530N*                   | T1500A<br>T1500Z*                                 | NS520<br>NS9530<br>GT9530*<br>AT9530* | CCX*<br>TN60<br>TN610<br>PV710*<br>TN620<br>PV720* | CX75<br>PX75*                  | CZ25*                      |
|         |                       | P20           | NX2525<br>AP25N*<br>VP25N*<br>NX3035<br>MP3025* | GC1525* | KT325<br>KTP10*<br>KT1120<br>KT5020* | TP1020<br>TP1030*               | IC20N<br>IC520N*<br>IC30N<br>IC530N*<br>IC75T | T1500A<br>T1500Z*<br>T2500A<br>T2500Z*<br>T3000Z* | NS9530<br>GT9530*<br>AT9530*          | TN60<br>TN620<br>PV720*<br>TN6020                  | CX75<br>PX75*<br>CX90<br>PX90* | CH550<br>CZ25*             |
|         |                       | P30           | MP3025*<br>VP45N*                               |         |                                      |                                 | IC75T                                         | T3000Z*                                           |                                       | PV730*<br>PV90*                                    | CX90<br>PX90*                  |                            |
|         | M                     | M10           | NX2525<br>AP25N*<br>VP25N*                      | GC1525* | KT315<br>KTP10*                      | TP1020<br>TP1030*<br>CM<br>CMP* |                                               | T1000A<br>T1500Z*                                 |                                       | TN60<br>TN620<br>PV720*<br>TN6020                  | LN10                           | CZ25*                      |
|         |                       | M20           | NX2525<br>AP25N*<br>VP25N*                      |         |                                      |                                 |                                               | T1500A<br>T1500Z*                                 |                                       | TN90<br>TN6020<br>TN620<br>PV720*<br>PV90*         | CX75<br>PX75<br>CX90           | CH550<br>CZ25*             |
|         |                       | M30           |                                                 |         |                                      |                                 |                                               |                                                   |                                       | PV730*                                             |                                |                            |
|         | K                     | K01           | NX2525<br>AP25N*                                |         |                                      |                                 |                                               | T1000A                                            | NS520<br>GT720*                       | CCX*<br>PV7005*                                    | LN10                           |                            |
|         |                       | K10           | NX2525<br>AP25N*                                | CT5015  | KT315<br>KTP10*                      |                                 |                                               |                                                   | NS520<br>NS9530<br>GT9530*            | CCX*<br>PV7005*<br>TN60                            |                                | CZ25*                      |
|         |                       | K20           | NX2525<br>AP25N*                                |         |                                      |                                 |                                               |                                                   |                                       |                                                    |                                | CH550                      |
| Milling | P                     | P10           | NX2525                                          |         |                                      | C15M                            | IC30N                                         |                                                   |                                       | TN100M<br>TN60                                     | CX75                           | MZ1000*                    |
|         |                       | P20           | MX3020<br>NX2525                                | CT530   | KT530M<br>HT7<br>KT605M              | C15M<br>MP1020                  | IC30N                                         | T250A<br>T2500A                                   |                                       | TN100M<br>TN620M<br>TN60                           | CX75<br>CX90                   | CH550<br>CH7030<br>MZ1000* |
|         |                       | P30           | MX3030<br>NX4545                                |         |                                      |                                 | IC30N                                         | T4500A                                            | NS740                                 |                                                    | CX90                           | CH7035                     |
|         | M                     | M10           | NX2525                                          |         |                                      |                                 | IC30N                                         |                                                   |                                       | TN60                                               |                                |                            |
|         |                       | M20           | MX3020<br>NX2525                                | CT530   | KT530M<br>HT7<br>KT605M              | C15M                            | IC30N                                         | T250A<br>T2500A                                   |                                       | TN100M                                             | CX75                           |                            |
|         |                       | M30           | MX3030<br>NX4545                                |         |                                      |                                 |                                               | T4500A                                            |                                       |                                                    |                                |                            |
|         | K                     | K01           |                                                 |         |                                      |                                 |                                               |                                                   |                                       |                                                    |                                |                            |
|         |                       | K10           | NX2525                                          |         |                                      |                                 |                                               |                                                   |                                       | TN60                                               | CX75                           |                            |
|         |                       | K20           | NX2525                                          |         | KT530M<br>HT7                        |                                 |                                               |                                                   |                                       |                                                    | CX75                           |                            |

\*Coated Cermet

Note 1) The tables above are based on published data and not authorized by each manufacturer.



# GRADES COMPARISON TABLE

## CVD COATED GRADE

|         | ISO<br>Classification | Symbol | Mitsubishi<br>Materials              | Sandvik                    | Kennametal                               | Seco<br>Tools                          | Iscar                      | Sumitomo<br>Electric                             | Tungaloy                         | Kyocera                                                 | Dijet            | MOLDINO                            |
|---------|-----------------------|--------|--------------------------------------|----------------------------|------------------------------------------|----------------------------------------|----------------------------|--------------------------------------------------|----------------------------------|---------------------------------------------------------|------------------|------------------------------------|
|         |                       |        |                                      |                            |                                          |                                        |                            |                                                  |                                  |                                                         |                  |                                    |
| Turning | P                     | P01    | MC6115                               | GC4305<br>GC4405<br>GC4415 | KCP05B<br>KCP05                          | TP0501<br>TP1501                       | IC9150<br>IC8150<br>IC428  | AC810P<br>AC8015P                                | T9105<br>T9205                   | CA510<br>CA115P<br>CA5505                               | JC110V           | HG8010                             |
|         |                       | P10    | MC6115<br>MY5015<br>MC6125           | GC4315<br>GC4325<br>GC4415 | KCP10B<br>KCP10<br>KCP25                 | TP1501<br>TP2501                       | IC9150<br>IC8150<br>IC8250 | AC810P<br>AC8020P                                | T9205<br>T9105<br>T9115<br>T9215 | CA510<br>CA115P<br>CA5505<br>CA515<br>CA5515            | JC110V<br>JC215V | HG8010<br>HG8025<br>GM8020         |
|         |                       | P20    | MC6115<br>MC6125<br>MC6135<br>MY5015 | GC4315<br>GC4325<br>GC4425 | KCP25B<br>KCP30B<br>KCP25<br>KCP25C      | TP2501                                 | IC8250<br>IC9250<br>IC8350 | AC8020P<br>AC820P<br>AC2000<br>AC8025P           | T9115<br>T9125<br>T9215<br>T9225 | CA025P CA125P<br>CA515 CA5515<br>CA525 CA5525<br>CR9025 | JC110V<br>JC215V | HG8025<br>GM8020<br>GM25           |
|         |                       | P30    | MC6125<br>MC6135<br>UH6400           | GC4325<br>GC4335<br>GC4425 | KCP30B<br>KCP30                          | TP3501                                 | IC8350<br>IC9250<br>IC9350 | AC6030M<br>AC8035P<br>AC830P<br>AC630M           | T9125<br>T9135<br>T9225<br>T9235 | CA025P CA125P<br>CA525 CA5525<br>CA530 CA5535<br>CR9025 | JC215V<br>JC325V | GM25<br>GM8035                     |
|         |                       | P40    | MC6035<br>UH6400                     | GC4335                     | KCP40<br>KCP40B                          | TP3501<br>TP40                         | IC9350                     | AC6030M<br>AC8035P<br>AC630M<br>AC830P           | T9135<br>T9235                   | CA530<br>CA5535                                         | JC325V           | GM8035<br>GX30                     |
|         | M                     | M10    | MC7015<br>US7020                     | GC2015<br>GC2220           | KCM15B<br>KCM15                          | TM1501<br>TM2000                       | IC6015<br>IC8250           | AC610M<br>AC6020M                                | T6120<br>T6215                   | CA6515                                                  |                  |                                    |
|         |                       | M20    | MC7015<br>US7020<br>MC7025           | GC2015<br>GC2220           | KCM15<br>KCM25B<br>KCP40B                | TM2000<br>TM2501                       | IC8150<br>IC6015           | AC6020M<br>AC610M<br>AC6030M<br>AC630M           | T6120<br>T6215                   | CA6515<br>CA6525                                        |                  | HG8025<br>GM25                     |
|         |                       | M30    | MC7025<br>US735                      | GC2025                     | KCM35B<br>KCP40                          | TM4000<br>TM3501                       | IC8250<br>IC6025           | AC6030M<br>AC630M                                | T6130                            | CA6525                                                  |                  | GM8035<br>GX30                     |
|         |                       | M40    | US735                                | GC2025                     | KCM35B                                   | TM4000<br>TM3501                       | IC6025                     | AC6030M<br>AC630M                                |                                  |                                                         |                  | GX30                               |
|         | K                     | K01    | MC5105                               | GC3205<br>GC3210           | KCK05B<br>KCK05                          | TK0501<br>TH1500                       | IC5005                     | AC405K<br>AC4010K                                | T505<br>T5105                    | CA4505<br>CA310                                         |                  | HX3505                             |
|         |                       | K10    | MC5115<br>MH515<br>MY5015            | GC3205<br>GC3210           | KCK15B<br>KCK15<br>KCK20<br>KCK20B       | TK0501<br>TK1501                       | IC5005<br>IC5010<br>IC428  | AC405K<br>AC4010K<br>AC410K<br>AC4015K<br>AC415K | T515<br>T5115                    | CA315<br>CA4515                                         |                  | HX3515<br>HG8010                   |
|         |                       | K20    | MC5125<br>MH515<br>MY5015            | GC3225                     | KCK20B<br>KCK20                          | TK1501                                 | IC5010<br>IC8150           | AC4015K<br>AC415K<br>AC420K<br>AC4125K           | T5115<br>T5125                   | CA320<br>CA4515                                         |                  | HG8025<br>GM8020                   |
|         |                       | K30    | MC6115                               | GC3225                     | KCPK05                                   |                                        |                            | AC8025P<br>AC4125K                               | T5125                            |                                                         |                  | HG8025<br>GM8020                   |
|         | S                     | S01    | MV9005<br>US905                      | S05F<br>S205               |                                          |                                        |                            |                                                  |                                  | CA6515<br>CA6525                                        |                  | HS9105<br>HS9115                   |
| Milling | P                     | P10    | MV1020<br>MV1030                     |                            |                                          | MP1501                                 | IC5400<br>IC5600           | ACP2000<br>XCU2500<br>ACP100                     |                                  |                                                         |                  |                                    |
|         |                       | P20    | MV1020<br>MV1030<br>MC7020<br>F7030  | GC4220                     | KCPM20                                   | MP1501<br>MP2501<br>MP3501<br>T25M     | IC5400<br>IC5500           | ACP2000<br>XCU2500<br>ACP100                     | T3130<br>T3225                   |                                                         |                  | GX2140<br>GF30                     |
|         |                       | P30    | MV1020<br>MV1030<br>MC7020<br>F7030  | GC4330                     | KCPK30                                   | MP1501 MP2501<br>MP3501 MS2500<br>T25M | IC5500                     | XCU2500<br>ACP100                                | T3130<br>T3225                   |                                                         |                  | GX2140<br>GX2160<br>GF30           |
|         |                       | P40    |                                      | GC4340                     | KC935M<br>KC530M                         | MP2501 MP3501<br>MS2500 MM4500         |                            |                                                  |                                  |                                                         |                  | GX2030<br>GX2160                   |
|         | M                     | M10    | MV1030                               |                            |                                          | MP2501                                 |                            | XCU2500<br>XCS2000                               |                                  |                                                         |                  |                                    |
|         |                       | M20    | MV1030<br>MC7020<br>F7030            |                            | KC925M                                   | MP2501 MP3501<br>MS2500 T25M<br>MM4500 |                            | ACP100<br>ACM200<br>XCU2500<br>XCS2000           | T3130<br>T3225                   | CA6535                                                  |                  | AX2040<br>GX2140                   |
|         |                       | M30    | MV1030<br>MC7020<br>F7030            | GC2040                     | KC930M                                   | MP2501 MP3501<br>MS2500 T25M<br>MM4500 | IC5820                     | ACP100<br>XCU2500<br>ACM200<br>XCS2000           | T3130<br>T3225                   | CA6535                                                  |                  | AX2040<br>GX2140<br>GX2160<br>GX30 |
|         |                       | M40    |                                      |                            | KC930M<br>KC935M                         | MP3501<br>MM4500                       |                            |                                                  |                                  |                                                         |                  | GX2160                             |
|         | K                     | K10    | MV1020 MV1030<br>MC520 MC5020        |                            | KCK15                                    | MK1500                                 |                            | XCK2000<br>ACK2000                               | T1215<br>T1115                   | CA420M                                                  | JC605W           | GX2120                             |
|         |                       | K20    | MV1020 MV1030<br>MC520 MC5020        | GC3330<br>K20W             | KC915M                                   | MK1500<br>MP1501                       | IC5100                     | ACK2000<br>XCU2500<br>XCK2000 ACK200             | T1115                            |                                                         | JC605W           | GX2120                             |
|         |                       | K30    | MV1030                               | GC3330<br>GC3040           | KC920M<br>KC925M KCPK30<br>KC930M KC935M | MK1500 MP1501<br>MP2501 MP3501         | IC5100<br>DT7150           |                                                  |                                  |                                                         |                  |                                    |
|         |                       | K40    |                                      |                            |                                          | MP3501                                 |                            |                                                  |                                  |                                                         |                  |                                    |
|         | S                     | Ni     |                                      |                            |                                          | MS2500<br>MP3501                       |                            | XCS2000                                          |                                  | CA6535                                                  |                  |                                    |
|         |                       | Ti     |                                      | S40T                       |                                          | MP3501                                 |                            |                                                  |                                  |                                                         |                  |                                    |

Note 1) The tables above are based on published data and not authorized by each manufacturer.

## PVD COATED GRADE

|         | ISO<br>Classification | Symbol | Mitsubishi<br>Materials                                  | Sandvik                              | Kennametal                                                                 | Seco<br>Tools                           | Iscar                                                                          | Sumitomo<br>Electric                    | Tungaloy                                                                 | Kyocera                                                         | Dijet                             | MOLDINO                         |
|---------|-----------------------|--------|----------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------|---------------------------------|
| Turning | P                     | P10    | VP10MF<br>MS6015                                         | GC1125                               | KCU10<br>KCU10B<br>KC5010<br>KC5510                                        | CP200<br>TS2000                         | IC250<br>IC807<br>IC907<br>IC908                                               |                                         | AH710                                                                    | PR1705<br>PR930 PR1025<br>PR1115 PR1225<br>PR1725 PR2025        |                                   |                                 |
|         |                       | P20    | VP10RT<br>VP20RT<br>VP15TF<br>VP20MF<br>MS6015           | GC1125                               | KCS10<br>KCU10<br>KCU10B<br>KC5025<br>KC5525                               | TS2500                                  | IC1007<br>IC250 IC308<br>IC807 IC808<br>IC907 IC908<br>IC1008<br>IC1028 IC3028 |                                         | AH725<br>AH120<br>J740<br>SH730<br>SH725<br>SH7025                       | PR930 PR1025<br>PR1725 PR1115<br>PR1225 PR1425<br>PR1535 PR2025 |                                   | IP2000                          |
|         |                       | P30    | VP10RT<br>VP20RT<br>VP15TF<br>VP20MF<br>MS7025           | GC1125                               | KCU25<br>KC5525                                                            | CP500                                   | IC228 IC250<br>IC328 IC330<br>IC354 IC528<br>IC1008<br>IC1028                  | AC1030U<br>AC530U                       | AH725 AH120<br>SH730 GH730<br>GH130 AH740<br>J740 SH725<br>AH7025 SH7025 | PR1025 PR1725<br>PR1225 PR1425<br>PR1535 PR1625<br>PR2025       |                                   | IP3000                          |
|         |                       | P40    |                                                          |                                      |                                                                            | CP500<br>CP600                          | IC228 IC328<br>IC528 IC928<br>IC1008 IC1028                                    |                                         | AH740                                                                    | PR1535                                                          |                                   |                                 |
|         | M                     | M01    |                                                          |                                      |                                                                            | CP200 TS2000                            |                                                                                |                                         |                                                                          | PR1725                                                          | JC5003                            |                                 |
|         |                       | M10    | VP10MF                                                   | GC1115<br>GC1125<br>GC1105           | KCS10<br>KCU10<br>KCU10B<br>KC5010                                         | CP200<br>TS2000<br>TS2500               | IC354<br>IC807<br>IC907<br>IC1007                                              |                                         | AC8005<br>AH630<br>AH6225                                                | PR1025 PR1225<br>PR930 PR1725<br>PR120S                         | JC5003<br>JC8015<br>JC5015        | IP050S                          |
|         |                       | M20    | VP10RT<br>VP20RT<br>VP15TF<br>VP20MF<br>MS7025<br>MS9025 | GC1115<br>GC1125                     | KCU25<br>KC5025<br>KCU10<br>KCU10B<br>KC5010<br>KCS10                      | TS2500<br>CP500<br>CP600                | IC354<br>IC808<br>IC908<br>IC1008<br>IC1028                                    | AC1030U<br>AC530U<br>AC6040M            | AH725<br>AH120 SH730<br>AH630<br>SH725 AH8015<br>AH7025<br>AH6225 SH7025 | PR1025<br>PR1225<br>PR930<br>PR1535<br>PR1725<br>PR120S         | JC5015<br>JC8015<br>JC5118        | IP100S                          |
|         |                       | M30    | VP10RT<br>VP20RT<br>VP15TF<br>VP20MF<br>MS7025<br>MP7035 | GC1125<br>GC2035                     | KC5025<br>KCU25                                                            | CP500<br>CP600                          | IC228<br>IC250<br>IC328<br>IC1008<br>IC1028                                    | AC530U<br>AC1030U<br>AC6040M            | AH725<br>AH120 SH730<br>J740 AH645<br>SH725<br>AH6235 SH7025             | PR1025<br>PR1725<br>PR1535<br>PR1225<br>PR120S<br>PR2035        | JC5118                            |                                 |
|         |                       | M40    | MP7035                                                   | GC2035                               |                                                                            | CP600                                   | IC328 IC928<br>IC1008<br>IC1028                                                | AC530U<br>AC6040M<br>AC1030U            | AH645<br>AH6235                                                          | PR1535<br>PR1225                                                |                                   |                                 |
|         | K                     | K10    |                                                          | GC15                                 | KCU10 KCS10<br>KC5010 KC5510                                               | CP200<br>TS2000                         | IC350<br>IC1008                                                                |                                         | GH110<br>AH110                                                           |                                                                 |                                   |                                 |
|         |                       | K20    | VP10RT<br>VP20RT<br>VP15TF                               |                                      | KCU15<br>KCU25                                                             | CP200<br>TS2000<br>TS2500               | IC228 IC808<br>IC830 IC908<br>IC1007 IC1008                                    | AC1030U<br>AC530U                       | AH7025<br>AH120                                                          |                                                                 |                                   |                                 |
|         |                       | K30    | VP10RT<br>VP20RT<br>VP15TF                               |                                      | KCU25<br>KC5525                                                            | CP500                                   | IC228 IC350<br>IC808 IC830<br>IC908 IC928<br>IC1007 IC1008                     |                                         | AH120<br>GH130                                                           |                                                                 |                                   |                                 |
|         | S                     | S01    | MP9005<br>VP05RT                                         | GC1105<br>GC1205                     |                                                                            | TH1000                                  | IC804<br>IC807<br>IC907                                                        | AC510U<br>AC5005S<br>AC5015S<br>AC5005S | AH8005                                                                   | PR005S<br>PR015S                                                | JC5003<br>JC8015<br>JC5015        | JP9105                          |
|         |                       | S10    | MP9005<br>MP9015<br>VP10RT                               | GC1105<br>GC1205<br>GC1115<br>GC1210 | KCU10 KCU10B<br>KC5010<br>KCS10<br>KCS10B                                  | CP200<br>TS2000 TS2050<br>TS2500 TH1000 | IC806<br>IC807                                                                 | AC510U<br>AC520U<br>AC5015S<br>AC5025S  | AH8005<br>AH8015                                                         | PR005S<br>PR015S<br>PR115S                                      | JC5003<br>JC5015<br>JC8015        | JP9115                          |
|         |                       | S20    | MP9015<br>MT9015                                         | GC1115<br>GC1125                     | KCU10 KCU10B<br>KCU25<br>KC5025 KCS10<br>KC5010 KCS10B                     | TS2000<br>TS2500<br>CP200               | IC228 IC328<br>IC808 IC908<br>IC928 IC806                                      | AC520U<br>AC5015S<br>AC5025S            | AH7025<br>AH8015                                                         | PR015S<br>PR1535<br>PR115S                                      | JC5015<br>JC5118                  |                                 |
|         |                       | S30    | MP9025<br>VP15TF<br>VP20RT                               | GC1125                               | KCU25<br>KC5025                                                            | CP600                                   | IC928<br>IC830                                                                 | AC1030U                                 | AH630<br>AH7025                                                          | PR1535<br>PR120S                                                | JC5118                            |                                 |
| Milling | P                     | P01    |                                                          |                                      |                                                                            |                                         |                                                                                |                                         | AH710<br>AH110                                                           |                                                                 | JC8003                            | ATH80D<br>JP4105                |
|         |                       | P10    |                                                          | GC1010<br>GC1130                     | KC505M<br>KC715M KC510M<br>KC515M                                          |                                         | IC250 IC350<br>IC808 IC810<br>IC910 IC950                                      | ACU2500<br>ACP200                       | AH120<br>AH725                                                           | PR830<br>PR1225<br>PR1825                                       | JC8003<br>JC8015 JC5015<br>JC5118 | PN15M<br>PN215 PCA12M<br>JP4115 |
|         |                       | P20    | MP6120<br>VP15TF                                         | GC1010<br>GC1030<br>GC1130<br>GC2030 | KC522M KC525M<br>KC527M KC610M<br>KC620M KC635M<br>KC715M KC730M<br>KTPK20 | F25M<br>MP3000                          | IC250<br>IC328 IC330<br>IC350 IC808<br>IC810 IC830<br>IC910 IC928<br>IC950     | ACU2500<br>ACP200                       | AH3135<br>AH3225<br>AH725 AH120<br>AH9130<br>AH6030<br>AH9030            | PR830<br>PR1225<br>PR1230<br>PR1525<br>PR1825                   | JC5015<br>JC8015<br>JC5118        | CY9020<br>JP4120<br>CY150       |

Note 1) The tables above are based on published data and not authorized by each manufacturer.

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TECHNICAL DATA

# GRADES COMPARISON TABLE

## PVD COATED GRADE

|         | ISO                 |        | Mitsubishi<br>Materials                                  | Sandvik                                      | Kennametal                                                   | Seco<br>Tools                    | Iscar                                                    | Sumitomo<br>Electric                | Tungaloy                                                        | Kyocera                                       | Dijet                                         | MOLDINO                                                |                                      |
|---------|---------------------|--------|----------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------|----------------------------------|----------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------------|--------------------------------------|
|         | Classifi-<br>cation | Symbol |                                                          |                                              |                                                              |                                  |                                                          |                                     |                                                                 |                                               |                                               |                                                        |                                      |
| Milling | P                   | P30    | MP6120<br>VP15TF<br>MP6130<br>VP30RT                     | GC1010<br>GC1030<br>GC2030<br>GC1130         | KC735M<br>KC725M<br>KC530M<br>KCPM40                         | F25M<br>MP3000<br>F30M<br>MP2050 | IC250 IC300<br>IC330 IC350<br>IC830 IC845<br>IC928 IC950 | ACU2500<br>ACP200<br>ACP300         | AH725<br>AH130<br>AH140<br>AH3035<br>AH6030<br>AH3225<br>AH9130 | PR1230<br>PR1525<br>PR1825                    | JC8050<br>JC5040<br>JC5118                    | JS4045<br>CY250<br>CY250V<br>CY25<br>HC844             |                                      |
|         |                     |        | P40                                                      | VP30RT                                       | GC2030<br>GC1030<br>GC1130                                   | KC735M<br>KCPM40                 | F40M<br>T60M                                             | IC328<br>IC330<br>IC830<br>IC928    | ACP300                                                          | AH140<br>AH3035                               | PR1525                                        | JC8050<br>JC5040                                       | JS4060<br>PTH30E<br>PTH40H<br>JS4060 |
|         | M                   | M01    |                                                          |                                              |                                                              |                                  | IC907                                                    |                                     |                                                                 |                                               |                                               |                                                        | PN08M PN208                          |
|         |                     | M10    |                                                          | GC1025 GC1030<br>GC1010 GC1130               | KC715M<br>KC515M                                             |                                  | IC903                                                    | ACU2500<br>ACM100                   | AH725                                                           | PR1225                                        |                                               |                                                        | PN15M<br>PN215                       |
|         |                     | M20    | VP15TF<br>MP7130<br>MP7030<br>VP20RT                     | GC1025<br>GC1030<br>GC1040<br>GC2030<br>S30T | KC610M KC635M<br>KC730M<br>KC522M KC525M<br>KCPM40<br>KTPK20 | F25M<br>MP3000                   | IC250<br>IC808<br>IC830<br>IC928                         | ACU2500<br>ACP200                   | AH725<br>AH6030<br>AH130<br>AH330<br>AH9130                     | PR1025<br>PR1225                              | JC5015<br>JC5118<br>JC8015                    | JP4120                                                 |                                      |
|         |                     | M30    | VP15TF<br>MP7130<br>MP7030<br>VP20RT<br>VP30RT<br>MP7140 | S30T<br>GC1040<br>GC2030                     | KC725M<br>KC735M<br>KCPM40<br>KC530M                         | F30M<br>F40M<br>MP3000<br>MP2050 | IC250 IC328<br>IC330 IC380<br>IC830 IC882<br>IC928       | ACP300<br>ACM300<br>ACK300          | AH130<br>AH140<br>AH730<br>AH3135<br>AH4035<br>AH9130           | PR830<br>PR1225<br>PR1525<br>PR1535<br>PR1835 | JC5015<br>JC8015<br>JC8050<br>JC5118          | JS4045<br>CY250                                        |                                      |
|         |                     | M40    | MP7140<br>VP30RT                                         |                                              |                                                              | F40M<br>MP2050                   | IC250<br>IC328<br>IC330<br>IC882                         | ACP300<br>ACM300                    | AH140<br>AH3135<br>AH4035                                       | PR1535<br>PR1835                              | JC8050                                        | PTH30E<br>PTH40H<br>JM4160                             |                                      |
|         | K                   | K01    | MP8010                                                   |                                              |                                                              |                                  |                                                          |                                     | AH110<br>AH330                                                  |                                               | JC8003                                        | ATH80D<br>ATH08M<br>TH308                              |                                      |
|         |                     | K10    | MP8010                                                   | GC1010                                       | KCKP10<br>KC514M<br>KC515M<br>KC527M<br>KC635M<br>KCK20B     | MK2050                           | IC350 IC810<br>IC830 IC900<br>IC910 IC928<br>IC950 IC380 | ACU2500<br>ACK3000                  | AH110<br>AH725<br>AH120<br>AH330                                | PR1210<br>PR1510<br>PR1810                    | JC8015                                        | ATH10E<br>TH315<br>CY100H                              |                                      |
|         |                     | K20    | VP15TF<br>VP20RT                                         | GC1010<br>GC1020                             | KTPK20 KC514M<br>KC610M KC520M<br>KC620M KC524M<br>KCK20B    | MK2000<br>MK2050                 | IC350 IC808<br>IC810 IC830<br>IC910 IC928<br>IC950       | ACU2500<br>ACK300<br>ACK3000        | AH120<br>AH9130<br>AH9030                                       | PR1210<br>PR1510<br>PR1810                    | JC5015<br>JC8015                              | CY150<br>JP4120<br>CY9020<br>PTH13S                    |                                      |
|         |                     | K30    | VP15TF<br>VP20RT                                         | GC1020                                       | KC522M<br>KC725M<br>KC524M<br>KC735M                         | MK2050                           | IC350 IC808<br>IC830 IC928<br>IC950                      | ACK300<br>ACK3000                   | AH120                                                           |                                               | JC5080<br>JC5015<br>JC8015                    | CY250<br>JS4045                                        |                                      |
|         | S                   | S01    |                                                          |                                              |                                                              |                                  | IC907<br>IC808                                           |                                     | AH110<br>AH710                                                  | PR1210                                        | JC8003<br>JC8015<br>JC5118                    | PN08M<br>PN208                                         |                                      |
|         |                     | S10    | MP9120<br>VP15TF                                         | GC1130<br>GC1010<br>GC1030<br>GC2030         | KC505M<br>KC510M                                             | MS2050                           | IC907<br>IC840<br>IC910<br>IC808                         | EH520Z<br>EH20Z<br>ACM100           | AH120<br>AH725                                                  | PR1210                                        | JC8003<br>JC5015<br>JC8015<br>JC5118<br>DS118 | JS1025<br>JP4120                                       |                                      |
|         |                     | S20    | MP9120<br>VP15TF<br>MP9130<br>MP9030                     | S30T<br>GC2030<br>GC1030<br>GC1130           | KC522M<br>KC525M<br>KCSM30<br>KCPM40                         | MS2050<br>MP2050                 | IC808 IC830<br>IC928 IC328<br>IC330 IC840<br>IC882 IC380 | EH520Z<br>EH20Z<br>ACK300<br>ACP300 | AH725<br>AH6030<br>AH130                                        | PR1535                                        | JC8015<br>JC5015<br>JC8050<br>JC5118<br>DS150 | PTH30H                                                 |                                      |
|         |                     | S30    | MP9140                                                   | GC2030<br>GC1040                             | KC725M<br>KCPM40                                             | MS2050 F40M<br>KCSM40            | IC830 IC882<br>IC928                                     | ACP300<br>ACM300                    | AH130<br>AH3135                                                 | PR1535                                        | JC8050<br>JC5118                              | JM4160                                                 |                                      |
|         | H                   | H01    | MP8010<br>VP05HT                                         |                                              |                                                              |                                  |                                                          |                                     | AH110<br>AH710                                                  |                                               | JC8003                                        |                                                        |                                      |
|         |                     | H10    | VP15TF<br>VP10H                                          | GC1130<br>GC1010<br>GC1030                   | KC505M<br>KC510M                                             | MH1000<br>F15M                   | IC808<br>IC907                                           |                                     | AH110<br>AH120<br>AH710                                         |                                               | JC6102<br>JC8008                              | JP4105<br>TH303<br>TH308<br>PTH08M<br>ATH08M<br>ATH80D |                                      |
|         |                     | H20    | VP15TF                                                   | GC1030<br>GC1130                             |                                                              | F15M                             | IC808<br>IC380                                           |                                     | AH120<br>AH3135<br>AH725<br>AH9030                              |                                               | JC8015<br>JC5118                              | JP4115<br>TH315                                        |                                      |
|         |                     | H30    |                                                          |                                              |                                                              | MP3000<br>F30M                   | IC380                                                    |                                     | AH3135                                                          |                                               |                                               | JP4120                                                 |                                      |

Note 1) The tables above are based on published data and not authorized by each manufacturer.

## PCBN

|         | Classification | ISO    | Mitsubishi Materials                                     | Sandvik                            | Seco Tools                                      | Iscar                                              | Sumitomo Electric                                  | Tungaloy                                  | Kyocera                                        |
|---------|----------------|--------|----------------------------------------------------------|------------------------------------|-------------------------------------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------|------------------------------------------------|
|         |                | Symbol |                                                          |                                    |                                                 |                                                    |                                                    |                                           |                                                |
| Turning | H              | H01    | BC8105<br>BC8210<br>BC8110<br>MB8110                     | CB7105<br>CB7015                   | CBN010<br>CBN060K<br>CH0550                     | IB50<br>IB10H<br>IB10HC                            | BNC2105<br>BNC2115<br>BNC2010<br>BN1000            | BXA10<br>BXM10<br>BX310                   | KBN05M<br>KBN010<br>KBN510                     |
|         |                | H10    | BC8110<br>BC8210<br>BC8120<br>BC8220<br>MB8110<br>MB8120 | CB7115<br>CB7125<br>CB7025<br>CB20 | CBN010<br>CBN060K<br>CBN150<br>CH2540<br>CH1050 | IB50<br>IB10H<br>IB10HC<br>IB55<br>IB20H<br>IB25HA | BNC2115<br>BNC2125<br>BNC2010<br>BNC2020<br>BN2000 | BXA10<br>BXA20<br>BXM10<br>BX330<br>BX530 | KBN010<br>KBN020<br>KBN05M<br>KBN25M<br>KBN525 |
|         |                | H20    | BC8220<br>BC8120<br>MB8120                               | CB7125<br>CB7025<br>CB50           | CBN150<br>CBN160C<br>CH2540<br>CH2581           | IB20H<br>IB25HA<br>IB90<br>IB25HC                  | BNC2020<br>BNC2125<br>BN2000                       | BXM20<br>BXA20<br>BX360                   | KBN020<br>KBN25M                               |
|         |                | H30    | BC8130<br>MB8130                                         | CB7135<br>CB7525                   | CBN160C<br>CH3515                               | IB90<br>IB25HC                                     | BNC300<br>BN350                                    | BXC50<br>BX380<br>BR35F                   | KBN35M                                         |
|         | S              | S01    | MB4120                                                   |                                    | CBN170                                          | IB05S                                              | BN7125<br>BN7000<br>NBC100                         | BX815                                     |                                                |
|         |                | S10    |                                                          |                                    |                                                 | IB05S<br>IB10S                                     | BNS8125                                            |                                           |                                                |
|         |                | S20    |                                                          |                                    |                                                 | IB10S                                              | BNS8125                                            |                                           |                                                |
|         |                | S30    |                                                          |                                    |                                                 |                                                    |                                                    |                                           |                                                |
|         | K              | K01    | BC5110<br>MB5015                                         | CB50                               | CBN400C                                         | IB50<br>IB55<br>IB85                               | BN7125<br>BNC500<br>BN500                          | BX910<br>BX930                            | KBN475<br>KBN60M                               |
|         |                | K10    | MB4120                                                   | CB7525                             | CBN300<br>CBN300 P<br>CBN200                    | IB50<br>IB55<br>IB85                               | BN7125<br>BN500                                    | BX480                                     | KBN475<br>KBN60M                               |
|         |                | K20    | MB4120                                                   |                                    | CBN200                                          |                                                    | BN7125<br>BNC8115<br>BNS8125                       | BX480                                     | KBN60M                                         |
|         |                | K30    | BC5030<br>MBS140                                         | CB7925                             | CBN500                                          |                                                    | BNS800<br>BNC8115<br>BNC8125                       | BXC90<br>BX90S                            | KBN900                                         |
|         | Sintered Alloy |        | MB4120                                                   |                                    | CBN200                                          | IB05S<br>IB10S                                     | BN7115<br>BN7125                                   | BX470<br>BX480                            | KBN570<br>KBN70M                               |

## PCD

|         | Classification | ISO    | Mitsubishi Materials | Sandvik        | Seco Tools      | Iscar | Sumitomo Electric | Tungaloy       | Kyocera          |
|---------|----------------|--------|----------------------|----------------|-----------------|-------|-------------------|----------------|------------------|
|         |                | Symbol |                      |                |                 |       |                   |                |                  |
| Turning | N              | N01    | MD205*               | CD05           | PCD30<br>PCD30M | ID5   | DA90              | DX180<br>DX160 | KPD230           |
|         |                | N10    | MD220                | CD10<br>CD1810 | PCD10           | ID5   | DA150             | DX160<br>DX140 | KPD010<br>KPD230 |
|         |                | N20    | MD220                |                | PCD20           |       | DA2200<br>DA1000  | DX140<br>DX110 | KPD010           |
|         |                | N30    | MD230*<br>MD2030     |                | PCD05           |       | DA2200<br>DA1000  | DX120<br>DX110 | KPD001           |

\*Non stock, produced to order only.

Note 1) The tables above are based on published data and not authorized by each manufacturer.

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TECHNICAL DATA

INSERT CHIPBREAKER  
COMPARISON TABLE

NEGATIVE INSERT TYPE

| ISO Classification | Cutting Mode        | Mitsubishi Materials   | Sandvik                  | Kennametal         | Seco Tools                            | Sumitomo Electric          | Tungaloy                                       | Kyocera                     | MOLDINO                    | Walter                         | TaeguTec                |
|--------------------|---------------------|------------------------|--------------------------|--------------------|---------------------------------------|----------------------------|------------------------------------------------|-----------------------------|----------------------------|--------------------------------|-------------------------|
| P                  | Finish              | FH, FP<br>FY, FS       | LC                       | FF, FPS            | FF1, FF2                              | FA, FB<br>FL, FE           | 01*<br>TF, 11<br>ZF                            | GP, PP, VF<br>XP, XF        | FE                         | FP5                            | FLP, FS<br>FA<br>FX     |
|                    | Light               | LP<br>SA, SH           | XF<br>PF<br>MF           | FV<br>K<br>LF, FN  | MF2                                   | SU, LU<br>SX, SE           | PS<br>NS, 27, TS<br>TSF, AS, TQ                | PQ<br>HQ, CQ                | BE<br>B, BH, CE            | MP3                            | FM<br>FG                |
|                    | Light (Mild Steel)  | SY                     |                          |                    |                                       |                            | 17                                             | XQ, XS                      |                            |                                | FC                      |
|                    | Light (With Wiper)  | SW                     | WL, WF                   | FW, FWS            | W-FF2<br>W-MF2                        | LUW, SEW                   | FW, SW<br>AFW, ASW                             | WF<br>WP, WQ                |                            | FW5                            | WS, WA                  |
|                    | Medium              | MP<br>MA<br>MH         | PM, PMC<br>QM, XM<br>XMR | MV<br>MP, P<br>MN  | MF3<br>MF5, M3<br>M5                  | GU<br>UG<br>GE, UX         | PM, NM, ZM<br>TA, TM, AM, 28<br>DM, 33, 37, 38 | PMG, PG, CJ<br>GS, PS<br>PT | CT, AB<br>AH, AR<br>AY, AE | MP5<br>MU5                     | PC, MP, FT<br>MT<br>MGP |
|                    | Medium (With Wiper) | MW                     | WMX, WM<br>WR            | MW, RW             | W-M6, W-M3<br>W-MF5                   | GUW                        |                                                | WE                          |                            | MW5                            | WT                      |
|                    | Rough               | RP<br>GH<br>Std.       | PR, HM<br>Std.           | RN, RP             | M6, MR6, MR7                          | MU, MX, ME<br>UZ           | TH, THS<br>Std.                                | PH<br>GT<br>Std.            | RE<br>Y                    | RP5, RP7                       | RGP<br>RT<br>Std.       |
|                    | Heavy               | HZ<br>HL, HM, HX<br>HV | QR, PR<br>HR, MR         | MR, RP<br>RM<br>RH | R4, R5<br>R57, RR6, R7<br>R68, RR9    | MP<br>HG, HP<br>HU, HW, HF | TRS, 57<br>TU<br>TUS, 65                       | PX<br>HX<br>HE, H           | HU3<br>HU5<br>HU7          | RX, RH<br>HD, HY, HT<br>HZ, EH |                         |
| M                  | Finish Light        | SH, LM                 | XF, MF                   | FF, FP<br>LF*      | FF1, FF2<br>MF1                       | SU, EF                     | SS                                             | MQ, SK*                     | MP, AB, BH                 | FM5                            | SF                      |
|                    | Medium              | MS, GM<br>MM, MA<br>ES | MM, MMC<br>QM, XM<br>K   | MS, MP<br>UP       | MF3<br>MF4<br>MF5, M3                 | EX, EG, UP<br>GU<br>HM     | SA, SF<br>SM<br>S                              | MS, MU<br>TK<br>ST          | PV, DE, SE<br>AH           | MM5, RM5<br>MU5                | ML<br>EM, MM<br>VF      |
|                    | Heavy               | GH, RM<br>HL, HZ       | MR, MRR<br>MR, MRR       | MR, RP             | M5, M6, R6<br>R56, RR6, R7<br>R8, RR9 | EM, MU<br>MP               | TH, SH                                         |                             | AE                         | HU5                            |                         |
| K                  | Finish Light        | LK, MA                 | KF                       | FN                 | MF2<br>M3, M4                         |                            | CF                                             | KQ                          | VA, AH                     | MK5                            | FG                      |
|                    | Medium              | MK, GK<br>Std.         | KM                       | RP, UN             | M5                                    | UZ, GZ, UX                 | CM<br>Std.                                     | KG, Std., C                 | V, AE                      | RK5, MV7                       | MC                      |
|                    | Rough               | RK                     | KR, KRR                  |                    | MR7                                   |                            |                                                | KH, GC, PH                  | RE                         | RK7                            | KT                      |
|                    | Heavy               | Flat top               |                          | Flat top           | MR9<br>Flat top                       | Flat top                   | CH, Flat top                                   | ZS, Flat top                | Flat top                   | Flat top                       |                         |
| S                  | Finish              | FS*, FJ*               | SF                       | FS*, FF, FP        | MF1                                   | EF                         |                                                | MQ, SK*                     |                            | FM5                            | FA                      |
|                    | Light               | LS, MJ, MJ*            | SGF*                     | LF*, MS, FN        | MF3                                   | SU*                        | HRF                                            |                             |                            | NFT<br>MS3                     | EA, SF                  |
|                    | Medium              | MS<br>MA               | SM<br>QM, SMC            | UP, P, MP          | M1<br>M3                              | EG, EX, UP                 | SDM, HRM, 28<br>SA, HMM                        | SQ<br>MS, MU, TK            | VI                         | NMS, NMT<br>MU5                | MGS, MK                 |
|                    | Heavy               | RS, GJ                 | SMR                      | RP                 | MR3<br>MR4                            | MU                         |                                                | SG, SX                      |                            | NRS, NRT<br>HU5                | ET                      |

\*Peripheral ground type insert.  
Note 1) The tables above are based on published data and not authorized by each manufacturer.

## 7° POSITIVE INSERT TYPE

| ISO Classification | Cutting Mode        | Mitsubishi Materials                      | Sandvik                      | Kennametal                    | Seco Tools     | Sumitomo Electric                       | Tungaloy                  | Kyocera                                | MOLDINO | Walter                     | TaeguTec                               |
|--------------------|---------------------|-------------------------------------------|------------------------------|-------------------------------|----------------|-----------------------------------------|---------------------------|----------------------------------------|---------|----------------------------|----------------------------------------|
| P                  | Finish              | FS-P*<br>SMG*                             | UM*                          | LF*                           |                | FF*<br>FC*                              | JP*<br>JS*, 01*           | CF*, GF*<br><br>SKS*                   |         | FL2*<br>FP2*               | SL*<br>SA*                             |
|                    | Finish Light        | FP, FV<br>LS-P*<br>LP, SV                 | PF, UF                       | UF, 11, FPS<br>LFS*<br>LF, FP | FF1<br>F1, MF2 | FB, FP, LU<br>SI*, SL*, SC*<br>LB, SU   | PF, PSF<br>PS, PSS, TSF   | GP, PP, VF<br>GQ*, SK*, CK*<br>XP      | JQ      | FP4                        | FA, FX<br>SM, FG                       |
|                    | Light (With Wiper)  | SW                                        | WF                           | FW, FWS                       | W-F1           | LUW                                     |                           | WP                                     |         | FW4                        |                                        |
|                    | Medium              | MV<br>MP, Std.                            | PM, UM<br>PR, UR, PMC        | MF, MP, MPS                   | M3<br>F2, M5   | GU<br>MU                                | TM, 23<br>PM, 24          | HQ, MF*<br>XQ, GK                      | JE      | FP6, MP4, MP6<br>RP4       | PC, FM<br>SH*, MT                      |
|                    | Medium (With Wiper) | MW                                        | WM                           | MW, MWS                       | W-MF2<br>W-M3  |                                         | SW                        |                                        |         | MW4                        | WT                                     |
| M                  | Finish Light        | FS-P*, FM<br>LS-P*<br>LM                  | MF, UF                       | FFS*, LFS*<br>LF, UF<br>FP    | F1, F2<br>MF2  | FF*, FC*, LU<br>SI*, SL*, SC*<br>LB, SU | JP*<br>PF, PSF<br>PS, PSS | CF*, GF*, SKS*<br>GQ*, SK*, CK*<br>MQ* | MP      | FM2*<br>FM4, FL2*          | FA<br>FG, FM                           |
|                    | Medium              | MM<br>Std.                                | MM, UM, MMC<br>MR, UR        | MP                            | M3<br>M5       | GU, MU                                  | PM                        | HQ, GK                                 |         | FM6<br>MM4, RM4            | PC<br>MT                               |
| K                  | Medium              | MK, Std.<br>Flat top                      | KF, KM, UM, KR               | Flat top                      | F1, M3, M5     | MU, Flat top*                           | Flat top, CM              | Flat top*                              |         | FK6, MK4<br>RK4, RK6       | MT                                     |
| N                  | Medium              | AZ*                                       | AL*                          | HP*                           | AL*            | AG*                                     | AL*                       | AP*<br>AH*                             |         | FN2*<br>MN2*               | FL*                                    |
| S                  | Finish Light        | FS*, LS*<br>FS-P*, LS-P*<br>FJ*<br>LS, MS | UM*<br>UF, MF<br>UM, MM, SMC | FFS*, LFS*<br>LF*<br>HP*      |                | FF*<br>SI*<br>GU                        | Std.                      | CF*, GF*, SKS*<br>GQ*, SK*, CK*<br>MQ* |         | FM2*, FM4, FM6<br>MM4, RM4 | SA*, FA, FG<br>SL*, SM*<br>SH*, PC, MT |

\*Peripheral ground type insert.

Note 1) The tables above are based on published data and not authorized by each manufacturer.

## 11° POSITIVE INSERT TYPE

| ISO Classification | Cutting Mode | Mitsubishi Materials | Sandvik | Kennametal          | Seco Tools | Sumitomo Electric                   | Tungaloy                       | Kyocera                                  | MOLDINO | Walter      | TaeguTec |
|--------------------|--------------|----------------------|---------|---------------------|------------|-------------------------------------|--------------------------------|------------------------------------------|---------|-------------|----------|
| P                  | Finish Light | FV, SMG*<br>SV       | PF      | UF, FP<br>FW, LF, K |            | SI, FK, FB<br>LU, LUW, LB<br>SU, SF | 01*<br>PF, PSF<br>PS, PSS, TSF | PP, GP, GF*<br>SKS*, CF*, CK*<br>PF*, XP | JQ      | FP2*<br>FP4 | FG       |
|                    | Medium       | MV                   | PM, UM  | MF<br>MP, MW        |            | GU, MU, US, SS                      | PM<br>TM, 23<br>24             | HQ<br>XQ                                 | JE      | MP4         |          |
| M                  | Finish Light | SMG*<br>SV           | MF      | HP*<br>LF           |            | SU                                  | SS*<br>PF, PS                  | GF*, CK*<br>PF*, GP, CF*<br>SKS*         | MP      | FP2*<br>FM4 |          |
|                    | Medium       | MV                   | MM      |                     |            | GU, MU, US                          | PM, Std.                       | HQ                                       |         | MM4         | PC, FM   |

\*Peripheral ground type insert.

Note 1) The tables above are based on published data and not authorized by each manufacturer.

P

TECHNICAL DATA

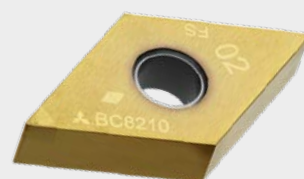
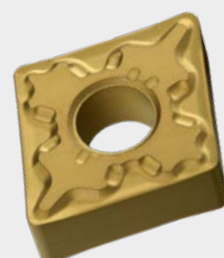




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| A0000-DDUNR/L15       | DOUBLE CLAMP DIMPLE BAR                    | E015 | C00000SDUCR/L000000-C | BORING BAR (Carbide shank) | E052       |
| A0000-DSKNR/L12       | DOUBLE CLAMP DIMPLE BAR                    | E016 | C00000STUCR/L000000   | BORING BAR (Carbide shank) | E049       |
| A0000-DTFNR/L16       | DOUBLE CLAMP DIMPLE BAR                    | E016 | C00000STUCR/L000000-C | BORING BAR (Carbide shank) | E050       |
| A0000-DVUNR/L16       | DOUBLE CLAMP DIMPLE BAR                    | E017 | C00000STUPR/L000000-C | BORING BAR (Carbide shank) | E051       |
| A0000-DWLNR/L00       | DOUBLE CLAMP DIMPLE BAR                    | E017 | C00000SWUCR/L000000   | BORING BAR (Carbide shank) | E054       |
| A0000MWLNR00          | M type boring bar                          | E042 | C00000SWUCR/L000000-C | BORING BAR (Carbide shank) | E054       |
| AJS0000T00            | Clamp screw                                | N003 | CA0000                | Clamp bridge               | N014       |
| AMS0                  | Clamp bridge                               | N014 | CB000RS               | MICRO-MINI TWIN            | E021       |
| A0000PCLNR/L00        | P type boring bar                          | E039 | CB000RS-00            | MICRO-MINI TWIN            | E021       |
| A0000PDQNR/L15        | P type boring bar                          | E040 | CB000RS-B             | MICRO-MINI TWIN            | E021       |
| A0000PDUNR/L00        | P type boring bar                          | E039 | CB000RS-00B           | MICRO-MINI TWIN            | E021       |
| A0000PDZNR/L15        | P type boring bar                          | E041 | CBS000                | Breaker piece              | N016       |
| A0000PSKNR/L00        | P type boring bar                          | E038 | CBT000                | Breaker piece              | N016       |
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| ASS0                  | Spring (For AJX/BRE/CV type cutter)        | C032 | CCET000000R/L-SR      | Insert (Class E tolerance) | A145, A146 |
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| BF-CNGM000000000WS2   | Insert (Class G tolerance)                 | B024 | CCGT000000-AZ         | Insert (Class G tolerance) | A141       |
| BF-CNGM0000000002     | Insert (Class G tolerance)                 | B024 | CCGT000000-FJ         | Insert (Class G tolerance) | A141       |
| BF-DCGT0000000002     | Insert (Class G tolerance)                 | B041 | CCGT000000L-F         | Insert (Class G tolerance) | A141       |
| BF-DNGM0000000002     | Insert (Class G tolerance)                 | B028 | CCGT000000LS          | Insert (Class G tolerance) | A142       |
| BF-DNGM000000000WS2   | Insert (Class G tolerance)                 | B028 | CCGT000000M-FS        | Insert (Class G tolerance) | A140       |
| BM-CCGT0000000002     | Insert (Class G tolerance)                 | B038 | CCGT000000M-FS-P      | Insert (Class G tolerance) | A140       |
| BM-CNGM0000000002     | Insert (Class G tolerance)                 | B024 | CCGT000000M-LS        | Insert (Class G tolerance) | A142       |
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| BM-DNGM0000000002     | Insert (Class G tolerance)                 | B028 | CCGT000000MR/L-F      | Insert (Class G tolerance) | A141       |
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| BOES101               | Set bolt                                   | N008 | CCGT000000MR/L-SS     | Insert (Class G tolerance) | A143       |
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| BRS0000               | Clamp screw                                | N003 | CCGW000000            | Insert (Class G tolerance) | A148       |
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| BTAT000000R/L-B       | Insert for external back turning           | D014 | CCMH000000MV          | Insert (Class M tolerance) | A145       |
| BTAT000000R-SMB       | Insert for external back turning           | D014 | CCMH000000SV          | Insert (Class M tolerance) | A143       |
| BTAT605000RX          | Insert for external back turning           | D014 | CCMT000000            | Insert (Class M tolerance) | A145       |
| BTBT000000R/L-B       | Insert for external back turning           | D015 | CCMT000000FM          | Insert (Class M tolerance) | A140       |
| BTBT000000R-SMB       | Insert for external back turning           | D015 | CCMT000000FP          | Insert (Class M tolerance) | A140       |
| BTBT606000R/L         | Insert for external back turning           | D015 | CCMT000000FS          | Insert (Class M tolerance) | A140       |
| BTVHR00000-750        | Small tools holder (External back turning) | D016 | CCMT000000FV          | Insert (Class M tolerance) | A140       |
| BTVT000000R-B         | Insert for external back turning           | D016 | CCMT000000LM          | Insert (Class M tolerance) | A142       |
| <b>C</b>              |                                            |      | CCMT000000LP          | Insert (Class M tolerance) | A142       |
| C00000SCLCR/L000000   | BORING BAR (Carbide shank)                 | E047 | CCMT000000LS          | Insert (Class M tolerance) | A142       |
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| CTI○●●●●●TN/P○●●                 | Shim (For MMTI holder)     | G026                                                | DNGG○●●●●●○●●●●-FJ               | Insert (Class G tolerance) | A106       |
| CT○●●●●●RS-M○●●                  | MICRO-MINI TWIN            | G031                                                | DNGG○●●●●●○●●●●-FS               | Insert (Class G tolerance) | A106       |
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| DCGT○●●●●●○●●●●-AZ               | Insert (Class G tolerance) | A153                                                | DNMG○●●●●●○●●●●                  | Insert (Class M tolerance) | A110       |
| DCGT○●●●●●○●●●●M-FS              | Insert (Class G tolerance) | A152                                                | DNMG○●●●●●○●●●●-FH               | Insert (Class M tolerance) | A106       |
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| DCGT○●●●●●○●●●●M-LS              | Insert (Class G tolerance) | A154                                                | DNMG○●●●●●○●●●●-FS               | Insert (Class M tolerance) | A106       |
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| DCGT○●●●●●○●●●●MR/L-SN           | Insert (Class G tolerance) | A157                                                | DNMG○●●●●●○●●●●-GH               | Insert (Class M tolerance) | A111       |
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| DCGT○●●●●●○●●●●-SMG              | Insert (Class G tolerance) | A158                                                | DNMG○●●●●●○●●●●-LP               | Insert (Class M tolerance) | A107       |
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| DCK○●●●●○●●●●                    | Clamp bridge               | N015                                                | DNMG○●●●●●○●●●●-MA               | Insert (Class M tolerance) | A110       |
| DCLNR/L○●●●●○●●●●○●●●●           | DOUBLE CLAMP holder        | C008                                                | DNMG○●●●●●○●●●●-MH               | Insert (Class M tolerance) | A110       |
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| DCMT○●●●●○●●●●○●●●●-FM           | Insert (Class M tolerance) | A152                                                | DNMG○●●●●●○●●●●-MM               | Insert (Class M tolerance) | A109       |
| DCMT○●●●●○●●●●○●●●●-FP           | Insert (Class M tolerance) | A152                                                | DNMG○●●●●●○●●●●-MP               | Insert (Class M tolerance) | A109       |
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| DCMT○●●●●○●●●●○●●●●-FV           | Insert (Class M tolerance) | A152                                                | DNMG○●●●●●○●●●●-RK               | Insert (Class M tolerance) | A111       |
| DCMT○●●●●○●●●●○●●●●-LM           | Insert (Class M tolerance) | A153                                                | DNMG○●●●●●○●●●●-RM               | Insert (Class M tolerance) | A111       |
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| DCMT○●●●●○●●●●○●●●●-MK           | Insert (Class M tolerance) | A155                                                | DNMG○●●●●●○●●●●-SA               | Insert (Class M tolerance) | A108       |
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| DCMT○●●●●○●●●●○●●●●-MP           | Insert (Class M tolerance) | A155                                                | DNMG○●●●●●○●●●●-SY               | Insert (Class M tolerance) | A108       |
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| DDJNR/L○●●●●○●●●●○●●●●○●●●●-15-T | DOUBLE CLAMP holder        | C010                                                | DWLNR/L○●●●●○●●●●○●●●●○●●●●      | DOUBLE CLAMP holder        | C022       |
| DEGX○●●●●○●●●●○●●●●○●●●●-R/L     | Insert (For AL holder)     | A159                                                | DWLNR/L○●●●●○●●●●○●●●●○●●●●-06-T | DOUBLE CLAMP holder        | C022       |
| DEGX○●●●●○●●●●○●●●●○●●●●-R/L-F   | Insert (For AL holder)     | A159, B059                                          | E                                |                            |            |
| DKS○●●●●○●●●●                    | Clamp screw                | N003                                                | E○●●○●●●●○●●●●○●●●●              | Stop ring                  | C019—C021  |

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| FC400890T.....              | Clamp screw.....                            | N003 | GYAR/L0000900-H00.....       | GY boring bar.....          | F092                               |
| FSCLC1008R/L-06A.....       | DIMPLE BAR.....                             | E007 | GYDR/L0000900-M00R/L.....    | GY holder.....              | F086-F092                          |
| FSCLC1008R/L-06E.....       | DIMPLE BAR (Carbide shank).....             | E008 | GYHR/L0000000000-M00R/L..... | GY holder.....              | F022-F032, F044-F074               |
| FSCLC1008R-06E-0/0.....     | DIMPLE BAR (Carbide shank).....             | E008 | GYHR/L0000000000-M00R/L..... | GY holder.....              | F042                               |
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| FSDQC000000R/L-00E.....     | DIMPLE BAR (Carbide shank).....             | E011 | GYM00R/L-00E00.....          | Modular blade.....          | F024, F036, F088, F094-F097        |
| FSDUC000000L-00S.....       | DIMPLE BAR.....                             | E010 | GYM00R/L-00E00-000.....      | Modular blade.....          | F048-F050, F076                    |
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| <b>G</b>                    |                                             |      | GY1G0000000000-GFGS.....     | Insert (For GY holder)..... | B048, F012                         |
| GT0HR/L00000-000.....       | Small tools holder (External grooving)..... | D018 | GY1M0000000000-N-GM.....     | Insert (For GY holder)..... | F012                               |
| GT0TR/L.....                | Insert (Blank).....                         | D019 | GY1M0000000000R/L05-GM.....  | Insert (For GY holder)..... | F012                               |
| GT0T0000000000R/L-E.....    | Insert for external grooving.....           | D019 | GY2B0000000000-N.....        | Insert (For GY holder)..... | F015                               |
| GT0T0000000000R/L-U.....    | Insert for external grooving.....           | D018 | GY2G0000000000-N-MF.....     | Insert (For GY holder)..... | F014                               |
| GWB00NA2-000.....           | GW holder.....                              | F124 | GY2G0000000000005N-GL.....   | Insert (For GY holder)..... | F013                               |
| GWB00NA2-000-C.....         | GW holder.....                              | F124 | GY2G0000000000R00-GS.....    | Insert (For GY holder)..... | F011                               |
| GWTBN200000-B00.....        | Tool block (For GW holder).....             | F125 | GY2M0000000000-N-BM.....     | Insert (For GY holder)..... | F015                               |
| GWTBN200000-B00-C.....      | Tool block (For GW holder).....             | F125 | GY2M0000000000-N-GM.....     | Insert (For GY holder)..... | F012                               |
| GW1B000000020N.....         | Insert (For GW holder).....                 | F126 | GY2M0000000000-N-GS.....     | Insert (For GY holder)..... | F011                               |
| GW1M0000000000N-00.....     | Insert (For GW holder).....                 | F126 | GY2M0000000000-N-GU.....     | Insert (For GY holder)..... | F011                               |
| GW1M0000000000R00-GS.....   | Insert (For GW holder).....                 | F126 | GY2M0000000000-N-MM.....     | Insert (For GY holder)..... | F014                               |
| GW1M0000000000R/L05-GM..... | Insert (For GW holder).....                 | F126 | GY2M0000000000-N-MS.....     | Insert (For GY holder)..... | F014                               |
| GYAR/L0000900-D00.....      | GY boring bar.....                          | F086 | GY2M0000000000R/L05-GM.....  | Insert (For GY holder)..... | F012                               |
| GYAR/L0000900-E00.....      | GY boring bar.....                          | F088 | GY2M0000000000R00-GS.....    | Insert (For GY holder)..... | F011                               |
| GYAR/L0000900-F00.....      | GY boring bar.....                          | F090 | GWSR/L000000JX00-000.....    | GW holder.....              | F122                               |
|                             |                                             |      | GWSR/L000000K00-000.....     | GW holder.....              | F122                               |
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| <b>H</b>              |                                    |            | <b>J</b>     |                            |                                                |
| HBH                   | Clamp screw                        | N002       | JSS          | Clamp screw                | N004                                           |
| HBHA                  | Clamp screw                        | N002       | <b>K</b>     |                            |                                                |
| HDS                   | Set bolt                           | N008       | KGC1         | Clamp bridge               | N015                                           |
| HFF080                | Set bolt                           | N008       | KNUX         | Insert (Class U tolerance) | A136                                           |
| HGM-PT                | Plug                               | E038—E041  | KS           | Axial screw                | N004                                           |
|                       | H007, H010, H012, H013, H016, H019 |            | KSN          | Clamp screw                | N009                                           |
| HKY                   | Driver                             | N002       | KSN3         | Micro Adjustment Nut       | N009                                           |
| HKY                   | Flag wrench                        | N002       | KS           | Pre-set screw              | N004                                           |
| HKY                   | L-wrench                           | N002       | KSS          | Clamp screw                | N009                                           |
| HKY                   | L-wrench                           | N002       | KSS2         | Large Adjustment Screw     | N009                                           |
| HKY                   | T-wrench                           | N002       | <b>L</b>     |                            |                                                |
| HKY                   | Flag wrench                        | N002       | LK1          | Clamp bridge               | N015                                           |
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| HSC                   | Set bolt                           | N008       | LLCS         | Clamp screw                | N004                                           |
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| HSP05008C             | Lock screw                         | N003       | LLP          | Shim pin                   | N013                                           |
| HSS                   | Clamp screw                        | N002       | LLR          | Radial screw               | N004                                           |
| HY                    | Bush screw                         | N004       | LLSCN        | Shim                       | N010                                           |
| HY-A1                 | Bush screw                         | N004       | LLSCN        | Shim                       | N010                                           |
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| H100TH-B              | HSK boring bar holder              | H022       | LLSDN        | Shim                       | N010                                           |
| H100TH-EN3232R/L-130  | HSK external turning tool holder   | H020       | LLSDP42      | Shim                       | N010                                           |
| H100TH-EV3232R/L-180  | HSK external turning tool holder   | H019       | LLSRN        | Shim                       | N010                                           |
| H63TH-A               | HSK DCLN type holder               | H008       | LLSSN        | Shim                       | N010                                           |
| H63TH-B               | HSK boring bar holder              | H021       | LLSSP42      | Shim                       | N010                                           |
| H63TH-DCLNL-L12-3     | HSK DCLN type holder               | H008       | LLSTE32      | Shim                       | N010                                           |
| H63TH-DCLNR/L-DX12    | HSK DCLN type holder               | H006       | LLSTN        | Shim                       | N010                                           |
| H63TH-DCMNN-H/L12     | HSK DCMN type holder               | H007       | LLSTP        | Shim                       | N010                                           |
| H63TH-DDJNL-L15-3     | HSK DDJN type holder               | H011       | LLSWN        | Shim                       | N010                                           |
| H63TH-DDJNR/L-DX15    | HSK DDJN type holder               | H009       | LLSWN        | Shim                       | N010                                           |
| H63TH-DDNNN-H/L15     | HSK DDNN type holder               | H010       | LLSWP        | Shim                       | N010                                           |
| H63TH-EN2525R/L-115   | HSK external turning tool holder   | H020       | LS           | Clamp screw                | N004                                           |
| H63TH-EV2020R/L-105-3 | HSK external turning tool holder   | H021       | LS           | Clamp screw                | N004                                           |
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| H63TH-MGHR/L-DX       | HSK MG type holder                 | H014       | LS           | Clamp screw                | N004                                           |
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| H63TH-MMTER-DX16      | HSK MMT type holder                | H016       | LS           | Clamp screw                | N004                                           |
| H63TH-MTHR/L-DX43     | HSK MT type holder                 | H017       | LS           | Clamp screw                | N004                                           |
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| H63TH-PCMNN-H/L12     | HSK PCMN type holder               | H007       | <b>M</b>     |                            |                                                |
| H63TH-PDJNR/L-DX15    | HSK PDJN type holder               | H009       | MBA          | Clamp screw                | N008                                           |
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| H63TH-PRDCN-H/L12     | HSK PRDC type holder               | H012       | MES          | Spring                     | C017, C018, C023, E042, F132, G024, H014, H017 |
| H63TH-PRGCR/L-DX12    | HSK PRGC type holder               | H012       | MGHR/L       | MG holder                  | F132                                           |
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| <b>SCMT</b> ..... <b>FP</b> .....                  | Insert (Class M tolerance) .....                                       | A161             | <b>SNMG</b> ..... <b>RP</b> .....    | Insert (Class M tolerance) .....               | A117             |
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| <b>SCMT</b> ..... <b>LM</b> .....                  | Insert (Class M tolerance) .....                                       | A161             | <b>SNMG</b> ..... <b>SA</b> .....    | Insert (Class M tolerance) .....               | A115             |
| <b>SCMT</b> ..... <b>LP</b> .....                  | Insert (Class M tolerance) .....                                       | A161             | <b>SNMG</b> ..... <b>SH</b> .....    | Insert (Class M tolerance) .....               | A114             |
| <b>SCMT</b> ..... <b>MK</b> .....                  | Insert (Class M tolerance) .....                                       | A162             | <b>SNMG120408-SY</b> .....           | Insert (Class M tolerance) .....               | A115             |
| <b>SCMT</b> ..... <b>MM</b> .....                  | Insert (Class M tolerance) .....                                       | A161             | <b>SNMM</b> ..... <b>HL</b> .....    | Insert (Class M tolerance) .....               | A118             |
| <b>SCMT</b> ..... <b>MP</b> .....                  | Insert (Class M tolerance) .....                                       | A161             | <b>SNMM</b> ..... <b>HM</b> .....    | Insert (Class M tolerance) .....               | A119             |
| <b>SCMT</b> ..... <b>MS</b> .....                  | Insert (Class M tolerance) .....                                       | A162             | <b>SNMM</b> ..... <b>HR</b> .....    | Insert (Class M tolerance) .....               | A118             |
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|                                                    |                                                                        |                  | <b>SPMN</b> .....                    | Insert (Class M tolerance) .....               | A188, L040       |
|                                                    |                                                                        |                  | <b>SPMN120304T</b> .....             | Insert (Class M tolerance) .....               | A188, L040       |
|                                                    |                                                                        |                  | <b>SPMR</b> .....                    | Insert (Class M tolerance) .....               | A188             |
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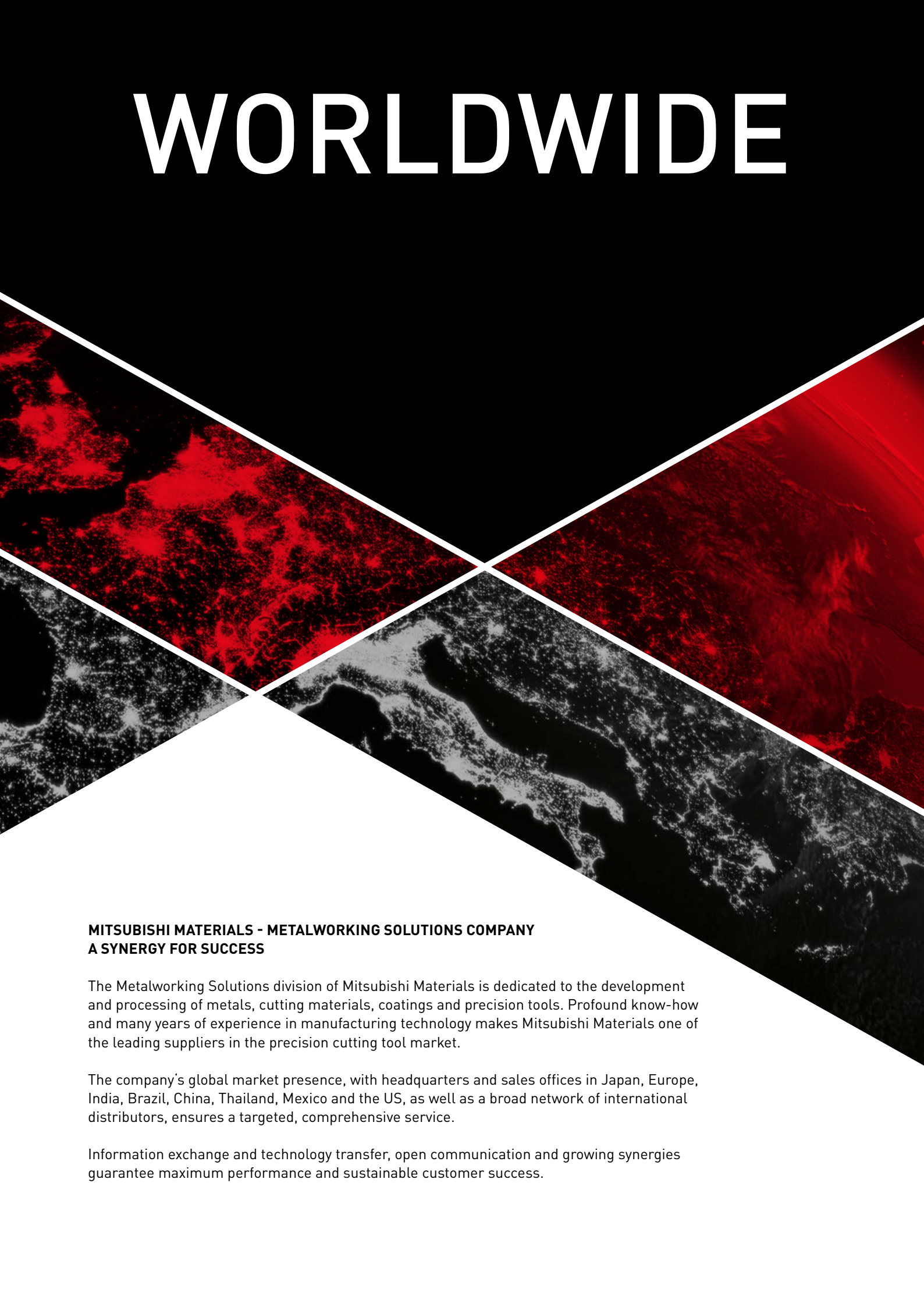
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This image shows a full page of a document template designed as a memo or notebook page. At the top left, the word "Memo" is written in a large, bold, black sans-serif font. A thick, solid black horizontal line runs across the entire width of the page directly beneath the title. The remainder of the page is filled with thin, light gray horizontal lines spaced evenly apart, providing a guide for writing. There are no vertical margin lines, bullet points, or other markings present.



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