

GENERAL CATALOG - VOL. 2

MILLING

we improve, we evolve, we **ADD**

2023/2024





Tungaloy's Insights – Smart Manufacturing

Tungaloy, as one of the leaders in the metal removal industry, offers the latest innovations in grades and geometries for superb performance and tool life.

*Tungaloy's latest
innovations in cutting
tools contribute to
carbon neutrality*



VOL. 2 MILLING

| | | |
|----------|---------------------|---------------|
| A | Grade | A001 - |
| B | Insert | B001 - |
| C | External Toolholder | C001 - |
| D | Internal Toolholder | D001 - |
| E | Threading Tool | E001 - |
| F | Parting, Grooving | F001 - |
| G | Miniature Machining | G001 - |
| H | Milling Cutter | H001 - |
| I | Endmill | I001 - |
| J | Drilling Tool | J001 - |
| K | Tooling System | K001 - |
| L | User's Guide | L001 - |
| M | Alphanumeric Index | M001 - |

About Tunggaloy Cutting Tool Catalog

Note in using this catalog:

- ★ This catalog provides the information of Tunggaloy's cutting tools as of March 2023.
- ★ The specifications are subject to change without prior notice for product improvements. Also, the products may be discontinued in the future due to the development of new products.
- ★ The dimensions of all products are shown in millimeters (mm).
- ★ For indexable tools, such as toolholders, cutters, drill bodies, applicable inserts or heads need to be ordered separately.

How to use this catalog:

The screenshot illustrates the catalog's navigation structure. On the left, a 'MILLING' category menu (1) lists various tool types, with 'Milling Cutter' (H001) and 'Endmill' (I001) highlighted. The main content area (2) shows a detailed view of a 4-flute endmill, including technical drawings and a table of specifications. On the right, an 'INSERT' section (3) displays a table of insert specifications and a diagram of the insert geometry.

- 1 Select the tool category at the product group index.
- 2 Select the tool type at the application index on the left pages.
- 3 The index is in the alphanumerical order. Use it for your product search.

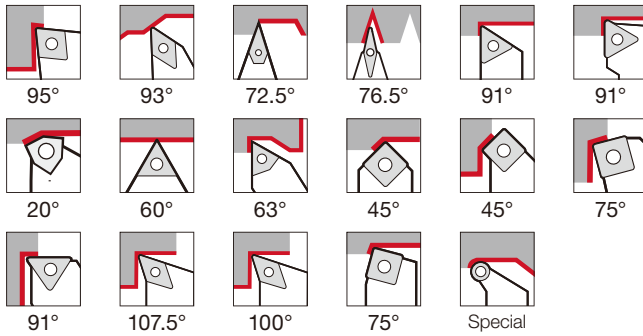
How to read the list for the standard items:

- ★ Designations for indexable tools – cutter bodies, holders, etc.
 - Orders are to be received for the tools with the designations in the catalog.
 - For the tool with right- and left-hand options, the designation includes ****R/L**** as shown below.
 - Ex. 1: Designation: TEN09**R**/L125M38.1-10
You can order both right- and left-hand tools. TEN09**R**125M38.1-10 (a right-hand tool) and TEN09**L**125M38.1-10 (a left-hand tool) will be available.
 - Ex. 2: Designation: TEN09**R**100M31.7-05
You can order only right-hand tools. Please contact us when you need left-hand tools.
- ★ Lineup for inserts, endmill heads, and solid tools
Blank : Please contact us regarding the product.

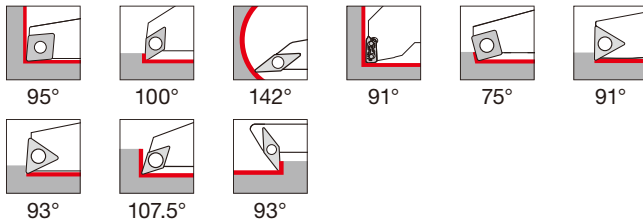
About Tungaloy Cutting Tool Catalog

■ Icons at the left side of each page

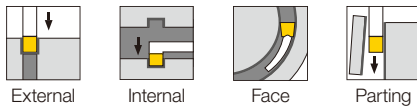
External toolholder (cutting edge shape / angle)



Internal toolholder (cutting edge shape / angle)



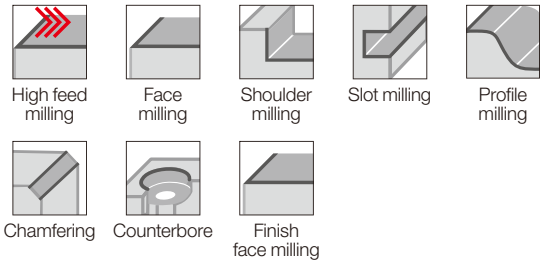
Parting, Grooving



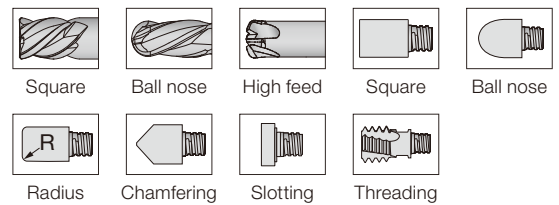
Miniature machining



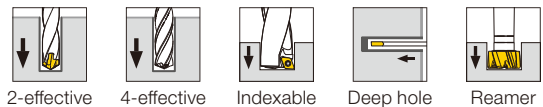
Mill



Endmill

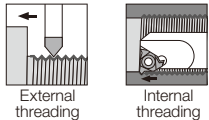


Drill

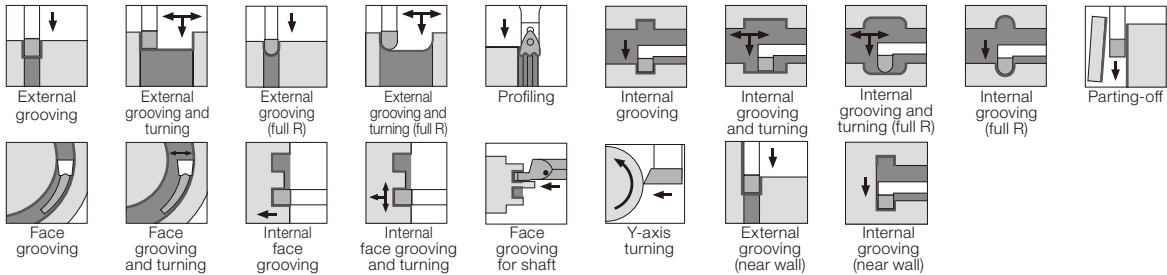


■ Icons for applications of each product

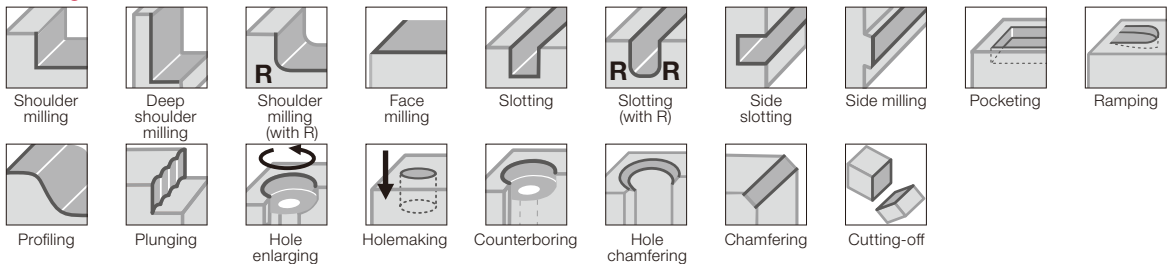
Threading



Grooving



Milling



Drilling



About the dimension symbols conforming to ISO13399

■ What is ISO13399?

ISO13399 is an international standard for the purpose of standardizing the electronic data of tools in the world.

■ Switching to the dimension symbols conforming to ISO13399

In this catalog, we use the dimension symbols (properties) conforming to ISO13399 international standard.

Below are the examples of the change.

■ Examples of the change:

| | Before | After |
|----------|--------|-------|
| Insert | | |
| Turning | | |
| Milling | | |
| Drilling | | |

ISO13399 standardizes not only the format of 2D and 3D CAD data but also the tool dimension symbols (properties) and reference position information. This allows the tool information to be read and combined into NC programs and CAM software, regardless of any tool maker's data. In addition to General Catalog (paper catalog), we are also updating the symbols in e-catalog (electronic catalog on our website) to the properties conforming to ISO13399. The e-catalog also provides 2D and 3D CAD data in accordance with ISO13399 standard.

■ Insert

| New symbol | Old symbol | Description |
|------------|------------|--|
| AN | - | Main cutting edge relief angle |
| APMX | Max. ap | Maximum depth of cut |
| AS | A | Side cutting edge relief angle |
| BW | B | Body width |
| BS | bs | Side cutting edge (wiper) length |
| CDX | T max | Maximum groove depth |
| CW | W | Grooving edge width |
| D1 | ød1 | Mounting hole diameter |
| DCONMS | øDs | Mounting part diameter on the machine |
| DMIN | øDm | Minimum machining diameter |
| EPSR | - | Nose angle |
| GAN | - | Rake angle (insert) |
| IC | ød | Inscribed circle diameter |
| INSD | A | Insert diameter (round type) |
| INSL | B | Insert length |
| KAPR | κ | Approach angle |
| LBB | - | Chipbreaker width |
| LE | A | Effective cutting edge length |
| LF | L1 | Standard length |
| M | m | Distance from inscribed circle to cutting edge (m dimension) |
| PDX | t | Thread position (X direction) |
| PDY | ℓ3 | Thread position (Y direction) |
| PNA | θ | Cutting edge angle |
| PSIRL | θ | Left-hand front cutting edge angle |
| PSIRR | θ | Right-hand front cutting edge angle |
| RE | r | Corner radius |
| S | T | Thickness |
| W1 | - | Insert width |

■ Turning, Grooving

| New symbol | Old symbol | Description |
|------------|---------------|--|
| B | b | Shank width |
| BD | øD1, øD2, øD3 | Body external diameter |
| CDX | ar | Maximum groove depth |
| CND | - | Oil hole diameter |
| CNT | - | Oil hole plug size |
| CUTDIA | øDmax | Maximum parting diameter |
| CW | W | Grooving edge width |
| CWN | - | Minimum grooving edge width |
| CWX | - | Maximum grooving edge width |
| DAXN | øDm | Minimum diameter in face grooving |
| DAXX | øDmax | Maximum diameter in face grooving |
| DCONMS | øDs | Mounting part diameter on the machine |
| DCONWS | øD, ød2 | Mounting part diameter on the workpiece |
| DMIN | øDm | Minimum machining diameter |
| GAMF | α | Radial rake angle |
| GAMP | θ | Axial rake angle |
| H | h | Shank length |
| HBH | h2 | Height of offset on the bottom of head |
| HBKL | f2 | Length of uneven level on the back of head |
| HBKW | L2 | Width of uneven level on the back of head |
| HBL | L2 | Length of offset on the bottom of head |
| HF | h1 | Standard height |
| KAPR | κ | Approach angle |
| LB | L | Body length |
| LF | L1 | Standard length |
| LH | L2 | Head length |
| OAH | h4 | Overall height |
| OAL | L1 | Overall length |
| OAW | L3 | Overall width |
| PSIR | β | Lead angle |
| WB | - | Body width |
| WF | f | Standard width |
| WFS | f2 | Standard width (the second corner) |

About the dimension symbols conforming to ISO13399

■ Tooling system

| New symbol | Old symbol | Description |
|------------|--|---|
| APMX | Max. ap | Maximum depth of cut |
| BD | $\varnothing D1, \varnothing D2, \varnothing D3$ | Body external diameter |
| BHTA | α | Neck taper angle (half of nose angle) |
| BTED | $\varnothing d1$ | Taper tip diameter |
| CRKS | S | Mounting screw size |
| DBC | $\varnothing d3$ | Bolt hole pitch diameter |
| DCONMS | $\varnothing Ds$ | Mounting part diameter on the machine |
| DCONWS | $\varnothing D, \varnothing d2$ | Mounting part diameter on the workpiece |
| DMIN | $\varnothing Dm$ | Minimum machining diameter |
| GAMF | $\alpha, R.R.$ | Radial rake angle |
| GAMP | $\theta, A.R.$ | Axial rake angle |
| KAPR | κ | Cutting edge angle |
| LB | L2, L3 | Body length |
| LF | L | Standard length |
| LPR | L1 | Parting length |
| LS | ℓs | Shank length |
| LSC | Lmin | Clamp length |
| LSCX | Lmax | Maximum clamp length |
| OAH | H4 | Overall height |
| OAL | L | Overall length |
| OAW | W | Overall width |
| THID | - | Mounting screw size |
| WB | W | Body width |
| WF | f | Standard width |

■ Drilling

| New symbol | Old symbol | Description |
|------------|--|--|
| BD | $\varnothing D1, \varnothing D2, \varnothing D3$ | Body external diameter |
| CND | - | Oil hole diameter |
| CNT | - | Oil hole plug size |
| CRKS | S | Mounting screw size |
| DC | $\varnothing Dc$ | Machining diameter |
| DCONMS | $\varnothing Ds$ | Mounting part diameter on the machine |
| DCONWS | $\varnothing D, \varnothing d2$ | Mounting part diameter on the workpiece |
| DCSFMS | $\varnothing D$ | Connecting part diameter |
| KAPR | κ | Cutting edge angle |
| LCF | ℓ | Flute length |
| LF | Lf | Standard length (from the drill shoulder) |
| LPR | - | Parting length (from flange to tip) |
| LS | ℓs | Shank length |
| LU | ℓ | Machinable depth |
| NOF | z | Number of flutes |
| OAL | L | Overall length (from tip) |
| PL | PL | Distance from drill tip to shoulder |
| ZEFP | Z eff | Number of effective cutting edges on periphery |

■ Milling

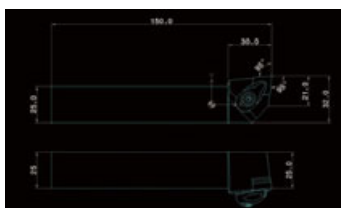
| New symbol | Old symbol | Description |
|------------|--|--|
| APMX | Max. ap | Maximum depth of cut |
| BD | $\varnothing D1, \varnothing D2, \varnothing D3$ | Body external diameter |
| BHTA | α | Neck taper angle (half of nose angle) |
| CBDP | ℓ | Mounting hole depth |
| CDX | Max. ae | Maximum slot width |
| CHW | k | Chamfer width on the corner |
| CICT | z | Number of inserts |
| CRKS | S | Mounting screw size |
| CW | W | Slotting edge width |
| CWN | - | Minimum slotting edge width |
| CWX | - | Maximum slotting edge width |
| DBC | $\varnothing d3$ | Bolt hole pitch diameter |
| DC | $\varnothing Dc$ | Machining diameter |
| DCONMS | $\varnothing d$ | Mounting part diameter on the machine |
| DCONWS | $\varnothing D, \varnothing d2$ | Mounting part diameter on the workpiece |
| DCSFMS | $\varnothing Db$ | Mounting surface diameter on the machine |
| DCX | $\varnothing Dc1$ | Maximum machining diameter |
| GAMF | R.R. | Radial rake angle |
| GAMP | A.R. | Axial rake angle |
| H | T | Width across flat |
| KAPR | κ | Cutting edge angle |
| KWW | a | Drive key width |
| LF | Lf | Standard length |
| LH | Lf | Neck length |
| LS | ℓs | Shank length |
| NOF | z | Number of flutes |
| OAL | L, L6 | Overall length |
| PDX | t | Thread position (X direction) |
| PNA | θ | Cutting edge angle |
| PSIR | β | Lead angle |
| RMPX | θ | Maximum ramping angle |
| THUB | T | Hub height (slot mill) |
| WT | Kg | Weight |
| ZEFP | Z eff | Number of effective cutting edges on the periphery |

Note:

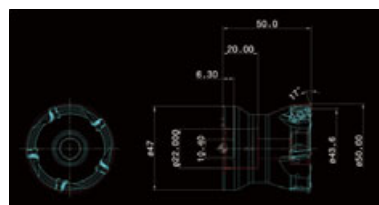
- Symbols unspecified in ISO13399 standard and Tungaloy's original symbols are not included.
- The symbols still under discussion are included. Please note any change or addition may occur.

■ CAD data provided in e-catalog

● 2D data (DXF format file)



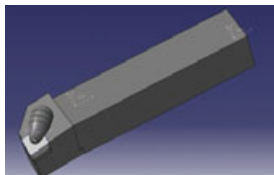
Turning:
Shows the insert with standard corner radius.



Milling:
Includes actual cutting edge curve (CUT layer) and body cross section (NOCUT layer).

● 3D data Light type (STP format file): Can be used to check tool path and interference.

Turning: Equipped with an insert with a standard corner radius.

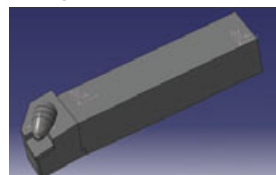


Milling: A rotating body model of an actual cutting edge curve and a body cross section.



● 3D data Detail type (STP format file): Can be used to create a new tool layout chart. (Can be combined with any insert model on a CAD software.)

Turning



Milling



Milling Cutter



Milling Cutter - Content structure

- Products are listed by application.
- Please refer the table of contents and the icons.

How to use the page

Method ①

Select the application (①) and the approach angle (②) at the left end of each page and choose a designation you need (⑤) in the dimension table (④). Applicable inserts are shown in (⑧).

ADD FEED EXN02
High feed endmill, shank type, for 4-corner double sided inserts

① Application: Face Milling, High-Feed Milling, Profile Milling, Slot Milling, etc.

② Approach angle: 7°-25°, 41°-45°, 60°-70°, 85°-88°, 90°

④ Dimension Table:

| Designation | APMX | DC | CHCT | DC | DCS | OAL | LF | H | KAPR | CRKS | WT | Air hole | Insert |
|------------------|------|----|------|------|-----|-----|-----|-----|------|------|----------|----------|--------|
| HN02D10M08-0-01 | 0.5 | 8 | 1 | 3.95 | 8 | 75 | 1 | 17° | 0.02 | W8 | LNK02... | | W8 |
| HN02D10M08-0-01L | 0.5 | 8 | 1 | 3.95 | 8 | 80 | 21 | 17° | 0.02 | W8 | LNK02... | | W8 |
| HN02D10M10-0-02 | 0.5 | 10 | 2 | 5.85 | 10 | 60 | 20 | 60° | 17° | 0.02 | W8 | LNK02... | |
| HN02D10M10-0-02L | 0.5 | 10 | 2 | 5.85 | 10 | 100 | 40 | 60° | 17° | 0.02 | W8 | LNK02... | |
| HN02D12M12-0-02L | 0.5 | 12 | 2 | 7.8 | 12 | 80 | 20 | 60° | 17° | 0.02 | W8 | LNK02... | |
| HN02D15M15-0-04L | 0.5 | 15 | 4 | 11.8 | 15 | 100 | 30 | 70° | 17° | 0.1 | W8 | LNK02... | |
| HN02D15M16-0-02L | 0.5 | 16 | 3 | 11.8 | 16 | 130 | 50 | 70° | 17° | 0.1 | W8 | LNK02... | |
| HN02D15M16-0-04L | 0.5 | 20 | 4 | 15.8 | 20 | 160 | 80 | 17° | 0.02 | W8 | LNK02... | | |
| HN02D15M20-0-02 | 0.5 | 20 | 5 | 15.8 | 20 | 130 | 50 | 80° | 17° | 0.2 | W8 | LNK02... | |
| HN02D15M20-0-07 | 0.5 | 25 | 7 | 20.8 | 25 | 140 | 60 | 80° | 17° | 0.4 | W8 | LNK02... | |
| HN02D15M25-0-05L | 0.5 | 25 | 5 | 20.8 | 25 | 100 | 100 | 80° | 17° | 0.1 | W8 | LNK02... | |

⑤ Designation: HN02D10M08-0-01, HN02D10M08-0-01L, HN02D10M10-0-02, HN02D10M10-0-02L, HN02D12M12-0-02L, HN02D15M15-0-04L, HN02D15M16-0-02L, HN02D15M16-0-04L, HN02D15M20-0-02, HN02D15M20-0-07, HN02D15M25-0-05L

⑧ Insert: W8, LNK02...

Method ②

Select the tool series name on **H006 - H007** and check the details on the product page.

Application Overview

Face Milling (H006 page)

- DOTMILL**: Three times the selection, more than a high advantage (H005 page)
- DOCPENT**: Face milling cutter with low cutting force and low cost per edge (H007 page)
- TUNGE MILL**: Economical 8 edged inserts with tight cutting face milling cutter (H008 page)

For aluminum milling

- TUNGE MILL**: High speed face milling cutter for finishing aluminum (H002 page)
- TUNGE-ALUMILL**: Shoulder mill that enables high speed machining of aluminum and non-ferrous materials (H002 page)

High-Feed Milling (H018 page)

- ADD FEED**: Ultimate high feed milling cutter for maximum productivity (H002 page)
- DO FEED**: High functional HFM cutter demonstrating ultimate versatility in a broad range of applications (H024 page)
- DO FTRI**: High feed milling cutters with six cutting edge inserts, featuring retract cutter design for high productivity (H042 page)
- MILLO FEED**: General-purpose high feed milling cutter providing optimal depth-of-cut in all material groups (H027 page)

Profile Milling (H192 page)

- FIXRMILL**: Unique anti-rotation insert locking for maximum process security (H075 page)
- ADD FBÄRREL**: Highly efficient profile milling cutter for maximum productivity (H192 page)
- TUNGE MASTER**: Exchangeable head and mill series with a full lineup of milling heads (H069 page)
- BALL NOSE**: Indestructible end mill for high-precision finishing (H192 page)

H004 tungaloy.com

Method ③

Select the tool series or the tool specification on **H006 - H017** and see the details on each page.

High-Feed Milling - Quick Guide

| | TUNGE MILL | ADD FEED | DO FEED | DO FTRI | DOTMILL |
|--------------------|-------------|-------------|-----------------------|-------------|-------------|
| Cutting edge angle | 12° | 17° | 10° / 12° / 15° / 17° | 12° | 20° / 25° |
| Depth of cut (mm) | 0.5 | 0.5 | 0.9 / 1.1 / 1.5 | - | 1.5 / 2 |
| Tool diameter | ø6 - ø16 | ø6 - ø20 | ø16 - ø200 | ø16 - ø20 | ø20 - ø63 |
| Workpiece material | Al, Cu, H | Al, Cu, H | Al, Cu, H | Al, Cu, H | Al, Cu, H |
| No. of corners | 2 | 4 | 4 | 6 | 4 |
| Face milling | ★ | ★ | ★ | ★ | ★ |
| Shoulder milling | ★ | ★ | ★ | ★ | ★ |
| Profile milling | ★ | ★ | ★ | ★ | ★ |
| Slot milling | ★ | ★ | ★ | ★ | ★ |
| Other applications | ★ | ★ | ★ | ★ | ★ |
| Reference groups | H038 - H041 | H020 - H023 | H024 - H037 | H042 - H045 | H046 - H050 |

★ Most suitable
☆ Suitable
□ Suitable

Icon: Face milling, Shoulder milling, Profile milling, Slot milling, etc.

H006 tungaloy.com

Icon

Approach angle

| | |
|--|-----------|
| | 7° ~ 25° |
| | 41° ~ 45° |
| | 60° ~ 70° |
| | 85° ~ 88° |
| | 90° |

Application

| | |
|--|----------------|
| | Thin workpiece |
| | Ramping |
| | Long overhang |
| | Axial plunging |
| | Hole enlarging |
| | Slot milling |

| | |
|--|-----------------------|
| | Deep shoulder milling |
| | Face milling |
| | External threading |
| | Back facing |
| | Peck milling |
| | Hollow workpiece |
| | Deep slot milling |

| | |
|--|---------------------|
| | Shoulder milling |
| | Internal threading |
| | Profiling |
| | Edging / Contouring |
| | Interrupted surface |
| | Cutting off |
| | Chamfering |

3 ADD FEED EXN02
 High feed endmill, strain type, for 4-corner double sided inserts

| Designation | APMX | DCX | CIC1 | DC | DCONMS | LF | LH | LS | KAPR | WTK(g) | A | hole | Insert |
|--------------------|------|-----|------|------|--------|-----|-----|----|------|--------|-----|------|-----------|
| ENK0R2R08M08-D-01 | 0.5 | 8 | 1 | 3.95 | 8 | 75 | 16 | 59 | 17° | 0.02 | 17° | With | LNMU02... |
| ENK0R2R08M10-D-01L | 0.5 | 8 | 1 | 3.95 | 8 | 90 | 31 | 59 | 17° | 0.03 | 17° | With | LNMU02... |
| ENK0R2R10M10-D-02 | 0.5 | 10 | 2 | 5.85 | 10 | 80 | 20 | 60 | 17° | 0.04 | 17° | With | LNMU02... |
| ENK0R2R10M10-D-02L | 0.5 | 10 | 2 | 5.85 | 10 | 100 | 40 | 60 | 17° | 0.05 | 17° | With | LNMU02... |
| ENK0R2R12M12-D-02 | 0.5 | 12 | 2 | 7.8 | 12 | 80 | 20 | 60 | 17° | 0.06 | 17° | With | LNMU02... |
| ENK0R2R12M12-D-02L | 0.5 | 12 | 2 | 7.8 | 12 | 110 | 50 | 60 | 17° | 0.08 | 17° | With | LNMU02... |
| ENK0R2R16M16-D-04 | 0.5 | 16 | 4 | 11.8 | 16 | 100 | 30 | 70 | 17° | 0.14 | 17° | With | LNMU02... |
| ENK0R2R16M16-D-02L | 0.5 | 16 | 3 | 11.8 | 16 | 120 | 50 | 70 | 17° | 0.17 | 17° | With | LNMU02... |
| ENK0R2R20M20-D-04L | 0.5 | 20 | 4 | 15.8 | 20 | 160 | 80 | 80 | 17° | 0.32 | 17° | With | LNMU02... |
| ENK0R2R20M20-D-05 | 0.5 | 20 | 5 | 15.8 | 20 | 130 | 50 | 80 | 17° | 0.27 | 17° | With | LNMU02... |
| ENK0R2R25M25-D-07 | 0.5 | 25 | 7 | 20.8 | 25 | 140 | 60 | 80 | 17° | 0.46 | 17° | With | LNMU02... |
| ENK0R2R25M25-D-08L | 0.5 | 25 | 6 | 20.8 | 25 | 180 | 100 | 80 | 17° | 0.57 | 17° | With | LNMU02... |

7 SPARE PARTS
 Designation: ENK0R2R08... ENK0R2R10... ENK0R2R12... ENK0R2R16... ENK0R2R20... ENK0R2R25...
 Chamfered insert: CSPB-18FL3.8 IP-40B
 Flank: IP-40B
 Tool diameter tolerance: Tool diameter / 0.1-0.4
 Recommended clamping torque: 0.5 N·m

8 INSERT
 LNMU02-MM (for general purpose)

| Designation | RE | APMX | DCX | CIC1 | DC | DCONMS | LF | LH | LS | KAPR | WTK | A | hole | Insert |
|----------------|-----|------|-----|------|----|--------|----|----|----|------|-----|---|------|--------|
| LNMU0202ZPR-MM | 0.0 | 0.5 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

10 Reference pages: Standard cutting conditions → H022 - H023, TungFlex → H036 - H037
 H020 tungaloy.com

9 STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|-------------|-----------------------|--------|-----------------------------|-----------------------------|
| P | Carbon steels S45C, S55C, etc. C45, S55C, etc. | ~ 300HB | First choice | AH325 | 100 - 300 | 0.2 - 1.2 |
| | Alloy steels SCM440, 42CrMo4, etc. SCM514, T03, etc. | ~ 300HB | First choice | AH325 | 100 - 300 | 0.2 - 1.2 |
| | Prehardened steels NA80, FA5, etc. | 30 - 40HRC | First choice | AH815 | 100 - 200 | 0.2 - 0.8 |
| M | Stainless steels SUS304, SUS316, etc. X3CrNi18-9, X3CrNiMo17-12-3, etc. | ~ 200HB | First choice | AH130 | 100 - 150 | 0.2 - 0.8 |
| | Gray cast irons FC200, FC300, etc. 200, 300, etc. | 150 - 250HB | First choice | AH815 | 100 - 300 | 0.2 - 1.2 |
| K | Ductile cast irons FC200, etc. GG-15, etc. | 150 - 250HB | For impact resistance | AH815 | 80 - 200 | 0.2 - 1.2 |
| | Titanium alloy Ti-6Al-4V, etc. | ~ 40HRC | First choice | AH130 | 30 - 60 | 0.2 - 0.7 |
| S | Heat resistance alloy Inconel, Hastelloy, etc. | ~ 40HRC | For wear resistance | AH815 | 20 - 50 | 0.1 - 0.3 |
| | Hardened steel SKD11, etc. X30CrMoV15-1, etc. | 50 - 60HRC | For impact resistance | AH325 | 80 - 150 | 0.1 - 0.5 |
| H | Hardened steel | 50 - 60HRC | First choice | AH815 | 80 - 150 | 0.1 - 0.5 |

APPLICATION RANGE

| Designation | DCX | APMX | RMPX | A | W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole øE |
|--------------|-----|------|------|------|---|-------------------------------|-------------------------------|--|
| E/HN02R08... | 8 | 0.5 | 1.05 | 0.15 | 2 | 10 | 13.2 | 5.87 |
| E/HN02R10... | 10 | 0.5 | 2.8 | 0.15 | 2 | 13.8 | 17 | 7.82 |
| E/HN02R12... | 12 | 0.5 | 1.9 | 0.15 | 2 | 17.8 | 21 | 9.81 |
| E/HN02R16... | 16 | 0.5 | 1.2 | 0.15 | 2 | 25.8 | 29 | 13.8 |
| E/HN02R20... | 20 | 0.5 | 0.88 | 0.15 | 2 | 33.8 | 37 | 17.8 |
| E/HN02M25... | 25 | 0.5 | 0.66 | 0.15 | 2 | 43.8 | 47 | 22.8 |

10 H022 tungaloy.com

- 1 : Application
- 2 : Approach angle
- 3 : Tool series name
- 4 : Dimension table
- 5 : Mill designation
- 6 : Dimension drawing (conforming to ISO13399)
- 7 : Spare parts
- 8 : Insert
- 9 : Standard cutting conditions
- 10 : Reference page



- Workpiece material**
- P** Steel
 - M** Stainless
 - K** Cast iron
 - N** Non-ferrous
 - S** Superalloys
 - H** Hard material

When ordering

- Please specify the designation and quantity for mills.
e.g. **TPW13R080M25.4-06** ... 1 (one mill per package)
- Please specify the designation, grade, and quantity for inserts.
e.g. **SWMT1304PDPR-MJ AH120** ... 10 (10 inserts per package)

*You will find a note if the number per package is not 10.

Application Overview

Face Milling

H066 page



For general face milling

DOT^{TRIPLE}MILL

Three times the selection, more than a triple advantage

H085 page

DO^{PENT}

Face milling cutter with low cutting force and low cost per edge

H070 page

TUNG^{EIGHT}MILL

Economical 8 edged inserts with light cutting face milling cutter

H083 page



For aluminum milling

TUNG^{SPEED}MILL

High speed face milling cutter for finishing aluminum

H092 page

TUNG-ALUMILL

Shoulder mill that enables high speed machining of aluminum and non-ferrous materials

H160 page

High-Feed Milling

H018 page



ADD^DFEED

Ultimate high feed milling cutter for maximum productivity

H020 page

DO^{FEED}

High-functional HFM cutter demonstrating ultimate versatility in a broad range of applications

H024 page

DO^FTRI

High feed milling cutters with six cutting edge inserts, featuring robust cutter design for high productivity

H042 page

MILL^QFEED

General-purpose high feed milling cutter providing optimal depths-of-cut in all material groups

H057 page

Profile Milling

H192 page



FIX^RMILL

Unique anti-rotation insert locking for maximum process security

H078 page

ADD^{FORCE}BARREL

Highly efficient profile milling cutter for maximum productivity

H198 page

TUNG^{MEISTER}

Exchangeable-head end mill series with a full lineup of milling heads

I060 page

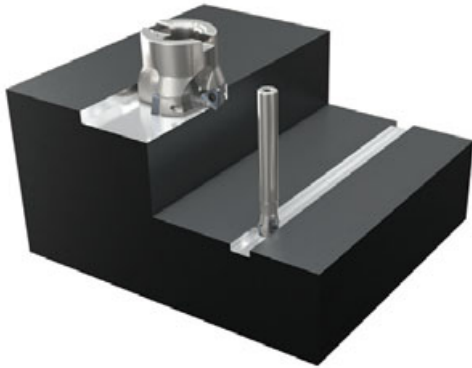
BALL^{FINISH}NOSE

Indexable end mill for high-precision finishing

H193 page

Shoulder Milling

H120 page



Shoulder milling cutters (with single-sided inserts)

TUNG-TRI

Offers a vast range of cutter diameters, insert grades and sizes. Insert features three economical cutting edges

H130 page

TUNG^{ORCE}FREC

Unique V shape inserts allow extremely aggressive cutting parameters

H122 page

Shoulder milling cutters (with double-sided inserts)

DO^{ORCE}FTRI

Rigid cutter body and double-sided six-edged inserts enable aggressive parameters and cost efficiency

H150 page

DOREC

Double-sided inserts with four cutting edges for maximum tool economy and productivity

H154 page

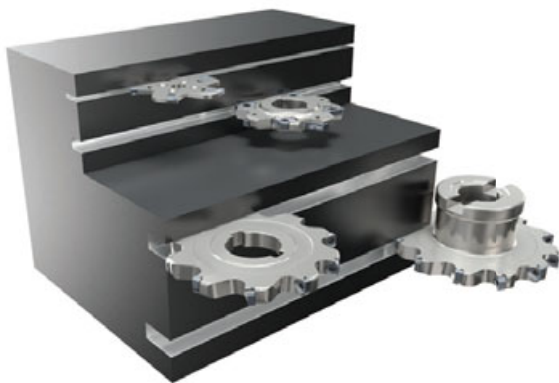
TECMILL

Exceptionally reliable tangential inserts for aggressive machining

H163 page

Other Applications

H180 page



Slot Milling

TUNG^MSLIT

Provides stable slot milling operation with excellent chip control

H181 page

TUNG^{THIN}SLIT

Enables deep slot milling with excellent tool economy

H185 page

TUNG^{UNIVERSAL}USLOT

Double-sided insert with six cutting edges for reduced cost per edge

H187 page

TEC^{TANGENTIAL}TSLOT

Incorporates tangential inserts for excellent tool reliability

H189 page

Thread Milling

THREADMILLING

Various types of threads can be machined with a single tool simply by changing the inserts

I124 page

TUNGMEISTER

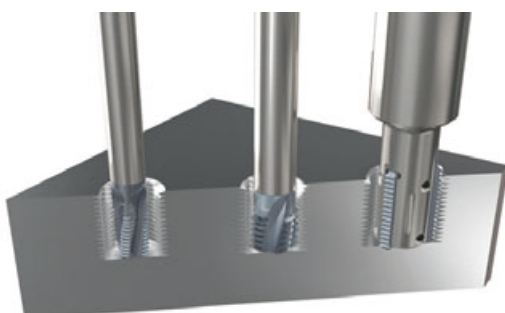
Exchangeable-head end mill series with a full lineup of milling heads

I060 page

Thread milling cutter SOLIDTHREAD

Economical indexable thread milling cutter series

I107 page







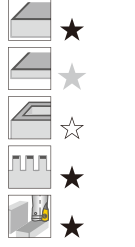
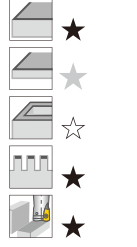
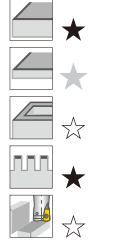




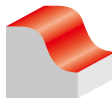







High-Feed Milling - Quick Guide

| | TUNGF^{FACE}FEED | ADD^DFEED | DOFEED | DOF^{TRI} | DO^TBALL |
|-------------------------|---------------------------------|----------------------------|-----------------------|--------------------------|---------------------------|
| | | | | | |
| Cutting edge angle | 12° | 17° | 10° / 12° / 15° / 17° | 12° | 20° / 25° |
| Depth of cut (APMX) | 0.5 | 0.5 | 0.9 / 1 / 1.5 | 1 | 1.3 / 2 |
| Tool diameter | ø8 - ø16 | ø8 - ø25 | ø16 - ø200 | ø16 - ø50 | ø20 - ø63 |
| Workpiece material | P M K S H | P M K S H | P M K S H | P M K S H | P M K S H |
| No. of corners (insert) | 2 | 4 | 4 | 6 | 4 |
| | ★ ★ ☆ ★ ★ | ★ ★ ☆ ☆ ★ | ★ ★ ☆ ☆ ★ | ★ ★ ☆ ☆ ★ | ★ ★ ☆ ☆ ☆ |
| | ☆ | ☆ | ☆ | ☆ | ☆ |
| | ☆ ☆ ☆ | ☆ ☆ ☆ | ☆ ☆ ☆ | ☆ ☆ ☆ | ☆ ☆ ☆ |
| | ★ | ★ | ★ | ★ | ★ |
| | ★ | ★ | ★ | ★ | ★ |
| Reference pages | H038 - H041 | H020 - H023 | H024 - H037 | H042 - H045 | H046 - H050 |

★ : Most suitable
 ☆ : Suitable
 ★ : Usable

Icon

| | | | | | | |
|--|--|--|--|--|--|--|
| | | | | | | |
| | | | | | | |
| | | | | | | |





















| | MILLFEED TXP | MILLQ[®]FEED | DOFEEDQUAD |
|---|---|---|---|
|  |  |  |  |
| Cutting edge angle | 10° / 15° / 20° | 7° / 10° / 12° / 14° | 13° |
| Depth of cut (APMX) | 1.5 / 3 | 1 / 1.5 / 2 / 2.5 | 2 |
| Tool diameter | ø20 - ø160 | ø25 - ø160 | ø50 - ø125 |
| Workpiece material | P M K S H | P M K S H | P M K S H |
| No. of corners (insert) | 3 | 4 | 8 |
|  Face milling |  |  |  |
|  Shoulder milling |  |  |  |
|  Profile milling |  |  | |
|  Slot milling |  |  | |
| Other applications |  |  | |
| Reference pages | H051 - H056 | H057 - H062 | H063 - H065 |

★ : Most suitable

☆ : Suitable

★ : Usable

Icon

| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |



High Feed Milling

Face Milling - Quick Guide



Face Milling



Shoulder Milling



Slot Milling



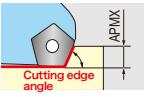





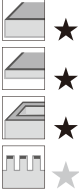
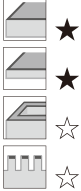


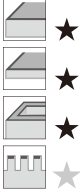









Profile Milling



Chamfering, Counterbore



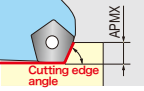











Finish Face Milling

| | TUNG MILL | DOP ENT | ROUND SPLIT | FIX R MILL | TUNG E ^{LIGHT} MILL |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Cutting edge angle | 45° | 70° | | | 41° |
| Depth of cut (APMX) | 4 / 5 / 2 | 6.4 | 6 / 8 | 6 | 3 |
| Tool diameter | ø25 - ø200 | ø32 - ø315 | ø32 - ø125 | ø40 - ø80 | ø50 - ø160 |
| Workpiece material | P M K N | P M K N S H | P M K N S | P M K S H | P M K S H |
| No. of corners (insert) | 4 | 10 | 4 / 8 | 6 / 8 | 8 |
| Face milling |  |  |  |  |  |
| Shoulder milling | | |  |  | |
| Profile milling | | |  |  | |
| Slot milling | | |  |  | |
| Other applications |  | |  |  | |
| Reference pages | H068 - H069 | H070 - H073 | H074 - H077 | H078 - H082 | H083 - H084 |

★ : Most suitable
☆ : Suitable
★ : Usable





















Icon

| | | | | | | |
|--|--|--|--|--|--|--|
| | | | | | | |
| | | | | | | |
| | | | | | | |

| | DO T MILL | DOOCTO | TUNG S MILL | | TFE |
|--|---|---|---|---|---|
| | | | TPYP | T/EPYD | |
|  |  |  |  |  |  |
| Cutting edge angle | 45° | 45° / 15° | 90° | 90° | 85.5° |
| Depth of cut (APMX) | 6 / 3.4 | 4.75 / 7.5 / 3.5 / 1.5 | 4 / 11 | 4.5 / 7.5 | 8 / 3.5 / 1.5 |
| Tool diameter | ø50 - ø160 | ø63 - ø315 | ø50 - ø125 | ø50 - ø160 | ø63 - ø125 |
| Workpiece material | P M K S H | P M K S H | N | N | P M K N |
| No. of corners (insert) | 8 / 16 | 8 / 16 | 1 / 2 | 1 | 4 / 1 / 2 |
|  Face milling |  |  |  |  |  |
|  Shoulder milling | | |  |  | |
|  Profile milling |  | | | | |
|  Slot milling | | | | | |
| Other applications |  |  | | | |
| Reference pages | H085 - H087 | H088 - H091 | H094 - H095 | H092 - H093 | H096 - H099 |

★ : Most suitable
☆ : Suitable
☆ : Usable

Icon

| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |



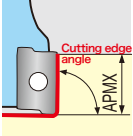










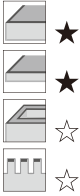


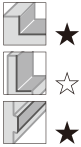












Shoulder milling - Quick Guide

| | TUNGFRREC | TUNG-TRI | | TUNGREC | |
|-------------------------|--------------------|--------------------|------------------|--------------------|--------------------|
| | | | | | |
| Cutting edge angle | 90° | 90° | 90° | 90° | 90° |
| Depth of cut (APMX) | 4 / 6 / 11.5 | 3.5 / 6 / 10 / 15 | 54 - 97 (-139) | 7 / 10.6 / 16.7 | 30.4 - 48.8 |
| Tool diameter | ø6 - ø63 | ø8 - ø160 | ø50 - ø100 | ø12 - ø160 | ø25 - ø50 |
| Workpiece material | P M K N S H | P M K N S H | P M K N S | P M K N S H | P M K N S H |
| No. of corners (insert) | 2 | 3 | 3 | 2 | 2 |
| Face milling | ★ ☆ ★ ☆ ★ ☆ | ★ ☆ ★ ☆ ★ ☆ | ★ ☆ ★ ☆ ★ ☆ | ★ ☆ ★ ☆ ★ ☆ | ★ ☆ ★ ☆ ★ ☆ |
| Shoulder milling | ★ ★ ★ ☆ | ★ ★ ★ ☆ | ★ ★ ★ ☆ | ★ ☆ ★ ☆ | ★ ☆ ★ ☆ |
| Profile milling | ★ ☆ ★ ☆ | ★ ☆ ★ ☆ | ★ ☆ ★ ☆ | ★ ☆ ★ ☆ | ★ ☆ ★ ☆ |
| Slot milling | ★ ★ ☆ ☆ | ★ ★ ☆ ☆ | | ★ ☆ ☆ ☆ | |
| Other applications | ★ ☆ | ★ ☆ | | ★ ☆ | |
| Reference pages | H122 - H129 | H130 - H139 | | H140 - H147 | |

★ : Most suitable
 ☆ : Suitable
 ☆ : Usable





















Icon

| | | | | | | |
|--------------------|--------------------|---------------------|---------------------|------------------|-------------------|-----------------------|
| Thin workpiece | Ramping | Long overhang | Axial plunging | Hole enlarging | Slot milling | Deep shoulder milling |
| Face milling | External threading | Back facing | Peck milling | Hollow workpiece | Deep slot milling | Shoulder milling |
| Internal threading | Profiling | Edging / Contouring | Interrupted surface | Cutting off | Chamfering | |

| | TUNGQUAD | | DOFRÄI | DOREC | TUNGSMILL EPYP |
|---|---|---|---|---|---|
|  |  | Roughing  |  |  |  |
| Cutting edge angle | 90° | 90° | 90° | 90° | 90° |
| Depth of cut (APMX) | 4 | 20.3 - 24.2 | 6.5 / 11 | 9 / 16 | 4 / 11 |
| Tool diameter | ø12 - ø40 | ø20 - ø25 | ø18 - ø160 | ø25 - ø160 | ø25 - ø32 |
| Workpiece material | P M K N S H | P M K N S H | P M K S | P M K S H | N |
| No. of corners (insert) | 4 | 4 | 6 | 4 | 1 / 2 |
|  Face milling |  |  |  |  |  |
|  Shoulder milling |  |  |  |  |  |
|  Profile milling | | | |  | |
|  Slot milling |  | |  |  | |
| Other applications |  | |  |  | |
| Reference pages | H148 - H149 | | H150 - H153 | H154 - H157 | H095, H158 |

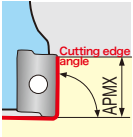






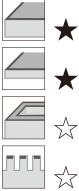





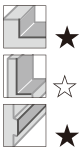
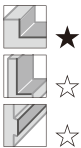
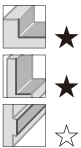
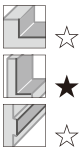
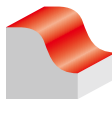




★ : Most suitable
☆ : Suitable
★ : Usable

Icon

| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |





















Shoulder milling - Quick Guide







- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

| | DOQ ^{AP} MILL | TECMILL | | TUNG ^T SHRED | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Cutting edge angle | 88° | 90° / 60° | 90° | 90° | 90° |
| Depth of cut (APMX) | 9.5 | 9.7 / 15.1 / 12.4 | 58.5 / 66.9 | 16 | 61 - 76 |
| Tool diameter | ø50 - ø100 | ø32 - ø250 | ø50 - ø63 | ø50 - ø100 | ø63 - ø80 |
| Workpiece material | P M K S H | P M K S H | P M K S H | P M K S H | P M K S H |
| No. of corners (insert) | 8 | 4 | 4 | 3 | 3 |
|  Face milling |  |  |  |  |  |
|  Shoulder milling | |  |  |  |  |
|  Profile milling | | | | | |
|  Slot milling | | | |  |  |
| Other applications | |  | | | |
| Reference pages | H158 - H159 | H163 - H166 | | H170 - H171 | |

- ★ : Most suitable
- ☆ : Suitable
- ☆ : Usable

Icon

| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |





















| TUNG-ALUMILL | |
|---|---|
|  |  |
| Cutting edge angle | 90° |
| Depth of cut (APMX) | 13 - 16 |
| Tool diameter | ø25 - ø125 |
| Workpiece material | N |
| No. of corners (insert) | 2 |
|  Face milling |  |
|  Shoulder milling |  |
|  Profile milling |  |
|  Slot milling |  |
| Other applications |  |
| Reference pages | H160 - H162 |

★ : Most suitable

☆ : Suitable

★ : Usable

Icon

| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |



High Feed Milling

Slot milling - Quick Guide



Face Milling



Shoulder Milling



Slot Milling



Profile Milling



Chamfering, Counterbore



Finish Face Milling

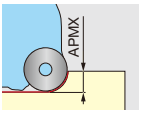


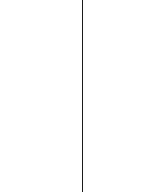












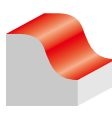
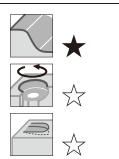

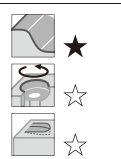
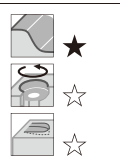
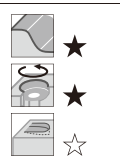








| | TUNG M SLIT | TUNG T SLIT | TUNG U SLIT | TEC T SLIT |
|-------------------------|--------------------|--------------------|--------------------|-------------------|
| | | | | |
| Depth of cut (W) | 1.6 - 4.1 | 4 - 8 | 9 - 16 | 16 - 25 |
| Tool diameter | ø63 - ø125 | ø80 - ø200 | ø80 - ø160 | ø100 - ø250 |
| Workpiece material | P M K | P M K S | P M K S | P M K S |
| No. of corners (insert) | 1 | 6 | 6 | 4 |
| Face milling | | | | |
| Shoulder milling | | | | |
| Profile milling | | | | |
| Slot milling | | | | |
| Other applications | | | | |
| Reference pages | H181 - H184 | H185 - H186 | H187 - H188 | H189- H190 |

★ : Most suitable
☆ : Suitable
★ : Usable

Icon





















| | | | | | | |
|--------------------|--------------------|---------------------|---------------------|------------------|-------------------|-----------------------|
| Thin workpiece | Ramping | Long overhang | Axial plunging | Hole enlarging | Slot milling | Deep shoulder milling |
| Face milling | External threading | Back facing | Peck milling | Hollow workpiece | Deep slot milling | Shoulder milling |
| Internal threading | Profiling | Edging / Contouring | Interrupted surface | Cutting off | Chamfering | |

Profile milling - Quick Guide

| | BALL F ^{NOSE} | ADD F ^{BÄRREL} | DO M ^{INI MILL} | BALL R ^{NOSE} | DO T ^{WIST BALL} |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Depth of cut (APMX) | 12.5 | - | 1 | 11.8 / 13.6 / 17.7 | 4 / 5 / 6 |
| Tool diameter | ø8 - ø32 | ø16 - ø40 | ø16 - ø25 | ø16 - ø25 | ø20 - ø63 |
| Workpiece material | P M K S H | P M K S H | P H | P M K S H | P M K S H |
| No. of corners (insert) | 1 | 4 | 6 | 2 | 4 |
|  Face milling |  | |  |  |  |
|  Shoulder milling |  | |  |  |  |
|  Profile milling |  |  |  |  |  |
|  Slot milling |  | |  |  |  |
| Other applications |  | |  |  |  |
| Reference pages | H193 - H197 | H198 - H199 | H200 | H201 - H202 | H046 - H050 |

★ : Most suitable
☆ : Suitable
☆ : Usable

Icon

| | | | | | | |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  | |























Chamfering and Counterboring - Quick Guide

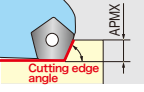




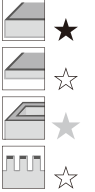

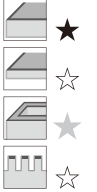
| | Chamfering cutter TUNGQUAD | Chamfering cutter ECP | Chamfering cutter ECC | Counterboring endmill TCB | DOM^{ULTI}REC |
|--|---|---|---|---|---|
|  High Feed Milling |  |  |  |  |  |
|  Face Milling | | | | | |
|  Shoulder Milling | | | | | |
|  Slot Milling | | | | | |
|  Profile Milling | | | | | |
|  Chamfering/Counterbore | | | | | |
|  Finish Face Milling | | | | | |
| Cutting edge angle | 45° | 45° | 30°, 45°, 60° | 90° | 90° |
| Depth of cut (APMX) | 3 | 6 | 14.5 / 20.5 / 25.5 | 4 / 5 / 6 / 8 / 10 | 7 / 9 / 11 |
| Tool diameter | ø12 - ø22 | ø27.5 - ø53.3 | ø34 - ø55 | ø10 - ø59 | ø16 - ø26 |
| Workpiece material | P M K N S | P K | P M K | P M K N S H | P M K S H |
| No. of corners (insert) | 4 | 4 | 2 | 4 | 4 |
| Face milling |  | | | |  |
| Shoulder milling |  | | | |  |
| Profile milling |  | | | |  |
| Slot milling |  | | | |  |
| Other applications |  ★ |  ★ |  ★ |  ★ |  |
| Reference pages | H210 - H212 | H213 | H214 - H215 | H216 - H220 | H221 - H223 |

★ : Most suitable
☆ : Suitable
☆ : Usable

Icon

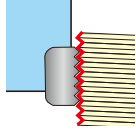




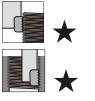
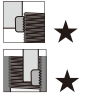
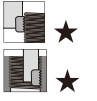
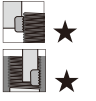
| | | | | | | |
|--|--|---|---|--|---|---|
|  Thin workpiece |  Ramping |  Long overhang |  Axial plunging |  Hole enlarging |  Slot milling |  Deep shoulder milling |
|  Face milling |  External threading |  Back facing |  Peck milling |  Hollow workpiece |  Deep slot milling |  Shoulder milling |
|  Internal threading |  Profiling |  Edging / Contouring |  Interrupted surface |  Cutting off |  Chamfering | |

Face Milling - Quick Guide

| | NMS | MS | SFP |
|---|---|---|---|
|  |  |  |  |
| Cutting edge angle | - | - | - |
| Depth of cut (APMX) | 0.2 | 0.1 | 0.1 |
| Tool diameter | ø80 - ø200 | ø100 - ø300 | ø100 - ø200 |
| Workpiece material | P M K | P H | P M K N |
| No. of corners (insert) | 4 | | |
|  Face milling |  |  |  |
| Reference pages | H232 - H233 | H234 - H235 | H235 - H236 |







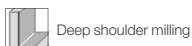
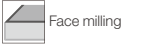
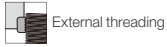










★ : Most suitable
☆ : Suitable
☆ : Usable

Thread milling - Quick Guide

| | SOLIDTHREAD | TUNGMEISTER | THREADMILLING E TTL | THREADMILLING Thread milling cutter |
|---|---|---|---|---|
|  |  |  |  |  |
| Pitch | 0.25 - 3.5 | 0.5 - 4.5 | 1.5 - 3 | 1.5 - 6 |
| Tool diameter | ø0.7 - ø20 | ø10 - ø21.7 | ø17 - ø30 | ø23 - ø80 |
| Workpiece material | P M K S | P M K S | P M K S | P M K |
| No. of corners (insert) | - | - | 2 | 2 |
| Thread milling |  |  |  |  |
| Reference pages | I107 - I123 | I060 - I105 | I124 - I127 | I128 - I129 |

★ : Most suitable
☆ : Suitable
☆ : Usable

Icon

| | | | | | | |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  | |





ADD^oFEED / DOFEED



Ultimate high feed milling cutter series for maximum productivity

ADD^oFEED

Insert size 02



Max. depth of cut: 0.5 mm
Tool diameter: ø8 - ø25 mm

- ✓ Tool diameters as small as **8 mm**
- ✓ **Highly reliable design**
- ✓ Perfect option for **replacing solid end mills**

DOFEED

Insert size 03



Max. depth of cut: 0.9 mm (UER), 1 mm (ZER)
Tool diameter: ø16 - ø50 mm

- ✓ **Close pitch cutter design** for high productivity
- ✓ **Extensive lineup** for various applications
- ✓ **New UER inserts with small approach angle** for long tool life

DOFEED

Insert size 06



Max. depth of cut: 1.5 mm
Tool diameter: ø32 - ø200 mm

- ✓ **Close pitch cutter design** for high productivity
- ✓ Tool diameters available for up to 200 mm, ideal for **rough milling of medium- and large-sized components**
- ✓ **Wiper inserts** for improved surface roughness

Tool diameters and number of teeth for each insert size

| Insert size | Max. depth of cut (mm) | Workpiece material | Tool diameter (mm), Number of teeth | | | | | | | | | | | | | | | | | | | | | |
|-------------|------------------------|--------------------|-------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| | | | ø8 | ø10 | ø12 | ø16 | ø18 | ø20 | ø22 | ø25 | ø28 | ø30 | ø32 | ø35 | ø40 | ø50 | ø52 | ø63 | ø66 | ø80 | ø100 | ø125 | ø160 | ø200 |
| 02 | 0.5 | P M K S H | 1 | 2 | 2 | 4 | | 5 | | 7 | | | | | | | | | | | | | | |
| 03 | 0.9 (UER) 1 (ZER) | P M K S H | | | | 2 | 2 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | |
| 06 | 1.5 | P M K S H | | | | | | | | | | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 6 | 6 | 8 | 10 | 12 |

Reference pages: **H020 - H037**

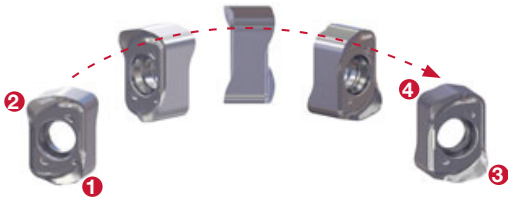
■ Cutter body design for maximum productivity

Extremely stiff body design with a large core

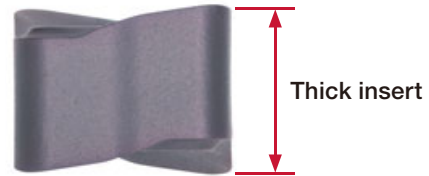


■ Reliable and economical inserts

Economical double-sided inserts with four cutting edges

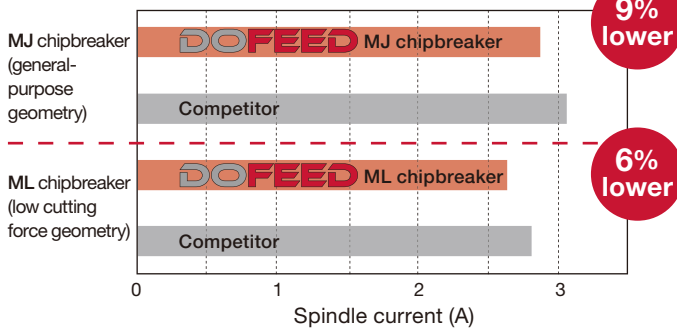


Thick insert design for increased reliability



■ Soft cutting geometry with superior chip control

■ Comparison of spindle load



P Cutter : EXN03R025M25.0-05 ($\phi 25$ mm, $z = 5$)
 Insert : LNNU0303ZER-MJ / ML AH725
 Workpiece material : S55C / C55
 Cutting speed : $V_c = 250$ m/min
 Feed per tooth : $f_z = 0.5$ mm/t
 Depth of cut : $a_p = 0.5$ mm
 Width of cut : $a_e = 25$ mm (Slot milling)
 Coolant : Dry
 Machine : Vertical M/C, BT40

Note: Test cut using a single insert

Provides stable, high productivity due to the excellent chip evacuation

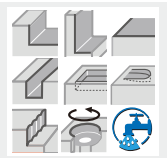
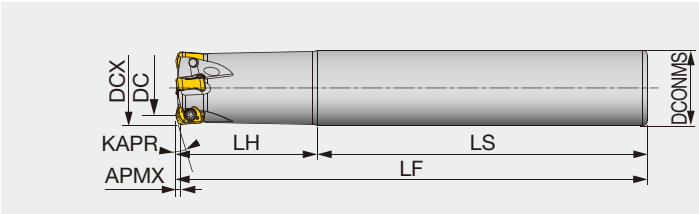
Forms compact chips



| | DOFEED | Competitor |
|---|--------|------------|
| Chip shapes | | |
| Shoulder surfaces after grooving operations | | |

High feed endmill, shank type, for 4-corner double sided inserts

GAMP = +6°, GAMF = +5° ~ +11°

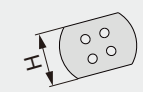
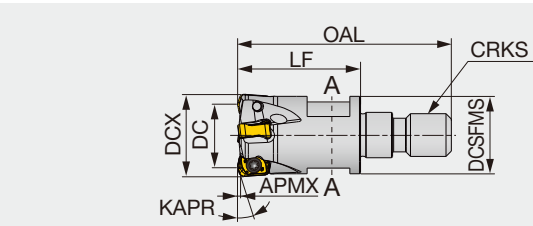


| Designation | APMX | DCX | CICT | DC | DCONMS | LF | LH | LS | KAPR | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|------|--------|-----|-----|----|------|--------|----------|-----------|
| EXN02R008M08.0-01 | 0.5 | 8 | 1 | 3.95 | 8 | 75 | 16 | 59 | 17° | 0.02 | With | LNMU02... |
| EXN02R008M08.0-01L | 0.5 | 8 | 1 | 3.95 | 8 | 90 | 31 | 59 | 17° | 0.03 | With | LNMU02... |
| EXN02R010M10.0-02 | 0.5 | 10 | 2 | 5.85 | 10 | 80 | 20 | 60 | 17° | 0.04 | With | LNMU02... |
| EXN02R010M10.0-02L | 0.5 | 10 | 2 | 5.85 | 10 | 100 | 40 | 60 | 17° | 0.05 | With | LNMU02... |
| EXN02R012M12.0-02 | 0.5 | 12 | 2 | 7.8 | 12 | 80 | 20 | 60 | 17° | 0.06 | With | LNMU02... |
| EXN02R012M12.0-02L | 0.5 | 12 | 2 | 7.8 | 12 | 110 | 50 | 60 | 17° | 0.08 | With | LNMU02... |
| EXN02R016M16.0-04 | 0.5 | 16 | 4 | 11.8 | 16 | 100 | 30 | 70 | 17° | 0.14 | With | LNMU02... |
| EXN02R016M16.0-03L | 0.5 | 16 | 3 | 11.8 | 16 | 120 | 50 | 70 | 17° | 0.17 | With | LNMU02... |
| EXN02R020M20.0-04L | 0.5 | 20 | 4 | 15.8 | 20 | 160 | 80 | 80 | 17° | 0.32 | With | LNMU02... |
| EXN02R020M20.0-05 | 0.5 | 20 | 5 | 15.8 | 20 | 130 | 50 | 80 | 17° | 0.27 | With | LNMU02... |
| EXN02R025M25.0-07 | 0.5 | 25 | 7 | 20.8 | 25 | 140 | 60 | 80 | 17° | 0.46 | With | LNMU02... |
| EXN02R025M25.0-06L | 0.5 | 25 | 6 | 20.8 | 25 | 180 | 100 | 80 | 17° | 0.57 | With | LNMU02... |

HXN02

High feed endmill, modular type (TungFlex)

GAMP = +6°, GAMF = +5° ~ +11°



A-A cross section



| Designation | APMX | DCX | CICT | DC | DCSFMS | OAL | LF | H | KAPR | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|-----|------|------|--------|------|----|----|------|------|--------|----------|-----------|
| HXN02R008MM06-01 | 0.5 | 8 | 1 | 3.95 | 9.5 | 33.5 | 19 | 7 | 17° | M6 | 0.01 | With | LNMU02... |
| HXN02R010MM06-02 | 0.5 | 10 | 2 | 5.85 | 9.5 | 31.5 | 17 | 7 | 17° | M6 | 0.01 | With | LNMU02... |
| HXN02R012MM06-02 | 0.5 | 12 | 2 | 7.8 | 10 | 31.5 | 17 | 7 | 17° | M6 | 0.01 | With | LNMU02... |
| HXN02R016MM08-04 | 0.5 | 16 | 4 | 11.8 | 14.5 | 40 | 23 | 10 | 17° | M8 | 0.03 | With | LNMU02... |
| HXN02R020MM10-05 | 0.5 | 20 | 5 | 15.8 | 17.8 | 49 | 30 | 15 | 17° | M10 | 0.06 | With | LNMU02... |
| HXN02R025MM12-07 | 0.5 | 25 | 7 | 20.8 | 23 | 52 | 30 | 17 | 17° | M12 | 0.1 | With | LNMU02... |

Approach angle



Others

SPARE PARTS

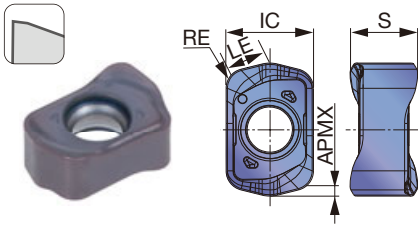
| Designation | Clamping screw | Wrench |
|--|----------------|--------|
| EXN02R008..., HXN02R008... | CSPB-1.8FL3.6 | IP-6DB |
| EXN02R010... - EXN02R025... HXN02R010... - HXN02R025... | CSPB-1.8FL4.3 | IP-6DB |

| Tool diameter tolerance | |
|-------------------------|----------|
| Tool diameter | 0 / -0.4 |

Recommended clamping torque: 0.5 N·m

INSERT

LNMU02-MM (for general purpose)



| | | | | | | | | | | | |
|----------|----------------|---|---|---|--|--|--|--|--|--|--|
| P | Steel | | ★ | ☆ | | | | | | | |
| M | Stainless | ★ | ☆ | | | | | | | | |
| K | Cast iron | | ☆ | ★ | | | | | | | |
| N | Non-ferrous | | | | | | | | | | |
| S | Superalloy | ★ | | ★ | | | | | | | |
| H | Hard materials | | ☆ | ★ | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | | | LE | IC | S | |
|----------------|-----|------|--------|--------|--------|--|--|--|--|--|--|----|------|---|-----|
| | | | AH130 | AH3225 | AH8015 | | | | | | | | | | |
| LNMU0202ZER-MM | 0.9 | 0.5 | ● | ● | ● | | | | | | | | 1.79 | 4 | 3.1 |

● : Line up

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



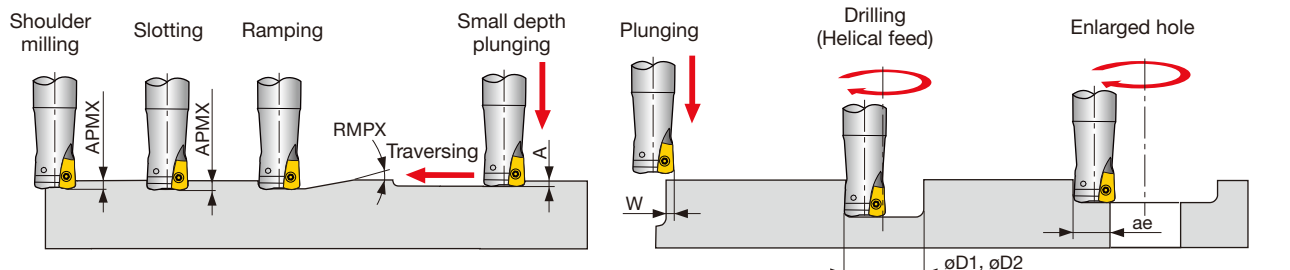
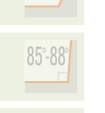
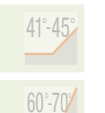


STANDARD CUTTING CONDITIONS



| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|-----|---|----------------------------------|-----------------------|--------------|--------------------------|--------------------------|-----------|
| P | Carbon steels S45C, S55C, etc. C45, S55C, etc. | - 300HB | First choice | AH3225 | 100 - 300 | 0.2 - 1.2 | |
| | | - 300HB | For wear resistance | AH8015 | 100 - 300 | 0.2 - 1.2 | |
| | Alloy steels SCM440, 42CrMo4, etc. 42CrMo4, 17Cr3, etc. | - 300HB | First choice | AH3225 | 100 - 300 | 0.2 - 1.2 | |
| | | - 300HB | For wear resistance | AH8015 | 100 - 300 | 0.2 - 1.2 | |
| | Prehardened steels NAK80, PX5, etc. | 30 - 40HRC | First choice | AH8015 | 100 - 200 | 0.2 - 0.8 | |
| | | 30 - 40HRC | For impact resistance | AH3225 | 100 - 200 | 0.2 - 0.8 | |
| M | Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | AH130 | 100 - 150 | 0.2 - 0.8 | |
| K | Gray cast irons FC250, FC300, etc. 200, 300, etc. | 150 - 250HB | First choice | AH8015 | 100 - 300 | 0.2 - 1.2 | |
| | | 150 - 250HB | For impact resistance | AH3225 | 100 - 300 | 0.2 - 1.2 | |
| | Ductile cast irons FCD600, etc. 600-3, etc. | 150 - 250HB | First choice | AH8015 | 80 - 200 | 0.2 - 1.2 | |
| | | 150 - 250HB | For impact resistance | AH3225 | 80 - 200 | 0.2 - 1.2 | |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice | AH130 | 30 - 60 | 0.2 - 0.7 | |
| | | - 40HRC | For wear resistance | AH8015 | 30 - 60 | 0.2 - 0.7 | |
| | Heat resistance alloy Inconel, Hastelloy, etc. | - 40HRC | First choice | AH8015 | 20 - 50 | 0.1 - 0.3 | |
| | | - 40HRC | For impact resistance | AH3225 | 20 - 50 | 0.1 - 0.3 | |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice | AH8015 | 80 - 150 | 0.1 - 0.5 |
| | | 40 - 50HRC | For impact resistance | AH3225 | 80 - 150 | 0.1 - 0.5 | |
| | SKD11, etc. X153CrMoV12, etc. | 50 - 60HRC | First choice | AH8015 | 50 - 70 | 0.1 - 0.3 | |

APPLICATION RANGE



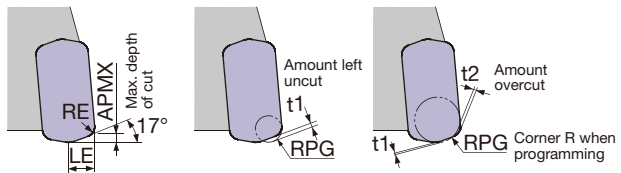
| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Max. cutting width in plunging W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole ae |
|----------------|-----|---------------------------|----------------------------|--------------------------|-------------------------------------|----------------------------------|----------------------------------|---|
| E/HXN02R008... | 8 | 0.5 | 0.5 | 0.03 | 2 | 11.5 | 13.2 | 5.87 |
| E/HXN02R010... | 10 | 0.5 | 2.8 | 0.15 | 2 | 13.8 | 17 | 7.82 |
| E/HXN02R012... | 12 | 0.5 | 1.9 | 0.15 | 2 | 17.8 | 21 | 9.81 |
| E/HXN02R016... | 16 | 0.5 | 1.2 | 0.15 | 2 | 25.8 | 29 | 13.8 |
| E/HXN02R020... | 20 | 0.5 | 0.88 | 0.15 | 2 | 33.8 | 37 | 17.8 |
| E/HXN02M025... | 25 | 0.5 | 0.66 | 0.15 | 2 | 43.8 | 47 | 22.8 |

Tool dia.: DCX (mm), Number of revolutions: n (min^{-1}), Feed speed: V_f (mm/min), Max. depth of cut: $a_p = 0.5$ mm, Number of teeth: CICT

| $\phi 8$, CICT = 1 | | $\phi 10$, CICT = 2 | | $\phi 12$, CICT = 2 | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
|-------------------------------------|-------|----------------------|--------|----------------------|-------|-----------|----------|----------|-----------|----------|----------|-----------|----------|----------|
| n | V_f | n | V_f | n | V_f | n | V_f | | n | V_f | | n | V_f | |
| | | | | | | | CICT = 3 | CICT = 4 | | CICT = 4 | CICT = 5 | | CICT = 6 | CICT = 7 |
| 7,960 | 6,370 | 6,370 | 10,200 | 5,310 | 8,500 | 3,980 | 9,560 | 12,740 | 3,180 | 10,180 | 12,720 | 2,550 | 12,240 | 14,280 |
| $V_c = 200$ m/min, $f_z = 0.8$ mm/t | | | | | | | | | | | | | | |
| 7,960 | 6,370 | 6,370 | 10,200 | 5,310 | 8,500 | 3,980 | 9,560 | 12,740 | 3,180 | 10,180 | 12,720 | 2,550 | 12,240 | 14,280 |
| $V_c = 200$ m/min, $f_z = 0.8$ mm/t | | | | | | | | | | | | | | |
| 5,970 | 2,990 | 4,780 | 4,780 | 3,980 | 3,980 | 2,990 | 4,490 | 5,980 | 2,390 | 4,780 | 5,980 | 1,910 | 5,730 | 6,690 |
| $V_c = 150$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | | | | | | |
| 4,780 | 2,390 | 3,820 | 3,820 | 3,190 | 3,190 | 2,390 | 3,590 | 4,780 | 1,910 | 3,820 | 4,780 | 1,530 | 4,590 | 5,360 |
| $V_c = 120$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | | | | | | |
| 7,960 | 6,370 | 6,370 | 10,200 | 5,310 | 8,500 | 3,980 | 9,560 | 12,740 | 3,180 | 10,180 | 12,720 | 2,550 | 12,240 | 14,280 |
| $V_c = 200$ m/min, $f_z = 0.8$ mm/t | | | | | | | | | | | | | | |
| 5,970 | 4,780 | 4,780 | 7,650 | 3,980 | 6,370 | 2,990 | 7,180 | 9,570 | 2,390 | 7,650 | 9,560 | 1,530 | 7,350 | 8,570 |
| $V_c = 150$ m/min, $f_z = 0.8$ mm/t | | | | | | | | | | | | | | |
| 1,590 | 800 | 1,270 | 1,270 | 1,060 | 1,060 | 800 | 1,200 | 1,600 | 640 | 1,280 | 1,600 | 510 | 1,530 | 1,790 |
| $V_c = 40$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | | | | | | |
| 1,190 | 240 | 1,000 | 400 | 800 | 320 | 600 | 360 | 480 | 480 | 390 | 480 | 380 | 460 | 540 |
| $V_c = 30$ m/min, $f_z = 0.2$ mm/t | | | | | | | | | | | | | | |
| 4,780 | 1,440 | 3,820 | 2,300 | 3,190 | 1,920 | 2,390 | 2,160 | 2,870 | 1,910 | 2,300 | 2,870 | 1,530 | 2,760 | 3,220 |
| $V_c = 120$ m/min, $f_z = 0.3$ mm/t | | | | | | | | | | | | | | |
| 2,390 | 480 | 1,910 | 770 | 1,590 | 640 | 1,190 | 720 | 960 | 950 | 760 | 950 | 760 | 920 | 1,070 |
| $V_c = 60$ m/min, $f_z = 0.2$ mm/t | | | | | | | | | | | | | | |

TOOL GEOMETRY ON PROGRAMMING

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as $R = 1$ mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t_1) and overcut (t_2).

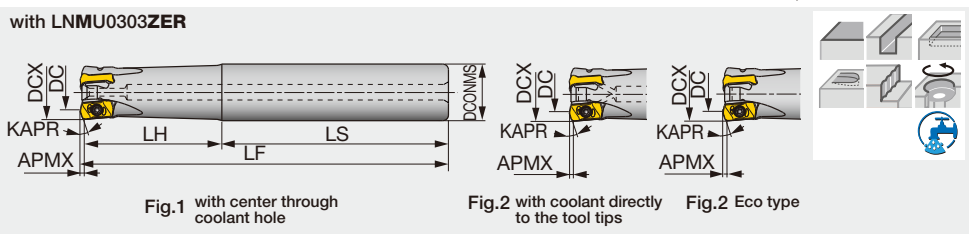


| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t_1 (mm) | Amount overcut t_2 (mm) |
|--------------------------------|--------------------------|----------|----------------------------------|---------------------------------|------------------------------|
| 0.5 | 0.9 | 2 | 0.5 | 0.38 | 0 |
| 0.5 | 0.9 | 2 | 0.8 | 0.31 | 0 |
| 0.5 | 0.9 | 2 | 1 | 0.26 | 0 |
| 0.5 | 0.9 | 2 | 1.5 | 0.14 | 0.08 |

*Recommended

High feed endmill, shank type

GAMP = +6°, GAMF = +5° ~ +11°



- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

| Designation | APMX | APMX2 | APMX3 | DCX | CICT | DC | DC2 | DC3 | DCONMS | LF | LH | LS | KAPR | KAPR2* | KAPR3* | WT(kg) | Air hole | Insert | Fig. |
|-------------------------------------|------|-------|-------|-----|------|------|------|------|--------|-----|-----|-----|------|--------|--------|--------|----------|-----------|------|
| EXN03R016M16.0-02 ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 16 | 100 | 30 | 70 | 15° | 10° | 15° | 0.2 | With | LN*U03... | 1 |
| EXN03R016M16.0-02L ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 16 | 150 | 50 | 100 | 15° | 10° | 15° | 0.2 | With | LN*U03... | 1 |
| EXN03R016M16.0-02-C ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 16 | 100 | 30 | 70 | 15° | 10° | 15° | 0.2 | With | LN*U03... | 2 |
| EXN03R016M16.0-02L-C ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 16 | 150 | 50 | 100 | 15° | 10° | 15° | 0.2 | With | LN*U03... | 2 |
| EXN03R016M16.0-02N ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 16 | 100 | 30 | 70 | 15° | 10° | 15° | 0.2 | Without | LN*U03... | 3 |
| EXN03R018M16.0-02 ⁽¹⁾ | 1 | 0.9 | 1 | 18 | 2 | 11.5 | 10.7 | 11.7 | 16 | 100 | 30 | 70 | 17° | 12° | 17° | 0.2 | With | LN*U03... | 1 |
| EXN03R018M16.0-02L ⁽¹⁾ | 1 | 0.9 | 1 | 18 | 2 | 11.5 | 10.7 | 11.7 | 16 | 150 | 25 | 125 | 17° | 12° | 17° | 0.2 | With | LN*U03... | 1 |
| EXN03R020M20.0-03 ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 1 |
| EXN03R020M20.0-03L ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 20 | 160 | 80 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 1 |
| EXN03R020M20.0-03-C ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 2 |
| EXN03R020M20.0-03L-C ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 20 | 160 | 80 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 2 |
| EXN03R020M20.0-03N ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | Without | LN*U03... | 3 |
| EXN03R020M20.0-04 ⁽¹⁾ | 1 | 0.9 | 1 | 20 | 4 | 13.5 | 12.7 | 13.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 1 |
| EXN03R020M20.0-04-C ⁽¹⁾ | 1 | 0.9 | 1 | 20 | 4 | 13.5 | 12.7 | 13.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 2 |
| EXN03R022M20.0-03 ⁽²⁾ | 1 | 0.9 | 1 | 22 | 3 | 15.5 | 14.7 | 15.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 1 |
| EXN03R022M20.0-03L ⁽²⁾ | 1 | 0.9 | 1 | 22 | 3 | 15.5 | 14.7 | 15.6 | 20 | 160 | 30 | 130 | 17° | 12° | 17° | 0.4 | With | LN*U03... | 1 |
| EXN03R022M20.0-04 ⁽¹⁾ | 1 | 0.9 | 1 | 22 | 4 | 15.5 | 14.7 | 15.6 | 20 | 130 | 50 | 80 | 17° | 12° | 17° | 0.3 | With | LN*U03... | 1 |
| EXN03R025M25.0-04 ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 1 |
| EXN03R025M25.0-04L ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 25 | 180 | 100 | 80 | 17° | 12° | 17° | 0.6 | With | LN*U03... | 1 |
| EXN03R025M25.0-04-C ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 2 |
| EXN03R025M25.0-04L-C ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 25 | 180 | 100 | 80 | 17° | 12° | 17° | 0.6 | With | LN*U03... | 2 |
| EXN03R025M25.0-04N ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | Without | LN*U03... | 3 |
| EXN03R025M25.0-05 ⁽¹⁾ | 1 | 0.9 | 1 | 25 | 5 | 18.5 | 17.7 | 18.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 1 |
| EXN03R025M25.0-05-C ⁽¹⁾ | 1 | 0.9 | 1 | 25 | 5 | 18.5 | 17.7 | 18.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 2 |
| EXN03R028M25.0-04 ⁽²⁾ | 1 | 0.9 | 1 | 28 | 4 | 21.5 | 20.7 | 21.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 1 |
| EXN03R028M25.0-04L ⁽²⁾ | 1 | 0.9 | 1 | 28 | 4 | 21.5 | 20.7 | 21.6 | 25 | 180 | 35 | 145 | 17° | 12° | 17° | 0.7 | With | LN*U03... | 1 |
| EXN03R028M25.0-05 ⁽¹⁾ | 1 | 0.9 | 1 | 28 | 5 | 21.5 | 20.7 | 21.6 | 25 | 140 | 60 | 80 | 17° | 12° | 17° | 0.5 | With | LN*U03... | 1 |
| EXN03R030M32.0-04 ⁽²⁾ | 1 | 0.9 | 1 | 30 | 4 | 23.5 | 22.7 | 23.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | With | LN*U03... | 1 |
| EXN03R030M32.0-04L ⁽²⁾ | 1 | 0.9 | 1 | 30 | 4 | 23.5 | 22.7 | 23.6 | 32 | 200 | 120 | 80 | 17° | 12° | 17° | 0.9 | With | LN*U03... | 1 |
| EXN03R030M32.0-05 ⁽²⁾ | 1 | 0.9 | 1 | 30 | 5 | 23.5 | 22.7 | 23.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | With | LN*U03... | 1 |
| EXN03R032M32.0-05 ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | With | LN*U03... | 1 |
| EXN03R032M32.0-05L ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 32 | 200 | 120 | 80 | 17° | 12° | 17° | 1.1 | With | LN*U03... | 1 |
| EXN03R032M32.0-05-C ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | With | LN*U03... | 2 |
| EXN03R032M32.0-05L-C ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 32 | 200 | 120 | 80 | 17° | 12° | 17° | 1.1 | With | LN*U03... | 2 |
| EXN03R032M32.0-05N ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | Without | LN*U03... | 3 |
| EXN03R032M32.0-06 ⁽¹⁾ | 1 | 0.9 | 1 | 32 | 6 | 25.5 | 24.7 | 25.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.9 | With | LN*U03... | 1 |
| EXN03R032M32.0-06-C ⁽¹⁾ | 1 | 0.9 | 1 | 32 | 6 | 25.5 | 24.7 | 25.6 | 32 | 150 | 70 | 80 | 17° | 12° | 17° | 0.8 | With | LN*U03... | 2 |
| EXN03R035M32.0-05 ⁽²⁾ | 1 | 0.9 | 1 | 35 | 5 | 28.5 | 27.7 | 28.6 | 32 | 150 | 35 | 115 | 17° | 12° | 17° | 0.9 | With | LN*U03... | 1 |
| EXN03R035M32.0-05L ⁽²⁾ | 1 | 0.9 | 1 | 35 | 5 | 28.5 | 27.7 | 28.6 | 32 | 200 | 35 | 165 | 17° | 12° | 17° | 1.2 | With | LN*U03... | 1 |
| EXN03R035M32.0-06 ⁽²⁾ | 1 | 0.9 | 1 | 35 | 6 | 28.5 | 27.7 | 28.6 | 32 | 150 | 35 | 115 | 17° | 12° | 17° | 0.9 | With | LN*U03... | 1 |
| EXN03R040M32.0-06-C ⁽²⁾ | 1 | 0.9 | 1 | 40 | 6 | 33.6 | 32.8 | 33.7 | 32 | 150 | 45 | 105 | 17° | 12° | 17° | 1 | With | LN*U03... | 2 |
| EXN03R040M32.0-06L-C ⁽²⁾ | 1 | 0.9 | 1 | 40 | 6 | 33.6 | 32.8 | 33.7 | 32 | 220 | 45 | 175 | 17° | 12° | 17° | 1.4 | With | LN*U03... | 2 |

*APMX2, KAPR2 : with LNMU0303UER
 *APMX3, KAPR3 : with LNMU0303ZER
 Clamping screws used for (1) and (2) above are different. See below for the part codes.

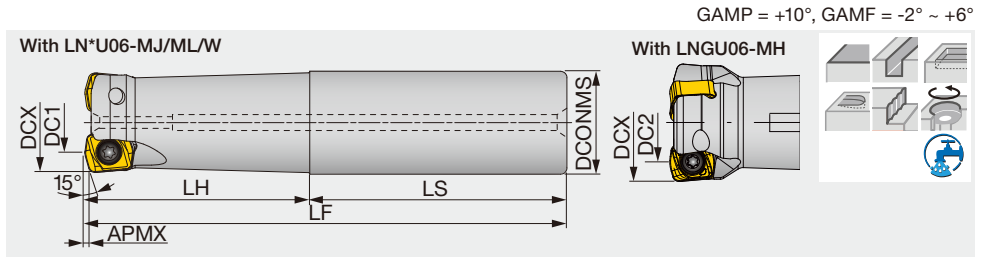
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench | Tool diameter tolerance | |
|-------------|----------------------------------|----------------------|--------|-------------------------|-----------|
| EXN03... | (1) CSPB-2.5 (2) CSPB-2.5L080 | (M-1000) | IP-8D | Tool diameter | 0 / -0.45 |

Recommended clamping torque: 1.3 N·m

Reference pages: Inserts → **H028 - H029**, Standard cutting conditions → **H030 - H033**

High feed mill shank type cutter, with screw clamp system

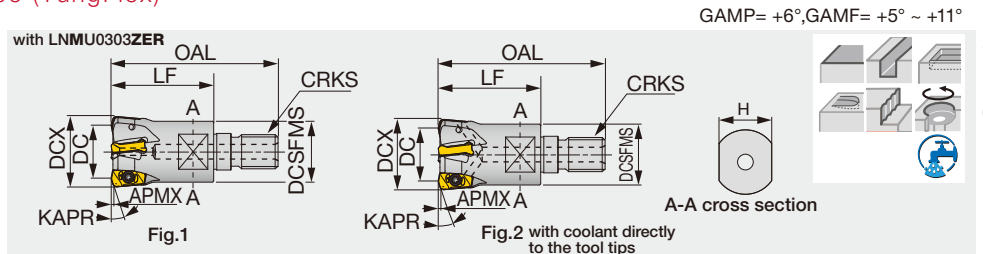


| Designation | APMX | DCX | CICT | DC1 | DC2 | DCONMS | LF | LH | LS | WT (kg) | Air hole | Insert |
|--------------------|------|-----|------|------|------|--------|-----|-----|-----|---------|----------|-----------|
| EXN06R032M32.0-02 | 1.5 | 32 | 2 | 19.7 | 19.1 | 32 | 150 | 70 | 80 | 0.8 | with | LN*U06... |
| EXN06R032M32.0-02L | 1.5 | 32 | 2 | 19.7 | 19.1 | 32 | 200 | 120 | 80 | 1.1 | with | LN*U06... |
| EXN06R035M32.0-02 | 1.5 | 35 | 2 | 22.7 | 22 | 32 | 150 | 45 | 105 | 0.9 | with | LN*U06... |
| EXN06R035M32.0-02L | 1.5 | 35 | 2 | 22.7 | 22 | 32 | 200 | 45 | 155 | 1.2 | with | LN*U06... |
| EXN06R040M32.0-03 | 1.5 | 40 | 3 | 27.7 | 27 | 32 | 150 | 45 | 105 | 0.9 | with | LN*U06... |
| EXN06R040M32.0-03L | 1.5 | 40 | 3 | 27.7 | 27 | 32 | 220 | 45 | 175 | 1.3 | with | LN*U06... |

| Tool diameter tolerance | |
|-------------------------|-----------|
| Tool diameter | 0 / -0.55 |

HXN03

High feed endmill, modular type (TungFlex)



| Designation | APMX | APMX2 | APMX3 | DCX | CICT | DC | DC2 | DC3 | OAL | LF | H | DCSFMS | KAPR | KAPR2* | KAPR3* | CRKS | WT(kg) | Air hole | Insert | Fig. |
|-----------------------------------|------|-------|-------|-----|------|------|------|------|-----|----|----|--------|------|--------|--------|------|--------|----------|-----------|------|
| HXN03R016MM08-02 ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 42 | 25 | 10 | 12.8 | 15° | 10° | 15° | M8 | 0.03 | With | LN*U03... | 1 |
| HXN03R016MM08-02-C ⁽¹⁾ | 1 | 0.9 | 1 | 16 | 2 | 9.6 | 8.8 | 9.8 | 42 | 25 | 10 | 12.8 | 15° | 10° | 15° | M8 | 0.03 | With | LN*U03... | 2 |
| HXN03R018MM08-02 ⁽¹⁾ | 1 | 0.9 | 1 | 18 | 2 | 11.5 | 10.7 | 11.7 | 42 | 25 | 10 | 14.5 | 17° | 12° | 17° | M8 | 0.04 | With | LN*U03... | 1 |
| HXN03R020MM10-03 ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.06 | With | LN*U03... | 1 |
| HXN03R020MM10-03-C ⁽²⁾ | 1 | 0.9 | 1 | 20 | 3 | 13.5 | 12.7 | 13.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.06 | With | LN*U03... | 2 |
| HXN03R020MM10-04 ⁽¹⁾ | 1 | 0.9 | 1 | 20 | 4 | 13.5 | 12.7 | 13.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.06 | With | LN*U03... | 1 |
| HXN03R020MM10-04-C ⁽¹⁾ | 1 | 0.9 | 1 | 20 | 4 | 13.5 | 12.7 | 13.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.06 | With | LN*U03... | 2 |
| HXN03R022MM10-03 ⁽²⁾ | 1 | 0.9 | 1 | 22 | 3 | 15.5 | 14.7 | 15.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.06 | With | LN*U03... | 1 |
| HXN03R022MM10-04 ⁽¹⁾ | 1 | 0.9 | 1 | 22 | 4 | 15.5 | 14.7 | 15.6 | 49 | 30 | 15 | 17.8 | 17° | 12° | 17° | M10 | 0.07 | With | LN*U03... | 1 |
| HXN03R025MM12-04 ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 57 | 35 | 17 | 20.8 | 17° | 12° | 17° | M12 | 0.1 | With | LN*U03... | 1 |
| HXN03R025MM12-04-C ⁽²⁾ | 1 | 0.9 | 1 | 25 | 4 | 18.5 | 17.7 | 18.6 | 57 | 35 | 17 | 20.8 | 17° | 12° | 17° | M12 | 0.1 | With | LN*U03... | 2 |
| HXN03R025MM12-05 ⁽¹⁾ | 1 | 0.9 | 1 | 25 | 5 | 18.5 | 17.7 | 18.6 | 57 | 35 | 17 | 20.8 | 17° | 12° | 17° | M12 | 0.11 | With | LN*U03... | 1 |
| HXN03R025MM12-05-C ⁽¹⁾ | 1 | 0.9 | 1 | 25 | 5 | 18.5 | 17.7 | 18.6 | 57 | 35 | 17 | 20.8 | 17° | 12° | 17° | M12 | 0.1 | With | LN*U03... | 2 |
| HXN03R028MM12-04 ⁽²⁾ | 1 | 0.9 | 1 | 28 | 4 | 21.5 | 20.7 | 21.6 | 57 | 35 | 17 | 23 | 17° | 12° | 17° | M12 | 0.12 | With | LN*U03... | 1 |
| HXN03R028MM12-05 ⁽²⁾ | 1 | 0.9 | 1 | 28 | 5 | 21.5 | 20.7 | 21.6 | 57 | 35 | 17 | 23 | 17° | 12° | 17° | M12 | 0.12 | With | LN*U03... | 1 |
| HXN03R030MM16-04 ⁽²⁾ | 1 | 0.9 | 1 | 30 | 4 | 23.5 | 22.7 | 23.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.19 | With | LN*U03... | 1 |
| HXN03R030MM16-05 ⁽²⁾ | 1 | 0.9 | 1 | 30 | 5 | 23.5 | 22.7 | 23.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.2 | With | LN*U03... | 1 |
| HXN03R032MM16-05 ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.2 | With | LN*U03... | 1 |
| HXN03R032MM16-05-C ⁽²⁾ | 1 | 0.9 | 1 | 32 | 5 | 25.5 | 24.7 | 25.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.2 | With | LN*U03... | 2 |
| HXN03R032MM16-06 ⁽¹⁾ | 1 | 0.9 | 1 | 32 | 6 | 25.5 | 24.7 | 25.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.21 | With | LN*U03... | 1 |
| HXN03R032MM16-06-C ⁽¹⁾ | 1 | 0.9 | 1 | 32 | 6 | 25.5 | 24.7 | 25.6 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.2 | With | LN*U03... | 2 |
| HXN03R040MM16-06-C ⁽²⁾ | 1 | 0.9 | 1 | 40 | 6 | 33.6 | 32.8 | 33.7 | 63 | 40 | 22 | 28.8 | 17° | 12° | 17° | M16 | 0.27 | With | LN*U03... | 2 |

*APMX2, KAPR2 : with LNMU0303UER
*APMX3, KAPR3 : with LNMU0303ZER
Clamping screws used for (1) and (2) above are different. See below for the part codes.

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench | Tool diameter tolerance | |
|-------------|----------------------------------|----------------------|--------|-------------------------|-----------|
| EXN06 | CSPB-5 | (M-1000) | IP-20D | Tool diameter | 0 / -0.45 |
| HXN03... | (1) CSPB-2.5 (2) CSPB-2.5L080 | (M-1000) | IP-8D | | |

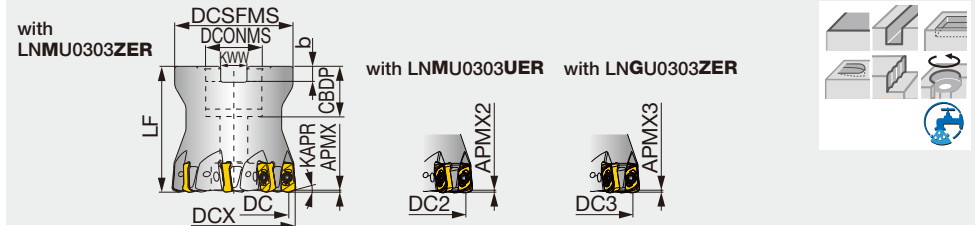
Recommended clamping torque: CSPB-5 = 5 N·m, CSPB-2.5, CSPB-2.5L080 = 1.3 N·m

Reference pages: Inserts → **H028 - H029**, Standard cutting conditions → **H030 - H033**, TungFlex → **H036 - H037**



High feed mill bore type cutter, for 4-corner double sided inserts

GAMP = +6°, GAMF = +12° ~ 13°



| Designation | APMX | APMX2 | APMX3 | DCX | CICT | DC | DC2 | DC3 | DCSFMS | DCONMS | CBDP | LF | b | KWW | KAPR | KAPR2 | KAPR3 | WT(kg) | Air hole | Insert |
|-------------------|------|-------|-------|-----|------|------|------|------|--------|--------|------|----|-----|------|------|-------|-------|--------|----------------|--------|
| TXN03R040M16.0E05 | 1 | 0.9 | 1 | 40 | 5 | 33.6 | 32.8 | 33.7 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 17° | 12° | 17° | 0.2 | With LN*U03... | |
| TXN03R040M16.0E06 | 1 | 0.9 | 1 | 40 | 6 | 33.6 | 32.8 | 33.7 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 17° | 12° | 17° | 0.2 | With LN*U03... | |
| TXN03R050M22.0E05 | 1 | 0.9 | 1 | 50 | 5 | 43.6 | 42.8 | 43.7 | 47 | 22 | 20 | 50 | 6.3 | 10.4 | 17° | 12° | 17° | 0.5 | With LN*U03... | |
| TXN03R050M22.0E08 | 1 | 0.9 | 1 | 50 | 8 | 43.6 | 42.8 | 43.7 | 47 | 22 | 20 | 50 | 6.3 | 10.4 | 17° | 12° | 17° | 0.5 | With LN*U03... | |
| TXN03R050M22.2-08 | 1 | 0.9 | 1 | 50 | 8 | 43.6 | 42.8 | 43.7 | 47 | 22.225 | 20 | 50 | 5 | 8 | 17° | 12° | 17° | 0.5 | With LN*U03... | |

*KAPR : with LNMU0303ZER
*KAPR2 : with LNMU0303UER
*KAPR3 : with LNGU0303ZER

Tool diameter tolerance

| | |
|---------------|-----------|
| Tool diameter | 0 / -0.45 |
|---------------|-----------|

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Shell locking bolt | Wrench |
|-------------|----------------|----------------------|--------------------|--------|
| TXN03R04... | CSPB-2.5L080 | (M-1000) | CM8X30H | IP-8D |
| TXN03R05... | CSPB-2.5L080 | (M-1000) | CM10X30H | IP-8D |

Recommended clamping torque: 1.3 N·m

Approach angle

7°-25°

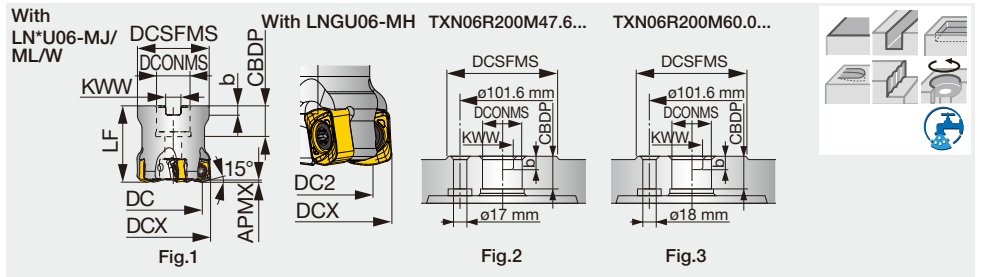
41°-45°

60°-70°

85°-88°

90°

Others



| Designation | APMX | DCX | CICT | DC1 | DC2 | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT (kg) | Air hole | Insert | Fig. |
|----------------------------------|------|-----|------|-------|-------|--------|----|--------|------|------|-----|---------|----------|-----------|------|
| TXN06R050M22.0E04 ⁽¹⁾ | 1.5 | 50 | 4 | 37.6 | 36.9 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | with | LN*U06... | 1 |
| TXN06R050M22.0E05 ⁽¹⁾ | 1.5 | 50 | 5 | 37.6 | 36.9 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | with | LN*U06... | 1 |
| TXN06R050M22.2-04 ⁽²⁾ | 1.5 | 50 | 4 | 37.6 | 36.9 | 47 | 50 | 22.225 | 20 | 8 | 5 | 0.4 | with | LN*U06... | 1 |
| TXN06R050M22.2-05 ⁽¹⁾ | 1.5 | 50 | 5 | 37.6 | 36.9 | 47 | 50 | 22.225 | 20 | 8 | 5 | 0.4 | with | LN*U06... | 1 |
| TXN06R052M22.0E04 ⁽¹⁾ | 1.5 | 52 | 4 | 39.6 | 38.9 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.5 | with | LN*U06... | 1 |
| TXN06R052M22.0E05 ⁽¹⁾ | 1.5 | 52 | 5 | 39.6 | 38.9 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.5 | with | LN*U06... | 1 |
| TXN06R063M22.0E04 ⁽²⁾ | 1.5 | 63 | 4 | 50.6 | 49.8 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.8 | with | LN*U06... | 1 |
| TXN06R063M22.0E06 ⁽²⁾ | 1.5 | 63 | 6 | 50.6 | 49.8 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.8 | with | LN*U06... | 1 |
| TXN06R063M22.2-04 ⁽²⁾ | 1.5 | 63 | 4 | 50.6 | 49.8 | 59 | 50 | 22.225 | 20 | 8 | 5 | 0.8 | with | LN*U06... | 1 |
| TXN06R063M22.2-06 ⁽²⁾ | 1.5 | 63 | 6 | 50.6 | 49.8 | 59 | 50 | 22.225 | 20 | 8 | 5 | 0.8 | with | LN*U06... | 1 |
| TXN06R066M27.0E04 | 1.5 | 66 | 4 | 53.6 | 52.8 | 63 | 50 | 27 | 22 | 12.4 | 7 | 0.8 | with | LN*U06... | 1 |
| TXN06R066M27.0E06 | 1.5 | 66 | 6 | 53.6 | 52.8 | 63 | 50 | 27 | 22 | 12.4 | 7 | 0.8 | with | LN*U06... | 1 |
| TXN06R080M27.0E05 | 1.5 | 80 | 5 | 67.6 | 66.8 | 76 | 63 | 27 | 22 | 12.4 | 7 | 1.6 | with | LN*U06... | 1 |
| TXN06R080M27.0E05 | 1.5 | 80 | 5 | 67.6 | 66.8 | 60 | 63 | 27 | 22 | 12.4 | 7 | 1.2 | with | LN*U06... | 1 |
| TXN06R080M27.0E08 | 1.5 | 80 | 8 | 67.6 | 66.8 | 76 | 63 | 27 | 22 | 12.4 | 7 | 1.6 | with | LN*U06... | 1 |
| TXN06R080M27.0EE08 | 1.5 | 80 | 8 | 67.6 | 66.8 | 60 | 63 | 27 | 22 | 12.4 | 7 | 1.2 | with | LN*U06... | 1 |
| TXN06R080M31.7-05 | 1.5 | 80 | 5 | 67.6 | 66.8 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 1.6 | with | LN*U06... | 1 |
| TXN06R080M31.7-08 | 1.5 | 80 | 8 | 67.6 | 66.8 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 1.6 | with | LN*U06... | 1 |
| TXN06R100M31.7-06 | 1.5 | 100 | 6 | 87.6 | 86.8 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 2.2 | with | LN*U06... | 1 |
| TXN06R100M32.0E06 | 1.5 | 100 | 6 | 87.6 | 86.8 | 96 | 63 | 32 | 25 | 14.4 | 8 | 2.2 | with | LN*U06... | 1 |
| TXN06R125M38.1-08 | 1.5 | 125 | 8 | 112.6 | 111.8 | 100 | 63 | 38.1 | 43 | 15.9 | 10 | 3 | with | LN*U06... | 1 |
| TXN06R125M40.0E08 | 1.5 | 125 | 8 | 112.6 | 111.8 | 100 | 63 | 40 | 37 | 16.4 | 9 | 3 | with | LN*U06... | 1 |
| TXN06R160M40.0E10 | 1.5 | 160 | 10 | 147.6 | 146.8 | 100 | 63 | 40 | 37 | 16.4 | 9 | 5 | with | LN*U06... | 1 |
| TXN06R160M50.8-10 | 1.5 | 160 | 10 | 147.6 | 146.8 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.6 | with | LN*U06... | 1 |
| TXN06R200M47.6-12 | 1.5 | 200 | 12 | 187.6 | 186.8 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 7.7 | without | LN*U06... | 2 |
| TXN06R200M60.0E12 | 1.5 | 200 | 12 | 187.6 | 186.8 | 130 | 63 | 60 | 38 | 25.7 | 14 | 7.2 | without | LN*U06... | 3 |

Shell locking bolt used for (1) and (2) above are different. See below for the part codes.

| Tool diameter tolerance | |
|-------------------------|-----------|
| Tool diameter | 0 / -0.55 |

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Grip (Optional) | Torx bit (Optional) |
|-------------------------|----------------|----------------------|----------------------|--------------------------------|-----------------|---------------------|
| TXN06R050, 052, 063M... | CSPB-5 | (M-1000) | - | (1) FSHM10-40H (2) CM10-30H | (H-TB2W) | (BLD IP20/S7) |
| TXN06R066,080M27.0... | CSPB-5 | (M-1000) | - | CM12X30H | (H-TB2W) | (BLD IP20/S7) |
| TXN06R080,100M31.7... | CSPB-5 | (M-1000) | - | CM16X40H | (H-TB2W) | (BLD IP20/S7) |
| TXN06R125M... | CSPB-5 | (M-1000) | TMBA-M20H | - | (H-TB2W) | (BLD IP20/S7) |
| TXN06R160M40.0... | CSPB-5 | (M-1000) | TMBA-M20H | - | (H-TB2W) | (BLD IP20/M7) |
| TXN06R160M50.8... | CSPB-5 | (M-1000) | TMBA-M24H | - | (H-TB2W) | (BLD IP20/M7) |
| TXN06R200M... | CSPB-5 | (M-1000) | - | - | (H-TB2W) | (BLD IP20/M7) |

Recommended clamping torque (Torx size): 5 N·m (T20)





High Feed Milling

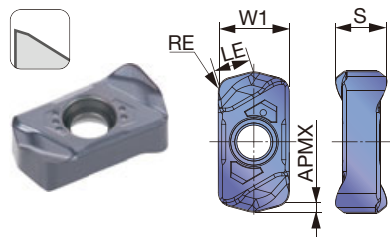
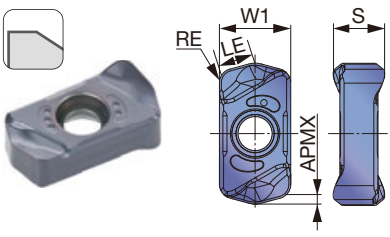
INSERT

LNMU03ZER-MJ (for general purpose)

LNMU03ZER-ML (for low cutting force)



Face Milling



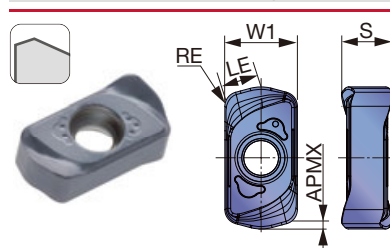
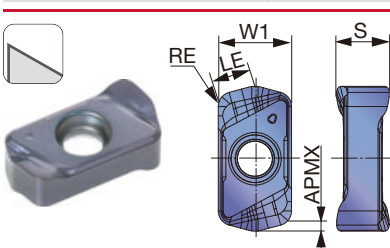
Shoulder Milling

LNMU03ZER-MS (for stainless steel)

LNGU03ZER-MH (Robust cutting edges)



Slot Milling



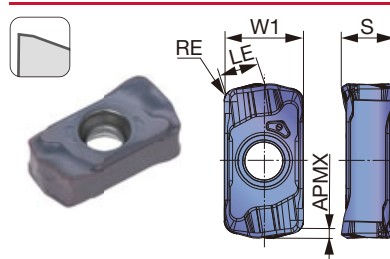
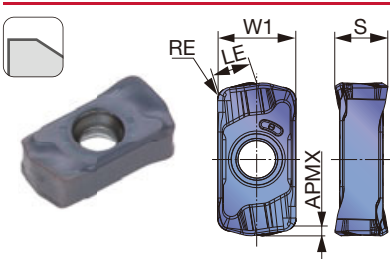
Profile Milling

LNMU03UER-MJ (for general purpose, low approach angle)

LNMU03UER-ML (for low cutting force, low approach angle)



Chamfering, Counterbore



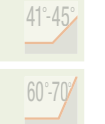
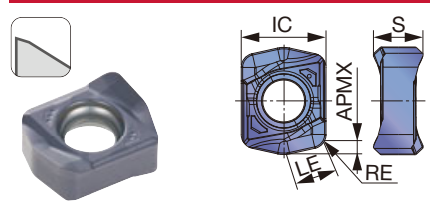
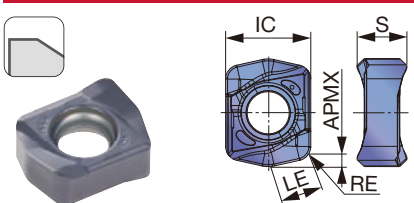
Finish Face Milling

LNMU06-MJ (for general purpose)

LNMU06-ML (for low cutting force)



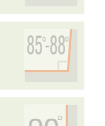
Approach angle 7°-25°



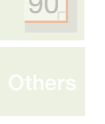
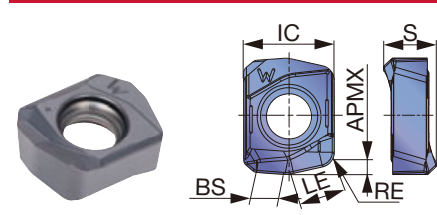
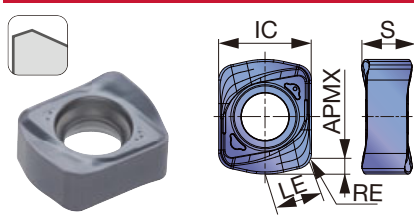
Approach angle 41°-45°

LNGU06-MH (Robust cutting edges)

LNGU06-W (Wiper, 2 cutting edge)



Approach angle 60°-70°



Approach angle 85°-88°



Approach angle 90°



Others

Reference pages: Standard cutting conditions → **H030 - H035**

| | | | | | | | | | | | | | | | | | | | | |
|----------|----------------|---|---|---|---|--|--|--|---|---|--|--|--|--|--|--|--|--|--|--|
| P | Steel | | ★ | | | | | | | | | | | | | | | | | |
| M | Stainless | ★ | ☆ | | | | | | | | | | | | | | | | | |
| K | Cast iron | | ☆ | ☆ | ★ | | | | | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | | | |
| S | Superalloys | ★ | ☆ | ☆ | | | | | ★ | | | | | | | | | | | |
| H | Hard materials | | | ☆ | | | | | ★ | ☆ | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | LE | W1 | IC | S | BS |
|----------------|-----|------|--------|--------|-------|-------|--------|--------|-----|----|----|-----|-----|
| | | | AH130 | AH3225 | AH725 | AH120 | AH8015 | AH8005 | | | | | |
| LNMU0303ZER-MJ | 1.2 | 1 | ● | ● | ● | ● | ● | | 3.2 | 6 | - | 4.3 | - |
| LNMU0303ZER-ML | 1.2 | 1 | ● | ● | ● | ● | ● | | 3.2 | 6 | - | 4.3 | - |
| LNMU0303ZER-MS | 1.2 | 1 | ● | ● | | | | | 3.2 | 6 | - | 4.3 | - |
| LNGU0303ZER-MH | 1.2 | 1 | | | | | ● | ● | 3.2 | 6 | - | 4.3 | - |
| LNMU0303UER-MJ | 1 | 0.9 | ● | ● | | | ● | | 3.1 | 6 | - | 4.1 | - |
| LNMU0303UER-ML | 1 | 0.9 | ● | ● | | | ● | | 3.1 | 6 | - | 4.1 | - |
| LNMU06X5ZER-MJ | 2 | 1.5 | ● | ● | ● | ● | ● | | 6 | - | 12 | 7 | - |
| LNMU06X5ZER-ML | 2 | 1.5 | ● | ● | ● | ● | ● | | 6 | - | 12 | 7 | - |
| LNGU06X5ZER-MH | 2 | 1.5 | | | | | ● | ● | 6 | - | 12 | 7 | - |
| LNGU06X5ZER-W | 2 | 1.5 | | ● | | | | | 6 | - | 12 | 7 | 3.6 |

- When wiper insert (-W) is used, the value of feed per rev. (mm/rev) must be less than 3.6 mm x n. for keeping this value, the number of wiper insert (n) and feed per tooth (mm/tooth) should be adjusted
- Wiper insert (-W) can be used just for face milling. It's not suitable for ramping or pocket milling

● : Line up

Grade
Insert
Toolholder
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





STANDARD CUTTING CONDITIONS

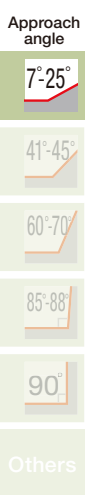
EXN03, HXN03, TXN03

ZER type

| ISO | Workpiece materials | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | | | | | | |
|----------|---|-----------------|------------------------------------|--------|--------------|--------------------------|---------------------------|------------|---------------|---------------|-------|-------|-------|-------|-------|--------|
| | | | | | | | Tool dia.: DCX (mm) | | | Plunging | | | | | | |
| | | | | | | | ø16 - ø22 | ø25 - ø50 | ø16, CICT = 2 | ø18, CICT = 2 | ø20 | n | Vf | n | Vf | n |
| P | Carbon steels S45C, S55C, etc. C45, C55, etc. | - 300HB | First choice | AH3225 | MJ | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 6,370 | 3,540 | 5,660 | 3,180 | 7,630 | 10,180 |
| | Alloy steels SCM440, etc. SCr415, etc. | - 300HB | First choice | AH3225 | MJ | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 6,370 | 3,540 | 5,660 | 3,180 | 7,630 | 10,180 |
| | Prehardened steels NAK80, PX5, etc. | 30-40HRC | First choice | AH3225 | MJ | 100 - 200 | 0.5 - 1.0 | 0.5 - 1.0 | 0.1 | 2,980 | 4,170 | 2,650 | 3,710 | 2,390 | 5,020 | 6,690 |
| M | Stainless steels SUS304, X5CrNi18-9, etc. | - 200HB | First choice | AH130 | MS | 80 - 150 | 0.3 - 0.8 | 0.3 - 0.8 | 0.1 | 2,390 | 2,390 | 2,120 | 2,120 | 1,910 | 2,860 | 3,820 |
| | Precipitation hardening stainless steels SUS630, etc. | 28HRC - (H1150) | First choice for wear resistance | AH130 | MS | 80 - 150 | 0.2 - 0.5 | 0.2 - 0.5 | 0.1 | 2,390 | 1,430 | 2,120 | 1,270 | 1,910 | 1,720 | 2,290 |
| | X5CrNiCuNb16-4, etc. | 40HRC - (H900) | First choice for impact resistance | AH3225 | ML | 80 - 120 | 0.1 - 0.3 | 0.1 - 0.3 | 0.1 | 1,990 | 800 | 1,770 | 710 | 1,590 | 950 | 1,270 |
| K | Gray cast irons FC250, etc. 250, etc. | 150-250HB | First choice | AH725 | MJ | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 6,370 | 3,540 | 5,660 | 3,180 | 7,630 | 10,180 |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150-250HB | First choice | AH725 | MJ | 80 - 200 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 2,980 | 4,770 | 2,650 | 4,240 | 2,390 | 5,740 | 7,650 |
| | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice for impact resistance | AH130 | ML | 30 - 60 | 0.3 - 0.7 | 0.3 - 0.7 | 0.08 | 800 | 640 | 710 | 570 | 640 | 770 | 1,020 |
| S | Heat-resistant alloy Inconel, Hastelloy, etc. | - 40HRC | First choice for impact resistance | AH8015 | ML | 20 - 50 | 0.1 - 0.3 | 0.1 - 0.3 | 0.05 | 600 | 240 | 530 | 210 | 480 | 290 | 380 |
| | Hot mold steel SKD61, etc. X40CrMoV5-1, etc. | 40-55HRC | First choice | AH8015 | MH | 80 - 150 | 0.1 - 0.5 | 0.1 - 0.5 | 0.05 | 2,390 | 1,430 | 2,120 | 1,270 | 1,910 | 1,720 | 2,290 |
| | Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc. | 40-55HRC | First choice for impact resistance | AH8015 | MJ | 50-100 | 0.1 - 0.3 | 0.1 - 0.3 | 0.05 | 1,590 | 640 | 1,420 | 570 | 1,270 | 760 | 1,020 |
| H | Cold mold steels SKD11, etc. | 55-60HRC | First choice | AH8005 | MH | 50 - 70 | 0.05 - 0.2 | 0.03 - 0.1 | 0.03 | 1,190 | 290 | 1,060 | 250 | 950 | 340 | 450 |
| | X153CrMoV12, etc. | 55-60HRC | for impact resistance | AH8015 | MH | 50 - 70 | 0.05 - 0.1 | 0.05 - 0.2 | 0.03 | 1,190 | 150 | 1,060 | 130 | 950 | 170 | 230 |

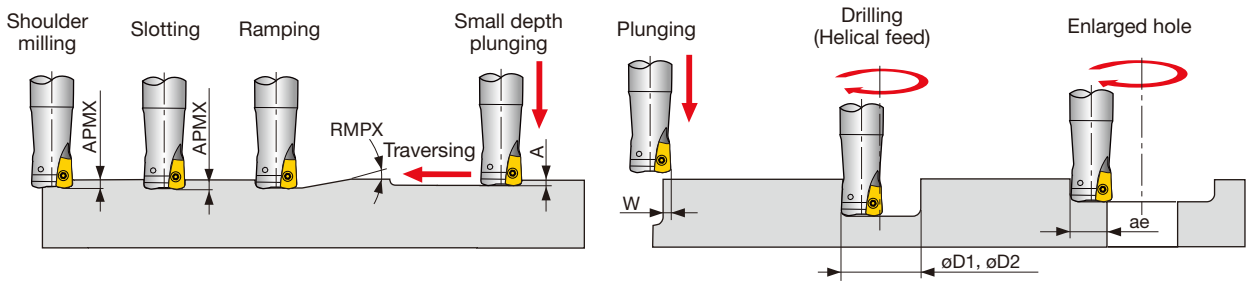
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area

- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed



Others

APPLICATION RANGE



| Designation | DCX | Max. depth of cut | | | Max. plunging depth | Max. cutting width in plunging | | Min. machinable hole dia. | | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole ae |
|-------------------|-----|-------------------|----------|-----|---------------------|--------------------------------|-----|---------------------------|----|-------------------------------|--|
| | | APMX | RMPX | | | W | øD1 | | | | |
| | | | MJ/ML/MS | MH | | | | MJ/ML/MS | MH | | |
| E/HXN03R016M... | 16 | 1 | 2.1 | 1.7 | 0.3 | 3.5 | 3 | 22 | 23 | 30 | 12.5 |
| E/HXN03R018M... | 18 | 1 | 1.7 | 1.6 | 0.3 | 3.5 | 3 | 26 | 27 | 34 | 14.5 |
| E/HXN03R020M... | 20 | 1 | 1.4 | 1.3 | 0.3 | 3.5 | 3 | 30 | 31 | 38 | 16.5 |
| E/HXN03R022M... | 22 | 1 | 1.2 | 1.1 | 0.3 | 3.5 | 3 | 34 | 35 | 42 | 18.5 |
| E/HXN03R025M... | 25 | 1 | 1.0 | 0.9 | 0.3 | 3.5 | 3 | 40 | 41 | 48 | 21.5 |
| E/HXN03R028M... | 28 | 1 | 0.8 | 0.8 | 0.3 | 3.5 | 3 | 46 | 46 | 54 | 24.5 |
| E/HXN03R030M... | 30 | 1 | 0.7 | 0.7 | 0.3 | 3.5 | 3 | 50 | 50 | 58 | 26.5 |
| E/HXN03R032M... | 32 | 1 | 0.7 | 0.7 | 0.3 | 3.5 | 3 | 54 | 54 | 62 | 28.5 |
| EXN03R035M... | 35 | 1 | 0.6 | 0.6 | 0.3 | 3.5 | 3 | 60 | 60 | 68 | 31.5 |
| E/H/TXN03R040M... | 40 | 1 | 0.5 | 0.5 | 0.3 | 3.5 | 3 | 70 | 70 | 78 | 36.5 |
| TXN03R050M... | 50 | 1 | 0.4 | 0.4 | 0.3 | 3.5 | 3 | 90 | 90 | 98 | 46.5 |

For DCX above ø33 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut

Tool dia.: DCX (mm), Number of revolutions: n (min⁻¹), Feed speed: Vf (mm/min), Max. depth of cut: ap = 1 mm, Number of teeth: CICT

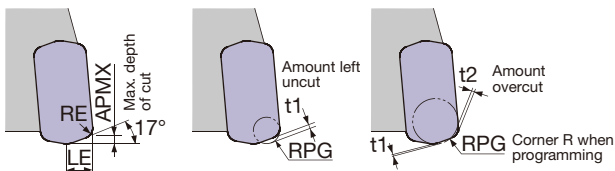
| ø22 | | | ø25 | | | ø28 | | | ø30 | | | ø32 | | | ø35 | | | ø40 | | | ø50 | | |
|-------------------------------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|
| n | Vf | | n | Vf | | n | Vf | | n | Vf | | n | Vf | | n | Vf | | n | Vf | | n | Vf | |
| | CICT=3 | CICT=4 | | CICT=4 | CICT=5 | | CICT=4 | CICT=5 | | CICT=4 | CICT=5 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 |
| 2,890 | 6,940 | 9,250 | 2,550 | 8,160 | 10,180 | 2,270 | 7,280 | 9,100 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,890 | 6,940 | 9,250 | 2,550 | 8,160 | 10,180 | 2,270 | 7,280 | 9,100 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,170 | 4,560 | 6,080 | 1,910 | 5,350 | 6,690 | 1,710 | 4,790 | 5,990 | 1,590 | 4,450 | 5,570 | 1,490 | 5,220 | 6,260 | 1,360 | 4,760 | 5,710 | 1,190 | 4,170 | 5,000 | 950 | 3,330 | 5,320 |
| Vc = 150 m/min, fz = 0.7 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,170 | 4,560 | 6,080 | 1,910 | 5,350 | 6,690 | 1,710 | 4,790 | 5,990 | 1,590 | 4,450 | 5,570 | 1,490 | 5,220 | 6,260 | 1,360 | 4,760 | 5,710 | 1,190 | 4,170 | 5,000 | 950 | 3,330 | 5,320 |
| Vc = 150 m/min, fz = 0.7 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 3,180 | 4,770 | 6,360 | 1,530 | 3,060 | 3,820 | 1,360 | 2,720 | 3,400 | 1,270 | 2,540 | 3,180 | 1,190 | 2,980 | 3,570 | 1,090 | 2,720 | 3,270 | 960 | 2,400 | 2,880 | 760 | 1,900 | 2,280 |
| Vc = 120 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,740 | 1,570 | 2,090 | 1,530 | 1,840 | 2,300 | 1,370 | 1,640 | 2,060 | 1,270 | 1,520 | 1,910 | 1,190 | 1,790 | 2,140 | 1,090 | 1,640 | 1,960 | 960 | 1,440 | 1,730 | 760 | 1,140 | 1,820 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,450 | 870 | 1,160 | 1,270 | 1,020 | 1,270 | 1,140 | 910 | 1,140 | 1,060 | 850 | 1,060 | 1,000 | 1,000 | 1,200 | 910 | 910 | 1,090 | 800 | 800 | 960 | 640 | 640 | 1,020 |
| Vc = 100 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,890 | 6,940 | 9,250 | 2,550 | 8,160 | 10,180 | 2,270 | 7,280 | 9,100 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,170 | 5,210 | 6,940 | 1,910 | 6,110 | 7,640 | 1,710 | 5,460 | 6,820 | 1,590 | 6,360 | 7,950 | 1,490 | 7,450 | 8,940 | 1,360 | 6,800 | 8,160 | 1,190 | 5,950 | 7,140 | 950 | 4,750 | 5,700 |
| Vc = 150 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 580 | 700 | 930 | 510 | 820 | 1,020 | 450 | 730 | 910 | 420 | 840 | 1,050 | 400 | 1,000 | 1,200 | 360 | 900 | 1,080 | 320 | 800 | 960 | 250 | 630 | 1,000 |
| Vc = 40 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 430 | 260 | 340 | 380 | 230 | 290 | 340 | 200 | 260 | 320 | 260 | 320 | 300 | 300 | 360 | 270 | 270 | 320 | 240 | 240 | 290 | 190 | 190 | 300 |
| Vc = 30 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,740 | 1,570 | 2,090 | 1,530 | 1,840 | 2,300 | 1,360 | 1,630 | 2,040 | 1,270 | 1,520 | 1,910 | 1,190 | 1,790 | 2,140 | 1,090 | 1,640 | 1,960 | 950 | 1,430 | 1,710 | 760 | 1,140 | 1,820 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,160 | 700 | 930 | 1,020 | 820 | 1,020 | 910 | 730 | 910 | 850 | 680 | 850 | 800 | 800 | 960 | 730 | 730 | 880 | 640 | 640 | 770 | 510 | 510 | 820 |
| Vc = 80 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 870 | 310 | 420 | 760 | 300 | 380 | 680 | 270 | 340 | 640 | 260 | 320 | 600 | 300 | 360 | 550 | 230 | 340 | 480 | 240 | 280 | 380 | 200 | 300 |
| Vc = 60 m/min, fz = 0.1 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 870 | 160 | 210 | 760 | 150 | 190 | 680 | 140 | 170 | 640 | 130 | 160 | 600 | 150 | 180 | 550 | 120 | 170 | 480 | 120 | 140 | 380 | 100 | 150 |
| Vc = 60 m/min, fz = 0.06 mm/t | | | | | | | | | | | | | | | | | | | | | | | |

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different.
 - Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity

of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally

TOOL GEOMETRY ON PROGRAMMING

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 1.5 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU0303ZER...

| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|-----------------------------|-----------------------|---------|-------------------------------|---------------------------|------------------------|
| 1 | 1.2 | 3 | 1 | 0.6 | - |
| 1 | 1.2 | 3 | 1.5 | 0.5 | - |
| 1 | 1.2 | 3 | 2 | 0.25 | 0.08 |
| 1 | 1.2 | 3 | 2.5 | 0.14 | 0.26 |

LNGU0303ZER...

| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|-----------------------------|-----------------------|---------|-------------------------------|---------------------------|------------------------|
| 1 | 1.2 | 3 | 1 | 0.45 | - |
| 1 | 1.2 | 3 | 1.5 | 0.35 | - |
| 1 | 1.2 | 3 | 2 | 0.2 | 0.1 |
| 1 | 1.2 | 3 | 2.5 | 0.08 | 0.29 |

Note: Each value in table is calculated theoretically at the maximum condition

*Recommended



STANDARD CUTTING CONDITIONS

EXN03, HXN03, TXN03

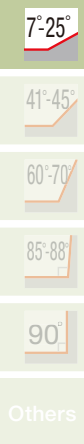
UER type

| ISO | Workpiece material | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | | | | | | | |
|----------|--|------------------|---------------------------------------|------------------|--------------|--------------------------|---------------------------|-----------|------|----------|-------|---------------|-------|---------------|-------|--------|--------|
| | | | | | | | Tool dia.: DCX (mm) | | | Plunging | | ø16, CICT = 2 | | ø18, CICT = 2 | | ø20 | |
| | | | | | | | ø16 - ø22 | ø25 - ø50 | ø50 | n | Vf | n | Vf | n | Vf | CICT=3 | CICT=4 |
| P | Carbon steels S45C, S55C, etc. C45, C55, etc. | - 300HB | First choice Low resistance | AH3225 | MJ ML | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 7,960 | 3,540 | 7,080 | 3,180 | 9,540 | 12,720 | |
| | Alloy steels SCM440, etc. SCr415, etc. | - 300HB | First choice Low resistance | AH3225 | MJ ML | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 7,960 | 3,540 | 7,080 | 3,180 | 9,540 | 12,720 | |
| M | Prehardened steels NAK80, PX5, etc. | 30 - 40HRC | First choice for impact resistance | AH8015 AH3225 | MJ MJ | 100 - 200 | 0.5 - 1 | 0.5 - 1 | 0.1 | 2,980 | 4,770 | 2,650 | 4,240 | 2,390 | 5,740 | 7,650 | |
| | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - 200HB | First choice for impact resistance | AH130 | ML MJ | 80 - 150 | 0.3 - 1 | 0.3 - 1 | 0.1 | 2,390 | 2,870 | 2,120 | 2,550 | 1,910 | 3,440 | 4,590 | |
| | Precipitation hardening stainless steels SUS630, etc. X5CrNiCuNb16-4, etc. | 28HRC - 40HRC | First choice for impact resistance | AH130 | ML MJ | 80 - 150 | 0.3 - 0.8 | 0.3 - 0.8 | 0.1 | 2,390 | 2,390 | 2,120 | 2,120 | 1,910 | 2,870 | 3,820 | |
| K | Gray cast irons FC250, etc. 250, etc. | 150 - 250HB | First choice for impact resistance | AH8015 AH3225 | MJ MJ | 100 - 300 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 3,980 | 7,960 | 3,540 | 7,080 | 3,180 | 9,540 | 12,720 | |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150 - 250HB | First choice for impact resistance | AH8015 AH3225 | MJ MJ | 80 - 200 | 0.5 - 1.2 | 0.5 - 1.5 | 0.1 | 2,980 | 5,960 | 2,650 | 5,300 | 2,390 | 7,170 | 9,560 | |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice for wear resistance | AH130 AH8015 | MJ MJ | 30 - 60 | 0.3 - 0.8 | 0.3 - 0.8 | 0.08 | 800 | 960 | 710 | 860 | 640 | 1,160 | 1,540 | |
| | Heat-resistant alloy Inconel, Hastelloy, etc. | - 40HRC | First choice for impact resistance | AH8015 | ML MJ | 20 - 50 | 0.2 - 0.5 | 0.2 - 0.5 | 0.05 | 600 | 360 | 530 | 320 | 480 | 440 | 580 | |
| H | Hot mold steel SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice for impact resistance | AH8015 AH3225 | MJ MJ | 80 - 150 | 0.1 - 0.5 | 0.1 - 0.5 | 0.05 | 2,390 | 1,440 | 2,120 | 1,280 | 1,910 | 1,720 | 2,300 | |
| | Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc. | 40 - 50HRC | First choice for impact resistance | AH8015 AH3225 | MJ MJ | 50 - 100 | 0.1 - 0.5 | 0.1 - 0.5 | 0.05 | 1,590 | 960 | 1,410 | 850 | 1,270 | 1,150 | 1,530 | |
| | Cold mold steels SKD11, etc. X153CrMoV12, etc. | 50 - 60HRC | First choice | AH8005 | MJ | 50 - 70 | 0.1 - 0.3 | 0.1 - 0.3 | 0.03 | 1,190 | 480 | 1,060 | 430 | 950 | 570 | 760 | |

- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area

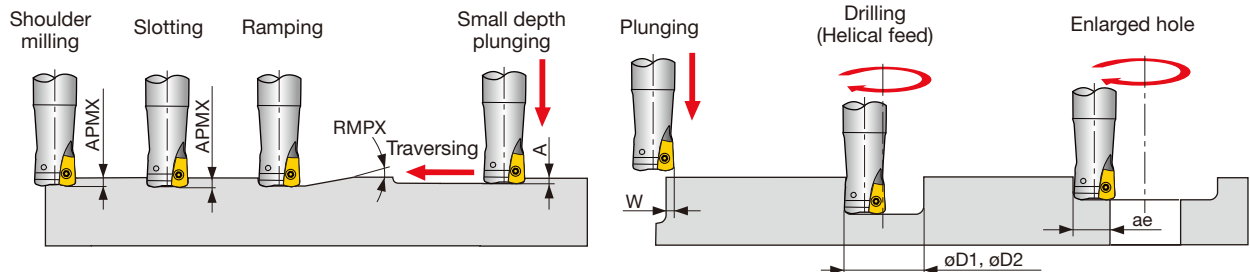
- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed

Approach angle



Others

APPLICATION RANGE



| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Max. cutting width in plunging W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole ae |
|-------------------|-----|------------------------|-------------------------|-----------------------|----------------------------------|-------------------------------|-------------------------------|--|
| E/HXN03R016M... | 16 | 0.9 | Not possible | Not possible | 3.8 | Not possible | Not possible | 12.2 |
| E/HXN03R018M... | 18 | 0.9 | 1.7° | 0.27 | 3.8 | 26 | 34 | 14.2 |
| E/HXN03R020M... | 20 | 0.9 | 1.4° | 0.27 | 3.8 | 30 | 38 | 16.2 |
| E/HXN03R022M... | 22 | 0.9 | 1.2° | 0.27 | 3.8 | 34 | 42 | 18.2 |
| E/HXN03R025M... | 25 | 0.9 | 1° | 0.27 | 3.8 | 40 | 48 | 21.2 |
| E/HXN03R028M... | 28 | 0.9 | 0.8° | 0.27 | 3.8 | 46 | 54 | 24.2 |
| E/HXN03R030M... | 30 | 0.9 | 0.7° | 0.27 | 3.8 | 50 | 58 | 26.2 |
| E/HXN03R032M... | 32 | 0.9 | 0.7° | 0.27 | 3.8 | 54 | 62 | 28.2 |
| EXN03R035M... | 35 | 0.9 | 0.6° | 0.27 | 3.8 | 60 | 68 | 31.2 |
| E/H/TXN03R040M... | 40 | 0.9 | 0.5° | 0.27 | 3.8 | 70 | 78 | 36.2 |
| TXN03R050M... | 50 | 0.9 | 0.4° | 0.27 | 3.8 | 90 | 98 | 46.2 |

For DCX above ø33 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut



Tool dia.: DCX (mm), Number of revolutions: n (min⁻¹), Feed speed: V_f (mm/min), Max. depth of cut: $a_p = 0.5$ mm, Number of teeth: CICT

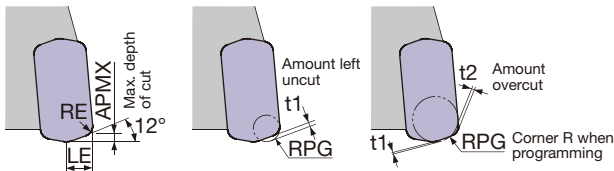
| ø22 | | | ø25 | | | ø28 | | | ø30 | | | ø32 | | | ø35 | | | ø40 | | | ø50 | | |
|-------------------------------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|--------|
| n | V_f | | n | V_f | | n | V_f | | n | V_f | | n | V_f | | n | V_f | | n | V_f | | n | V_f | |
| | CICT=3 | CICT=4 | | CICT=4 | CICT=5 | | CICT=4 | CICT=5 | | CICT=4 | CICT=5 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 | | CICT=5 | CICT=6 |
| 2,890 | 8,670 | 11,560 | 2,550 | 10,200 | 12,750 | 2,270 | 9,080 | 11,350 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,890 | 8,670 | 11,560 | 2,550 | 10,200 | 12,750 | 2,270 | 9,080 | 11,350 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,170 | 5,210 | 6,950 | 1,910 | 6,120 | 7,640 | 1,710 | 5,480 | 6,840 | 1,590 | 5,090 | 6,360 | 1,490 | 5,960 | 7,160 | 1,360 | 5,440 | 6,530 | 1,190 | 4,760 | 5,720 | 950 | 3,800 | 6,080 |
| Vc = 150 m/min, fz = 0.8 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,740 | 3,140 | 4,180 | 1,530 | 3,680 | 4,590 | 1,360 | 3,270 | 4,080 | 1,270 | 3,050 | 3,810 | 1,190 | 3,570 | 4,290 | 1,090 | 3,270 | 3,930 | 950 | 2,850 | 3,420 | 760 | 2,280 | 3,650 |
| Vc = 120 m/min, fz = 0.6 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,740 | 2,610 | 3,480 | 1,530 | 3,060 | 3,830 | 1,360 | 2,720 | 3,400 | 1,270 | 2,540 | 3,180 | 1,190 | 2,980 | 3,570 | 1,090 | 2,730 | 3,270 | 950 | 2,380 | 2,850 | 760 | 1,900 | 3,040 |
| Vc = 120 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,450 | 1,740 | 2,320 | 1,270 | 2,040 | 2,540 | 1,140 | 1,830 | 2,280 | 1,060 | 1,700 | 2,120 | 990 | 1,980 | 2,380 | 910 | 1,820 | 2,190 | 800 | 1,600 | 1,920 | 640 | 1,280 | 2,050 |
| Vc = 100 m/min, fz = 0.4 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,890 | 8,670 | 11,560 | 2,550 | 10,200 | 12,750 | 2,270 | 9,080 | 11,350 | 2,120 | 8,480 | 10,600 | 1,990 | 9,950 | 11,940 | 1,820 | 9,100 | 10,920 | 1,590 | 7,950 | 9,540 | 1,270 | 6,350 | 10,160 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 2,170 | 6,510 | 8,680 | 1,910 | 7,640 | 9,550 | 1,710 | 6,840 | 8,550 | 1,590 | 6,360 | 7,950 | 1,490 | 7,450 | 8,940 | 1,360 | 6,800 | 8,160 | 1,190 | 5,950 | 7,140 | 950 | 4,750 | 7,600 |
| Vc = 150 m/min, fz = 1 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 580 | 1,050 | 1,400 | 510 | 1,230 | 1,530 | 450 | 1,080 | 1,350 | 420 | 1,010 | 1,260 | 400 | 1,200 | 1,440 | 360 | 1,080 | 1,300 | 320 | 960 | 1,160 | 250 | 750 | 1,200 |
| Vc = 40 m/min, fz = 0.6 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 430 | 390 | 520 | 380 | 460 | 570 | 340 | 410 | 510 | 320 | 390 | 480 | 300 | 450 | 540 | 270 | 410 | 490 | 240 | 360 | 440 | 190 | 290 | 460 |
| Vc = 30 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,740 | 1,570 | 2,090 | 1,530 | 1,840 | 2,300 | 1,360 | 1,640 | 2,040 | 1,270 | 1,530 | 1,910 | 1,190 | 1,790 | 2,150 | 1,090 | 1,640 | 1,970 | 950 | 1,430 | 1,710 | 760 | 1,140 | 1,830 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 1,160 | 1,050 | 1,400 | 1,020 | 1,230 | 1,530 | 910 | 1,100 | 1,370 | 850 | 1,020 | 1,280 | 800 | 1,200 | 1,440 | 730 | 1,100 | 1,320 | 640 | 960 | 1,160 | 510 | 770 | 1,230 |
| Vc = 80 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | | | | | | | | |
| 870 | 530 | 700 | 760 | 610 | 760 | 680 | 550 | 680 | 640 | 520 | 640 | 600 | 600 | 720 | 550 | 550 | 660 | 480 | 480 | 580 | 380 | 380 | 610 |
| Vc = 60 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | | | | | | | | |

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different.
- Cutting conditions are generally limited by the rigidity and power of the machine and the

rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally

TOOL GEOMETRY ON PROGRAMMING

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as $R = 1.5$ mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t_1) and overcut (t_2).



LNMU0303UER...

| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|-----------------------------|-----------------------|------------|-------------------------------|---------------------------|------------------------|
| 0.9 | 1 | 3.5 | 1 | 0.48 | - |
| 0.9 | 1 | 3.5 | 1.5 | 0.39 | - |
| 0.9 | 1 | 3.5 | 2 | 0.3 | 0.12 |
| 0.9 | 1 | 3.5 | 2.5 | 0.21 | 0.31 |

Note: Each value in table is calculated theoretically at the maximum condition.

***Recommended**



STANDARD CUTTING CONDITIONS

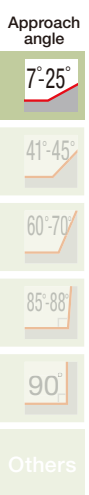
EXN06, TXN06



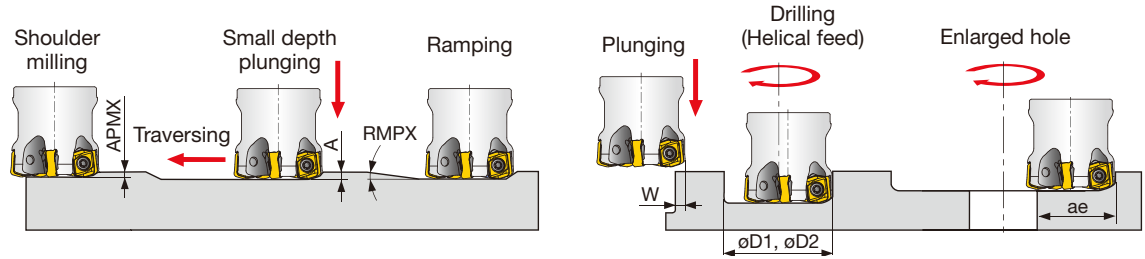
| ISO | Workpiece materials | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | Plunging | | | | | |
|------------|--|-----------------------|------------------------------------|--------|--------------|--------------------------|---------------------------|----------|---------------|-------|---------------|-------|---------------|-------|
| | | | | | | | Tool dia.: DCX (mm) | Plunging | ø32, CICT = 2 | | ø35, CICT = 2 | | ø40, CICT = 3 | |
| | | | | | | | | | n | Vf | n | Vf | n | Vf |
| P | Carbon steels S45C, S55C, etc. C45, C55, etc. | - 300HB | First choice | AH3225 | MJ | 100 - 300 | 0.5 - 1.5 | 0.15 | 1,990 | 3,980 | 1,820 | 3,640 | 1,590 | 4,770 |
| | Alloy steels SCM440, etc. SCr415, etc. | - 300HB | First choice | AH3225 | MJ | 100 - 200 | 0.5 - 1.5 | 0.15 | 1,990 | 3,980 | 1,820 | 3,640 | 1,590 | 4,770 |
| | Prehardened steels NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | MJ | 100 - 200 | 0.5 - 1.2 | 0.15 | 1,490 | 2,380 | 1,360 | 2,180 | 1,190 | 2,860 |
| M | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - 200HB | First choice | AH130 | ML | 80 - 150 | 0.3 - 0.8 | 0.1 | 1,190 | 1,430 | 1,090 | 1,310 | 950 | 1,710 |
| | Precipitation hardening stainless steels SUS630, etc. | 28HRC - (H1150) | First choice for impact resistance | AH130 | MJ | 80 - 150 | 0.2 - 0.5 | 0.1 | 1,190 | 710 | 1,090 | 650 | 960 | 860 |
| | X5CrNiCuNb16-4, etc. | 40HRC - (H900) | First choice for impact resistance | AH130 | ML | 80 - 120 | 0.1 - 0.3 | 0.1 | 1,000 | 400 | 910 | 360 | 800 | 480 |
| K | Gray cast irons FC250, etc. 250, etc. | 150 - 250HB | First choice | AH120 | MJ | 100 - 300 | 0.5 - 1.5 | 0.15 | 1,990 | 3,980 | 1,820 | 3,640 | 1,590 | 4,770 |
| | | 150 - 250HB | First choice | AH120 | MJ | 80 - 200 | 0.5 - 1.5 | 0.15 | 1,490 | 2,980 | 1,360 | 2,720 | 1,190 | 3,570 |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice for impact resistance | AH130 | ML | 30 - 60 | 0.3 - 0.7 | 0.08 | 400 | 400 | 360 | 360 | 320 | 480 |
| | Heat-resistant alloy Inconel, Hastelloy, etc. | - 40HRC | First choice for impact resistance | AH8015 | ML | 20 - 50 | 0.1 - 0.3 | 0.05 | 300 | 120 | 270 | 110 | 240 | 140 |
| H | Hot mold steel SKD61, etc. X40CrMoV5-1, etc. | 40 - 55HRC | First choice | AH8015 | MH | 80 - 150 | 0.1 - 0.5 | 0.05 | 1,190 | 710 | 1,090 | 650 | 950 | 850 |
| | Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc | 40 - 55HRC | Low resistance | AH8015 | MJ | 50-100 | 0.1 - 0.3 | 0.05 | 800 | 320 | 730 | 290 | 640 | 380 |
| | | 40 - 55HRC | First choice for impact resistance | AH8015 | MH | | 0.1 - 0.5 | | 600 | 120 | 550 | 110 | 480 | 140 |
| | Cold mold steels SKD11, etc. X153CrMoV12, etc. | 55 - 60HRC | First choice | AH8005 | MH | 50 - 70 | 0.05 - 0.3 | 0.03 | 600 | 60 | 550 | 55 | 480 | 70 |
| 55 - 60HRC | | for impact resistance | AH8015 | MH | 50 - 70 | 0.05 - 0.3 | 0.03 | 600 | 60 | 550 | 55 | 480 | 70 | |

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different.
 - Cutting conditions are generally limited by the rigidity and power of the machine

and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally



APPLICATION RANGE



| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | | Max. plunging depth A | Max. cutting width in plunging W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole ae | |
|---------------|-----|------------------------|-------------------------|------|-----------------------|----------------------------------|-------------------------------|-------------------------------|--|-----|
| | | | MJ/ML | MH | | | | | | |
| | | | MJ/ML | MH | | | | | | |
| EXN06R032M... | 32 | 1.5 | 2 | 1.4 | 0.5 | 0.4 | 6 | 47 | 59 | 25 |
| EXN06R035M... | 35 | 1.5 | 1.7 | 1.1 | 0.5 | 0.4 | 6 | 53 | 65 | 28 |
| EXN06R040M... | 40 | 1.5 | 1.3 | 0.8 | 0.5 | 0.4 | 6 | 63 | 75 | 33 |
| TXN06R050M... | 50 | 1.5 | 0.9 | 0.7 | 0.5 | 0.4 | 6 | 83 | 95 | 43 |
| TXN06R052M... | 52 | 1.5 | 0.8 | 0.6 | 0.5 | 0.4 | 6 | 87 | 99 | 45 |
| TXN06R063M... | 63 | 1.5 | 0.6 | 0.5 | 0.5 | 0.4 | 6 | 109 | 121 | 56 |
| TXN06R066M... | 66 | 1.5 | 0.5 | 0.5 | 0.5 | 0.4 | 6 | 115 | 127 | 59 |
| TXN06R080M... | 80 | 1.5 | 0.5 | 0.3 | 0.5 | 0.4 | 6 | 143 | 155 | 73 |
| TXN06R100M... | 100 | 1.5 | 0.34 | 0.25 | 0.5 | 0.4 | 6 | 183 | 195 | 93 |
| TXN06R125M... | 120 | 1.5 | 0.26 | 0.2 | 0.5 | 0.4 | 6 | 233 | 245 | 118 |
| TXN06R160M... | 160 | 1.5 | 0.2 | 0.15 | 0.5 | 0.4 | 6 | 303 | 315 | 153 |
| TXN06R200M... | 200 | 1.5 | 0.15 | 0.11 | 0.5 | 0.4 | 6 | 383 | 395 | 193 |

For DCX above 100 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

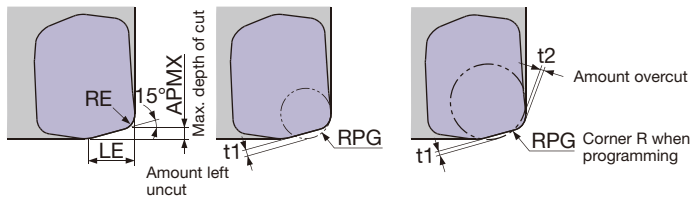


Tool dia.: DCX (mm), Number of revolutions: n (min⁻¹), Feed speed: V_f (mm/min), Max. depth of cut: $a_p = 1.5$ mm, Number of teeth: CICT

| ø50 | | | ø63 | | | ø80 | | | ø100, CICT = 6 | | ø125, CICT = 8 | | ø160, CICT = 10 | | ø200, CICT = 12 | |
|-------------------------------|----------|----------|-------|----------|----------|-----|----------|----------|----------------|-------|----------------|-------|-----------------|-------|-----------------|-------|
| n | V_f | | n | V_f | | n | V_f | | n | V_f | n | V_f | n | V_f | n | V_f |
| | CICT = 4 | CICT = 5 | | CICT = 4 | CICT = 6 | | CICT = 5 | CICT = 8 | | | | | | | | |
| 1,270 | 5,080 | 6,350 | 1,010 | 4,040 | 6,060 | 800 | 4,000 | 6,400 | 640 | 3,820 | 510 | 4,080 | 400 | 3,980 | 320 | 3,820 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | |
| 1,270 | 5,080 | 6,350 | 1,010 | 4,040 | 6,060 | 800 | 4,000 | 6,400 | 640 | 3,820 | 510 | 4,080 | 400 | 3,980 | 320 | 3,820 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | |
| 950 | 3,040 | 3,800 | 760 | 2,430 | 3,650 | 600 | 2,400 | 3,840 | 480 | 2,290 | 380 | 2,450 | 300 | 2,390 | 240 | 2,290 |
| Vc = 150 m/min, fz = 0.8 mm/t | | | | | | | | | | | | | | | | |
| 950 | 3,800 | 4,750 | 760 | 3,040 | 4,560 | 600 | 3,000 | 4,800 | 480 | 2,880 | 380 | 3,040 | 300 | 3,000 | 240 | 2,880 |
| Vc = 150 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | |
| 760 | 1,820 | 2,280 | 610 | 1,470 | 2,200 | 480 | 1,440 | 2,300 | 380 | 1,380 | 310 | 1,470 | 240 | 1,430 | 190 | 1,380 |
| Vc = 120 m/min, fz = 0.6 mm/t | | | | | | | | | | | | | | | | |
| 760 | 910 | 1,140 | 610 | 730 | 1,100 | 480 | 720 | 1,150 | 380 | 680 | 310 | 740 | 240 | 720 | 190 | 680 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | |
| 640 | 510 | 640 | 510 | 410 | 610 | 400 | 400 | 640 | 320 | 380 | 260 | 420 | 200 | 400 | 160 | 380 |
| Vc = 100 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | |
| 1,270 | 5,080 | 6,350 | 1,010 | 4,040 | 6,060 | 800 | 4,000 | 6,400 | 640 | 3,820 | 510 | 4,080 | 400 | 3,980 | 320 | 3,820 |
| Vc = 200 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | |
| 950 | 3,800 | 4,750 | 760 | 3,040 | 4,560 | 600 | 3,000 | 4,800 | 480 | 2,870 | 380 | 3,060 | 300 | 2,990 | 240 | 2,870 |
| Vc = 150 m/min, fz = 1.0 mm/t | | | | | | | | | | | | | | | | |
| 250 | 500 | 630 | 200 | 400 | 600 | 160 | 400 | 640 | 130 | 380 | 100 | 410 | 80 | 400 | 60 | 380 |
| Vc = 40 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | | |
| 190 | 150 | 190 | 150 | 120 | 180 | 120 | 120 | 190 | 100 | 120 | 80 | 120 | 60 | 120 | 50 | 120 |
| Vc = 30 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | |
| 760 | 910 | 1,140 | 610 | 730 | 1,100 | 480 | 720 | 1,150 | 380 | 680 | 310 | 740 | 240 | 720 | 190 | 680 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | | |
| 510 | 410 | 510 | 400 | 320 | 480 | 320 | 320 | 510 | 250 | 300 | 200 | 320 | 160 | 320 | 130 | 310 |
| Vc = 80 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | | |
| 380 | 150 | 190 | 300 | 120 | 180 | 240 | 120 | 190 | 190 | 110 | 150 | 120 | 120 | 120 | 100 | 120 |
| Vc = 60 m/min, fz = 0.1 mm/t | | | | | | | | | | | | | | | | |
| 380 | 75 | 95 | 300 | 60 | 90 | 240 | 60 | 95 | 190 | 55 | 150 | 60 | 120 | 60 | 100 | 60 |
| Vc = 60 m/min, fz = 0.05 mm/t | | | | | | | | | | | | | | | | |

TOOL GEOMETRY ON PROGRAMMING

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as $R = 3$ mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t_1) and overcut (t_2).



LNMU06...

| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|--------------------------------|--------------------------|---------|----------------------------------|------------------------------|---------------------------|
| 1.5 | 2 | 6 | 2 | 1 | - |
| | | | 3 | 0.77 | - |
| | | | 4 | 0.54 | 0.26 |

LNGU06...MH

| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|--------------------------------|--------------------------|---------|----------------------------------|------------------------------|---------------------------|
| 1.5 | 2 | 6 | 2 | 0.9 | - |
| | | | 3 | 0.66 | - |
| | | | 4 | 0.41 | 0.26 |

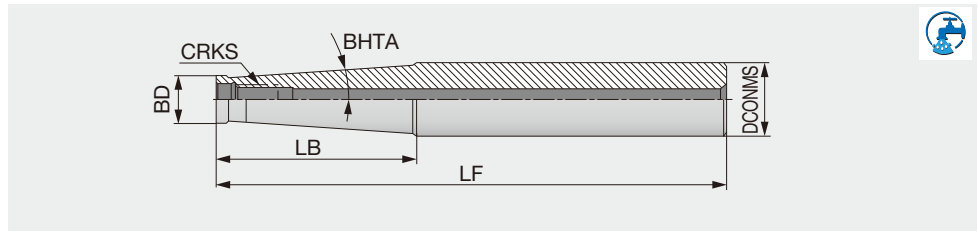
Note: Each value in table is calculated theoretically at the maximum condition.
*Recommended



TUNGFLEX

SM

Steel modular shank

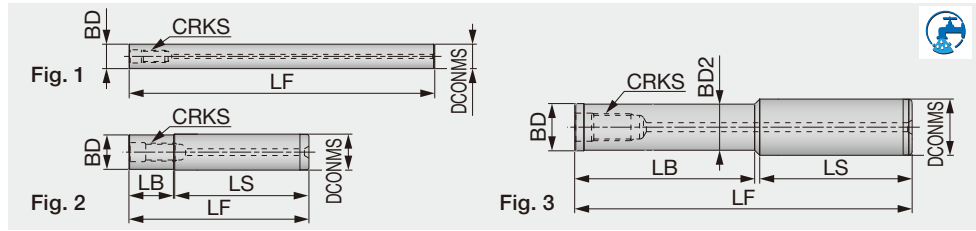


| Designation | CRKS | DCONMS | LF | LB | BD | BHTA | Shank type |
|---------------|------|--------|-----|------|-----|------|-------------|
| SM06-L60C10 | M6 | 10 | 60 | 20 | 9.7 | 0° | Cylindrical |
| SM06-L105-C12 | M6 | 12 | 105 | 60 | 9.7 | 1.2° | Cylindrical |
| SM06-L125-C16 | M6 | 16 | 125 | 60 | 9.7 | 3.3° | Cylindrical |
| SM08-L73C16 | M8 | 16 | 73 | 25 | 13 | 0° | Cylindrical |
| SM08-L128-C16 | M8 | 16 | 128 | 80 | 13 | 0.9° | Cylindrical |
| SM08-L170-C20 | M8 | 20 | 170 | 66.8 | 13 | 3.3° | Cylindrical |
| SM10-L80C20 | M10 | 20 | 80 | 30 | 18 | 0° | Cylindrical |
| SM10-L130-C20 | M10 | 20 | 130 | 80 | 18 | 0.6° | Cylindrical |
| SM10-L200-C25 | M10 | 25 | 200 | 57.2 | 19 | 3.3° | Cylindrical |
| SM12-L86-C25 | M12 | 25 | 86 | 30 | 21 | 5.1° | Cylindrical |
| SM12-L200-C32 | M12 | 32 | 200 | 78 | 21 | 4.4° | Cylindrical |
| SM16-L95-C32 | M16 | 32 | 95 | 35 | 29 | 1.7° | Cylindrical |
| SM16-L230-C32 | M16 | 32 | 230 | 50 | 29 | 1.8° | Cylindrical |

Approach angle



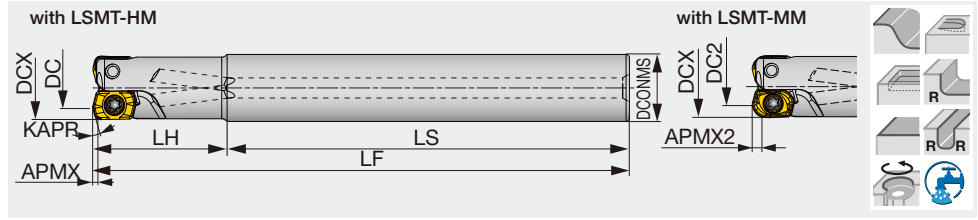
Others



| Designation | CRKS | DCONMS | LF | LB | LS | BD | BD2 | Fig. |
|-------------------------|------|--------|-----|-----|-------|------|------|------|
| SM06-L100-C10-C-H | M6 | 10 | 100 | - | - | 10 | - | 1 |
| SM06-L150-C10-C-H | M6 | 10 | 150 | - | - | 10 | - | 1 |
| SM06-L100-C12-C-H | M6 | 12 | 100 | - | - | 12 | - | 1 |
| SM06-L150-C12-C-H | M6 | 12 | 150 | - | - | 12 | - | 1 |
| SM08-L80-20-C16-C-H | M8 | 16 | 80 | 20 | 59.6 | 15.3 | - | 2 |
| SM08-L100-40-C16-C-H | M8 | 16 | 100 | 40 | 59.6 | 15.3 | - | 2 |
| SM08-L150-80-C16-C-H | M8 | 16 | 150 | 80 | 69.6 | 15.3 | - | 2 |
| SM08-L200-100-C16-C-H | M8 | 16 | 200 | 100 | 98.2 | 13 | 12.5 | 3 |
| SM08-L200-140-C16-C-H | M8 | 16 | 200 | 140 | 59.6 | 15.3 | - | 2 |
| SM08-L250-180-C16-C-H | M8 | 16 | 250 | 180 | 69.6 | 15.3 | - | 2 |
| SM10-L80-20-C20-C-H | M10 | 20 | 80 | 20 | 59.2 | 18.5 | - | 2 |
| SM10-L100-40-C20-C-H | M10 | 20 | 100 | 40 | 59.2 | 18.5 | - | 2 |
| SM10-L150-80-C20-C-H | M10 | 20 | 150 | 80 | 69.2 | 18.5 | - | 2 |
| SM10-L200-100-C20-C-H | M10 | 20 | 200 | 100 | 99.2 | 18.5 | - | 2 |
| SM10-L200-140-C20-C-H | M10 | 20 | 200 | 140 | 58.7 | 18 | 17.5 | 3 |
| SM10-L200-140-C20-C-H-N | M10 | 20 | 200 | 140 | 59.2 | 18.5 | - | 2 |
| SM10-L250-130-C20-C-H | M10 | 20 | 250 | 130 | 118.7 | 18 | 17.5 | 3 |
| SM10-L250-180-C20-C-H | M10 | 20 | 250 | 180 | 68.7 | 18 | 17.5 | 3 |
| SM10-L250-180-C20-C-H-N | M10 | 20 | 250 | 180 | 69.2 | 18.5 | - | 2 |
| SM10-L300-180-C20-C-H | M10 | 20 | 300 | 180 | 118.7 | 18 | 17.5 | 3 |
| SM10-L300-230-C20-C-H | M10 | 20 | 300 | 230 | 68.7 | 18 | 17.5 | 3 |
| SM12-L100-40-C25-C-H | M12 | 25 | 100 | 40 | 59.5 | 24 | - | 2 |
| SM12-L150-80-C25-C-H | M12 | 25 | 150 | 80 | 67.7 | 21 | 20.5 | 3 |
| SM12-L150-80-C25-C-H-N | M12 | 25 | 150 | 80 | 69.5 | 24 | - | 2 |
| SM12-L200-100-C25-C-H | M12 | 25 | 200 | 100 | 97.7 | 21 | 20.5 | 3 |
| SM12-L200-100-C25-C-H-N | M12 | 25 | 200 | 100 | 99.5 | 24 | - | 2 |
| SM12-L200-140-C25-C-H | M12 | 25 | 200 | 140 | 57.7 | 21 | 20.5 | 3 |
| SM12-L250-130-C25-C-H | M12 | 25 | 250 | 130 | 117.7 | 21 | 20.5 | 3 |
| SM12-L250-180-C25-C-H | M12 | 25 | 250 | 180 | 69.5 | 24 | - | 2 |
| SM12-L300-180-C25-C-H | M12 | 25 | 300 | 180 | 117.7 | 21 | 20.5 | 3 |
| SM12-L300-180-C25-C-H-N | M12 | 25 | 300 | 180 | 119.5 | 24 | - | 2 |
| SM12-L300-230-C25-C-H | M12 | 25 | 300 | 230 | 67.7 | 21 | 20.5 | 3 |
| SM16-L100-40-C32-C-H | M16 | 32 | 100 | 40 | 58.5 | 29 | - | 2 |
| SM16-L150-80-C32-C-H | M16 | 32 | 150 | 80 | 68.5 | 29 | - | 2 |
| SM16-L200-100-C32-C-H | M16 | 32 | 200 | 100 | 98.5 | 29 | - | 2 |
| SM16-L200-140-C32-C-H | M16 | 32 | 200 | 140 | 58.5 | 29 | - | 2 |
| SM16-L250-130-C32-C-H | M16 | 32 | 250 | 130 | 118.5 | 29 | - | 2 |
| SM16-L250-180-C32-C-H | M16 | 32 | 250 | 180 | 68.5 | 29 | - | 2 |
| SM16-L300-180-C32-C-H | M16 | 32 | 300 | 180 | 118.5 | 29 | - | 2 |
| SM16-L300-230-C32-C-H | M16 | 32 | 300 | 230 | 68.5 | 29 | - | 2 |
| SM16-L350-230-C32-C-H | M16 | 32 | 350 | 230 | 118.5 | 29 | - | 2 |
| SM16-L350-280-C32-C-H | M16 | 32 | 350 | 280 | 68.5 | 29 | - | 2 |

Cylindrical type holder for high-feed milling, screw-on

GAMP = +4°, GAMF = -21° ~ -17°



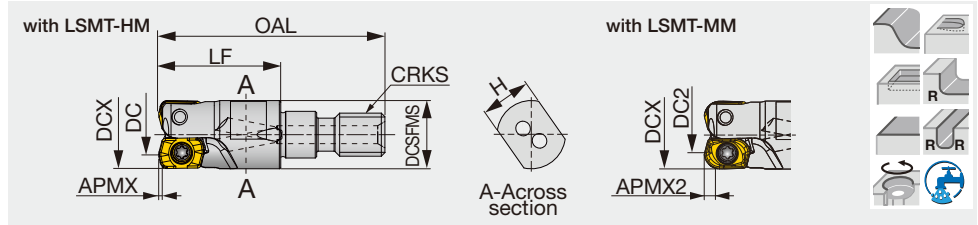
| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | DCONMS | LS | LH | LF | KAPR | WT (kg) | Air hole | Insert |
|-------------------------|------|-------|-----|------|-------|-----|--------|----|-----|-----|------|---------|----------|-----------|
| EXLS02M008C08.0LH16R01 | 0.5 | 2 | 8 | 1 | 4.29 | 4 | 8 | 59 | 16 | 75 | 12° | 0.02 | With | LSMT02... |
| EXLS02M008C08.0LH30R01 | 0.5 | 2 | 8 | 1 | 4.29 | 4 | 8 | 59 | 31 | 90 | 12° | 0.03 | With | LSMT02... |
| EXLS02M010C10.0LH20R02 | 0.5 | 2 | 10 | 2 | 6.28 | 6 | 10 | 60 | 20 | 80 | 12° | 0.04 | With | LSMT02... |
| EXLS02M010C10.0LH40R02 | 0.5 | 2 | 10 | 2 | 6.28 | 6 | 10 | 60 | 40 | 100 | 12° | 0.05 | With | LSMT02... |
| EXLS02M010C08.0LH20R02 | 0.5 | 2 | 10 | 2 | 6.28 | 6 | 8 | 60 | 20 | 80 | 12° | 0.03 | With | LSMT02... |
| EXLS02M012C12.0LH20R03 | 0.5 | 2 | 12 | 3 | 8.31 | 8 | 12 | 60 | 20 | 80 | 12° | 0.06 | With | LSMT02... |
| EXLS02M012C12.0LH50R02 | 0.5 | 2 | 12 | 2 | 8.31 | 8 | 12 | 60 | 50 | 110 | 12° | 0.08 | With | LSMT02... |
| EXLS02M012C10.0LH20R03 | 0.5 | 2 | 12 | 3 | 8.31 | 8 | 10 | 60 | 20 | 80 | 12° | 0.04 | With | LSMT02... |
| EXLS02M016C16.0LH30R05 | 0.5 | 2 | 16 | 5 | 12.31 | 12 | 16 | 70 | 30 | 100 | 12° | 0.14 | With | LSMT02... |
| EXLS02M016C16.0LH50R03 | 0.5 | 2 | 16 | 3 | 12.31 | 12 | 16 | 70 | 50 | 120 | 12° | 0.17 | With | LSMT02... |
| EXLS02M020C20.0LH50R05 | 0.5 | 2 | 20 | 5 | 16.29 | 16 | 20 | 80 | 50 | 130 | 12° | 0.27 | With | LSMT02... |
| EXLS02M020C20.0LH50R06 | 0.5 | 2 | 20 | 6 | 16.29 | 16 | 20 | 80 | 50 | 130 | 12° | 0.27 | With | LSMT02... |
| EXLS02M020C20.0LH80R05 | 0.5 | 2 | 20 | 5 | 16.29 | 16 | 20 | 80 | 80 | 160 | 12° | 0.33 | With | LSMT02... |
| EXLS02M025C25.0LH60R06 | 0.5 | 2 | 25 | 6 | 21.28 | 21 | 25 | 80 | 60 | 140 | 12° | 0.45 | With | LSMT02... |
| EXLS02M025C25.0LH60R08 | 0.5 | 2 | 25 | 8 | 21.28 | 21 | 25 | 80 | 60 | 140 | 12° | 0.47 | With | LSMT02... |
| EXLS02M025C25.0LH100R06 | 0.5 | 2 | 25 | 6 | 21.28 | 21 | 25 | 80 | 100 | 180 | 12° | 0.57 | With | LSMT02... |

HXLS

Modular head for high-feed milling, screw-on (TungFlex)

GAMP = +4°, GAMF = -21° ~ -17°

- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | OAL | LF | H | DCSFMS | CRKS | KAPR | WT (kg) | Air hole | Insert |
|------------------|------|-------|-----|------|-------|-----|------|----|----|--------|------|------|---------|----------|-----------|
| HXLS02M008M06R01 | 0.5 | 2 | 8 | 1 | 4.29 | 4 | 33.5 | 19 | 7 | 9.5 | M6 | 12° | 0.01 | With | LSMT02... |
| HXLS02M010M06R02 | 0.5 | 2 | 10 | 2 | 6.28 | 6 | 31.5 | 17 | 7 | 9.5 | M6 | 12° | 0.01 | With | LSMT02... |
| HXLS02M012M06R03 | 0.5 | 2 | 12 | 3 | 8.31 | 8 | 31.5 | 17 | 7 | 10 | M6 | 12° | 0.01 | With | LSMT02... |
| HXLS02M012M06R02 | 0.5 | 2 | 12 | 2 | 8.31 | 8 | 31.5 | 17 | 7 | 10 | M6 | 12° | 0.01 | With | LSMT02... |
| HXLS02M016M08R05 | 0.5 | 2 | 16 | 5 | 12.31 | 12 | 40 | 23 | 10 | 13 | M8 | 12° | 0.03 | With | LSMT02... |
| HXLS02M016M08R03 | 0.5 | 2 | 16 | 3 | 12.31 | 12 | 40 | 23 | 10 | 13 | M8 | 12° | 0.03 | With | LSMT02... |
| HXLS02M020M10R05 | 0.5 | 2 | 20 | 5 | 16.29 | 16 | 49 | 30 | 15 | 17.8 | M10 | 12° | 0.05 | With | LSMT02... |
| HXLS02M020M10R06 | 0.5 | 2 | 20 | 6 | 16.9 | 16 | 49 | 30 | 15 | 17.8 | M10 | 12° | 0.05 | With | LSMT02... |
| HXLS02M025M12R06 | 0.5 | 2 | 25 | 6 | 21.28 | 21 | 52 | 30 | 17 | 20.8 | M12 | 12° | 0.08 | With | LSMT02... |
| HXLS02M025M12R08 | 0.5 | 2 | 25 | 8 | 21.28 | 21 | 52 | 30 | 17 | 20.8 | M12 | 12° | 0.08 | With | LSMT02... |

SPARE PARTS

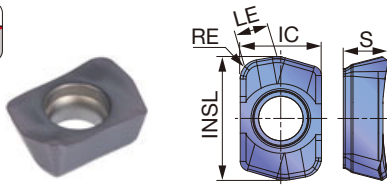
| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|------------------------|----------------|----------------------|--------|
| EXLS02M..., HXLS02M... | CSPB-2H | (M-1000) | IP-6DB |

Recommended clamping torque: 0.7 N·m

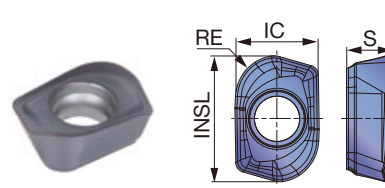
Reference pages: Standard cutting conditions → **H040 - H041**, TungFlex → **H036 - H037**

INSERT

LSMT-HM (High feed)



LSMT-MM (Radius)



| | | | | | | | | | | | | | |
|----------|----------------|---|---|--|--|--|--|--|--|--|--|--|--|
| P | Steel | ★ | ☆ | | | | | | | | | | |
| M | Stainless | ★ | | | | | | | | | | | |
| K | Cast iron | ☆ | ★ | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | |
| S | Superalloys | ☆ | ★ | | | | | | | | | | |
| H | Hard materials | | ★ | | | | | | | | | | |

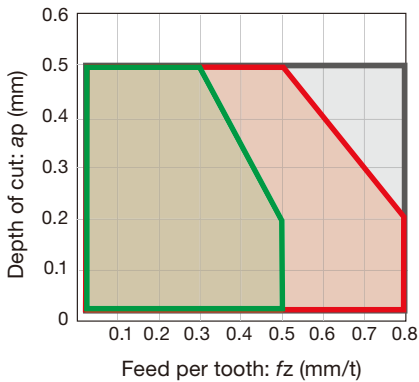
★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | LE | INSL | IC | S |
|----------------|----|------|--------|--------|--|--|--|--|--|-----|------|-----|-----|
| | | | AH3225 | AH8015 | | | | | | | | | |
| LSMT0202ZER-HM | 1 | 0.5 | ● | ● | | | | | | 1.7 | 6.4 | 4.2 | 2.3 |
| LSMT0202R2-MM | 2 | 2 | ● | ● | | | | | | - | 6.4 | 4.3 | 2.3 |

●: Line up

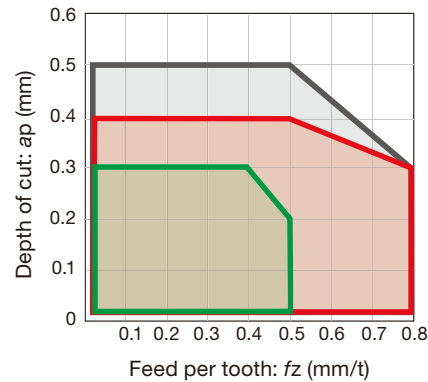
APPLICATION

LSMT-HM



- For standard shanks in $\leq 3xD$
- For long-neck shanks in $\geq 4xD$
- For modular head shanks in $\geq 7xD$

LSMT-MM



- For standard shanks in $\leq 3xD$
- For long-neck shanks in $\geq 4xD$
- For modular head shanks in $\geq 7xD$

* When the DOC is 0.5 mm or more, the feed less than 0.15 mm/t is recommended.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

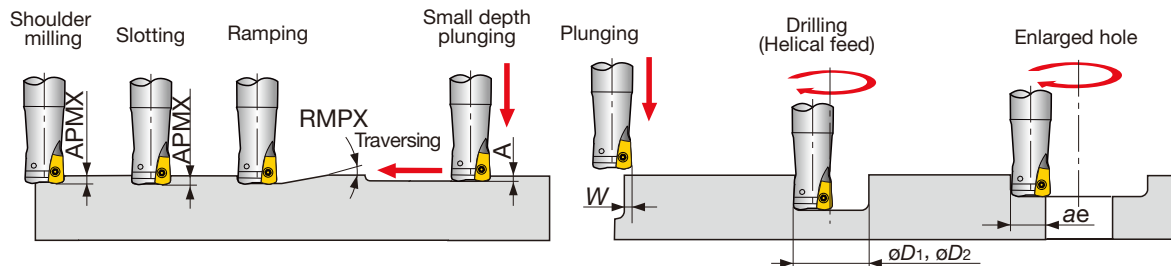


STANDARD CUTTING CONDITIONS



| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|------------|---|----------------------------------|-----------------------|--------------|--------------------------|--------------------------|-----------|
| P | Carbon steels S45C, S55C, etc. C45, S55C, etc. | - 300HB | First choice | AH3225 | 100 - 300 | 0.2 - 0.8 | |
| | | - 300HB | For wear resistance | AH8015 | 100 - 300 | 0.2 - 0.8 | |
| | Alloy steels SCM440, 42CrMo4, etc. 42CrMo4, 17Cr3, etc. | - 300HB | First choice | AH3225 | 100 - 300 | 0.2 - 0.8 | |
| | | - 300HB | For wear resistance | AH8015 | 100 - 300 | 0.2 - 0.8 | |
| | Prehardened steels NAK80, PX5, etc. | 30 - 40HRC | First choice | AH8015 | 100 - 200 | 0.2 - 0.5 | |
| 30 - 40HRC | | For impact resistance | AH3225 | 100 - 200 | 0.2 - 0.5 | | |
| M | Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | AH3225 | 100 - 150 | 0.2 - 0.5 | |
| K | Gray cast irons FC250, FC300, etc. 200, 300, etc. | 150 - 250HB | First choice | AH8015 | 100 - 300 | 0.2 - 0.8 | |
| | | 150 - 250HB | For impact resistance | AH3225 | 100 - 300 | 0.2 - 0.8 | |
| | Ductile cast irons FCD600, etc. 600-3, etc. | 150 - 250HB | First choice | AH8015 | 80 - 200 | 0.2 - 0.8 | |
| | | 150 - 250HB | For impact resistance | AH3225 | 80 - 200 | 0.2 - 0.8 | |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice | AH3225 | 30 - 60 | 0.1 - 0.3 | |
| | | - 40HRC | For wear resistance | AH8015 | 30 - 60 | 0.1 - 0.3 | |
| | Heat resistance alloy Inconel, Hastelloy, etc. | - 40HRC | First choice | AH8015 | 20 - 50 | 0.1 - 0.3 | |
| | | - 40HRC | For impact resistance | AH3225 | 20 - 50 | 0.1 - 0.3 | |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice | AH8015 | 80 - 150 | 0.1 - 0.5 |
| | | SKD11, etc. X153CrMoV12, etc. | 50 - 60HRC | First choice | AH8015 | 50 - 70 | 0.1 - 0.3 |

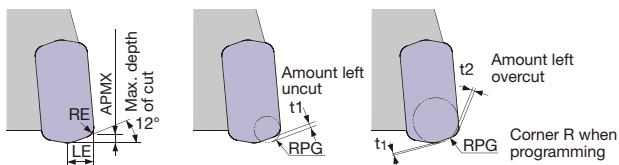
APPLICATION RANGE



| Designation | DC | Max. depth of cut | | RMPX | Max. plunging depth | Max. cutting width in plunging | Min. machining | Max. machining | Max. cutting width in enlarged hole |
|-----------------|----|-------------------|-------|------|---------------------|--------------------------------|----------------|----------------|-------------------------------------|
| | | APMX | APMX2 | | | | | | |
| E/HXLS02M008... | 8 | 0.5 | 2 | 4° | 0.2 | 2 | 10 | 15 | 5.9 |
| E/HXLS02M010... | 10 | 0.5 | 2 | 3.3° | 0.2 | 2 | 14 | 19 | 7.9 |
| E/HXLS02M012... | 12 | 0.5 | 2 | 2° | 0.2 | 2 | 18 | 23 | 9.9 |
| E/HXLS02M016... | 16 | 0.5 | 2 | 1.3° | 0.2 | 2 | 26 | 31 | 13.9 |
| E/HXLS02M020... | 20 | 0.5 | 2 | 1.2° | 0.2 | 2 | 34 | 39 | 17.9 |
| E/HXLS02M025... | 25 | 0.5 | 2 | 1° | 0.2 | 2 | 44 | 49 | 22.9 |

APMX: with LSMT-HM, APMX2: with LSMT-MM

Tool geometry on programming



LSMT...-HM

| Corner R when programming: RPG | Amount left uncut t1 (mm) | Amount left overcut t2 (mm) |
|--------------------------------|---------------------------|-----------------------------|
| 1 | 0.162 | 0 |
| 1.5 | 0.07 | 0.14 |
| 2 | 0 | 0.34 |

*Recommended

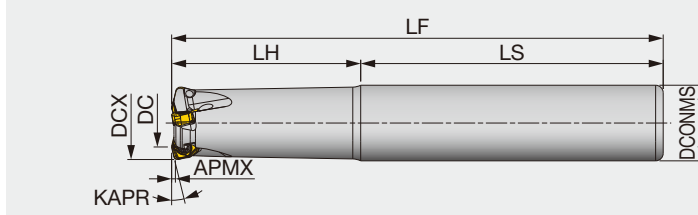
| Tool dia.: ϕD_c (mm), Number of revolutions: n (min ⁻¹), Feed speed: V_f (mm/min), Max. depth of cut: $a_p = 0.5$ mm, Number of teeth: CICT | | | | | | | | | | | | | | | |
|---|-------|----------------------|-------|-----------|----------|----------|-----------|----------|----------|-----------|----------|----------|-----------|----------|----------|
| $\phi 8$, CICT = 1 | | $\phi 10$, CICT = 2 | | $\phi 12$ | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
| n | V_f | n | V_f | n | V_f | | n | V_f | | n | V_f | | n | V_f | |
| | | | | | CICT = 2 | CICT = 3 | | CICT = 3 | CICT = 5 | | CICT = 5 | CICT = 6 | | CICT = 6 | CICT = 8 |
| 7,960 | 3,980 | 6,370 | 6,370 | 5,310 | 5,310 | 7,970 | 3,980 | 5,970 | 9,950 | 3,180 | 7,950 | 9,540 | 2,550 | 7,650 | 10,200 |
| Vc = 200 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | |
| 7,960 | 3,980 | 6,370 | 6,370 | 5,310 | 5,310 | 7,970 | 3,980 | 5,970 | 9,950 | 3,180 | 7,950 | 9,540 | 2,550 | 7,650 | 10,200 |
| Vc = 200 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | |
| 5,970 | 2,390 | 4,780 | 3,820 | 3,980 | 3,180 | 4,780 | 2,990 | 3,590 | 5,980 | 2,390 | 4,780 | 5,740 | 1,910 | 4,590 | 6,120 |
| Vc = 150 m/min, fz = 0.4 mm/t | | | | | | | | | | | | | | | |
| 4,780 | 1,910 | 3,820 | 3,060 | 3,190 | 2,550 | 3,830 | 2,390 | 2,870 | 4,780 | 1,910 | 3,820 | 4,590 | 1,530 | 3,680 | 4,900 |
| Vc = 120 m/min, fz = 0.4 mm/t | | | | | | | | | | | | | | | |
| 7,960 | 3,980 | 6,370 | 6,370 | 5,310 | 5,310 | 7,970 | 3,980 | 5,970 | 9,950 | 3,180 | 7,950 | 9,540 | 2,550 | 7,650 | 10,200 |
| Vc = 200 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | |
| 5,970 | 2,990 | 4,780 | 4,780 | 3,980 | 3,980 | 5,970 | 2,990 | 4,490 | 7,480 | 2,390 | 5,980 | 7,170 | 1,530 | 4,590 | 6,120 |
| Vc = 150 m/min, fz = 0.5 mm/t | | | | | | | | | | | | | | | |
| 1,590 | 320 | 1,270 | 510 | 1,060 | 420 | 640 | 800 | 480 | 800 | 640 | 640 | 770 | 510 | 620 | 820 |
| Vc = 40 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | |
| 1,190 | 240 | 1,000 | 400 | 800 | 320 | 480 | 600 | 360 | 600 | 480 | 480 | 580 | 380 | 460 | 460 |
| Vc = 30 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | |
| 4,780 | 1,430 | 3,820 | 2,290 | 3,190 | 1,910 | 2,870 | 2,390 | 2,150 | 3,590 | 1,910 | 2,870 | 3,440 | 1,530 | 2,760 | 3,680 |
| Vc = 120 m/min, fz = 0.3 mm/t | | | | | | | | | | | | | | | |
| 2,390 | 480 | 1,910 | 760 | 1,590 | 640 | 950 | 1,190 | 710 | 1,190 | 950 | 950 | 1,140 | 760 | 920 | 1,220 |
| Vc = 60 m/min, fz = 0.2 mm/t | | | | | | | | | | | | | | | |

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



High feed endmill, shank type, with screw clamp system

GAMP = +23°, GAMF = -7.9° ~ -6.2°

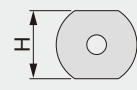
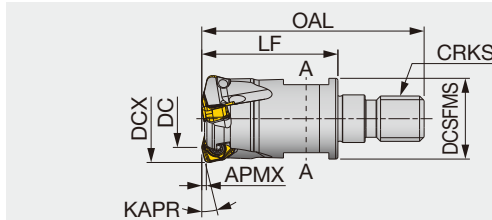


| Designation | APMX | DCX | CICT | DC | DCONMS | LS | LH | LF | KAPR | WT(kg) | Air hole | Insert |
|---------------------|------|-----|------|------|--------|-----|-----|-----|------|--------|----------|-----------|
| EXWX03M016C16.0R02 | 1 | 16 | 2 | 8.9 | 16 | 70 | 30 | 100 | 12° | 0.14 | With | WXMU03... |
| EXWX03M016C16.0R02L | 1 | 16 | 2 | 8.9 | 16 | 100 | 50 | 150 | 12° | 0.21 | With | WXMU03... |
| EXWX03M020C20.0R03 | 1 | 20 | 3 | 12.8 | 20 | 80 | 50 | 130 | 12° | 0.26 | With | WXMU03... |
| EXWX03M020C20.0R03L | 1 | 20 | 3 | 12.8 | 20 | 80 | 80 | 160 | 12° | 0.31 | With | WXMU03... |
| EXWX03M025C25.0R04 | 1 | 25 | 4 | 17.8 | 25 | 80 | 60 | 140 | 12° | 0.46 | With | WXMU03... |
| EXWX03M025C25.0R04L | 1 | 25 | 4 | 17.8 | 25 | 80 | 100 | 180 | 12° | 0.58 | With | WXMU03... |
| EXWX03M032C32.0R05 | 1 | 32 | 5 | 24.7 | 32 | 80 | 70 | 150 | 12° | 0.84 | With | WXMU03... |
| EXWX03M032C32.0R05L | 1 | 32 | 5 | 24.7 | 32 | 80 | 120 | 200 | 12° | 1.11 | With | WXMU03... |

HXWX03-M

High feed endmill, modular type (TungFlex)

GAMP = +23°, GAMF = -7.9° ~ -6.2°



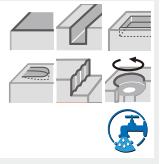
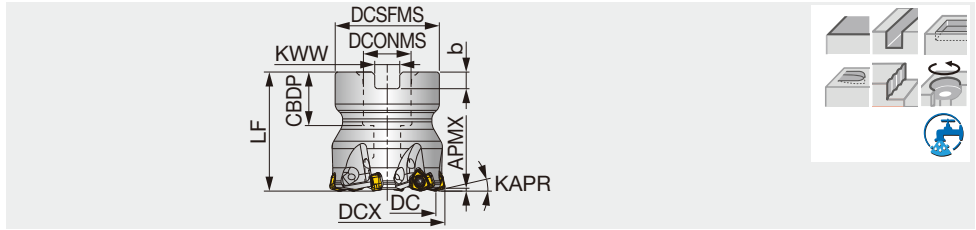
| Designation | APMX | DCX | CICT | DC | OAL | LF | H | DCSFMS | KAPR | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|-----|------|------|-----|----|----|--------|------|------|--------|----------|-----------|
| HXWX03M016M08R02 | 1 | 16 | 2 | 8.9 | 42 | 25 | 10 | 12.8 | 12° | M8 | 0.03 | With | WXMU03... |
| HXWX03M020M10R03 | 1 | 20 | 3 | 12.8 | 49 | 30 | 15 | 17.8 | 12° | M10 | 0.06 | With | WXMU03... |
| HXWX03M025M12R04 | 1 | 25 | 4 | 17.8 | 57 | 35 | 17 | 20.8 | 12° | M12 | 0.1 | With | WXMU03... |
| HXWX03M032M16R05 | 1 | 32 | 5 | 24.7 | 63 | 40 | 22 | 28.8 | 12° | M16 | 0.21 | With | WXMU03... |

SPARE PARTS



| Designation | Clamping screw | Wrench |
|----------------------|----------------|--------|
| EXWX03..., HXWX03... | CSPB-2.5SH | IP-7D |

Recommended clamping torque: 1.1 N·m



| Designation | APMX | DCX | CICT | DC | DCSFMS | DCONMS | CBDP | LF | b | KWW | KAPR | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|------|--------|--------|------|----|-----|------|------|--------|----------|-----------|
| TXWX03M040B16.0R06 | 1 | 40 | 6 | 32.7 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 12° | 0.22 | With | WXMU03... |
| TXWX03M050B22.0R08 | 1 | 50 | 8 | 42.7 | 47 | 22 | 20 | 50 | 6.3 | 10.4 | 12° | 0.46 | With | WXMU03... |

SPARE PARTS

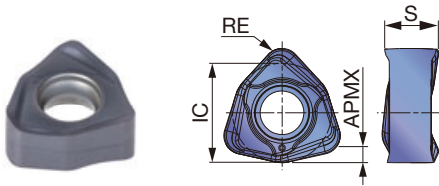


| Designation | Clamping screw | Shell locking bolt | Wrench |
|--------------------|----------------|--------------------|--------|
| EXWX03M... | CSPB-2.5SH | - | IP-7D |
| TXWX03M040B16.0R06 | CSPB-2.5SH | CM8X30H | IP-7D |
| TXWX03M050B22.0R08 | CSPB-2.5SH | CM10X30H | IP-7D |

Recommended clamping torque: 1.1 N·m

INSERT

WXMU0303-MM



| | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| P | Steel | ★ | ☆ | | | | | | | | | | | | | | | | |
| M | Stainless | ★ | | | | | | | | | | | | | | | | | |
| K | Cast iron | ☆ | ★ | | | | | | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | | |
| S | Superalloy | ☆ | ★ | | | | | | | | | | | | | | | | |
| H | Hard materials | | ★ | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | IC | S |
|----------------|-----|------|--------|--------|------|------|
| | | | AH3225 | AH8015 | | |
| WXMU0303ZER-MM | 1.2 | 1 | ● | ● | 6.35 | 3.63 |

● : Line up





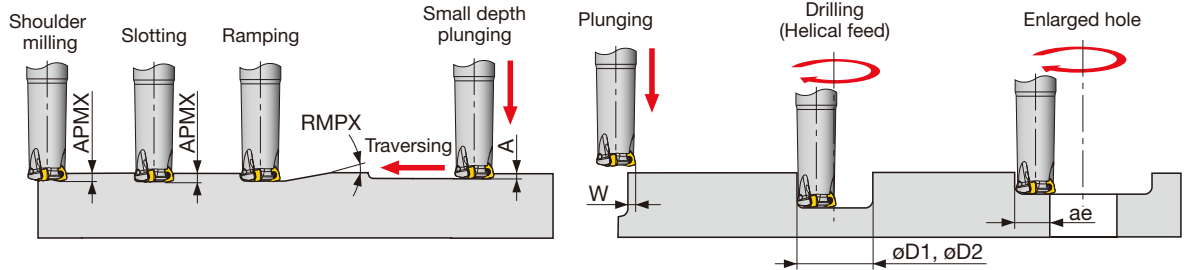
STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Priority | Grades | Chipbreaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|-------------|-----------------------|--------|-------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 300HB | First choice | AH3225 | MM | 100 - 300 | 0.5 - 1.5 |
| | | | For wear resistance | AH8015 | | | |
| P | Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc. | - 300HB | First choice | AH3225 | MM | 100 - 250 | 0.5 - 1.5 |
| | | | For wear resistance | AH8015 | | | |
| P | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | MM | 100 - 200 | 0.5 - 1.2 |
| | | | For wear resistance | AH8015 | | | |
| M | Austenitic Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200HB | First choice | AH3225 | MM | 80 - 150 | 0.5 - 1 |
| | | | For wear resistance | AH8015 | | | |
| M | Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc. | - 200HB | First choice | AH3225 | MM | 50 - 120 | 0.3 - 1 |
| | | | For wear resistance | AH8015 | | | |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250HB | First choice | AH8015 | MM | 100 - 300 | 0.5 - 1.5 |
| | | | For impact resistance | AH3225 | | | |
| K | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250HB | First choice | AH8015 | MM | 80 - 200 | 0.5 - 1.5 |
| | | | For impact resistance | AH3225 | | | |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice | AH3225 | MM | 30 - 60 | 0.3 - 0.7 |
| | | | For wear resistance | AH8015 | | | |
| S | Superalloys Inconel718, etc. | - 40HRC | First choice | AH8015 | MM | 20 - 50 | 0.1 - 0.3 |
| | | | For wear resistance | AH3225 | | | |
| H | Hardened steel | 40 - 50HRC | First choice | AH8015 | MM | 80 - 150 | 0.1 - 0.5 |
| | | | For impact resistance | AH3225 | | | |
| H | Hardened steel | 50 - 60HRC | First choice | AH8015 | MM | 50 - 70 | 0.05 - 0.1 |
| | | | For impact resistance | AH3225 | | | |

Approach angle

- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

APPLICATION RANGE



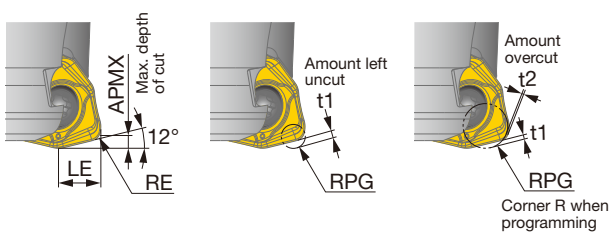
| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Max. cutting width in plunging W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarged hole ae |
|-----------------|-----|---------------------------|----------------------------|--------------------------|-------------------------------------|----------------------------------|----------------------------------|---|
| E/HXWX03M016... | 16 | 1 | 3 | 0.3 | 4 | 25 | 30 | 12 |
| E/HXWX03M020... | 20 | 1 | 2 | 0.3 | 4 | 31 | 38 | 16 |
| E/HXWX03M025... | 25 | 1 | 1.4 | 0.3 | 4 | 41 | 48 | 21 |
| E/HXWX03M032... | 32 | 1 | 1 | 0.3 | 4 | 54 | 62 | 28 |
| TXWX03M040... | 40 | 1 | 0.7 | 0.3 | 4 | 71 | 78 | 36 |
| TXWX03M050... | 50 | 1 | 0.6 | 0.3 | 4 | 87 | 98 | 46 |

Tool dia: DCX (mm), Number of revolution: n (min^{-1}), Feed speed: V_f (mm/min), Max. depth of cut: $APMX = 1$ mm, Number of teeth: CICT

| $\phi 16$, CICT = 2 | | $\phi 20$, CICT = 3 | | $\phi 25$, CICT = 4 | | $\phi 32$, CICT = 5 | | $\phi 40$, CICT = 6 | | $\phi 50$, CICT = 8 | |
|-------------------------------------|-------|----------------------|-------|----------------------|--------|----------------------|-------|----------------------|-------|----------------------|--------|
| n | V_f | n | V_f | n | V_f | n | V_f | n | V_f | n | V_f |
| 3,981 | 7,962 | 3,185 | 9,554 | 2,548 | 10,191 | 1,990 | 9,952 | 1,592 | 9,554 | 1,274 | 10,191 |
| $V_c = 200$ m/min, $f_z = 1$ mm/t | | | | | | | | | | | |
| 3,981 | 7,962 | 3,185 | 9,554 | 2,548 | 10,191 | 1,990 | 9,952 | 1,592 | 9,554 | 1,274 | 10,191 |
| $V_c = 200$ m/min, $f_z = 1$ mm/t | | | | | | | | | | | |
| 2,986 | 4,180 | 2,389 | 5,016 | 1,911 | 5,350 | 1,493 | 5,225 | 1,194 | 5,016 | 955 | 5,350 |
| $V_c = 150$ m/min, $f_z = 0.7$ mm/t | | | | | | | | | | | |
| 2,389 | 2,389 | 1,911 | 2,866 | 1,529 | 3,057 | 1,194 | 2,986 | 955 | 2,866 | 764 | 3,057 |
| $V_c = 120$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | | | |
| 1,990 | 1,194 | 1,592 | 1,433 | 1,274 | 1,529 | 995 | 1,493 | 796 | 1,433 | 637 | 1,529 |
| $V_c = 100$ m/min, $f_z = 0.3$ mm/t | | | | | | | | | | | |
| 3,981 | 7,962 | 3,185 | 9,554 | 2,548 | 10,191 | 1,990 | 9,952 | 1,592 | 9,554 | 1,274 | 10,191 |
| $V_c = 200$ m/min, $f_z = 1$ mm/t | | | | | | | | | | | |
| 2,986 | 5,971 | 2,389 | 7,166 | 1,911 | 7,643 | 1,493 | 7,464 | 1,194 | 7,166 | 955 | 7,643 |
| $V_c = 150$ m/min, $f_z = 1$ mm/t | | | | | | | | | | | |
| 796 | 637 | 637 | 764 | 510 | 815 | 398 | 796 | 318 | 764 | 255 | 815 |
| $V_c = 40$ m/min, $f_z = 0.4$ mm/t | | | | | | | | | | | |
| 597 | 239 | 478 | 287 | 382 | 306 | 299 | 299 | 239 | 287 | 191 | 306 |
| $V_c = 30$ m/min, $f_z = 0.2$ mm/t | | | | | | | | | | | |
| 2,389 | 1,433 | 1,911 | 1,720 | 1,529 | 1,834 | 1,194 | 1,791 | 955 | 1,720 | 764 | 1,834 |
| $V_c = 120$ m/min, $f_z = 0.3$ mm/t | | | | | | | | | | | |
| 1,194 | 239 | 955 | 287 | 764 | 306 | 597 | 299 | 478 | 287 | 382 | 306 |
| $V_c = 60$ m/min, $f_z = 0.1$ mm/t | | | | | | | | | | | |

TOOL GEOMETRY ON PROGRAMMING

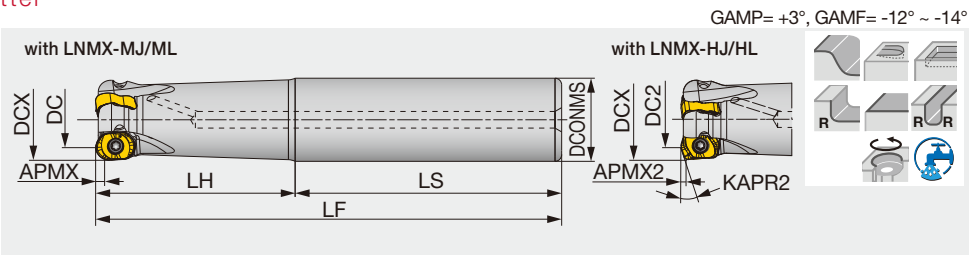
When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as $R = 1.5$ mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t_1) and overcut (t_2).



| Max. depth of cut APMX (mm) | Corner radius RE (mm) | LE (mm) | Corner R when programming RPG | Amount left uncut t1 (mm) | Amount overcut t2 (mm) |
|-----------------------------|-----------------------|---------|-------------------------------|---------------------------|------------------------|
| 1 | 1.2 | 3.5 | 1 | 0.56 | - |
| 1 | 1.2 | 3.5 | 1.5 | 0.46 | - |
| 1 | 1.2 | 3.5 | 2 | 0.35 | 0.16 |
| 1 | 1.2 | 3.5 | 2.5 | 0.2 | 0.5 |

*Recommended

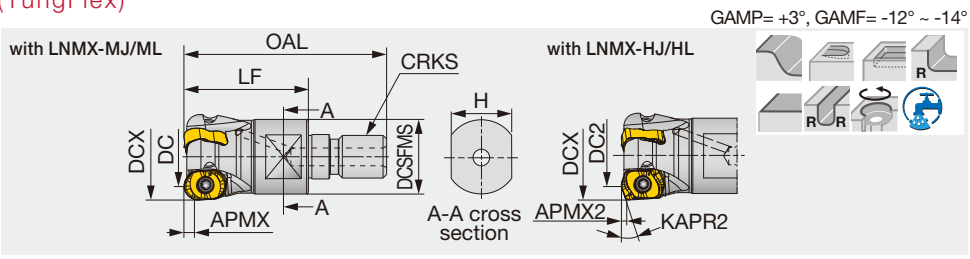
Radius endmill, shank type cutter



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | KAPR2 | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|---------------------|------|-------|-----|------|------|------|-------|--------|-----|-----|-----|--------|----------|-----------|
| EXLN04M020C20.0R02 | 4 | 1.3 | 20 | 2 | 12.2 | 11.6 | 20° | 20 | 80 | 50 | 130 | 0.28 | With | LNMX04... |
| EXLN04M020C20.0R02L | 4 | 1.3 | 20 | 2 | 12.2 | 11.6 | 20° | 20 | 80 | 80 | 160 | 0.34 | With | LNMX04... |
| EXLN04M025C25.0R03 | 4 | 1.3 | 25 | 3 | 17.2 | 16.6 | 20° | 25 | 80 | 60 | 140 | 0.46 | With | LNMX04... |
| EXLN04M025C25.0R03L | 4 | 1.3 | 25 | 3 | 17.2 | 16.6 | 20° | 25 | 80 | 100 | 180 | 0.6 | With | LNMX04... |
| EXLN05M025C25.0R02 | 5 | - | 25 | 2 | 15 | - | - | 25 | 90 | 60 | 150 | 0.54 | With | LNMX05... |
| EXLN04M032C32.0R04 | 4 | 1.3 | 32 | 4 | 24.2 | 23.6 | 20° | 32 | 80 | 70 | 150 | 0.83 | With | LNMX04... |
| EXLN04M032C32.0R05 | 4 | 1.3 | 32 | 5 | 24.2 | 23.6 | 20° | 32 | 80 | 70 | 150 | 0.83 | With | LNMX04... |
| EXLN04M032C32.0R05L | 4 | 1.3 | 32 | 5 | 24.2 | 23.6 | 20° | 32 | 80 | 120 | 200 | 1.09 | With | LNMX04... |
| EXLN05M032C32.0R04 | 5 | - | 32 | 4 | 21.9 | - | - | 32 | 80 | 70 | 150 | 0.87 | With | LNMX05... |
| EXLN06M032C32.0R02 | 6 | 2 | 32 | 2 | 19.6 | 19.3 | 25° | 32 | 80 | 70 | 150 | 0.9 | With | LNMX06... |
| EXLN06M040C32.0R04 | 6 | 2 | 40 | 4 | 27.6 | 27.3 | 25° | 32 | 100 | 50 | 150 | 0.95 | With | LNMX06... |

HXLN04-M

Radius endmill, modular type (TungFlex)



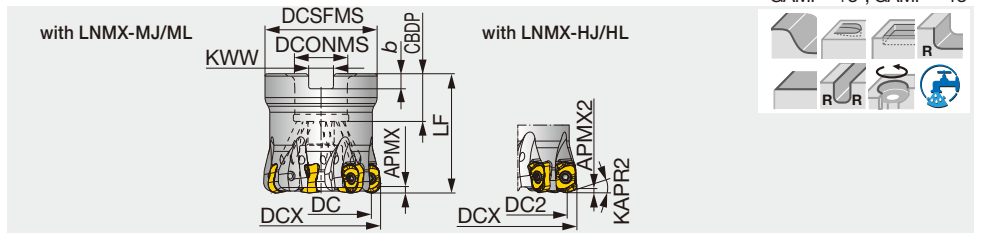
| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | KAPR2 | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|-------|-----|------|------|------|-------|-----|----|----|--------|------|--------|----------|-----------|
| HXLN04M020M10R02 | 4 | 1.3 | 20 | 2 | 12.2 | 11.6 | 20° | 49 | 30 | 15 | 18 | M10 | 0.07 | With | LNMX04... |
| HXLN04M025M12R03 | 4 | 1.3 | 25 | 3 | 17.2 | 16.6 | 20° | 57 | 35 | 17 | 21 | M12 | 0.16 | With | LNMX04... |
| HXLN05M025M12R02 | 5 | - | 25 | 2 | 15 | - | - | 57 | 35 | 17 | 21 | M12 | 0.1 | With | LNMX05... |
| HXLN04M032M16R04 | 4 | 1.3 | 32 | 4 | 24.2 | 23.6 | 20° | 63 | 40 | 22 | 29 | M16 | 0.2 | With | LNMX04... |
| HXLN04M032M16R05 | 4 | 1.3 | 32 | 5 | 24.2 | 23.6 | 20° | 63 | 40 | 22 | 29 | M16 | 0.2 | With | LNMX04... |
| HXLN05M032M16R04 | 5 | - | 32 | 4 | 21.9 | - | - | 63 | 40 | 22 | 28.8 | M16 | 0.2 | With | LNMX05... |
| HXLN06M032M16R02 | 6 | 2 | 32 | 2 | 19.6 | 19.3 | 25° | 63 | 40 | 22 | 28.8 | M16 | 0.24 | With | LNMX06... |
| HXLN04M040M16R06 | 4 | 1.3 | 40 | 6 | 32.2 | 31.6 | 20° | 63 | 40 | 22 | 29 | M16 | 0.24 | With | LNMX04... |

SPARE PARTS

| Designation | Clamping screw | Mono block wrench | Torx bit (Optional) | Grip (Optional) |
|-----------------------|----------------|-------------------|---------------------|-----------------|
| EXLN04... / HXLN04... | CSPD-3 | IP-10D | - | - |
| EXLN05... / HXLN05... | CSPB-4S | - | (BLD IP15/S7) | (H-TB2W) |
| EXLN06... / HXLN06... | CSPB-5 | - | (BLD IP20/S7) | (H-TB2W) |

Recommended clamping torque (Torx size): CSPD-3 = 2.5 N·m, CSPB-4S = 3.5 N·m (15IP), CSPB-5 = 5 N·m (20IP)

Reference pages: Standard cutting conditions → H048 - H049, TungFlex → H036 - H037



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | KAPR2 | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-------|-----|------|------|------|-------|--------|----|--------|------|------|-----|--------|----------|-----------|
| TXLN04M040B16.0R06 | 4 | 1.3 | 40 | 6 | 32.2 | 31.6 | 20 | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.21 | With | LNMX04... |
| TXLN05M040B16.0R05 | 5 | - | 40 | 5 | 29.8 | - | - | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.26 | With | LNMX05... |
| TXLN04M042B16.0R06 | 4 | 1.3 | 42 | 6 | 34.2 | 33.6 | 20 | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.21 | With | LNMX04... |
| TXLN04M050B22.0R07 | 4 | 1.3 | 50 | 7 | 42.2 | 41.6 | 20 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.45 | With | LNMX04... |
| TXLN05M050B22.0R06 | 5 | - | 50 | 6 | 39.8 | - | - | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | LNMX05... |
| TXLN06M050B22.0R05 | 6 | 2 | 50 | 5 | 37.6 | 37.3 | 25 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | LNMX06... |
| TXLN04M052B22.0R07 | 4 | 1.3 | 52 | 7 | 44.2 | 43.6 | 20 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.47 | With | LNMX04... |
| TXLN06M052B22.0R05 | 6 | 2 | 52 | 5 | 39.6 | 39.3 | 25 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.55 | With | LNMX06... |
| TXLN04M063B22.0R07 | 4 | 1.3 | 63 | 7 | 55.2 | 54.6 | 20 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.76 | With | LNMX04... |
| TXLN06M063B22.0R06 | 6 | 2 | 63 | 6 | 50.6 | 50.3 | 25 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.82 | With | LNMX06... |

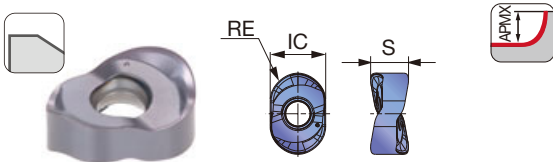
SPARE PARTS

| Designation | Clamping screw | Torx bit 1 | Torx bit 2 (Optional) | Grip 1 | Grip 2 (Optional) | Shell locking bolt |
|-------------------------------|----------------|-------------|-----------------------|--------|-------------------|--------------------|
| TXLN04M04*B16.0R06 | CSPD-3 | BLD IP10/S7 | - | SW6-SD | - | FSHM8-30H |
| TXLN04M05*B22.0R07 | CSPD-3 | BLD IP10/S7 | - | SW6-SD | - | CM10X30H |
| TXLN04M063B22.0R07 | CSPD-3 | BLD IP10/S7 | - | SW6-SD | - | CM10X30H |
| TXLN05M040B16.0R05 | CSPB-4S | - | (BLD IP15/S7) | - | (H-TB2W) | FSHM8-30H |
| TXLN05M050B22.0R06 | CSPB-4S | - | (BLD IP15/S7) | - | (H-TB2W) | CM10X30H |
| TXLN06M050B22.0R05 | CSPB-5 | - | (BLD IP20/S7) | - | (H-TB2W) | FSHM10-40H |
| TXLN06M052... / TXLN06M063... | CSPB-5 | - | (BLD IP20/S7) | - | (H-TB2W) | CM10X30H |

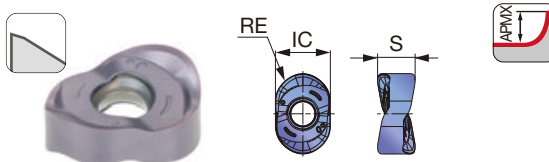
Recommended clamping torque (Torx size): CSPD-3 = 2.5 N·m, CSPB-4S = 3.5 N·m (15IP), CSPB-5 = 5 N·m (20IP)

INSERT

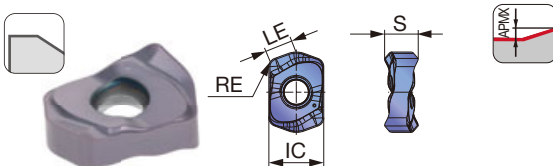
LNMX-MJ (Radius, for general purpose)



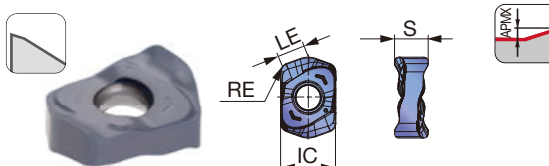
LNMX-ML (Radius, for low cutting force)



LNMX-HJ (High feed, for general purpose)



LNMX-HL (High feed, for low cutting force)



| | | | | | | | | | | | | | | | | |
|------------------|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|
| P Steel | ☆ | ★ | ☆ | ★ | | | | | | | | | | | | |
| M Stainless | | ★ | | ★ | | | | | | | | | | | | |
| K Cast iron | ★ | ☆ | ★ | ☆ | | | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | | | | | |
| S Superalloys | ★ | ☆ | ★ | ☆ | | | | | | | | | | | | |
| H Hard materials | ★ | ☆ | ☆ | ☆ | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | LE | IC | S |
|----------------|-----|------|--------|--------|-------|--------|------|------|-----|
| | | | AH8015 | AH3225 | AH120 | AH3135 | | | |
| LNMX0405R4-MJ | 4 | 4 | ● | ● | ● | ● | - | 8.2 | 5.6 |
| LNMX0405R4-ML | 4 | 4 | | | ● | ● | - | 8.2 | 5.6 |
| LNMX0405ZER-HJ | 1.3 | 1.3 | ● | ● | ● | ● | 4.36 | 8.2 | 5 |
| LNMX0405ZER-HL | 1.3 | 1.3 | ● | ● | | ● | 4.36 | 8.2 | 5 |
| LNMX0506R5-MJ | 5 | 5 | ● | ● | ● | ● | - | 10.4 | 6.1 |
| LNMX0607R6-MJ | 6 | 6 | ● | ● | ● | ● | - | 12.6 | 7.4 |
| LNMX0607ZER-HJ | 2 | 2 | ● | ● | ● | ● | 6.71 | 12.7 | 7.2 |

● : Line up

Reference pages: Standard cutting conditions → H048 - H049



High Feed Milling

STANDARD CUTTING CONDITIONS

FOR RADIUS (MJ, ML)

| | ISO | Workpiece material | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-------------------------|-----|--|--------------|---------------------|--------|--------------|--------------------------|--------------------------|
| High Feed Milling | P | Low carbon steel S15C, SS400, etc. C15, C20, etc. | - 200 HB | First choice | AH3225 | MJ | 100 - 300 | 0.2 - 0.6 |
| | | | | Low cutting force | AH3135 | ML | 100 - 300 | 0.2 - 0.6 |
| Face Milling | P | Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc. | - 300 HB | First choice | AH3225 | MJ | 100 - 250 | 0.2 - 0.6 |
| | | | | Low cutting force | AH3135 | ML | 100 - 250 | 0.2 - 0.6 |
| Shoulder Milling | P | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | MJ | 100 - 200 | 0.15 - 0.4 |
| | | | | Low cutting force | AH3135 | ML | 100 - 200 | 0.15 - 0.4 |
| Slot Milling | M | Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | First choice | AH3135 | MJ | 100 - 200 | 0.2 - 0.6 |
| | | | | Low cutting force | AH3135 | ML | 100 - 200 | 0.2 - 0.6 |
| Profile Milling | K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | MJ | 100 - 300 | 0.2 - 0.6 |
| | | | | Fracture resistance | AH3225 | MJ | 100 - 300 | 0.2 - 0.6 |
| Chamfering, Counterbore | S | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250 HB | First choice | AH120 | MJ | 80 - 250 | 0.2 - 0.6 |
| | | | | Fracture resistance | AH3225 | MJ | 80 - 250 | 0.2 - 0.6 |
| Finish Face Milling | H | Hardened steel SKD61, etc. X40CrMoV5-1, etc. SKD11, etc. X153CrMoV12, etc. | 40 - 50 HRC | First choice | AH3225 | MJ | 50 - 150 | 0.1 - 0.3 |
| | | | | Wear resistance | AH8015 | MJ | 50 - 150 | 0.1 - 0.3 |
| | H | | 50 - 60 HRC | First choice | AH8015 | MJ | 50 - 70 | 0.05 - 0.15 |
| | | | | | | | | |

· When using a long shank or modular head with long overhang, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

HIGH FEED (HJ, HL)

LNMX04-HJ/HL

| Approach angle | ISO | Workpiece material | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------------|-----|---|--------------|---------------------|--------|--------------|--------------------------|--------------------------|
| 7°-25° | P | Low carbon steel S15C, SS400, etc. C15, C20, etc. | - 300 HB | First choice | AH3225 | HJ | 100 - 300 | 0.5 - 1.3 |
| | | | | Wear resistance | AH8015 | HJ | | |
| | | | | Low cutting force | AH3225 | HL | | |
| 41°-45° | P | Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc. | - 300 HB | First choice | AH3225 | HJ | 100 - 250 | 0.5 - 1.3 |
| | | | | Wear resistance | AH8015 | HJ | | |
| | | | | Low cutting force | AH3225 | HL | | |
| 60°-70° | P | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | HJ | 100 - 200 | 0.4 - 1 |
| | | | | Wear resistance | AH8015 | HJ | | |
| | | | | Low cutting force | AH3225 | HL | | |
| 85°-88° | M | Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | First choice | AH3135 | HL | 100 - 200 | 0.3 - 0.9 |
| | | | | Fracture resistance | AH3135 | HJ | | |
| | | | | Fracture resistance | AH3135 | HJ | | |
| 90° | M | Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc. | - 200 HB | First choice | AH3135 | HJ | 100 - 300 | 0.3 - 0.9 |
| | | | | Fracture resistance | AH3135 | HJ | | |
| | | | | Fracture resistance | AH3135 | HJ | | |
| Others | K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | HJ | 100 - 300 | 0.5 - 1.3 |
| | | | | Fracture resistance | AH3225 | HJ | | |
| | | | | Fracture resistance | AH3225 | HJ | | |
| | S | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250 HB | First choice | AH120 | HJ | 80 - 250 | 0.5 - 1.3 |
| | | | | Fracture resistance | AH3225 | HJ | | |
| | | | | Fracture resistance | AH3225 | HJ | | |
| | S | Titanium alloy Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3135 | HL | 30 - 60 | 0.3 - 0.7 |
| | | | | Fracture resistance | AH3135 | HJ | | |
| | | | | Fracture resistance | AH3135 | HJ | | |
| | S | Superalloys Inconel718, etc. | - 40 HRC | First choice | AH8015 | HL | 20 - 50 | 0.1 - 0.3 |
| | | | | Fracture resistance | AH8015 | HJ | | |
| | | | | Fracture resistance | AH8015 | HJ | | |
| | H | Hardened steel SKD61, etc. X40CrMoV5-1, etc. | 40 - 50 HRC | First choice | AH3225 | HJ | 50 - 150 | 0.1 - 0.5 |
| | | | | Wear resistance | AH8015 | HJ | | |
| | | | | Wear resistance | AH8015 | HJ | | |
| | H | Hardened steel SKD11, etc. X153CrMoV12, etc. | 50 - 60 HRC | First choice | AH8015 | HJ | 50 - 70 | 0.05 - 0.2 |
| | | | | First choice | AH8015 | HJ | | |
| | | | | First choice | AH8015 | HJ | | |

H048 tungaloy.com

HIGH FEED (HJ, HL)
LNMX06-HJ

| ISO | Workpiece material | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|-------------|---------------------|--------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, SS400, etc. C15, C20, etc. | - 300HB | First choice | AH3225 | HJ | 100 - 300 | 0.3 - 1.1 |
| | | | Wear resistance | AH8015 | | | |
| | Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc. | - 300HB | First choice | AH3225 | HJ | 100 - 250 | 0.3 - 1.1 |
| | | | Wear resistance | AH8015 | | | |
| M | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | HJ | 100 - 200 | 0.2 - 0.7 |
| | | | Wear resistance | AH8015 | | | |
| M | Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200HB | First choice | AH3135 | HJ | 100 - 200 | 0.2 - 0.7 |
| | | | First choice | AH3135 | | | |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250HB | First choice | AH120 | HJ | 100 - 300 | 0.3 - 1.1 |
| | | | Fracture resistance | AH3225 | | | |
| K | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250HB | First choice | AH120 | HJ | 80 - 250 | 0.3 - 1.1 |
| | | | Fracture resistance | AH3225 | | | |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3135 | HJ | 30 - 60 | 0.15 - 0.6 |
| | | | First choice | AH8015 | | | |
| H | Hardened steel | 40 - 50HRC | First choice | AH3225 | HJ | 50 - 150 | 0.1 - 0.3 |
| | | | Wear resistance | AH8015 | | | |
| | | 50 - 60HRC | First choice | AH8015 | HJ | 50 - 70 | 0.05 - 0.15 |
| | | | First choice | AH8015 | | | |

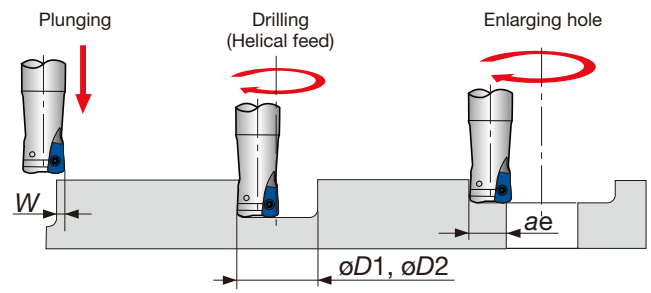
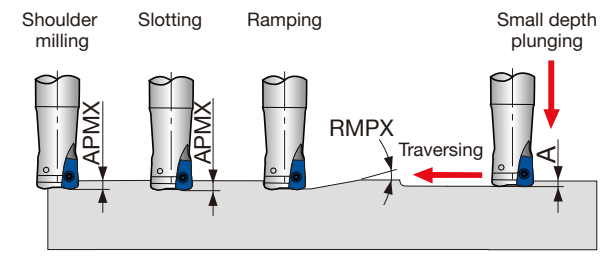
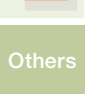
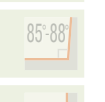
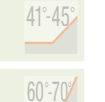
· When using a long shank or modular head with long overhang, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





MACHINING APPLICATIONS



FOR RADIUS (MJ, ML)

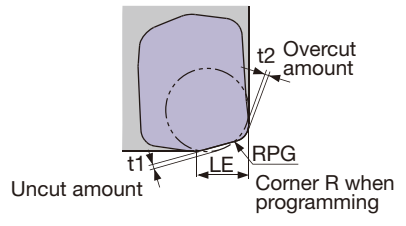
| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging A | Max. cutting width in plunging W | Min. machining dia. øD1 | Max. machining dia. øD2 | Max. cutting width in enlarging ae |
|--------------------|-----|---------------------------|----------------------------|--------------------|-------------------------------------|----------------------------|----------------------------|---------------------------------------|
| E/HXLN04M020... | 20 | 4 | 4.5° | 0.75 | 4 | 28 | 38 | 15 |
| E/HXLN04M025... | 25 | 4 | 2.9° | 0.75 | 4 | 38 | 48 | 20 |
| E/HXLN04M032... | 32 | 4 | 1.9° | 0.75 | 4 | 52 | 62 | 27 |
| H/TXLN04M040... | 40 | 4 | 1.2° | 0.6 | 4 | 68 | 78 | 35 |
| TXLN04M042B16.0R06 | 42 | 4 | 1.1° | 0.6 | 4 | 72 | 82 | 37 |
| TXLN04M050B22.0R07 | 50 | 4 | 0.9° | 0.6 | 4 | 88 | 98 | 45 |
| TXLN04M052B22.0R07 | 52 | 4 | 0.8° | 0.6 | 4 | 92 | 102 | 47 |
| TXLN04M063B22.0R07 | 63 | 4 | 0.7° | 0.7 | 4 | 114 | 124 | 58 |
| E/HXLN05M025... | 25 | 5 | 2.3° | 0.5 | 5 | 35 | 48 | 17 |
| E/HXLN05M032... | 32 | 5 | 2.1° | 0.6 | 5 | 48 | 62 | 24 |
| TXLN05M040B16.0R05 | 40 | 5 | 2° | 1 | 5 | 64 | 78 | 31 |
| TXLN05M050B22.0R06 | 50 | 5 | 1.3° | 1 | 5 | 84 | 98 | 41 |
| E/HXLN06M032... | 32 | 6 | 3.7° | 1 | 6 | 52 | 62 | 22 |
| EXLN06M040C32.0R04 | 40 | 6 | 3.4° | 1 | 6 | 60 | 78 | 29 |
| TXLN06M050B22.0R05 | 50 | 6 | 2.8° | 1.7 | 6 | 79 | 98 | 39 |
| TXLN06M052B22.0R05 | 52 | 6 | 2.5° | 1.6 | 6 | 81 | 102 | 41 |
| TXLN06M063B22.0R06 | 63 | 6 | 1.8° | 1.6 | 6 | 105 | 124 | 52 |

HIGH FEED (HJ, HL)

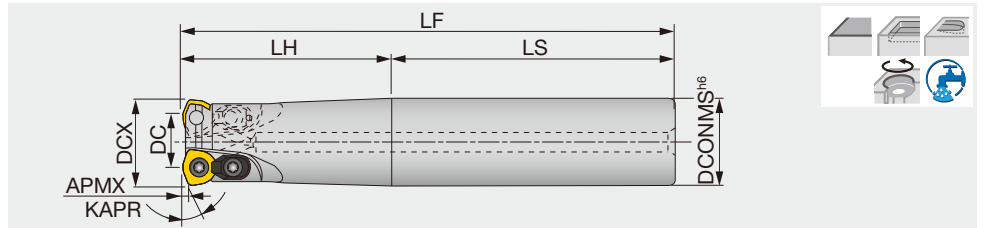
| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging A | Max. cutting width in plunging W | Min. machining øD1 | Max. machining øD2 | Max. cutting width in enlarging ae |
|--------------------|-----|---------------------------|----------------------------|--------------------|-------------------------------------|-----------------------|-----------------------|---------------------------------------|
| E/HXLN04M020... | 20 | 1.3 | 4.9° | 0.7 | 4.1 | 27 | 38 | 15.5 |
| E/HXLN04M025... | 25 | 1.3 | 3° | 0.7 | 4.1 | 37 | 48 | 20.5 |
| E/HXLN04M032... | 32 | 1.3 | 2° | 0.7 | 4.1 | 51 | 62 | 27.5 |
| E/TXLN04M040... | 40 | 1.3 | 1.4° | 0.7 | 4.1 | 67 | 78 | 35.5 |
| TXLN04M042B16.0R06 | 42 | 1.3 | 1.3° | 0.7 | 4.1 | 71 | 82 | 37.5 |
| TXLN04M050B22.0R07 | 50 | 1.3 | 1° | 0.7 | 4.1 | 87 | 98 | 45.5 |
| TXLN04M052B22.0R07 | 52 | 1.3 | 0.9° | 0.7 | 4.1 | 91 | 102 | 47.5 |
| TXLN04M063B22.0R07 | 63 | 1.3 | 0.8° | 0.7 | 4.1 | 113 | 124 | 58.5 |
| E/HXLN06M032... | 32 | 2 | 5.7° | 1.4 | 6.1 | 42 | 62 | 20 |
| EXLN06M040C32.0R04 | 40 | 2 | 3.8° | 1.5 | 6.1 | 57 | 78 | 28 |
| TXLN06M050B22.0R05 | 50 | 2 | 2.7° | 1.6 | 6.1 | 77 | 98 | 38 |
| TXLN06M052B22.0R05 | 52 | 2 | 2.5° | 1.6 | 6.1 | 81 | 102 | 40 |
| TXLN06M063B22.0R06 | 63 | 2 | 1.8° | 1.5 | 6.1 | 104 | 124 | 51 |

TOOL GEOMETRY ON PROGRAMMING FOR HIGH FEED (HJ, HL)

The following table shows the amount left uncut (t1) and overcut (t2).



| | Max. depth of cut APMX (mm) | LE (mm) | Programmed corner R (mm) | Amount left uncut t1 (mm) | Amount left overcut t2 (mm) |
|------------------------|--------------------------------|---------|--------------------------|------------------------------|--------------------------------|
| LNMX04-HJ LNMX04-HL | 1.3 | 4.1 | R1.5 | 0.8 | - |
| | 1.3 | 4.1 | R2.0 | 0.65 | - |
| | 1.3 | 4.1 | R2.5 | 0.5 | 0.05 |
| LNMX06-HJ | 1.3 | 4.1 | R3.0 | 0.36 | 0.2 |
| | 2 | 6.1 | R2.0 | 1.4 | - |
| | 2 | 6.1 | R3.0 | 1.1 | - |
| | 2 | 6.1 | R3.5 | 0.91 | - |
| | 2 | 6.1 | R4.0 | 0.74 | 0.05 |
| | 2 | 6.1 | R5.0 | 0.41 | 0.35 |



| Designation | APMX | DCX | CICT | DC | DCONMS | LF | LH | LS | KAPR | Air hole | Insert | Shank |
|---------------|------|-----|------|------|--------|-----|-----|-----|------|----------|-----------|-------------|
| EXP05020RL | 1.5 | 20 | 2 | 12.4 | 20 | 180 | 100 | 80 | 15° | with | WPM*05... | Cylindrical |
| EXP05020RLL | 1.5 | 20 | 2 | 12.4 | 20 | 250 | 130 | 120 | 15° | with | WPM*05... | Cylindrical |
| EXP05020RS | 1.5 | 20 | 2 | 12.4 | 20 | 130 | 50 | 80 | 15° | with | WPM*05... | Cylindrical |
| EXP05021RL | 1.5 | 21 | 2 | 13.4 | 20 | 180 | 100 | 80 | 15° | with | WPM*05... | Cylindrical |
| EXP05021RLL | 1.5 | 21 | 2 | 13.4 | 20 | 250 | 50 | 200 | 15° | with | WPM*05... | Cylindrical |
| EXP05021RS | 1.5 | 21 | 2 | 13.4 | 20 | 130 | 50 | 80 | 15° | with | WPM*05... | Cylindrical |
| EXP06025RL | 1.5 | 25 | 2 | 16.4 | 25 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06025RLL | 1.5 | 25 | 2 | 16.4 | 25 | 300 | 180 | 120 | 20° | with | WPM*06... | Cylindrical |
| EXP06025RS | 1.5 | 25 | 2 | 16.4 | 25 | 140 | 60 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06026RL | 1.5 | 26 | 2 | 17.4 | 25 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06026RLL | 1.5 | 26 | 2 | 17.4 | 25 | 300 | 60 | 240 | 20° | with | WPM*06... | Cylindrical |
| EXP06026RS | 1.5 | 26 | 2 | 17.4 | 25 | 140 | 60 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06032RL | 1.5 | 32 | 2 | 23.4 | 32 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06032RLB | 1.5 | 32 | 3 | 23.4 | 32 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06032RLL | 1.5 | 32 | 2 | 23.4 | 32 | 300 | 180 | 120 | 20° | with | WPM*06... | Cylindrical |
| EXP06032RS | 1.5 | 32 | 2 | 23.4 | 32 | 150 | 70 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06032RSB | 1.5 | 32 | 3 | 23.4 | 32 | 150 | 70 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06033RL | 1.5 | 33 | 2 | 24.4 | 32 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06033RLB | 1.5 | 33 | 3 | 24.4 | 32 | 200 | 120 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06033RLL | 1.5 | 33 | 2 | 24.4 | 32 | 300 | 70 | 230 | 20° | with | WPM*06... | Cylindrical |
| EXP06033RS | 1.5 | 33 | 2 | 24.4 | 32 | 150 | 70 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06033RSB | 1.5 | 33 | 3 | 24.4 | 32 | 150 | 70 | 80 | 20° | with | WPM*06... | Cylindrical |
| EXP06040RL | 1.5 | 40 | 3 | 31.4 | 32 | 250 | 50 | 200 | 20° | with | WPM*06... | Cylindrical |
| EXP06040RLL | 1.5 | 40 | 3 | 31.4 | 32 | 300 | 50 | 250 | 20° | with | WPM*06... | Cylindrical |
| EXP06040RLS42 | 1.5 | 40 | 3 | 31.4 | 42 | 250 | 50 | 200 | 20° | with | WPM*06... | Cylindrical |
| EXP06040RS | 1.5 | 40 | 3 | 31.4 | 32 | 150 | 50 | 100 | 20° | with | WPM*06... | Cylindrical |
| EXP08040RLA | 1.5 | 40 | 2 | 28.6 | 32 | 250 | 50 | 200 | 10° | with | WPMT08... | Cylindrical |
| EXP08040RLL | 1.5 | 40 | 2 | 28.6 | 32 | 300 | 50 | 250 | 10° | with | WPMT08... | Cylindrical |
| EXP08040RSA | 1.5 | 40 | 2 | 28.6 | 32 | 150 | 50 | 100 | 10° | with | WPMT08... | Cylindrical |
| EXP09050RS | 3 | 50 | 2 | 36.4 | 42 | 150 | 50 | 100 | 20° | with | WPMT09... | Cylindrical |
| EXP09050RL | 3 | 50 | 2 | 36.4 | 42 | 250 | 50 | 200 | 20° | with | WPMT09... | Cylindrical |

SPARE PARTS



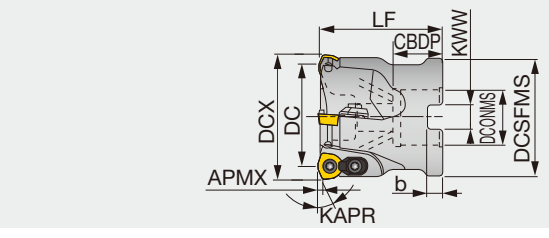
| Designation | Clamp set | Clamping screw | Lubricant (Optional) | Wrench 1 | Wrench 2 |
|-------------|-----------|----------------|----------------------|----------|----------|
| EXP050... | - | CSPB-3.5S | (M-1000) | IP-15D | - |
| EXP060... | CSY-15 | CSPB-4S | (M-1000) | IP-15D | - |
| EXP080... | CSX20 | CSTB-5 | (M-1000) | - | T-20T |
| EXP090... | CSY-20 | CSPB-5 | (M-1000) | - | IP-20T |

Recommended clamping torque: CSPB-3.5S/CSPB-4S = 3.5 N·m, CSTB-5/CSPB-5 = 5 N·m



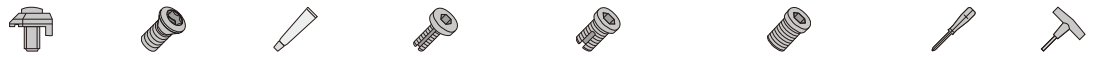
High feed bore type cutter with double clamp system

GAMP = +5°, GAMF = -4° - -6°



| Designation | APMX | DCX | CICT | DC | DCSFMS | LF | DCONMS | CBDP | KWW | b | KAPR | WT(kg) | Air hole | Insert |
|--------------|------|-----|------|-------|--------|----|--------|------|------|-----|------|--------|----------|-----------|
| TXP06050R | 1.5 | 50 | 4 | 41.4 | 47 | 50 | 22 | 20 | 10 | 6 | 20 | 0.4 | without | WPM*06... |
| TXP06050R2 | 1.5 | 50 | 4 | 41.4 | 47 | 50 | 22.225 | 20 | 8 | 5 | 20 | 0.4 | with | WPM*06... |
| TXP06050RA | 1.5 | 50 | 4 | 41.4 | 47 | 50 | 22 | 20 | 10 | 6 | 20 | 0.4 | with | WPM*06... |
| TXP08050R | 1.5 | 50 | 3 | 38.6 | 47 | 50 | 22 | 19.5 | 10 | 6 | 10 | 0.4 | with | WPMT08... |
| TXP08050R2 | 1.5 | 50 | 3 | 38.6 | 47 | 50 | 22.225 | 19.5 | 8 | 5 | 10 | 0.4 | with | WPMT08... |
| TXP08050RA | 1.5 | 50 | 3 | 38.6 | 47 | 50 | 22 | 19.5 | 10 | 6 | 10 | 0.4 | with | WPMT08... |
| TXP08050R-E | 1.5 | 50 | 3 | 38.6 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 10 | 0.4 | without | WPMT08... |
| TXP08052R-E | 1.5 | 52 | 3 | 40.6 | 50 | 50 | 22 | 20 | 10.4 | 6.3 | 10 | 0.5 | without | WPMT08... |
| TXP05063RB-E | 1.5 | 63 | 6 | 55.4 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 15 | 0.8 | with | WPM*05... |
| TXP06063RB-E | 1.5 | 63 | 5 | 54.4 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 20 | 0.7 | with | WPM*06... |
| TXP08063R | 1.5 | 63 | 4 | 51.6 | 59 | 50 | 22 | 20 | 10 | 6 | 10 | 0.7 | with | WPMT08... |
| TXP08063R2 | 1.5 | 63 | 4 | 51.6 | 59 | 50 | 22.225 | 20 | 8 | 5 | 10 | 0.7 | with | WPMT08... |
| TXP08063RA | 1.5 | 63 | 4 | 51.6 | 59 | 50 | 22 | 20 | 10 | 6 | 10 | 0.7 | with | WPMT08... |
| TXP08063R-E | 1.5 | 63 | 4 | 51.6 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 10 | 0.7 | without | WPMT08... |
| TXP09063R | 3 | 63 | 3 | 49.4 | 59 | 50 | 22 | 20 | 10 | 6 | 20 | 0.6 | with | WPMT09... |
| TXP09063R2 | 3 | 63 | 3 | 49.4 | 59 | 50 | 22.225 | 20 | 8 | 5 | 20 | 0.6 | with | WPMT09... |
| TXP09063R-E | 3 | 63 | 3 | 49.4 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 20 | 0.6 | without | WPMT09... |
| TXP08066R-E | 1.5 | 66 | 4 | 54.6 | 63 | 50 | 27 | 22 | 12.4 | 7 | 10 | 0.8 | without | WPM*06... |
| TXP05080RB-E | 1.5 | 80 | 7 | 72.4 | 76 | 63 | 27 | 22 | 12.4 | 7 | 15 | 1.7 | with | WPM*05... |
| TXP06080RB-E | 1.5 | 80 | 6 | 71.4 | 76 | 63 | 27 | 22 | 12.4 | 7 | 20 | 1.6 | with | WPM*06... |
| TXP08080R | 1.5 | 80 | 5 | 68.6 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 10 | 1.4 | with | WPMT08... |
| TXP08080RA | 1.5 | 80 | 5 | 68.6 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 10 | 1.4 | with | WPMT08... |
| TXP08080R-E | 1.5 | 80 | 5 | 68.6 | 76 | 63 | 27 | 22 | 12.4 | 7 | 10 | 1.5 | without | WPM*06... |
| TXP09080R | 3 | 80 | 4 | 66.4 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 20 | 1.3 | with | WPMT09... |
| TXP09080R-E | 3 | 80 | 4 | 66.4 | 76 | 63 | 27 | 22 | 12.4 | 7 | 20 | 1.3 | without | WPMT09... |
| TXP08100R | 1.5 | 100 | 6 | 88.6 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 10 | 2.5 | with | WPMT08... |
| TXP08100RA | 1.5 | 100 | 6 | 88.6 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 10 | 2.5 | with | WPMT08... |
| TXP08100R-E | 1.5 | 100 | 6 | 88.6 | 96 | 63 | 32 | 25 | 14.4 | 8 | 10 | 2.5 | with | WPM*06... |
| TXP09100R | 3 | 100 | 5 | 86.4 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 20 | 2.4 | with | WPMT09... |
| TXP09100R-E | 3 | 100 | 5 | 86.4 | 96 | 63 | 32 | 25 | 14.4 | 8 | 20 | 2.4 | without | WPMT09... |
| TXP08125R | 1.5 | 125 | 7 | 113.6 | 80 | 63 | 38.1 | 45 | 15.9 | 10 | 10 | 3.1 | with | WPMT08... |
| TXP08125R-E | 1.5 | 125 | 7 | 113.6 | 98 | 63 | 40 | 32 | 16.4 | 9 | 10 | 3.1 | without | WPMT08... |
| TXP09125R | 3 | 125 | 6 | 111.4 | 98 | 63 | 38.1 | 38 | 15.9 | 10 | 20 | 3.1 | with | WPMT09... |
| TXP09125R-E | 3 | 125 | 6 | 111.4 | 98 | 63 | 40 | 32 | 16.4 | 9 | 20 | 2.9 | without | WPMT09... |
| TXP08160R | 1.5 | 160 | 8 | 148.6 | 100 | 63 | 50.8 | 46 | 19 | 11 | 10 | 5.1 | with | WPMT08... |
| TXP09160R | 3 | 160 | 7 | 146.4 | 100 | 63 | 50.8 | 38 | 19 | 11 | 20 | 4.7 | with | WPMT09... |

SPARE PARTS



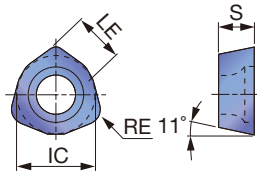
| Designation | Clamp set | Clamping screw | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Shell locking bolt 3 | Wrench 1 | Wrench 2 |
|------------------|-----------|----------------|----------------------|----------------------|----------------------|----------------------|----------|----------|
| TXP05063RB-E | CSY-15 | CSPB-3.5S | (M-1000) | - | CM10X30H | - | IP-15D | - |
| TXP05080RB-E | CSY-15 | CSPB-3.5S | (M-1000) | - | - | CAP-CM12X1.75X30 | IP-15D | - |
| TXP06050R | CSY-15 | CSPB-4S | (M-1000) | - | - | CAP-CM10X1.5X30 | IP-15D | - |
| TXP06050R2, RA | CSY-15 | CSPB-4S | (M-1000) | - | CM10X30H | - | IP-15D | - |
| TXP06063RB-E | CSY-15 | CSPB-4S | (M-1000) | - | CM12X30H | - | IP-15D | - |
| TXP08050R | CSX20 | CSTB-5 | (M-1000) | - | - | FSHM10-40 | - | T-20T |
| TXP08050R-E | CSX20 | CSTB-5 | (M-1000) | - | FSHM10-40H | - | - | T-20T |
| TXP08063R | CSX20 | CSTB-5 | (M-1000) | - | - | CAP-CM10X1.5X30 | - | T-20T |
| TXP08063R2 | CSX20 | CSTB-5 | (M-1000) | - | CM10X30H | - | - | T-20T |
| TXP08063RA | CSX20 | CSTB-5 | (M-1000) | - | - | - | - | T-20T |
| TXP08063, 066R-E | CSX20 | CSTB-5 | (M-1000) | - | - | - | - | T-20T |
| TXP08080R | CSX20 | CSTB-5 | (M-1000) | - | - | CAP-CM16X2.0X40 | - | T-20T |
| TXP08100R | CSX20 | CSTB-5 | (M-1000) | - | CM16X40H | - | - | T-20T |
| TXP08080RA | CSX20 | CSTB-5 | (M-1000) | - | - | - | - | T-20T |
| TXP08080R-E | CSX20 | CSTB-5 | (M-1000) | - | - | - | - | T-20T |
| TXP08100R-E | CSX20 | CSTB-5 | (M-1000) | - | - | - | - | IP-20T |
| TXP08125R | CSX20 | CSTB-5 | (M-1000) | TMBA-M20H | - | - | - | T-20T |
| TXP08160R | CSX20 | CSTB-5 | (M-1000) | TMBA-M24H | - | - | - | T-20T |
| TXP09063R* | CSY-20 | CSPB-5 | (M-1000) | - | CM10X30H | - | - | IP-20T |
| TXP09063R-E | CSY-20 | CSPB-5 | (M-1000) | - | - | - | - | IP-20T |
| TXP09080R-E | CSY-20 | CSPB-5 | (M-1000) | - | CM16X40H | - | - | IP-20T |
| TXP09100R-E | CSY-20 | CSPB-5 | (M-1000) | - | - | - | - | IP-20T |
| TXP09125R-E | CSY-20 | CSPB-5 | (M-1000) | - | - | - | - | IP-20T |
| TXP09080R | CSY-20 | CSPB-5 | (M-1000) | TMBA-M20H | - | - | - | IP-20T |
| TXP09100R | CSY-20 | CSPB-5 | (M-1000) | TMBA-M24H | - | - | - | IP-20T |

Recommended clamping torque: CSPB-3.5S/CSPB-4S = 3.5 N·m, CSTB-5/CSPB-5 = 5 N·m

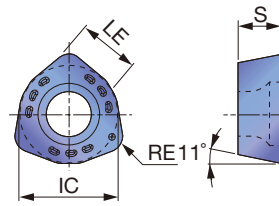
Reference pages: Inserts → H053, Standard cutting conditions → H054 - H055

INSERT

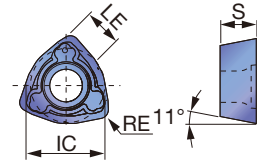
WPMW05/06



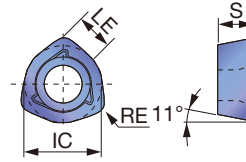
WPMT08/09



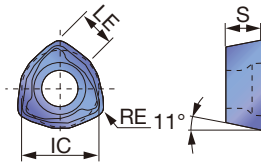
WPMT05/06/08/09-ML



WPMT05/06/08/09-MH



WPMT05/06/08/09-DML



| | | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| P | Steel | ☆ | | | | ☆ | ★ | | | | | | | | | | | | | |
| M | Stainless | | ★ | ☆ | | | ★ | | | | | | | | | | | | | |
| K | Cast iron | ★ | | | | | | | | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | | | |
| S | Superalloys | ★ | ☆ | | | | | | | | | | | | | | | | | |
| H | Hard materials | | | | ★ | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | LE | IC | S |
|-------------------|-----|------|--------|-------|-------|-------|-------|--------|----|-------|------|
| | | | AH120 | AH130 | AH140 | AH730 | T3130 | AH3135 | | | |
| WPMW05H315ZPR | 1.5 | 1.5 | ● | ● | ● | ● | | | 5 | 7.94 | 3.5 |
| WPMT05H315ZPR-ML | 1.5 | 1.5 | ● | ● | ● | ● | | | 5 | 7.94 | 3.5 |
| WPMT05H315ZPR-MH | 1.5 | 1.5 | ● | ● | | ● | | | 5 | 7.94 | 3.5 |
| WPMT05H315ZPR-DML | 1.5 | 1.5 | | | | ● | | | 5 | 7.94 | 3.5 |
| WPMW06X415ZPR | 1.5 | 1.5 | ● | ● | ● | ● | | | 6 | 9.525 | 4.2 |
| WPMT06X415ZPR-ML | 1.5 | 1.5 | ● | ● | ● | ● | | | 6 | 9.525 | 4.2 |
| WPMT06X415ZPR-MH | 1.5 | 1.5 | ● | ● | | ● | | | 6 | 9.525 | 4.2 |
| WPMT06X415ZPR-DML | 1.5 | 1.5 | | | | ● | | | 6 | 9.525 | 4.2 |
| WPMT080615ZSR | 1.5 | 1.5 | ● | ● | ● | ● | ● | | 8 | 12.87 | 6.35 |
| WPMT080615ZPR-ML | 1.5 | 1.5 | ● | ● | ● | ● | ● | | 8 | 12.87 | 6.35 |
| WPMT080615ZSR-MH | 1.5 | 1.5 | ● | ● | | ● | ● | | 8 | 12.87 | 6.35 |
| WPMT080615ZPR-DML | 1.5 | 1.5 | | | | ● | ● | | 8 | 12.87 | 6.35 |
| WPMT090725ZSR | 2.5 | 3 | ● | ● | | ● | ● | | 9 | 15 | 7 |
| WPMT090725ZPR-ML | 2.5 | 3 | ● | ● | ● | ● | ● | | 9 | 15 | 7 |
| WPMT090725ZSR-MH | 2.5 | 3 | ● | ● | ● | | ● | | 9 | 15 | 7 |
| WPMT090725ZPR-DML | 2.5 | 3 | | | | ● | ● | | 9 | 15 | 7 |

● : Line up

Reference pages: Standard cutting conditions → **H054 - H055**



High Feed Milling

STANDARD CUTTING CONDITIONS

05-06 type

| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | ø20, 21 (CICT = 2) | ø25, 26 (CICT = 2) | ø32, 33 (CICT = 2, 3) | ø40 (CICT = 3) | ø50 (CICT = 4) | ø63 (CICT = 5, 6) |
|-----|--|-------------|-------------------|-----------------------------|-----------------------------|--|---|--------------------------|---|-------------------|----------------------|
| P | Carbon Steels S50C, etc. C50, etc. | < 300HB | AH3135 | 100 - 250 | 0.5 - 2 | Vc = 150 m/min, fz = 0.8 mm/t ap = 1 mm, ae = 1×DCX mm | Vc = 150 m/min, fz = 1 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | |
| | Alloy steels SCM440, etc. 42CrMo4etc, etc. | < 300HB | AH3135 | 100 - 200 | 0.5 - 2 | Vc = 130 m/min, fz = 0.8 mm/t ap = 1 mm, ae = 1×DCX mm | Vc = 130 m/min, fz = 1 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | |
| | Prehardened steels NAK80, PX5, X96CrMoV12, etc. | 30 - 40HRC | AH3135 | 80 - 150 | 0.5 - 1 | Vc = 100 m/min, fz = 0.5 mm/t ap = 1 mm, ae = 1×DCX mm | Vc = 100 m/min, fz = 0.5 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.1 mm/t | | |
| M | Stainless steels SUS304, etc. X5CrNi18 9, etc. | - 200HB | AH130 (AH3135) | 100 - 200 | 0.5 - 2 | Vc = 130 m/min, fz = 0.8 mm/t ap = 1 mm, ae = 1×DCX mm | Vc = 130 m/min, fz = 1 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | |
| K | Cast irons FC250, etc. 250, etc. | 150 - 250HB | AH120 | 100 - 250 | 0.8 - 2.5 | Vc = 150 m/min, fz = 1 mm/t ap = 1 mm, ae = 1×DCX mm | Vc = 180 m/min, fz = 1.5 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | |
| | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | AH130 | 30 - 60 | 0.3 - 0.7 | Vc = 50 m/min, fz = 0.5 mm/t, ap = 0.7 mm, ae = 0.5×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | |
| S | Heat-resistant alloys Inconel 718, etc. | - 40HRC | AH120 | 10 - 40 | 0.1 - 0.3 | Vc = 30 m/min, fz = 0.2 mm/t, ap = 0.7 mm, ae = 0.5×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | |
| | Hard materials SKD11, etc. X153CrMoV12, etc. | 40 - 50HRC | AH730 | 50 - 80 | 0.5 - 1 | Vc = 70 m/min, fz = 0.7 mm/t, ap = 0.7 mm, ae = 1×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | |

08 type

| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | ø40 (CICT = 2) | ø50 (CICT = 3) | ø63 (CICT = 4) | ø80 (CICT = 5) | ø100 (CICT = 6) | ø125 (CICT = 7) | ø160 (CICT = 8) |
|-----|--|-------------|-------------------|-----------------------------|-----------------------------|--|---|-------------------|---|--------------------|--------------------|--------------------|
| P | Carbon Steels S50C, etc. C50, etc. | < 300HB | AH3135 | 100 - 250 | 0.5 - 2 | Vc = 180 m/min, fz = 1 mm/t ap = 1 mm, ae = 40 mm | Vc = 200 m/min, fz = 1.5 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | | |
| | Alloy steels SCM440, etc. 42CrMo4etc, etc. | < 300HB | AH3135 | 100 - 200 | 0.5 - 2 | Vc = 130 m/min, fz = 1 mm/t ap = 1 mm, ae = 40 mm | Vc = 150 m/min, fz = 1.5 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | | |
| | Prehardened steels NAK80, PX5, X96CrMoV12, etc. | 30 - 40HRC | AH3135 | 80 - 150 | 0.5 - 1 | Vc = 100 m/min, fz = 0.5 mm/t ap = 1 mm, ae = 40 mm | Vc = 120 m/min, fz = 0.8 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.1 mm/t | | | |
| M | Stainless steels SUS304, etc. X5CrNi18 9, etc. | - 200HB | AH130 (AH3135) | 100 - 200 | 0.5 - 2 | Vc = 130 m/min, fz = 1 mm/t ap = 1 mm, ae = 40 mm | Vc = 150 m/min, fz = 1.5 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | | |
| K | Cast irons FC250, etc. 250, etc. | 150 - 250HB | AH120 | 150 - 250 | 0.8 - 2.5 | Vc = 180 m/min, fz = 1.5 mm/t ap = 1 mm, ae = 40 mm | Vc = 200 m/min, fz = 2 mm/t ap = 1 mm, ae = 1×DCX mm | | When plunging in small depth: fz = 0.2 mm/t | | | |
| | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | AH130 | 30 - 60 | 0.3 - 0.7 | Vc = 50 m/min, fz = 0.5 mm/t, ap = 0.7 mm, ae = 0.5×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | | |
| S | Heat-resistant alloys Inconel 718, etc. | - 40HRC | AH120 | 10 - 40 | 0.1 - 0.3 | Vc = 30 m/min, fz = 0.2 mm/t, ap = 0.7 mm, ae = 0.5×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | | |
| | Hard materials SKD11, etc. X153CrMoV12, etc. | 40 - 50HRC | AH730 | 50 - 80 | 0.5 - 1 | Vc = 70 m/min, fz = 0.7 mm/t, ap = 0.7 mm, ae = 1×DCX mm | | | When plunging in small depth: fz = 0.1 mm/t | | | |

Note: •The above values of cutting speed show the standard speed when overhang length of tool is below 3D. The cutting speed and the feed rate should be set at the lower limit values when overhang length of tool exceeds 3D.
•Thick and heavy chips are discharged by these TAC mills. Use internal air supply or air-blowing in order to prevent tool failure.

STANDARD CUTTING CONDITIONS

09 type

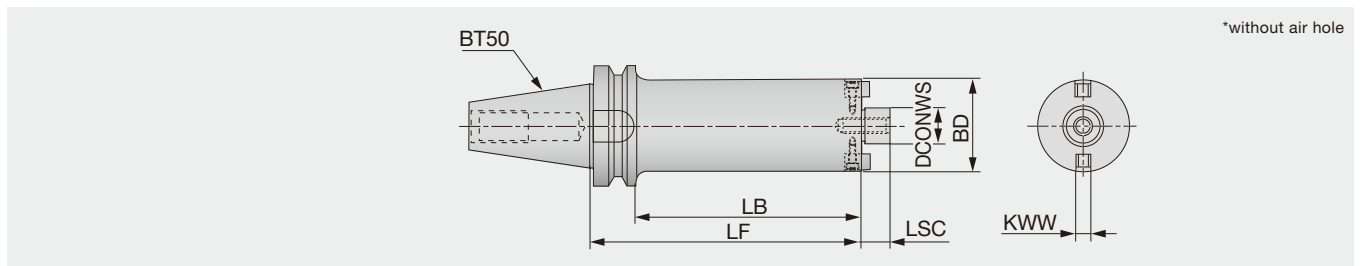
| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | ø50 (CICT = 2) | ø63 (CICT = 3) | ø80 (CICT = 4) | ø100 (CICT = 5) | ø125 (CICT = 6) | ø160 (CICT = 7) |
|---|---|-------------|-------------------|-----------------------------|-----------------------------|--|-------------------|-------------------|--------------------|--------------------|--------------------|
| P | Carbon Steels S50C, etc. C50, etc. | < 300HB | AH3135 | 100 - 250 | 0.5 - 2 | Vc = 200 m/min, fz = 1.5 mm/t, ap = 2 mm, ae = 1×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.2 mm/t | | | | | |
| | Alloy steels SCM440, etc. 42CrMo4etc, etc. | < 300HB | AH3135 | 100 - 200 | 0.5 - 2 | Vc = 150 m/min, fz = 1.5 mm/t, ap = 2 mm, ae = 1×DCX mm | | | | | |
| When plunging in small depth: fz = 0.2 mm/t | | | | | | | | | | | |
| M | Prehardened steels NAK80, PX5, X96CrMoV12, etc. | 30 - 40HRC | AH3135 | 80 - 150 | 0.5 - 1 | Vc = 120 m/min, fz = 0.8 mm/t, ap = 2 mm, ae = 1×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.1 mm/t | | | | | |
| K | Stainless steels SUS304, etc. X5CrNi18 9, etc. | - 200HB | AH130 (AH3135) | 100 - 200 | 0.5 - 2 | Vc = 150 m/min, fz = 1.5 mm/t, ap = 2 mm, ae = 1×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.2 mm/t | | | | | |
| S | Cast irons FC250, etc. 250, etc. | 150 - 250HB | AH120 | 150 - 250 | 0.8 - 2.5 | Vc = 200 m/min, fz = 2 mm/t, ap = 2 mm, ae = 1×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.2 mm/t | | | | | |
| H | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | AH130 | 30 - 60 | 0.3 - 0.7 | Vc = 50 m/min, fz = 0.5 mm/t, ap = 1.5 mm, ae = 0.5×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.1 mm/t | | | | | |
| | Heat-resistant alloys Inconel 718, etc. | - 40HRC | AH120 | 10 - 40 | 0.1 - 0.3 | Vc = 30 m/min, fz = 0.2 mm/t, ap = 1 mm, ae = 0.5×DCX mm | | | | | |
| When plunging in small depth: fz = 0.1 mm/t | | | | | | | | | | | |
| H | Hard materials SKD11, etc. X153CrMoV12, etc. | 40 - 50HRC | AH730 | 60 - 100 | 0.5 - 1 | Vc = 70 m/min, fz = 0.7 mm/t, ap = 0.7 mm, ae = 1×DCX mm | | | | | |
| | | | | | | When plunging in small depth: fz = 0.1 mm/t | | | | | |

Notes : The cutting speed and feed should be set to 70 to 80 % of the value shown in the above table when overhang length of tool exceeds 3D.

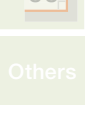
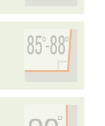
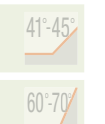
MILLFEED

BT50-FMC/FMA

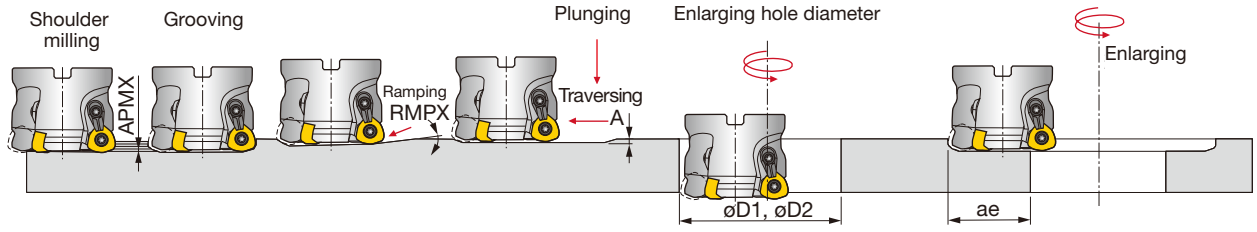
Arbor



| Designation | LF | LB | BD | DCONWS | LSC | KWW | WT(kg) |
|----------------------|-----|-----|----|--------|-----|------|--------|
| BT50-FMC22-138-47 | 138 | 100 | 47 | 22 | 18 | 10 | 5.2 |
| BT50-FMC22-188-47 | 188 | 150 | 47 | 22 | 18 | 10 | 5.9 |
| BT50-FMC22-243-47 | 243 | 205 | 47 | 22 | 18 | 10 | 6.5 |
| BT50-FMC22-293-47 | 293 | 255 | 47 | 22 | 18 | 10 | 7.2 |
| BT50-FMC22-178-59 | 178 | 140 | 59 | 22 | 18 | 10 | 6.8 |
| BT50-FMC22-238-59 | 238 | 200 | 59 | 22 | 18 | 10 | 8 |
| BT50-FMC22-308-59 | 308 | 270 | 59 | 22 | 18 | 10 | 9.5 |
| BT50-FMC22-373-59 | 373 | 335 | 59 | 22 | 18 | 10 | 10.9 |
| BT50-FMA31.75-215-76 | 215 | 177 | 76 | 31.75 | 30 | 12.7 | 10 |
| BT50-FMA31.75-295-76 | 295 | 257 | 76 | 31.75 | 30 | 12.7 | 12.9 |
| BT50-FMA31.75-375-76 | 375 | 337 | 76 | 31.75 | 30 | 12.7 | 15.8 |
| BT50-FMA31.75-275-96 | 275 | 237 | 96 | 31.75 | 30 | 12.7 | 16.8 |
| BT50-FMA31.75-375-96 | 375 | 337 | 96 | 31.75 | 30 | 12.7 | 23 |



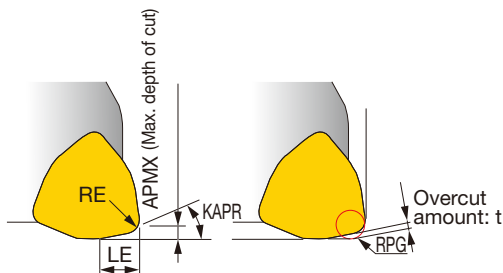
APPLICATION RANGE



| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Min. machining hole dia. øD1 | Max. machining hole dia. øD2 | Max. cutting width in enlarging hole ae |
|---------------|-----|---------------------------|----------------------------|--------------------------|---------------------------------|---------------------------------|--|
| EXP05020... | 20 | 1.5 | 3° | 0.5 | 30 | 37 | 16 |
| EXP05021... | 21 | 1.5 | 2.5° | 0.5 | 32 | 39 | 17 |
| TXP05063RB-E | 63 | 1.5 | 1° | 0.5 | 116 | 123 | 59 |
| TXP05080RB-E | 80 | 1.5 | 0.5 | 0.5 | 150 | 157 | 76 |
| E/HXP06025... | 25 | 1.5 | 5° | 1 | 33 | 47 | 20 |
| E/HXP06026... | 26 | 1.5 | 4.5° | 1 | 35 | 49 | 21 |
| E/HXP06032... | 32 | 1.5 | 3.5° | 1 | 47 | 61 | 27 |
| E/HXP06033... | 33 | 1.5 | 3° | 1 | 49 | 63 | 28 |
| E/HXP06040... | 40 | 1.5 | 2° | 1 | 63 | 77 | 35 |
| T/HXP06050... | 50 | 1.5 | 1.5° | 1 | 83 | 97 | 45 |
| TXP06063RB-E | 63 | 1.5 | 1° | 1 | 109 | 123 | 58 |
| TXP06080RB-E | 80 | 1.5 | 0.5 | 1 | 143 | 157 | 75 |
| E/HXP08040... | 40 | 1.5 | 6° | 1 | 53 | 77 | 34 |
| T/HXP08050... | 50 | 1.5 | 4° | 1 | 72 | 97 | 44 |
| TXP08052R-E | 52 | 1.5 | 4° | 1 | 76 | 101 | 46 |
| TXP08063... | 63 | 1.5 | 2.5° | 1 | 98 | 123 | 57 |
| TXP08066R-E | 66 | 1.5 | 2.5 | 1 | 104 | 129 | 60 |
| TXP08080... | 80 | 1.5 | 1.5° | 1 | 132 | 157 | 74 |
| TXP08100... | 100 | 1.5 | 1° | 1 | 172 | 197 | 94 |
| TXP08125R | 125 | 1.5 | 0.75° | 1 | 222 | 247 | 119 |
| TXP08160R | 160 | 1.5 | 0.5° | 1 | 292 | 317 | 154 |
| E/HXP09050... | 50 | 3 | 1.5° | 0.8 | 76 | 97 | 43 |
| EXP09050RS/L | 50 | 3 | 1.5 | 0.8 | 76 | 97 | 43 |
| TXP09063... | 63 | 3 | 2° | 1.5 | 98 | 123 | 56 |
| TXP09080R | 80 | 3 | 1.5° | 1.5 | 132 | 157 | 73 |
| TXP09100R | 100 | 3 | 1° | 1.5 | 172 | 197 | 93 |
| TXP09125R | 125 | 3 | 0.75° | 1.5 | 222 | 247 | 118 |
| TXP09160R | 160 | 3 | 0.5° | 1.5 | 292 | 317 | 153 |

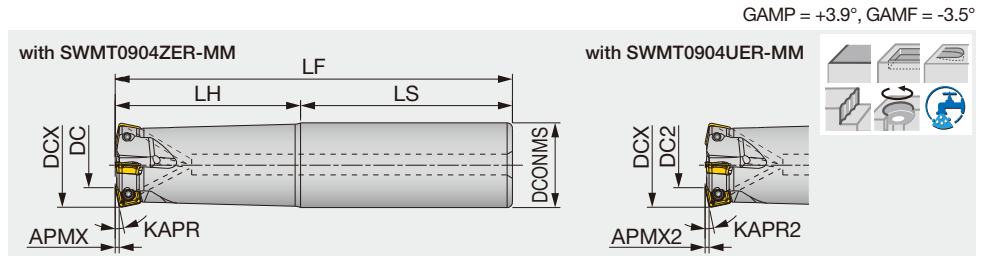
TOOL GEOMETRY FOR PROGRAMMING

When programming for CAD/CAM, the tool should be assumed to be a radius cutter shown in the table below. In this case, the amount left as uncut (t) is shown below.



| | Max. depth of cut | Corner of insert | Cutting edge angle | Corner R when programming | t | RPG |
|-----|-------------------|------------------|--------------------|---------------------------|-----|-----|
| TXP | APMX | RE | KAPR | LE | t | RPG |
| 05 | 1.5 | 1.5 | 15° | 3.8 | 0.5 | 2 |
| 06 | 1.5 | 1.5 | 20° | 4.3 | 0.7 | 2.5 |
| 08 | 1.5 | 1.5 | 10° | 5.7 | 0.7 | 2 |
| 09 | 3 | 2.5 | 20° | 6.8 | 1.4 | 3 |
| 09 | 3 | 2.5 | 20° | 6.8 | 1.2 | 4 |

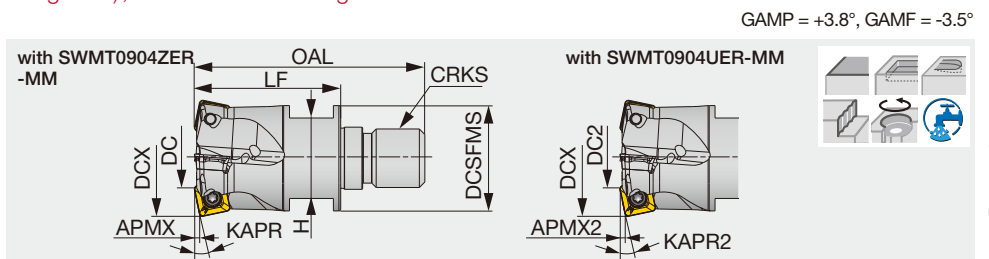
High feed mill



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | DCONMS | LF | LH | LS | KAPR | KAPR2 | WT(kg) | Air hole | Insert |
|---------------------|------|-------|-----|------|----|-----|--------|-----|-----|----|------|-------|--------|----------|-----------|
| EXSW09M025C25.0R03 | 1.5 | 1 | 25 | 3 | 10 | 9 | 25 | 140 | 60 | 80 | 12° | 7° | 0.45 | With | SWMT09... |
| EXSW09M025C25.0R03L | 1.5 | 1 | 25 | 3 | 10 | 9 | 25 | 180 | 100 | 80 | 12° | 7° | 0.57 | With | SWMT09... |
| EXSW09M032C32.0R04 | 1.5 | 1 | 32 | 4 | 17 | 16 | 32 | 150 | 70 | 80 | 12° | 7° | 0.81 | With | SWMT09... |
| EXSW09M032C32.0R04L | 1.5 | 1 | 32 | 4 | 17 | 16 | 32 | 200 | 120 | 80 | 12° | 7° | 1.07 | With | SWMT09... |

HXSW09

High feed mill, modular type (TungFlex), for 4-corner single sided inserts



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | OAL | LF | H | DCSFMS | KAPR | KAPR2 | CRKS | WT (kg) | Air hole | Insert |
|------------------|------|-------|-----|------|----|-----|-----|----|----|--------|------|-------|------|---------|----------|-----------|
| HXSW09M025M12R03 | 1.5 | 1 | 25 | 3 | 10 | 9 | 57 | 35 | 17 | 20.8 | 12° | 7° | M12 | 0.09 | With | SWMT09... |
| HXSW09M032M16R04 | 1.5 | 1 | 32 | 4 | 17 | 16 | 63 | 40 | 22 | 28.8 | 12° | 7° | M16 | 0.18 | With | SWMT09... |

SPARE PARTS

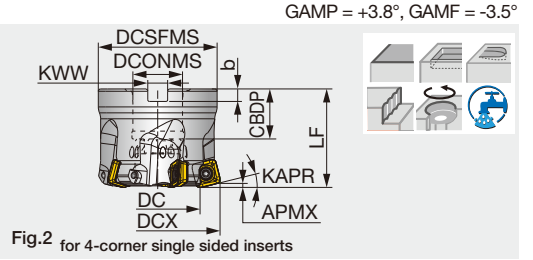
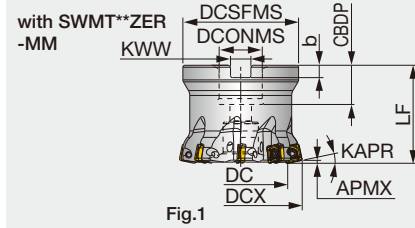


| Designation | Clamping screw | Mono block wrench | Lubricant (Optional) |
|-----------------------|----------------|-------------------|----------------------|
| EXSW09... / HXSW09... | CSPD-3 | IP-10D | (M-1000) |

Recommended clamping torque: 2.5 N·m



High feed mill



| Designation | APMX | APMX2 | DCX | CICT | DC | DC2 | DCSFMS | DCONMS | CBDP | LF | KWW | b | KAPR | KAPR2 | WT(kg) | Air hole | Insert | Fig. |
|--------------------|------|-------|-----|------|-------|-------|--------|--------|------|----|------|-----|------|-------|--------|----------|-----------|------|
| TXSW09M040B16.0R04 | 1.5 | 1 | 40 | 4 | 25 | 24 | 38 | 16 | 18 | 40 | 8.4 | 5.6 | 12° | 7° | 0.2 | With | SWMT09... | 1 |
| TXSW09M040B16.0R05 | 1.5 | 1 | 40 | 5 | 25 | 24 | 38 | 16 | 18 | 40 | 8.4 | 5.6 | 12° | 7° | 0.2 | With | SWMT09... | 1 |
| TXSW09M050B22.0R05 | 1.5 | 1 | 50 | 5 | 35 | 34 | 47 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.37 | With | SWMT09... | 1 |
| TXSW09M050B22.0R07 | 1.5 | 1 | 50 | 7 | 35 | 34 | 47 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.38 | With | SWMT09... | 1 |
| TXSW15M050B22.0R03 | 2.5 | 2 | 50 | 3 | 24.1 | 22.2 | 47 | 22 | 20 | 50 | 10.4 | 6.3 | 14° | 10° | 0.4 | With | SWMT15... | 2 |
| TXSW09M052B22.0R05 | 1.5 | 1 | 52 | 5 | 37 | 36 | 49 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.42 | With | SWMT09... | 1 |
| TXSW09M052B22.0R07 | 1.5 | 1 | 52 | 7 | 37 | 36 | 49 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.38 | With | SWMT09... | 1 |
| TXSW09M063B22.0R06 | 1.5 | 1 | 63 | 6 | 48 | 47 | 59 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.69 | With | SWMT09... | 1 |
| TXSW09M063B22.0R08 | 1.5 | 1 | 63 | 8 | 48 | 47 | 59 | 22 | 20 | 50 | 10.4 | 6.3 | 12° | 7° | 0.7 | With | SWMT09... | 1 |
| TXSW15M063B22.0R04 | 2.5 | 2 | 63 | 4 | 37.1 | 35.2 | 59 | 22 | 20 | 50 | 10.4 | 6.3 | 14° | 10° | 0.66 | With | SWMT15... | 2 |
| TXSW15J080B31.7R05 | 2.5 | 2 | 80 | 5 | 54.1 | 52.2 | 76 | 31.75 | 32 | 63 | 12.7 | 8 | 14° | 10° | 1.31 | With | SWMT15... | 2 |
| TXSW15M080B27.0R05 | 2.5 | 2 | 80 | 5 | 54.1 | 52.2 | 76 | 27 | 22 | 63 | 12.4 | 7 | 14° | 10° | 1.41 | With | SWMT15... | 2 |
| TXSW15J100B31.7R06 | 2.5 | 2 | 100 | 6 | 74.1 | 72.2 | 96 | 31.75 | 32 | 63 | 12.7 | 8 | 14° | 10° | 2.25 | With | SWMT15... | 2 |
| TXSW15M100B32.0R06 | 2.5 | 2 | 100 | 6 | 74.1 | 72.2 | 96 | 32 | 25 | 63 | 14.4 | 8 | 14° | 10° | 2.26 | With | SWMT15... | 2 |
| TXSW15J125B38.1R07 | 2.5 | 2 | 125 | 7 | 99.1 | 97.2 | 100 | 38.1 | 43 | 63 | 15.9 | 10 | 14° | 10° | 2.91 | With | SWMT15... | 2 |
| TXSW15M125B40.0R07 | 2.5 | 2 | 125 | 7 | 99.1 | 97.2 | 100 | 40 | 37 | 63 | 16.4 | 9 | 14° | 10° | 2.83 | With | SWMT15... | 2 |
| TXSW15J160B50.8R08 | 2.5 | 2 | 160 | 8 | 134.1 | 132.2 | 100 | 50.8 | 46 | 63 | 19 | 11 | 14° | 10° | 3.93 | With | SWMT15... | 2 |
| TXSW15M160B40.0R08 | 2.5 | 2 | 160 | 8 | 134.1 | 132.2 | 100 | 40 | 37 | 63 | 16.4 | 9 | 14° | 10° | 4.23 | With | SWMT15... | 2 |

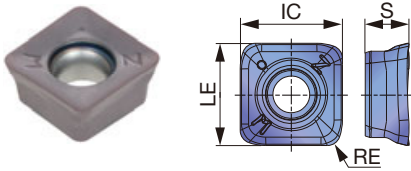
SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Shell locking bolt 3 | Torx bit 1 | Torx bit 2 (Optional) |
|--------------------|----------------|-----------------|----------------------|----------------------|----------------------|----------------------|-------------|-----------------------|
| TXSW09M04... | CSPD-3 | (H-TB2W) | (M-1000) | - | FSHM8-30H | - | BLD IP10/S7 | - |
| TXSW09M05... | CSPD-3 | (H-TB2W) | (M-1000) | - | FSHM10-40H | - | BLD IP10/S7 | - |
| TXSW09M06... | CSPD-3 | (H-TB2W) | (M-1000) | - | CM10X30H | - | BLD IP10/S7 | - |
| TXSW15M050B22.0R03 | TS50115I | (H-TB2W) | (M-1000) | - | - | SRPS118-0273 | - | (BT20S) |
| TXSW15M063B22.0R04 | TS50115I | (H-TB2W) | (M-1000) | - | FSHM10-40H | - | - | (BT20S) |
| TXSW15J080B31.7R05 | TS50115I | (H-TB2W) | (M-1000) | - | CM16X40H | - | - | (BT20S) |
| TXSW15M080B27.0R05 | TS50115I | (H-TB2W) | (M-1000) | - | CM12X30H | - | - | (BT20S) |
| TXSW15*100B... | TS50115I | (H-TB2W) | (M-1000) | - | CM16X40H | - | - | (BT20S) |
| TXSW15*125B... | TS50115I | (H-TB2W) | (M-1000) | TMBA-M20H | - | - | - | (BT20M) |
| TXSW15J160B50.8R08 | TS50115I | (H-TB2W) | (M-1000) | TMBA-M24H | - | - | - | (BT20M) |
| TXSW15M160B40.0R08 | TS50115I | (H-TB2W) | (M-1000) | TMBA-M20H | - | - | - | (BT20M) |

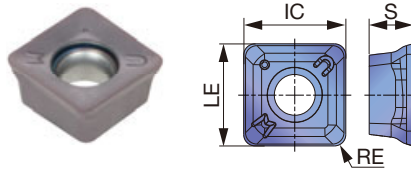
Recommended clamping torque (Torx size): CSPD-3 = 2.5 N·m, TS50115I = 5 N·m (T20)

INSERT

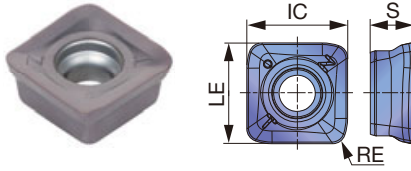
SWMT09/15ZER-MM (for general purpose)



SWMT09/15UER-MM (for general purpose)



SWMT15ZER-MT (Robust cutting edges)



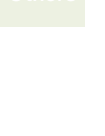
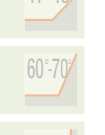
| | | | | | | | | | |
|-------------------------------|---|---|---|---|---|--|--|--|--|
| P Steel | | ☆ | ★ | | | | | | |
| M Stainless | ★ | ☆ | ☆ | | | | | | |
| K Cast iron | | ☆ | ☆ | ★ | | | | | |
| N Non-ferrous | | | | | | | | | |
| S Titanium | ★ | ☆ | | | | | | | |
| S Heat resistant alloy | | | | ☆ | ★ | | | | |
| H Hard materials | | | ☆ | ☆ | ★ | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | LE | IC | S |
|----------------|----|------|--------|--------|--------|-------|--------|--------|--------|-----|
| | | | AH130 | AH3135 | AH3225 | AH120 | AH8015 | | | |
| SWMT0904ZER-MM | 1 | 1.5 | ● | ● | ● | ● | ● | 8.605 | 8.605 | 4 |
| SWMT0904UER-MM | 1 | 1 | ● | ● | ● | ● | ● | 9.05 | 9.05 | 4 |
| SWMT1506ZER-MM | 2 | 2.5 | | ● | | ● | | 16.01 | 16.01 | 6.8 |
| SWMT1506UER-MM | 2 | 2 | | ● | | | | 16.27 | 16.27 | 6.8 |
| SWMT1506ZER-MT | 2 | 2.5 | | ● | | ● | | 15.925 | 15.925 | 6.8 |

● : Line up





STANDARD CUTTING CONDITIONS

09 type

| ISO | Workpiece material | Hardness | Priority | Insert type | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|--|---|------------------------------------|---------------------|---------------------|--------|--------------|--------------------------|--------------------------|-----------|
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300HB | First choice | ZER | AH3225 | MM | 100 - 300 | 0.5 - 1.5 | |
| | | | Fracture resistance | ZER | AH3135 | MM | 100 - 300 | 0.5 - 1.5 | |
| | | | Wear resistance | UER | AH3225 | MM | 100 - 300 | 0.5 - 1.5 | |
| | Alloy steel SCM440, etc. 42CrMo4, etc. | - 300HB | First choice | ZER | AH3225 | MM | 100 - 200 | 0.5 - 1.5 | |
| | | | Fracture resistance | ZER | AH3135 | MM | 100 - 200 | 0.5 - 1.5 | |
| | | | Wear resistance | UER | AH3225 | MM | 100 - 200 | 0.5 - 1.5 | |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | ZER | AH3225 | MM | 100 - 200 | 0.5 - 1.2 | |
| | | | Fracture resistance | ZER | AH3135 | MM | 100 - 200 | 0.5 - 1.2 | |
| | | | Wear resistance | UER | AH3225 | MM | 100 - 200 | 0.5 - 1.2 | |
| M | Austenitic stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200HB | First choice | UER | AH3135 | MM | 100 - 150 | 0.5 - 1.2 | |
| | | | Fracture resistance | UER | AH130 | MM | 100 - 150 | 0.5 - 1.2 | |
| | | | Low cutting force | ZER | AH3135 | MM | 100 - 150 | 0.5 - 1.2 | |
| | Precipitation hardening stainless steel SUS630, etc. X20CrNiCuNb-16-4, etc. | 28HRC - (H1150) | First choice | UER | AH3135 | MM | 80 - 150 | 0.3 - 1.2 | |
| | | | Fracture resistance | UER | AH130 | MM | 80 - 150 | 0.3 - 1.2 | |
| | | | Low cutting force | ZER | AH3135 | MM | 80 - 150 | 0.3 - 1.2 | |
| | | 40HRC - (H900) | First choice | UER | AH3135 | MM | 80 - 120 | 0.3 - 0.8 | |
| | | | Fracture resistance | UER | AH130 | MM | 80 - 120 | 0.3 - 0.8 | |
| | | | Low cutting force | ZER | AH3135 | MM | 80 - 120 | 0.3 - 0.8 | |
| K | Gray cast iron FC250, FC300, etc., 250, 300, etc. | 150 - 250HB | First choice | ZER | AH8015 | MM | 100 - 300 | 0.5 - 2 | |
| | | | Fracture resistance | ZER | AH120 | MM | 100 - 300 | 0.5 - 2 | |
| | Ductile cast iron FCD600, etc., 600-3, etc. | 150 - 250HB | First choice | ZER | AH8015 | MM | 80 - 200 | 0.5 - 2 | |
| | | | Fracture resistance | ZER | AH120 | MM | 80 - 200 | 0.5 - 2 | |
| | S | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | First choice | UER | AH130 | MM | 30 - 60 | 0.3 - 0.7 |
| | | | | Wear resistance | UER | AH8015 | MM | 30 - 60 | 0.3 - 0.7 |
| Heat-resistance alloys Inconel, Hastelloy, etc. | | - 40HRC | First choice | UER | AH8015 | MM | 20 - 50 | 0.1 - 0.3 | |
| | | | Fracture resistance | UER | AH130 | MM | 20 - 50 | 0.1 - 0.3 | |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice | UER | AH8015 | MM | 80 - 130 | 0.1 - 0.3 |
| | | | | Fracture resistance | UER | AH130 | MM | 80 - 130 | 0.1 - 0.3 |
| | | | 50 - 60HRC | First choice | ZER | AH8015 | MM | 80 - 130 | 0.1 - 0.3 |
| | | | | Low cutting force | ZER | AH8015 | MM | 80 - 130 | 0.1 - 0.3 |

15 type

| ISO | Workpiece material | Hardness | Priority | Insert type | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|----------------------------------|---|-------------------|----------------------------------|---------------------|--------------|--------------|--------------------------|--------------------------|------------|
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300HB | First choice | ZER | AH3135 | MM | 100 - 300 | 0.5 - 1.5 | |
| | | | Wear resistance | ZER | AH120 | MM | 100 - 300 | 0.5 - 1.5 | |
| | | | Fracture resistance | ZER | AH3135 | MT | 100 - 300 | 0.5 - 2 | |
| | Alloy steel SCM440, etc. 42CrMo4, etc. | - 300HB | First choice | ZER | AH3135 | MM | 100 - 200 | 0.5 - 1.5 | |
| | | | Wear resistance | ZER | AH120 | MM | 100 - 200 | 0.5 - 1.5 | |
| | | | Fracture resistance | ZER | AH3135 | MT | 100 - 200 | 0.5 - 2 | |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | ZER | AH3135 | MM | 100 - 200 | 0.5 - 1.2 | |
| | | | Wear resistance | ZER | AH120 | MM | 100 - 200 | 0.5 - 1.2 | |
| | | | Fracture resistance | ZER | AH3135 | MT | 100 - 200 | 0.5 - 1.5 | |
| M | Austenitic stainless steel SUS304, etc., X5CrNi18-9, etc. | - 200HB | First choice | UER | AH3135 | MM | 100 - 150 | 0.5 - 1.2 | |
| | | | Low cutting force | ZER | AH3135 | MM | 100 - 150 | 0.5 - 1.2 | |
| | Precipitation hardening stainless steel SUS630, etc. X20CrNiCuNb-16-4, etc. | 28HRC - (H1150) | First choice | UER | AH3135 | MM | 80 - 150 | 0.3 - 1.2 | |
| | | | Low cutting force | ZER | AH3135 | MM | 80 - 150 | 0.3 - 1.2 | |
| | | 40HRC - (H900) | First choice | UER | AH3135 | MM | 80 - 120 | 0.3 - 0.8 | |
| | | | Low cutting force | ZER | AH3135 | MM | 80 - 120 | 0.3 - 0.8 | |
| K | Gray cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250HB | First choice | ZER | AH120 | MT | 100 - 300 | 0.5 - 2 | |
| | | | Fracture resistance | ZER | AH3135 | MT | 100 - 300 | 0.5 - 2 | |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 250HB | Low cutting force | ZER | AH120 | MM | 100 - 300 | 0.5 - 1.5 | |
| | | | First choice | ZER | AH120 | MT | 80 - 200 | 0.5 - 2 | |
| | Fracture resistance | ZER | AH3135 | MT | 80 - 200 | 0.5 - 2 | | | |
| | | Low cutting force | ZER | AH120 | MM | 80 - 200 | 0.5 - 1.5 | | |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | First choice | UER | AH3135 | MM | 30 - 60 | 0.3 - 0.7 | |
| | | | Low cutting force | ZER | AH3135 | MM | 30 - 60 | 0.3 - 0.7 | |
| | Heat-resistance alloys Inconel, Hastelloy, etc. | - 40HRC | Fracture resistance | ZER | AH3135 | MT | 30 - 60 | 0.3 - 0.7 | |
| | | | First choice | UER | AH3135 | MM | 20 - 50 | 0.1 - 0.3 | |
| Wear resistance | ZER | AH120 | MM | 20 - 50 | 0.1 - 0.3 | | | | |
| | H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice | ZER | AH3135 | MT | 80 - 130 |
| Wear resistance | | | | | ZER | AH120 | MT | 80 - 130 | 0.1 - 0.3 |
| SKD11, etc. X153CrMoV12, etc. | | | 50 - 60HRC | First choice | ZER | AH120 | MT | 50 - 70 | 0.05 - 0.2 |
| | | | | Fracture resistance | ZER | AH120 | MT | 50 - 70 | 0.05 - 0.2 |

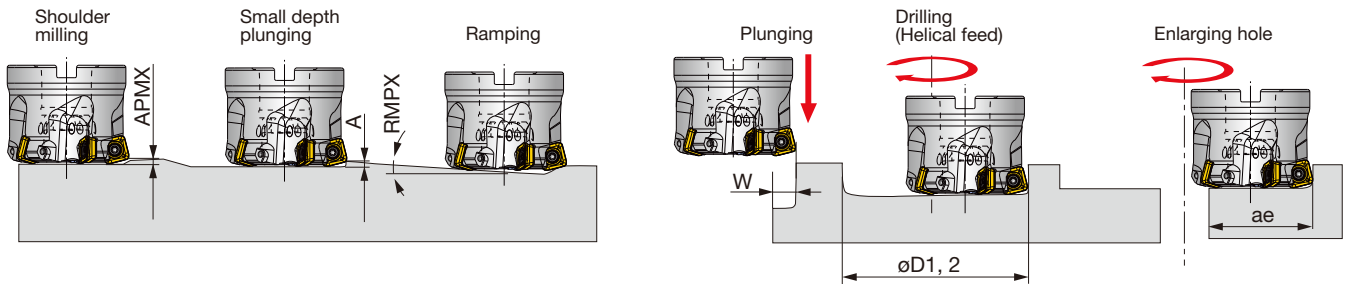
Tool dia.: DCX (mm), Number of revolutions: n (min^{-1}), Feed speed: V_f (mm/min), Number of inserts: z

| $\varnothing 25, z=3$ | | $\varnothing 32, z=4$ | | $\varnothing 40, z=5$ | | $\varnothing 50, z=7$ | |
|-------------------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|--------|
| n | V_f | n | V_f | n | V_f | n | V_f |
| 2,550 | 7,650 | 1,990 | 7,960 | 1,590 | 7,950 | 1,270 | 8,890 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | |
| 1,910 | 5,730 | 1,490 | 5,960 | 1,190 | 5,950 | 960 | 6,720 |
| Vc = 150 m/min, fz = 1 mm/t | | | | | | | |
| 1,910 | 4,580 | 1,490 | 4,770 | 1,190 | 4,760 | 960 | 5,380 |
| Vc = 150 m/min, fz = 0.8 mm/t | | | | | | | |
| 1,530 | 3,670 | 1,190 | 3,810 | 960 | 3,840 | 760 | 4,260 |
| Vc = 120 m/min, fz = 0.8 mm/t | | | | | | | |
| 1,530 | 3,670 | 1,190 | 3,810 | 960 | 3,840 | 760 | 4,260 |
| Vc = 120 m/min, fz = 0.8 mm/t | | | | | | | |
| 1,270 | 2,290 | 1,000 | 2,400 | 800 | 2,400 | 640 | 2,690 |
| Vc = 100 m/min, fz = 0.6 mm/t | | | | | | | |
| 2,550 | 9,180 | 1,990 | 9,550 | 1,590 | 9,540 | 1,270 | 10,670 |
| Vc = 200 m/min, fz = 1.2 mm/t | | | | | | | |
| 1,910 | 6,880 | 1,490 | 7,150 | 1,190 | 7,140 | 1,270 | 10,670 |
| Vc = 150 m/min, fz = 1.2 mm/t | | | | | | | |
| 510 | 770 | 400 | 800 | 320 | 800 | 250 | 880 |
| Vc = 40 m/min, fz = 0.5 mm/t | | | | | | | |
| 380 | 230 | 300 | 240 | 240 | 240 | 190 | 270 |
| Vc = 30 m/min, fz = 0.2 mm/t | | | | | | | |
| 1,270 | 760 | 1,000 | 800 | 800 | 800 | 640 | 900 |
| Vc = 100 m/min, fz = 0.2 mm/t | | | | | | | |

Tool dia.: DCX (mm), Number of revolutions: n (min^{-1}), Feed speed: V_f (mm/min), Number of inserts: z

| $\varnothing 50, z=3$ | | $\varnothing 63, z=4$ | | $\varnothing 80, z=5$ | | $\varnothing 100, z=6$ | | $\varnothing 125, z=7$ | | $\varnothing 160, z=8$ | |
|-------------------------------|-------|-----------------------|-------|-----------------------|-------|------------------------|-------|------------------------|-------|------------------------|-------|
| n | V_f | n | V_f | n | V_f | n | V_f | n | V_f | n | V_f |
| 1,270 | 3,810 | 1,010 | 4,040 | 800 | 4,000 | 640 | 3,840 | 510 | 3,570 | 400 | 3,200 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | | | | | |
| 1,270 | 4,570 | 1,010 | 4,850 | 800 | 4,800 | 640 | 4,610 | 510 | 4,280 | 400 | 3,840 |
| Vc = 200 m/min, fz = 1.2 mm/t | | | | | | | | | | | |
| 960 | 2,880 | 760 | 3,040 | 600 | 3,000 | 480 | 2,880 | 380 | 2,660 | 300 | 2,400 |
| Vc = 150 m/min, fz = 1 mm/t | | | | | | | | | | | |
| 960 | 3,460 | 760 | 3,650 | 600 | 3,600 | 480 | 3,460 | 380 | 3,190 | 300 | 2,880 |
| Vc = 150 m/min, fz = 1.2 mm/t | | | | | | | | | | | |
| 960 | 2,300 | 760 | 2,430 | 600 | 2,400 | 480 | 2,300 | 380 | 2,130 | 300 | 1,920 |
| Vc = 150 m/min, fz = 0.8 mm/t | | | | | | | | | | | |
| 960 | 2,880 | 760 | 3,040 | 600 | 3,000 | 480 | 2,880 | 380 | 2,660 | 300 | 2,400 |
| Vc = 150 m/min, fz = 1 mm/t | | | | | | | | | | | |
| 760 | 1,820 | 610 | 1,950 | 480 | 1,920 | 380 | 1,820 | 310 | 1,740 | 240 | 1,540 |
| Vc = 120 m/min, fz = 0.8 mm/t | | | | | | | | | | | |
| 760 | 1,820 | 610 | 1,950 | 480 | 1,920 | 380 | 1,820 | 310 | 1,740 | 240 | 1,540 |
| Vc = 120 m/min, fz = 0.8 mm/t | | | | | | | | | | | |
| 640 | 1,150 | 510 | 1,220 | 400 | 1,200 | 320 | 1,150 | 250 | 1,050 | 200 | 960 |
| Vc = 100 m/min, fz = 0.6 mm/t | | | | | | | | | | | |
| 1,270 | 4,570 | 1,010 | 4,850 | 800 | 4,800 | 640 | 4,610 | 510 | 4,280 | 400 | 3,840 |
| Vc = 200 m/min, fz = 1.2 mm/t | | | | | | | | | | | |
| 1,270 | 3,810 | 1,010 | 4,040 | 800 | 4,000 | 640 | 3,840 | 510 | 3,570 | 400 | 3,200 |
| Vc = 200 m/min, fz = 1 mm/t | | | | | | | | | | | |
| 960 | 3,460 | 760 | 3,650 | 600 | 3,600 | 480 | 3,460 | 380 | 3,190 | 300 | 2,880 |
| Vc = 150 m/min, fz = 1.2 mm/t | | | | | | | | | | | |
| 960 | 2,880 | 760 | 3,040 | 600 | 3,000 | 480 | 2,880 | 380 | 2,660 | 300 | 2,400 |
| Vc = 150 m/min, fz = 1 mm/t | | | | | | | | | | | |
| 250 | 380 | 200 | 400 | 160 | 400 | 130 | 390 | 100 | 350 | 80 | 320 |
| Vc = 40 m/min, fz = 0.5 mm/t | | | | | | | | | | | |
| 200 | 120 | 150 | 120 | 120 | 120 | 100 | 120 | 80 | 110 | 60 | 100 |
| Vc = 30 m/min, fz = 0.2 mm/t | | | | | | | | | | | |
| 640 | 380 | 510 | 410 | 400 | 400 | 320 | 380 | 250 | 350 | 200 | 320 |
| Vc = 100 m/min, fz = 0.2 mm/t | | | | | | | | | | | |
| 380 | 140 | 300 | 140 | 240 | 140 | 190 | 140 | 150 | 130 | 120 | 120 |
| Vc = 60 m/min, fz = 0.12 mm/t | | | | | | | | | | | |

APPLICATION RANGE



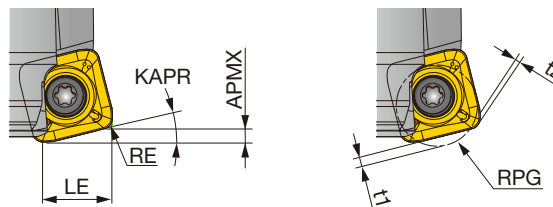
09 type

| Designation | Tool dia. DCX | Max. depth of cut | | Max. plunging depth A | Max. ramping angle | | Max. cutting width in plunging | | Min. machining dia. | | Max. machining dia. | | Max. cutting width in enlarging | |
|---------------|------------------|-------------------|--------------|--------------------------|--------------------|--------------|--------------------------------|--------------|---------------------|--------------|---------------------|--------------|---------------------------------|--------------|
| | | APMX | | | RMPX | | W | | øD1 | | øD2 | | ae | |
| | | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER |
| EXSW09M025... | 25 | 1.5 | 1 | 0.3 | 4.8 | 6 | 7 | 7.5 | 34 | 33 | 47 | 47 | 16.5 | 16 |
| EXSW09M032... | 32 | 1.5 | 1 | 0.3 | 2.7 | 3.2 | 7 | 7.5 | 48 | 47 | 61 | 61 | 23.5 | 23 |
| TXSW09M040... | 40 | 1.5 | 1 | 0.3 | 1.8 | 2.1 | 7 | 7.5 | 64 | 63 | 77 | 77 | 31.5 | 31 |
| TXSW09M050... | 50 | 1.5 | 1 | 0.3 | 1.2 | 1.4 | 7 | 7.5 | 84 | 83 | 97 | 97 | 41.5 | 41 |
| TXSW09M052... | 52 | 1.5 | 1 | 0.3 | 1.2 | 1.4 | 7 | 7.5 | 88 | 87 | 101 | 101 | 43.5 | 43 |
| TXSW09M063... | 63 | 1.5 | 1 | 0.3 | 0.8 | 1.1 | 7 | 7.5 | 110 | 109 | 123 | 123 | 54.5 | 54 |

15 type

| Designation | Tool dia. DCX | Max. depth of cut | | Max. plunging depth A | Max. ramping angle | Max. cutting width in plunging | | Min. machining dia. øD1 | Max. machining dia. øD2 | Max. cutting width in enlarging | |
|-------------------|------------------|-------------------|--------------|--------------------------|--------------------|--------------------------------|--------------|----------------------------|----------------------------|---------------------------------|--------------|
| | | APMX | | | | W | | | | ae | |
| | | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER |
| TXSW15M050B... | 50 | 2.5 | 2 | 0.7 | 4.8° | 12.5 | 13.5 | 70 | 95 | 36 | 35 |
| TXSW15M063B... | 63 | 2.5 | 2 | 0.7 | 2.9° | 12.5 | 13.5 | 96 | 121 | 49 | 48 |
| TXSW15J, M080B... | 80 | 2.5 | 2 | 0.7 | 2° | 12.5 | 13.5 | 130 | 155 | 66 | 65 |
| TXSW15J, M100B... | 100 | 2.5 | 2 | 0.7 | 1.4° | 12.5 | 13.5 | 170 | 195 | 86 | 85 |
| TXSW15J, M125B... | 125 | 2.5 | 2 | 0.7 | 1° | 12.5 | 13.5 | 220 | 245 | 111 | 110 |
| TXSW15J, M160B... | 160 | 2.5 | 2 | 0.7 | 0.7° | 12.5 | 13.5 | 290 | 315 | 146 | 145 |

TOOL GEOMETRY FOR PROGRAMMING



09 type

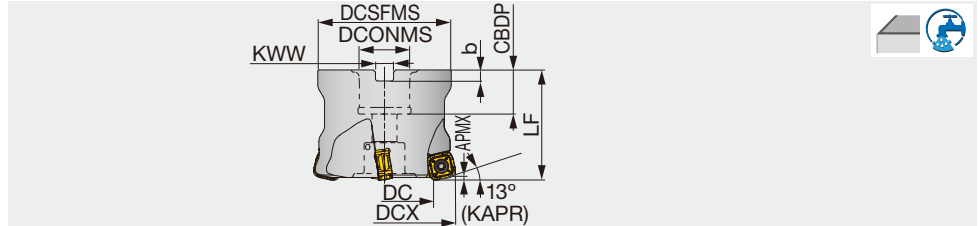
| APMX (mm) | | Actual corner radius RE (mm) | LE (mm) | | KAPR | | Programmed corner radius RPG | Uncut amount: t1 (mm) | | Overcut amount: t2 (mm) | |
|--------------|--------------|---------------------------------|--------------|--------------|--------------|--------------|---------------------------------|-----------------------|--------------|-------------------------|--------------|
| SWMT 09**ZER | SWMT 09**UER | | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER | | SWMT 09**ZER | SWMT 09**UER | SWMT 09**ZER | SWMT 09**UER |
| 1.5 | 1 | 1 | 7.4 | 7.9 | 12° | 7° | 1 | 1.3 | 0.81 | - | - |
| 1.5 | 1 | 1 | 7.4 | 7.9 | 12° | 7° | 1.5 | 1.21 | 0.76 | - | - |
| 1.5 | 1 | 1 | 7.4 | 7.9 | 12° | 7° | 2 | 1.12 | 0.7 | - | 0.02 |
| 1.5 | 1 | 1 | 7.4 | 7.9 | 12° | 7° | 2.5 | 1.03 | 0.65 | 0.01 | 0.15 |
| 1.5 | 1 | 1 | 7.4 | 7.9 | 12° | 7° | 3 | 0.94 | 0.59 | 0.11 | 0.33 |

- When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set in SWMT09**ZER insert: RPG = 1.5 mm. If a larger radius is used, overcutting may occur.

15 type

| APMX (mm) | | Actual corner radius RE (mm) | LE (mm) | | KAPR | | Programmed corner radius RPG | Uncut amount: t1 (mm) | | Overcut amount: t2 (mm) | |
|--------------|--------------|---------------------------------|--------------|--------------|--------------|--------------|---------------------------------|-----------------------|--------------|-------------------------|--------------|
| SWMT 15**ZER | SWMT 15**UER | | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER | | SWMT 15**ZER | SWMT 15**UER | SWMT 15**ZER | SWMT 15**UER |
| 2.5 | 2 | 2 | 12.7 | 13.8 | 14° | 10° | 3.5 | 2.1 | 1.85 | - | - |
| 2.5 | 2 | 2 | 12.7 | 13.8 | 14° | 10° | 4 | 1.99 | 1.77 | - | - |
| 2.5 | 2 | 2 | 12.7 | 13.8 | 14° | 10° | 4.5 | 1.88 | 1.69 | - | 0.03 |
| 2.5 | 2 | 2 | 12.7 | 13.8 | 14° | 10° | 5 | 1.78 | 1.61 | 0.01 | 0.13 |

- When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set in SWMT15**ZER insert: RPG = 4.5 mm, SWMT**UER insert: RPG = 4 mm. If a larger radius is used, overcutting may occur. The above table shows the uncut (t1) and overcut (t2) amounts for the programmed corner radius.



| Designation | APMX | DCX | CICT | DC | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|-----|------|-------|--------|----|--------|------|------|-----|--------|----------|-----------|
| TXQ12R050M22.0E03 | 2 | 50 | 3 | 33.8 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | SQMU12... |
| TXQ12R050M22.2-03 | 2 | 50 | 3 | 33.8 | 47 | 50 | 22.225 | 20 | 8 | 5 | 0.4 | With | SQMU12... |
| TXQ12R052M22.0E03 | 2 | 52 | 3 | 35.8 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | SQMU12... |
| TXQ12R063M22.0E04 | 2 | 63 | 4 | 46.8 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.8 | With | SQMU12... |
| TXQ12R063M22.2-04 | 2 | 63 | 4 | 46.8 | 59 | 50 | 22.225 | 20 | 8 | 5 | 0.8 | With | SQMU12... |
| TXQ12R066M27.0E04 | 2 | 66 | 4 | 49.8 | 63 | 50 | 27 | 22 | 12.4 | 7 | 0.9 | With | SQMU12... |
| TXQ12R080M27.0E05 | 2 | 80 | 5 | 63.8 | 76 | 63 | 27 | 22 | 12.4 | 7 | 1.6 | With | SQMU12... |
| TXQ12R080M31.7-05 | 2 | 80 | 5 | 63.8 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 1.5 | With | SQMU12... |
| TXQ12R100M31.7-06 | 2 | 100 | 6 | 83.8 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 2.6 | With | SQMU12... |
| TXQ12R100M32.0E06 | 2 | 100 | 6 | 83.8 | 96 | 63 | 32 | 25 | 14.4 | 8 | 3 | With | SQMU12... |
| TXQ12R125M38.1-07 | 2 | 125 | 7 | 108.8 | 98 | 63 | 38.1 | 44 | 15.9 | 10 | 3.3 | With | SQMU12... |
| TXQ12R125M40.0E07 | 2 | 125 | 7 | 108.8 | 98 | 63 | 40 | 32 | 16.4 | 9 | 3.2 | With | SQMU12... |

SPARE PARTS

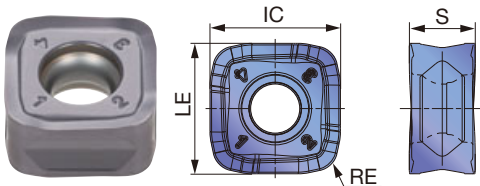


| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit (Optional) |
|------------------------|----------------|-----------------|----------------------|----------------------|----------------------|---------------------|
| TXQ12R050, 052M22.0... | CSPB-4 | (H-TBS) | (M-1000) | - | FSHM10-40H | (BLD IP15/S7) |
| TXQ12R063M... | CSPB-4 | (H-TBS) | (M-1000) | - | CM10X30H | (BLD IP15/S7) |
| TXQ12R066, 080M27.0... | CSPB-4 | (H-TBS) | (M-1000) | - | CM12X30H | (BLD IP15/S7) |
| TXQ12R080, 100M31.7... | CSPB-4 | (H-TBS) | (M-1000) | - | CM16X40H | (BLD IP15/S7) |
| TXQ12R100M32.0E06 | CSPB-4 | (H-TBS) | (M-1000) | - | CM16X40H | (BLD IP15/S7) |
| TXQ12R125M... | CSPB-4 | (H-TBS) | (M-1000) | TMBA-M20H | - | (BLD IP15/S7) |

Recommended clamping torque (Torx size): 3.5 N·m (15IP)

INSERT

SQMU-MJ



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ☆ | | | | | |
| Stainless | | ★ | ☆ | | | |
| Cast iron | ★ | | ☆ | | | |
| Non-ferrous | | | | ★ | | |
| Superalloys | ★ | ☆ | ★ | | | |
| Hard materials | | | ★ | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | LE | S | IC |
|----------------|----|------|--------|-------|-------|-------|------|---|------|
| | | | AH120 | AH130 | AH725 | T3130 | | | |
| SQMU1206ZSR-MJ | 2 | 2 | ● | ● | ● | ● | 11.7 | 6 | 11.7 |

● : Line up



STANDARD CUTTING CONDITIONS



| ISO | Workpiece material | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------------|---------------------|--------|--------------------------|--------------------------|
| P | Carbon steels S45C, etc. C45, etc. | - 300 HB | First choice | AH725 | 100 - 300 | 0.5 - 2 |
| | | | Wear resistance | T3130 | 100 - 300 | 0.5 - 2 |
| | | | Fracture resistance | AH130 | 100 - 300 | 0.5 - 2 |
| P | Alloy steels SCM440, etc. 42CrMo4, etc. | - 300 HB | First choice | AH725 | 100 - 200 | 0.5 - 1.5 |
| | | | Wear resistance | T3130 | 100 - 200 | 0.5 - 1.5 |
| | | | Fracture resistance | AH130 | 100 - 200 | 0.5 - 1.5 |
| | Prehardened steels NAK80, PX5, etc. | 30 - 40 HRC | - | AH725 | 100 - 200 | 0.5 - 1 |
| M | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - 200 HB | - | AH130 | 100 - 150 | 0.3 - 0.8 |
| K | Gray cast irons FC250, etc. 250, etc. | 150 - 250 HB | - | AH120 | 100 - 300 | 0.5 - 2 |
| | Ductile cast irons FCD600, etc. 600-3, etc. | 150 - 250 HB | - | AH120 | 80 - 200 | 0.5 - 2 |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40 HRC | - | AH725 | 30 - 60 | 0.3 - 0.7 |
| H | Hardened steels SKD61, etc. X40CrMoV5-1, etc. | 40 - 50 HRC | - | AH725 | 80 - 130 | 0.1 - 0.3 |
| | | 50 - 60 HRC | - | AH725 | 50 - 70 | 0.03 - 0.07 |

- Slot or pocket milling is not recommended, since chip re-cutting easily occurs.
- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Approach angle



Others

Tool dia: DCX (mm), Number of revolution: n (min^{-1}), Feed speed: V_f (mm/min), Max. depth of cut: $APM_X = 2$ mm

| $\varnothing 50$ | | $\varnothing 63$ | | $\varnothing 80$ | | $\varnothing 100$ | | $\varnothing 125$ | |
|-------------------------------------|-------|------------------|-------|------------------|-------|-------------------|-------|-------------------|-------|
| n | V_f | n | V_f | n | V_f | n | V_f | n | V_f |
| 1,270 | 4,570 | 1,010 | 4,850 | 790 | 4,740 | 630 | 4,540 | 500 | 4,200 |
| $V_c = 200$ m/min, $f_z = 1.2$ mm/t | | | | | | | | | |
| 950 | 2,850 | 750 | 3,000 | 590 | 2,950 | 470 | 2,820 | 380 | 2,660 |
| $V_c = 150$ m/min, $f_z = 1.0$ mm/t | | | | | | | | | |
| 950 | 2,280 | 750 | 2,400 | 590 | 2,360 | 470 | 2,260 | 380 | 2,130 |
| $V_c = 150$ m/min, $f_z = 0.8$ mm/t | | | | | | | | | |
| 760 | 1,140 | 600 | 1,200 | 470 | 1,180 | 380 | 1,140 | 300 | 1,050 |
| $V_c = 120$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | |
| 1,270 | 4,570 | 1,010 | 4,850 | 790 | 4,740 | 630 | 4,540 | 500 | 4,200 |
| $V_c = 200$ m/min, $f_z = 1.2$ mm/t | | | | | | | | | |
| 950 | 3,420 | 750 | 3,600 | 590 | 3,540 | 470 | 3,380 | 380 | 3,190 |
| $V_c = 150$ m/min, $f_z = 1.2$ mm/t | | | | | | | | | |
| 250 | 370 | 200 | 400 | 150 | 380 | 120 | 360 | 100 | 350 |
| $V_c = 40$ m/min, $f_z = 0.5$ mm/t | | | | | | | | | |
| 630 | 380 | 500 | 400 | 390 | 390 | 310 | 370 | 250 | 350 |
| $V_c = 100$ m/min, $f_z = 0.2$ mm/t | | | | | | | | | |
| 380 | 60 | 300 | 60 | 235 | 60 | 190 | 60 | 150 | 50 |
| $V_c = 60$ m/min, $f_z = 0.05$ mm/t | | | | | | | | | |

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

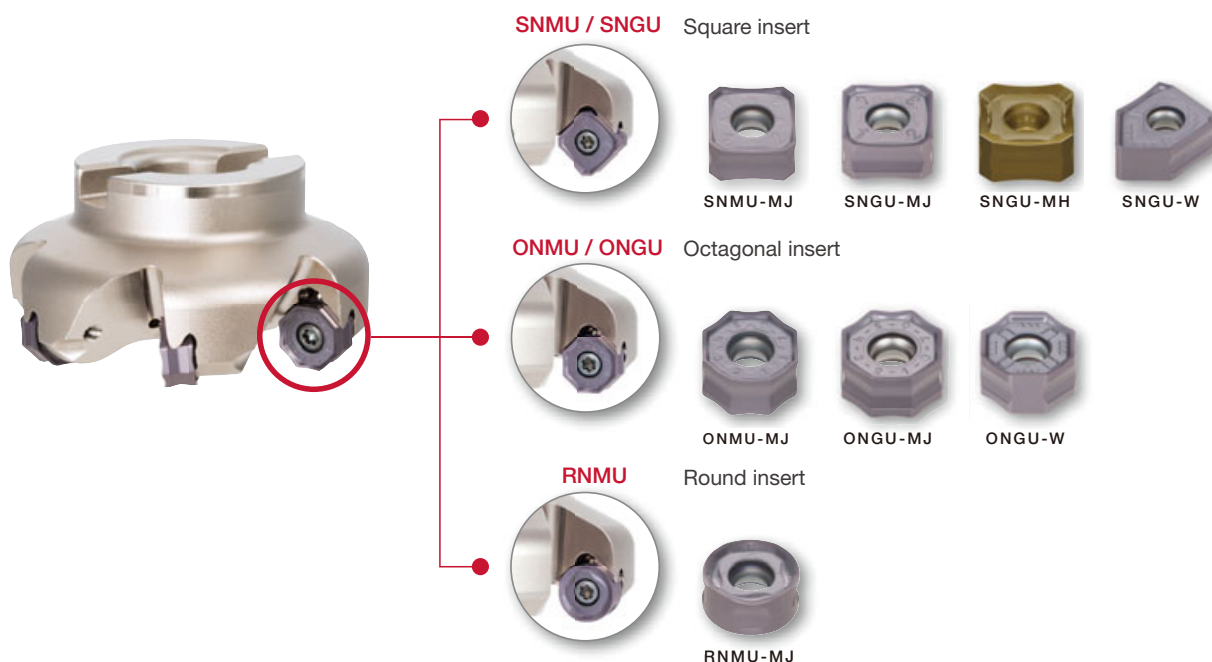
Index



Brings a top performance in every operation: from high feed milling, scale removing, finish milling ... to stainless steel milling

Versatility

3 types of double sided inserts fit in the same pocket



High efficiency with close pitch cutter/Extra-close pitch type available in addition to regular close pitch type

Tool line-up includes extra close pitch cutter maximizing efficiency in cast iron machining.



Standard pitch



Close pitch



Extra-close pitch

Reference pages: **H085 - H087**



Super high density PCD cutter for efficient finishing of aluminum

Super high density cutter

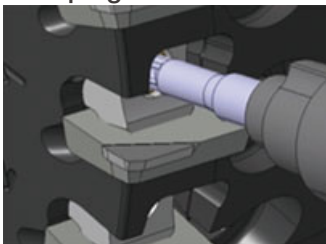


Super high density design
High speed cutting more than $V_c = 3,000$ m/min is possible.

| Cutter diameter (mm) | Max num. of teeth | Max. rotation number (min ⁻¹) | Cutter weight (kg) |
|----------------------|-------------------|---|--------------------|
| 50 | 8 | 20,000 | 0.86 |
| 63 | 10 | 19,000 | 0.53 |
| 80 | 16 | 17,000 | 1.18 |
| 100 | 22 | 15,000 | 1.66 |
| 125 | 26 | 14,000 | 3.44 |
| 160 | 34 | 12,000 | 5.15 |

CamAdjust - super simple adjusting mechanism

Clamping insert

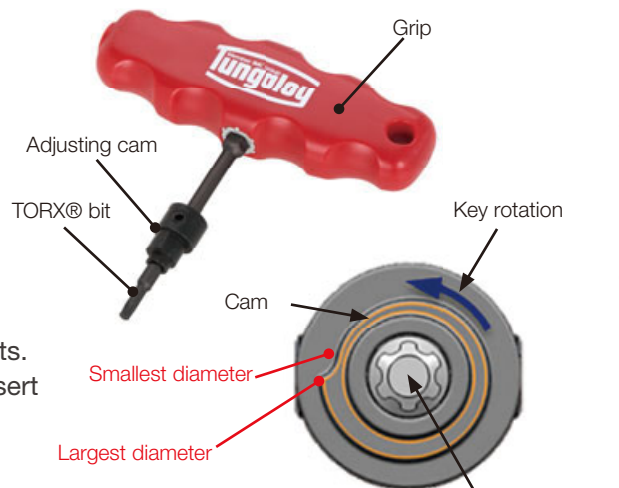


Adjusting axial runout



The same key is used for mounting and adjusting the inserts. The key wrench is operated in a single direction making insert adjustment easy on the pre-setter.

Special key wrench with adjusting cam



Insert's axial runout is adjusted with the eccentric cam profile.

Reference pages: **H092 - H093**

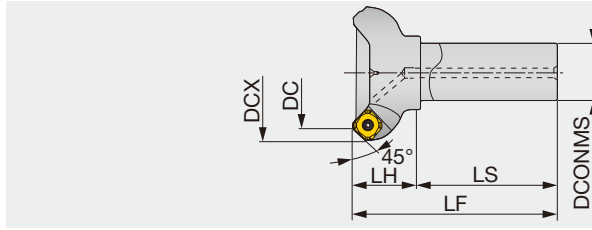


TUNG MILL

EAW13

Face endmill, shank type, with screw clamp system

GAMP=+17°~+20°,GAMF=-16°~-11°



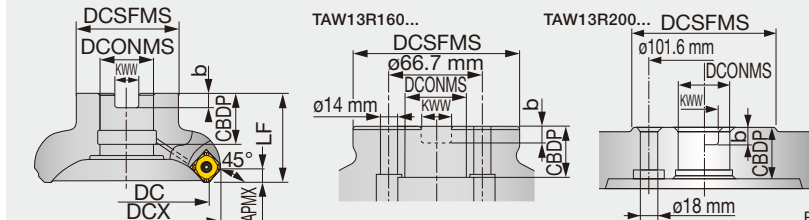
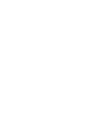
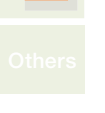
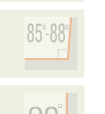
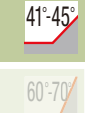
Right hand (R) shown.

| Designation | DC | DCX | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|----|-----|------|--------|----|----|-----|--------|----------|-----------|
| EAW13R025M25.0-02 | 25 | 39 | 2 | 25 | 80 | 35 | 115 | 0.4 | With | SW*T13... |
| EAW13R032M32.0-02 | 32 | 46 | 2 | 32 | 80 | 35 | 115 | 0.7 | With | SW*T13... |
| EAW13R040M32.0-03 | 40 | 54 | 3 | 32 | 80 | 35 | 115 | 0.8 | With | SW*T13... |
| EAW13R050M32.0-03 | 50 | 63 | 3 | 32 | 80 | 40 | 120 | 1 | With | SW*T13... |
| EAW13R050M32.0-04 | 50 | 63 | 4 | 32 | 80 | 40 | 120 | 0.9 | With | SW*T13... |
| EAW13R063M32.0-04 | 63 | 76 | 4 | 32 | 80 | 40 | 120 | 1.1 | With | SW*T13... |
| EAW13R063M32.0-05 | 63 | 76 | 5 | 32 | 80 | 40 | 120 | 1.1 | With | SW*T13... |
| EAW13R080M32.0-04 | 80 | 94 | 4 | 32 | 80 | 40 | 120 | 1.5 | With | SW*T13... |
| EAW13R080M32.0-06 | 80 | 94 | 6 | 32 | 80 | 40 | 120 | 1.4 | With | SW*T13... |

TAW13

Face mill, with screw clamp system

GAMP=+17°~+20°,GAMF=-16°~-11°



Right hand (R) shown.

| Designation | DC | DCX | CICT | DCSFMS | LF | DCONMS | CBBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|-----|-----|------|--------|----|--------|-------|------|-----|--------|----------|-----------|
| TAW13R050M22.0-03 | 50 | 63 | 3 | 41 | 40 | 22 | 20 | 10 | 6 | 0.4 | With | SW*T13... |
| TAW13R050M22.0-04 | 50 | 63 | 4 | 41 | 40 | 22 | 20 | 10 | 6 | 0.4 | With | SW*T13... |
| TAW13R050M22.0E04 | 50 | 63 | 4 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | SW*T13... |
| TAW13R050M22.0E05 | 50 | 63 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | SW*T13... |
| TAW13R063M22.0-04 | 63 | 76 | 4 | 41 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | SW*T13... |
| TAW13R063M22.0-05 | 63 | 76 | 5 | 41 | 40 | 22 | 20 | 10 | 6 | 0.6 | With | SW*T13... |
| TAW13R063M22.0E05 | 63 | 76 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.6 | With | SW*T13... |
| TAW13R063M22.0E06 | 63 | 76 | 6 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.6 | With | SW*T13... |
| TAW13R080M25.4-04 | 80 | 94 | 4 | 50 | 50 | 25.4 | 26 | 9.5 | 6 | 1 | With | SW*T13... |
| TAW13R080M25.4-06 | 80 | 94 | 6 | 50 | 50 | 25.4 | 26 | 9.5 | 6 | 1 | With | SW*T13... |
| TAW13R080M27.0E06 | 80 | 94 | 6 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | SW*T13... |
| TAW13R080M27.0E08 | 80 | 94 | 8 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | SW*T13... |
| TAW13R100M31.7-05 | 100 | 114 | 5 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.5 | With | SW*T13... |
| TAW13R100M31.7-07 | 100 | 114 | 7 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.5 | With | SW*T13... |
| TAW13R100M32.0E07 | 100 | 114 | 7 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.5 | With | SW*T13... |
| TAW13R100M32.0E10 | 100 | 114 | 10 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.5 | With | SW*T13... |
| TAW13R125M38.1-06 | 125 | 139 | 6 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.8 | With | SW*T13... |
| TAW13R125M38.1-08 | 125 | 139 | 8 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.7 | With | SW*T13... |
| TAW13R125M40.0E08 | 125 | 139 | 8 | 80 | 63 | 40 | 32 | 16.4 | 9 | 2.7 | With | SW*T13... |
| TAW13R125M40.0E12 | 125 | 139 | 12 | 80 | 63 | 40 | 32 | 16.4 | 9 | 3 | With | SW*T13... |
| TAW13R160M40.0E10 | 160 | 174 | 10 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.4 | Without | SW*T13... |
| TAW13R160M40.0E16 | 160 | 174 | 16 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.4 | Without | SW*T13... |
| TAW13R160M50.8-07 | 160 | 174 | 7 | 100 | 63 | 50.8 | 40 | 19 | 11 | 4.4 | Without | SW*T13... |
| TAW13R160M50.8-10 | 160 | 174 | 10 | 100 | 63 | 50.8 | 40 | 19 | 11 | 4.4 | Without | SW*T13... |
| TAW13R200M47.6-08 | 200 | 213 | 8 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 8 | Without | SW*T13... |

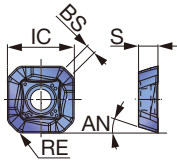
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Shim screw | Shell locking bolt 1 | Shell locking bolt 2 | Shim | Wrench | Wrench 1 |
|------------------------------|----------------|----------------------|------------|----------------------|----------------------|----------|--------|----------|
| EAW13R025**~040** | CSPB-3.5 | (M-1000) | - | - | - | - | IP-15D | - |
| EAW13R050**~080** | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | - | FSSA1102 | IP-15D | P-3.5 |
| TAW13R050 - 063... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | CM10X30H | FSSA1102 | IP-15D | P-3.5 |
| TAW13R080... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | CM12X30H | FSSA1102 | IP-15D | P-3.5 |
| TAW13R100... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | TMBA-M16H | - | FSSA1102 | IP-15D | P-3.5 |
| TAW13R125... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | TMBA-M20H | - | FSSA1102 | IP-15D | P-3.5 |
| TAW13R160... TAW13R200... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | - | FSSA1102 | IP-15D | P-3.5 |

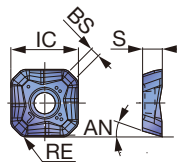
Recommended clamping torque: 3.5 N·m

INSERT

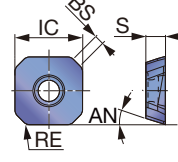
SWMT13T3-MJ



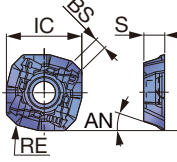
SWMT13T3-ML



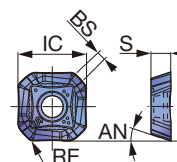
SWMW13T3 (Flat)



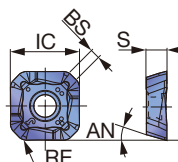
SWMT13T3-HJ



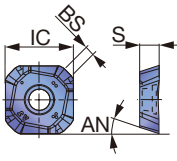
SWMT13T3-MS



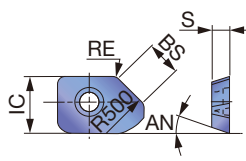
SWGT13T3-MJ



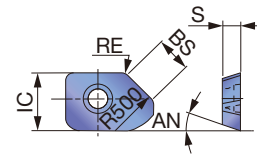
SWGT13T3-AJ



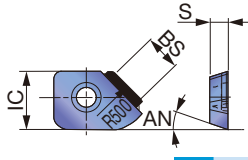
WWCW13T3AFER-WS



WWCW13T3AFFR-WS



WWCW13T3AFFR-WD



| | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|
| P | Steel | ☆ | | | | | | | | | | | | | | | | | |
| M | Stainless | | ★ | ☆ | ★ | | | | | | | | | | | | | | |
| K | Cast iron | ★ | | | | ★ | ★ | ★ | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | | |
| S | Superalloys | ★ | ☆ | | ☆ | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | Cermet NS740 | Uncoated KS05F | PCD DX140 | IC | S | AN | BS |
|-----------------|-----|------|--------|-------|-------|--------|-------|-------|-------|-----------------|-------------------|--------------|------|---|-------|-----|
| | | | AH120 | AH130 | AH140 | AH3135 | GH110 | T1115 | T1215 | | | | | | | |
| SWMT13T3AFPR-MJ | 1.5 | 4 | ● | ● | ● | ● | | | | | | | 13.9 | 4 | 18.5° | 2 |
| SWMT13T3AFER-ML | 1.5 | 2.5 | ● | | | ● | | | | | | | 13.9 | 4 | 18.5° | 2 |
| SWMW13T3AFTR | 1.5 | 5 | ● | | | ● | | | | ● | | | 13.9 | 4 | 18.5° | 2 |
| SWMT13T3AFPR-HJ | 1.5 | 2 | ● | ● | ● | ● | | | | | | | 14.7 | 4 | 18.5° | 2.3 |
| SWMT13T3AFPR-MS | 1 | 4 | | ● | ● | ● | | | | | | | 14.1 | 4 | 18.5° | 2 |
| SWGT13T3AFPR-MJ | 1.5 | 4 | ● | | | ● | | | | ● | | | 13.9 | 4 | 18.5° | 2 |
| SWGT13T3AFFR-AJ | - | 4 | | | | | | | | | ● | | 14.1 | 4 | 18.5° | 2 |
| WWCW13T3AFER-WS | 1.5 | - | | | | | ● | | | ● | | | 12.8 | 4 | 18.5° | 7.8 |
| WWCW13T3AFFR-WS | 1.5 | - | | | | | | | | | ● | | 12.8 | 4 | 18.5° | 7.8 |
| WWCW13T3AFFR-WD | - | - | | | | | | | | | | ● | 12.8 | 4 | 18.5° | 7.8 |

● : Line up
DX140 : Packing Quantity = 1 pc.

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EAW13

e-catalog



TAW13

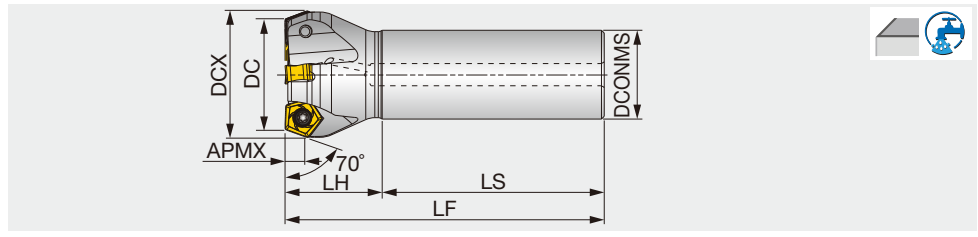
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

DO PENT

EEN09

Face endmill, shank type, with screw clamp system

GAMP=-6°, GAMF=-2°~-10°



| Designation | APMX | DC | DCX | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|------|----|-----|------|--------|----|----|-----|--------|----------|-------------|
| EEN09R032M32.0-03 | 6.4 | 32 | 38 | 3 | 32 | 80 | 35 | 115 | 0.7 | With | PN*U0905... |
| EEN09R040M32.0-04 | 6.4 | 40 | 46 | 4 | 32 | 80 | 35 | 115 | 0.7 | With | PN*U0905... |
| EEN09R050M32.0-04 | 6.4 | 50 | 56 | 4 | 32 | 80 | 40 | 120 | 0.9 | With | PN*U0905... |
| EEN09R063M32.0-06 | 6.4 | 63 | 69 | 6 | 32 | 80 | 40 | 120 | 1 | With | PN*U0905... |
| EEN09R080M32.0-07 | 6.4 | 80 | 86 | 7 | 32 | 80 | 40 | 120 | 1.3 | With | PN*U0905... |

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------|----------------|----------------------|--------|
| EEN09 | CSTR-4L100 | (M-1000) | T-15D |

Recommended clamping torque: 3.5 N·m

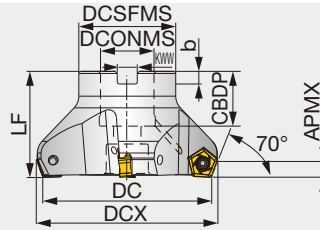
Approach angle

- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

Reference pages: Inserts → **H072**, Standard cutting conditions → **H073**



Arbor type A



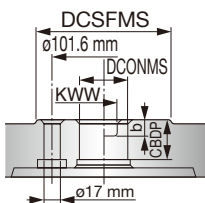
Right hand (R) shown.

| Designation | APMX | DC | CICT | DCX | DCSFMS | LF | DCONMS | CDBP | KWW | b | WT(kg) | Air hole | Insert | Arbor type |
|----------------------|------|-----|------|-----|--------|----|--------|------|------|-----|--------|----------|-------------|------------|
| TEN09R050M22.0-03 | 6.4 | 50 | 3 | 56 | 41 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | PN*U0905... | A |
| TEN09R050M22.0-04 | 6.4 | 50 | 4 | 56 | 41 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | PN*U0905... | A |
| TEN09R050M22.0-06 | 6.4 | 50 | 6 | 56 | 41 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | PN*U0905... | A |
| TEN09R050M22.0E04 | 6.4 | 50 | 4 | 56 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | PN*U0905... | A |
| TEN09R050M22.0E06 | 6.4 | 50 | 6 | 56 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | PN*U0905... | A |
| TEN09R063M22.0-04 | 6.4 | 63 | 4 | 69 | 41 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | PN*U0905... | A |
| TEN09R063M22.0-06 | 6.4 | 63 | 6 | 69 | 41 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | PN*U0905... | A |
| TEN09R063M22.0-08 | 6.4 | 63 | 8 | 69 | 41 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | PN*U0905... | A |
| TEN09R063M22.0E06 | 6.4 | 63 | 6 | 69 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | PN*U0905... | A |
| TEN09R063M22.0E08 | 6.4 | 63 | 8 | 69 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | PN*U0905... | A |
| TEN09R080M25.4-04 | 6.4 | 80 | 4 | 86 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.9 | With | PN*U0905... | A |
| TEN09R080M25.4-07 | 6.4 | 80 | 7 | 86 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.9 | With | PN*U0905... | A |
| TEN09R080M25.4-10 | 6.4 | 80 | 10 | 86 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.9 | With | PN*U0905... | A |
| TEN09R080M27.0E07 | 6.4 | 80 | 7 | 86 | 50 | 50 | 27 | 22 | 12.4 | 7 | 0.9 | With | PN*U0905... | A |
| TEN09R080M27.0E10 | 6.4 | 80 | 10 | 86 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | PN*U0905... | A |
| TEN09R100M31.7-05 | 6.4 | 100 | 5 | 106 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.3 | With | PN*U0905... | A |
| TEN09R/L100M31.7-08* | 6.4 | 100 | 8 | 106 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.3 | With | PN*U0905... | A |
| TEN09R100M31.7-12 | 6.4 | 100 | 12 | 106 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.4 | With | PN*U0905... | A |
| TEN09R/L100M32.0E08* | 6.4 | 100 | 8 | 106 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.3 | With | PN*U0905... | A |
| TEN09R100M32.0E12 | 6.4 | 100 | 12 | 106 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | With | PN*U0905... | A |
| TEN09R125M38.1-06 | 6.4 | 125 | 6 | 131 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.6 | With | PN*U0905... | A |
| TEN09R/L125M38.1-10* | 6.4 | 125 | 10 | 131 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.7 | With | PN*U0905... | A |
| TEN09R125M38.1-16 | 6.4 | 125 | 16 | 131 | 80 | 63 | 38.1 | 43 | 15.9 | 10 | 2.9 | With | PN*U0905... | A |
| TEN09R/L125M40.0E10* | 6.4 | 125 | 10 | 131 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.3 | With | PN*U0905... | A |
| TEN09R125M40.0E16 | 6.4 | 125 | 16 | 131 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.5 | With | PN*U0905... | A |
| TEN09R160M50.8-07 | 6.4 | 160 | 7 | 166 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.4 | Without | PN*U0905... | A |
| TEN09R/L160M40.0E12* | 6.4 | 160 | 12 | 166 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4 | Without | PN*U0905... | A |
| TEN09R160M40.0E20 | 6.4 | 160 | 20 | 166 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.3 | Without | PN*U0905... | A |
| TEN09R/L160M50.8-12* | 6.4 | 160 | 12 | 166 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.6 | Without | PN*U0905... | A |
| TEN09R160M50.8-20 | 6.4 | 160 | 20 | 166 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.9 | Without | PN*U0905... | A |
| TEN09R200M47.6-10 | 6.4 | 200 | 10 | 206 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 6.5 | Without | PN*U0905... | B |
| TEN09R200M60.0E14 | 6.4 | 200 | 14 | 206 | 130 | 63 | 60 | 38 | 25.7 | 14 | 6.34 | Without | PN*U0905... | B |
| TEN09R250M47.6-12 | 6.4 | 250 | 12 | 256 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 12.94 | Without | PN*U0905... | B |
| TEN09R250M60.0E16 | 6.4 | 250 | 16 | 256 | 130 | 63 | 60 | 38 | 25.7 | 14 | 13.46 | Without | PN*U0905... | B |
| TEN09R315M47.6-14 | 6.4 | 315 | 14 | 321 | 220 | 63 | 47.625 | 38 | 25.4 | 14 | 17.9 | Without | PN*U0905... | C |

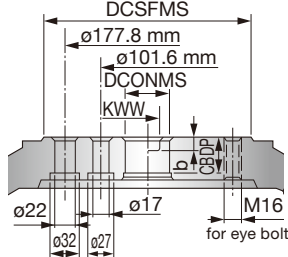
*Please use neutral hand inserts for TEN09L (left hand cutter).

Arbor type

Arbor type B



Arbor type C



SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit (Optional) |
|--|----------------|-----------------|----------------------|----------------------|----------------------|---------------------|
| TEN09R050 - 063... | CSTR-4L100 | (H-TBS) | (M-1000) | - | CM10X30H | (BT15S) |
| TEN09R080... | CSTR-4L100 | (H-TBS) | (M-1000) | - | CM12X30H | (BT15S) |
| TEN09R/L100... | CSTR-4L100 | (H-TBS) | (M-1000) | TMBA-M16H | - | (BT15S) |
| TEN09R125...06, TEN09R/L125M...10 | CSTR-4L100 | (H-TBS) | (M-1000) | TMBA-M20H | - | (BT15M) |
| TEN09R125M...16 | CSTR-4L100 | (H-TBS) | (M-1000) | TMBA-M20H | - | (BT15S) |
| TEN09R160M...07, TEN09R/L160M...12, TEN09R200M..., TEN09R250M... | CSTR-4L100 | (H-TBS) | (M-1000) | - | - | (BT15M) |
| TEN09R160M...20 | CSTR-4L100 | (H-TBS) | (M-1000) | - | - | (BT15S) |
| TEN09R315M... | CSTR-4L100 | (H-TBS) | (M-1000) | - | - | (BT15L) |

Recommended clamping torque (Torx size): 3.5 N·m (T15)

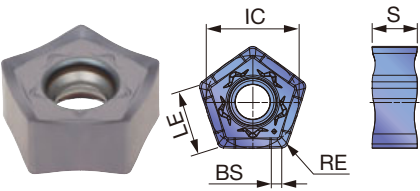
Reference pages: Inserts → **H072**, Standard cutting conditions → **H073**



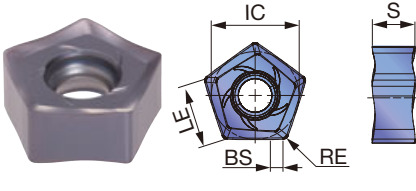
High Feed Milling
 Face Milling
 Shoulder Milling
 Slot Milling
 Profile Milling
 Chamfering, Counterbore
 Finish Face Milling
 Approach angle
 7°-25°
 41°-45°
 60°-70°
 85°-88°
 90°
 Others

INSERT

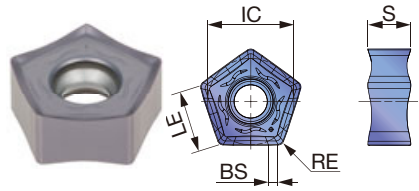
PN*U0905GNEN-MJ (Neutral)



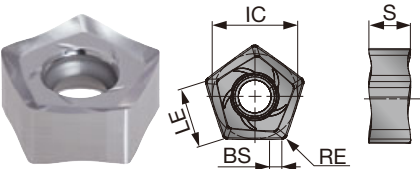
PNCU0905GNER-MJ (Right hand)



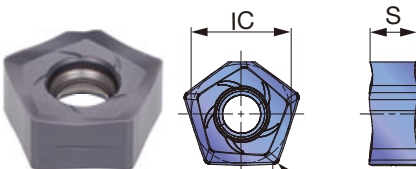
PNCU0905-ML (Neutral)



PNCU0905-AJ (Right hand)



PNCU0905-W (Right hand)



| | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|---|---|---|---|---|--|---|--|--|--|--|
| P Steel | ★ | ☆ | ★ | ☆ | ★ | | ☆ | ☆ | ★ | | | | | | |
| M Stainless | | | ★ | ☆ | ☆ | | ☆ | ☆ | | | | | | | |
| K Cast iron | | ☆ | | ★ | ☆ | ★ | ★ | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | ★ | | | | |
| S Superalloys | | | ☆ | ☆ | | ★ | | | | | | | | | |
| H Hard materials | ★ | | | | | | | | | | | | | | |

★ : First choice
 ☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | | Cermet | Uncoated | LE | S | IC | BS | | | | | |
|-----------------|-----|------|--------|--------|--------|-------|-------|-------|-------|-------|--------|----------|----|---|----|----|-------|------|------|------|-----|
| | | | AH3225 | AH8015 | AH3135 | AH120 | AH140 | AH725 | T1215 | T1115 | T3225 | T3130 | | | | | NS740 | TH10 | | | |
| PNMU0905GNEN-MJ | 0.8 | 6.4 | ● | ● | ● | ● | | | | | ● | | | | | | | 8.9 | 6 | 12.2 | 1.4 |
| PNCU0905GNEN-MJ | 0.8 | 6.4 | ● | ● | ● | ● | | | | | ● | | | | | | | 8.9 | 6 | 12.2 | 1.4 |
| PNCU0905GNER-MJ | 0.8 | 6.4 | | | | ● | ● | ● | | | ● | | | | | | | 8.9 | 5.93 | 12.2 | 1.4 |
| PNCU0905GNEN-ML | 0.8 | 6.4 | ● | ● | ● | | | | | | | | | | | | | 8.9 | 5.96 | 12.2 | 1.4 |
| PNCU0905GNFR-AJ | 0.8 | 6.4 | | | | | | | | | | ● | | | | | | 8.9 | 6.25 | 12.2 | 1.4 |
| PNCU0905GNER-W | 0.8 | 2 | | | | | | ● | | | | | | | | | | - | 5.93 | 12.2 | 3.8 |

● : Line up

STANDARD CUTTING CONDITIONS

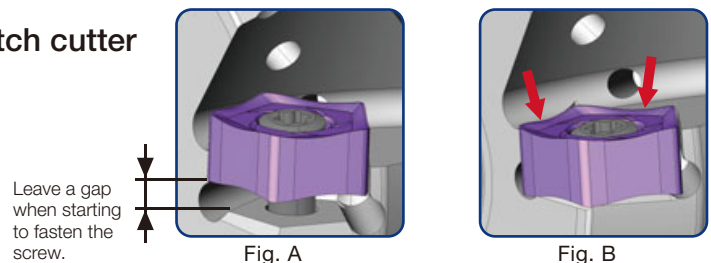
| ISO | Workpiece materials | Hardness | Selection criteria | Recommended grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-------------|--|-----------------|---------------------|-------------------|--------------|--------------------------|--------------------------|
| P | Low carbon steels S15C, C15E4, etc. C15, etc. | 200 - 300 HB | First choice | AH3225 | MJ | 100 - 250 | 0.1 - 0.4 |
| | | 200 - 300 HB | Low cutting force | AH3225 | ML | 100 - 250 | 0.1 - 0.3 |
| | | 200 - 300 HB | Wear resistance | T3225 | MJ | 200 - 350 | 0.1 - 0.3 |
| | | 200 - 300 HB | Surface quality | NS740 | MJ | 100 - 250 | 0.1 - 0.3 |
| | High carbon steels, alloyed steels S45C, SCM440, etc. C45, 42CrMo4, etc. | 150 - 300 HB | First choice | AH3225 | MJ | 100 - 250 | 0.1 - 0.35 |
| | | 150 - 300 HB | Low cutting force | AH3225 | ML | 100 - 250 | 0.1 - 0.3 |
| | | 150 - 300 HB | Wear resistance | T3225 | MJ | 180 - 300 | 0.1 - 0.3 |
| | Prehardened steels NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | MJ | 100 - 200 | 0.1 - 0.3 |
| | | 30 - 40 HRC | Low cutting force | AH3225 | ML | 100 - 200 | 0.1 - 0.25 |
| 30 - 40 HRC | | Wear resistance | T3225 | MJ | 150 - 250 | 0.1 - 0.25 | |
| M | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | ML | 100 - 200 | 0.1 - 0.3 |
| | | - 200 HB | Fracture resistance | AH3135 | MJ | 100 - 200 | 0.1 - 0.35 |
| | | - 200 HB | Wear resistance | T3225 | MJ | 100 - 250 | 0.1 - 0.3 |
| K | Grey cast irons FCD400, etc. 250, etc. | 150 - 250 HB | First choice | T1215 | MJ | 100 - 300 | 0.1 - 0.35 |
| | | 150 - 250 HB | Fracture resistance | AH120 | MJ | 100 - 250 | 0.1 - 0.4 |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150 - 250 HB | First choice | T1215 | MJ | 100 - 300 | 0.1 - 0.35 |
| | | 150 - 250 HB | Fracture resistance | AH120 | MJ | 80 - 200 | 0.1 - 0.4 |
| N | Aluminium alloys Si < 13% | - | First choice | TH10 | AJ | 500 - 1500 | 0.1 - 0.5 |
| | Aluminium alloys Si ≥ 13% | - | First choice | TH10 | AJ | 150 - 500 | 0.1 - 0.5 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3135 | ML | 30 - 60 | 0.1 - 0.3 |
| | | - 40 HRC | Fracture resistance | AH3135 | MJ | 30 - 60 | 0.1 - 0.3 |
| H | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | First choice | AH725 | MJ | 10 - 40 | 0.04 - 0.1 |
| | | - 45 HRC | First choice | AH8015 | MJ | 80 - 150 | 0.05 - 0.15 |
| H | Hardened materials SKD61, X40CrMoV5-1, etc. | - 45 HRC | First choice | AH8015 | MJ | 80 - 150 | 0.05 - 0.15 |
| | | - 45 HRC | Low cutting force | AH8015 | ML | 80 - 150 | 0.05 - 0.15 |

- Remove excessive chips with an air blast to prevent chip jamming.
- Use water-soluble coolant to avoid built-up edge in case extreme welding occurs on cutting edges. (ex. aluminium machining).
- For operations with a varied depth of cut (ex. casting skin) and machining of workpiece materials with interrupted surface, the feed (fz) should be set to the lower recommended value shown in the above table.

- Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

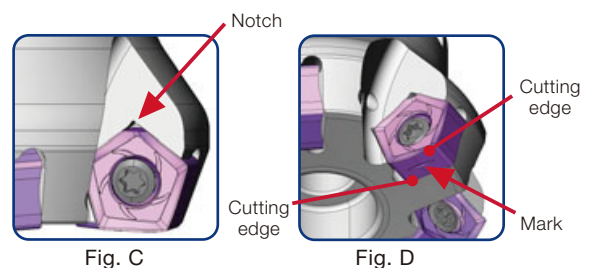
Installation of inserts on an extra close-pitch cutter

- On an extra close-pitch cutter, the screw hole of an insert pocket is placed at an angle.
- Leave a gap between the insert and pocket when starting to fasten the screw on the cutter body as shown in Fig. A.
- After fastening the screw, please ensure that there is no gap between the cutter body and insert. (Fig. B)



Notes for using wiper inserts

- When fine surface finish is required, wiper insert PNCU0905GNER-W is recommended.
- Attach the insert with its notch on the top, as shown in Fig. C.
- Also, make sure that the mark of the insert is located at the bottom of the cutter body, as shown in Fig. D.
- The wiper insert has two corners available (Fig. D). Do not use the other corners as the cutter body may be broken.



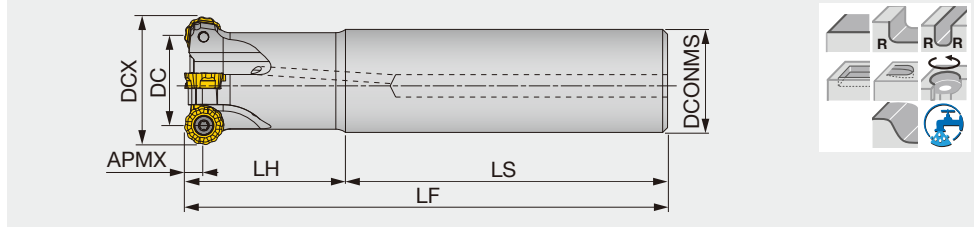
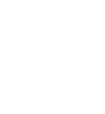
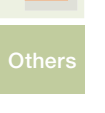
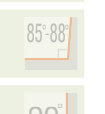
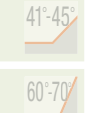


ROUNDSPLIT

ERC12/16

Endmill, shank type

GAMP = +0°, GAMF = -1° ~ -5°



| Designation | APMX | DCX | DC | CICT | DCONMS | LF | LH | LS | WT(kg) | Air hole | Insert |
|---------------------|------|-----|----|------|--------|-----|-----|-----|--------|----------|-------------|
| ERC12R032M32.0-03 | 6 | 32 | 20 | 3 | 32 | 150 | 70 | 80 | 0.8 | With | RCMT1204... |
| ERC12R032M32.0-03L | 6 | 32 | 20 | 3 | 32 | 250 | 150 | 100 | 1.3 | With | RCMT1204... |
| ERC12R032M32.0-03LL | 6 | 32 | 20 | 3 | 32 | 300 | 180 | 120 | 1.6 | With | RCMT1204... |
| ERC12R033M32.0-03 | 6 | 33 | 21 | 3 | 32 | 150 | 70 | 80 | 0.8 | With | RCMT1204... |
| ERC12R033M32.0-03L | 6 | 33 | 21 | 3 | 32 | 250 | 150 | 100 | 1.4 | With | RCMT1204... |
| ERC12R033M32.0-03LL | 6 | 33 | 21 | 3 | 32 | 300 | 70 | 230 | 1.7 | With | RCMT1204... |
| ERC12R040M32.0-04 | 6 | 40 | 28 | 4 | 32 | 150 | 50 | 100 | 0.8 | With | RCMT1204... |
| ERC12R040M32.0-04L | 6 | 40 | 28 | 4 | 32 | 250 | 50 | 200 | 1.5 | With | RCMT1204... |
| ERC12R040M32.0-04LL | 6 | 40 | 28 | 4 | 32 | 300 | 50 | 250 | 1.8 | With | RCMT1204... |
| ERC12R050M42.0-05 | 6 | 50 | 38 | 5 | 42 | 150 | 50 | 100 | 1.5 | With | RCMT1204... |
| ERC12R050M42.0-05L | 6 | 50 | 38 | 5 | 42 | 250 | 50 | 200 | 2.6 | With | RCMT1204... |
| ERC12R050M42.0-05LL | 6 | 50 | 38 | 5 | 42 | 300 | 50 | 250 | 3 | With | RCMT1204... |
| ERC16R040M32.0-02 | 8 | 40 | 24 | 2 | 32 | 150 | 50 | 100 | 0.8 | With | RCMT1606... |
| ERC16R040M32.0-02L | 8 | 40 | 24 | 2 | 32 | 250 | 50 | 200 | 1.4 | With | RCMT1606... |
| ERC16R040M32.0-02LL | 8 | 40 | 24 | 2 | 32 | 300 | 50 | 250 | 1.7 | With | RCMT1606... |
| ERC16R050M42.0-03 | 8 | 50 | 34 | 3 | 42 | 150 | 50 | 100 | 1.4 | With | RCMT1606... |
| ERC16R050M42.0-03L | 8 | 50 | 34 | 3 | 42 | 250 | 50 | 200 | 2.4 | With | RCMT1606... |
| ERC16R050M42.0-03LL | 8 | 50 | 34 | 3 | 42 | 300 | 50 | 250 | 3 | With | RCMT1606... |

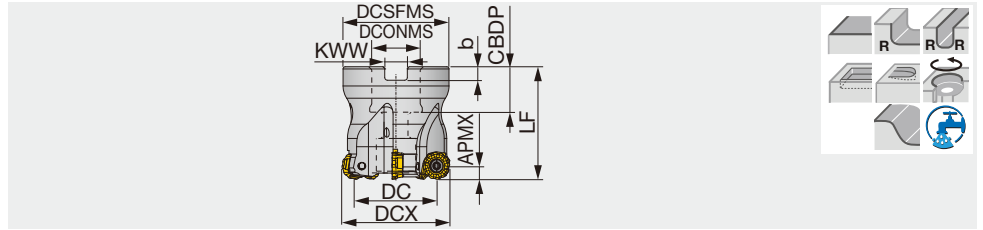
SPARE PARTS



| Designation | Clamping screw | Wewnch |
|--------------|----------------|--------|
| ERC12R... | CSTB-4L090 | T-15DB |
| ERC16R040... | CSTB-5L105 | T-20DB |
| ERC16R050... | CSTB-5L120 | T-20DB |

Recommended clamping torque: CSTB-4L090 = 3.5 N-m, CSTB-5L105 = 5 N-m, CSTB-5L120 = 5 N-m

Reference pages: Inserts → [H076](#)



| Designation | APMX | DCX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|-----|-----|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TRC12R040M16.0-04 | 6 | 40 | 28 | 4 | 35 | 40 | 16 | 18 | 8.2 | 5.6 | 0.2 | With | RCMT1204... |
| TRC12R040M16.0E04 | 6 | 40 | 28 | 4 | 35 | 40 | 16 | 19 | 8.4 | 5.6 | 0.2 | With | RCMT1204... |
| TRC12R050M22.0-05 | 6 | 50 | 38 | 5 | 47 | 50 | 22 | 20 | 10 | 6 | 0.4 | With | RCMT1204... |
| TRC12R050M22.0E05 | 6 | 50 | 38 | 5 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | RCMT1204... |
| TRC12R050M22.2-05 | 6 | 50 | 38 | 5 | 47 | 50 | 22.225 | 20 | 8 | 5 | 0.4 | With | RCMT1204... |
| TRC12R052M22.0E05 | 6 | 52 | 40 | 5 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | RCMT1204... |
| TRC12R063M22.0-06 | 6 | 63 | 51 | 6 | 59 | 50 | 22 | 20 | 10 | 6 | 0.7 | With | RCMT1204... |
| TRC12R063M22.0E06 | 6 | 63 | 51 | 6 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.7 | With | RCMT1204... |
| TRC12R063M22.2-06 | 6 | 63 | 51 | 6 | 59 | 50 | 22.225 | 20 | 8 | 5 | 0.7 | With | RCMT1204... |
| TRC12R066M22.0E06 | 6 | 66 | 54 | 6 | 62 | 50 | 22 | 20 | 10.4 | 6.3 | 0.7 | With | RCMT1204... |
| TRC12R080M27.0E07 | 6 | 80 | 68 | 7 | 76 | 50 | 27 | 22 | 12.4 | 7 | 1.1 | With | RCMT1204... |
| TRC12R080M31.7-07 | 6 | 80 | 68 | 7 | 76 | 63 | 31.750 | 32 | 12.7 | 8 | 1.5 | With | RCMT1204... |
| TRC16R050M22.0-04 | 8 | 50 | 34 | 4 | 47 | 50 | 22 | 20 | 10 | 6 | 0.4 | With | RCMT1606... |
| TRC16R050M22.0E04 | 8 | 50 | 34 | 4 | 47 | 50 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | RCMT1606... |
| TRC16R050M22.2-04 | 8 | 50 | 34 | 4 | 47 | 50 | 22.225 | 20 | 8 | 5 | 0.4 | With | RCMT1606... |
| TRC16R052M22.0E04 | 8 | 52 | 36 | 4 | 49 | 50 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | RCMT1606... |
| TRC16R063M22.0-05 | 8 | 63 | 47 | 5 | 59 | 50 | 22 | 20 | 10 | 6 | 0.6 | With | RCMT1606... |
| TRC16R063M22.0E05 | 8 | 63 | 47 | 5 | 59 | 50 | 22 | 20 | 10.4 | 6.3 | 0.6 | With | RCMT1606... |
| TRC16R063M22.2-05 | 8 | 63 | 47 | 5 | 59 | 50 | 22.225 | 20 | 8 | 5 | 0.7 | With | RCMT1606... |
| TRC16R066M22.0E05 | 8 | 66 | 50 | 5 | 62 | 50 | 22 | 20 | 10.4 | 6.3 | 0.7 | With | RCMT1606... |
| TRC16R080M27.0E06 | 8 | 80 | 64 | 6 | 76 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | RCMT1606... |
| TRC16R080M31.7-06 | 8 | 80 | 64 | 6 | 76 | 63 | 31.75 | 32 | 12.7 | 8 | 1.3 | With | RCMT1606... |
| TRC16R100M31.7-07 | 8 | 100 | 84 | 7 | 96 | 63 | 31.75 | 32 | 12.7 | 8 | 1.6 | With | RCMT1606... |
| TRC16R100M32.0E07 | 8 | 100 | 84 | 7 | 96 | 63 | 32 | 25 | 14.4 | 8 | 2.4 | With | RCMT1606... |
| TRC16R125M38.1-08 | 8 | 125 | 109 | 8 | 98 | 63 | 38.1 | 43 | 15.9 | 10 | 3.6 | With | RCMT1606... |
| TRC16R125M40.0E08 | 8 | 125 | 109 | 8 | 98 | 63 | 40 | 32 | 16.4 | 9 | 3 | With | RCMT1606... |

SPARE PARTS



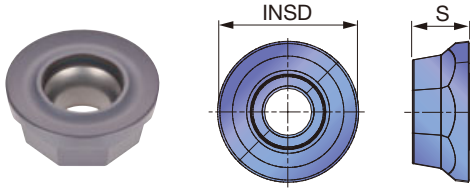
| Designation | Clamping screw | Grip | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit |
|--------------------|----------------|-------|----------------------|----------------------|----------|
| TRC12R040... | CSTB-4L090 | H-TBS | - | FSHM8-30H | BT15S |
| TRC12R050 - 066... | CSTB-4L090 | H-TBS | - | CM10X30H | BT15S |
| TRC12R080M27.0E07 | CSTB-4L090 | H-TBS | - | CM12X30H | BT15S |
| TRC12R080M31.7-07 | CSTB-4L090 | H-TBS | - | CM16X40H | BT15S |
| TRC16R050 - 052... | CSTB-5L120 | H-TB | - | FSHM10-40H | BT20S |
| TRC16R063 - 066... | CSTB-5L120 | H-TB | - | CM10X30H | BT20S |
| TRC16R080M27.0E06 | CSTB-5L120 | H-TB | - | CM12X30H | BT20S |
| TRC16R080M31.7-06 | CSTB-5L120 | H-TB | - | CM16X40H | BT20S |
| TRC16R100... | CSTB-5L120 | H-TB | - | CM16X40H | BT20S |
| TRC16R125... | CSTB-5L120 | H-TB | TMBA-M20H | - | BT20M |

Recommended clamping torque: CSTB-4L090 = 3.5 N-m, CSTB-5L120 = 5 N-m

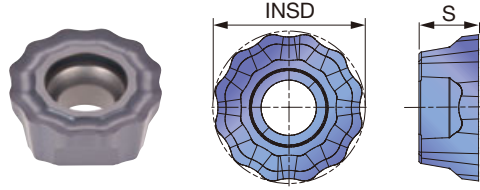


INSERT

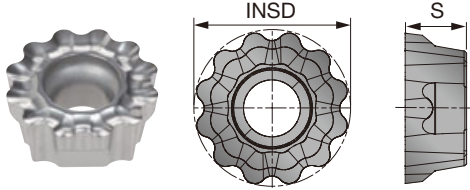
RCMT-MJ



RCMT-NMJ



RCMT-NAJ



| | | | | | | | | | |
|---|----------------|---|---|---|---|--|--|--|--|
| P | Steel | ☆ | ★ | | | | | | |
| M | Stainless | | ★ | ☆ | | | | | |
| K | Cast iron | ★ | | ☆ | | | | | |
| N | Non-ferrous | | | | ★ | | | | |
| S | Superalloys | ★ | ★ | | | | | | |
| H | Hard materials | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | Uncoated | INSD | S |
|----------------|------|--------|-------|-------|----------|------|-----|
| | | AH120 | AH140 | AH725 | KS15F | | |
| RCMT1204EN-MJ | 6 | ● | ● | ● | | 12 | 4.8 |
| RCMT1204EN-NMJ | 6 | ● | ● | ● | | 12 | 4.8 |
| RCMT1204FN-NAJ | 6 | | | | ● | 12 | 4.8 |
| RCMT1606EN-MJ | 8 | ● | ● | ● | | 16 | 6.5 |
| RCMT1606EN-NMJ | 8 | ● | ● | ● | | 16 | 6.5 |
| RCMT1606FN-NAJ | 8 | | | | ● | 16 | 6.5 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



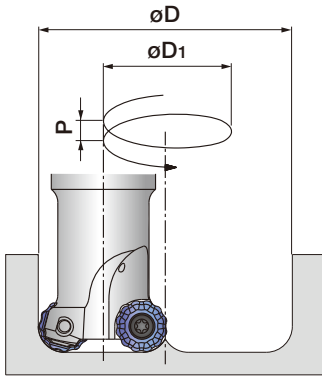
TRC12/16

e-catalog



ERC12/16

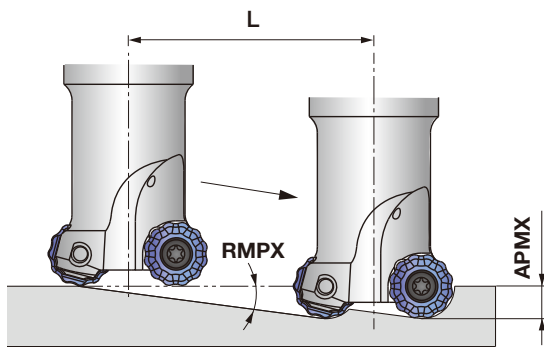
Holemaking with helical feed



| Designation | Tool ø DCX (mm) | Min. machining diameter (mm) | | Max. machining diameter (mm) | | Pitch P (mm) |
|----------------|-----------------|------------------------------|-----|------------------------------|-----|--------------|
| | | øD | øD1 | øD | øD1 | |
| ERC12R032... | ø32 | 52 | 20 | 62 | 30 | < 6 |
| ERC12R033... | ø33 | 54 | 21 | 64 | 31 | < 6 |
| T/ERC12R040... | ø40 | 68 | 28 | 78 | 38 | < 6 |
| T/ERC12R050... | ø50 | 88 | 38 | 98 | 48 | < 6 |
| TRC12R063... | ø63 | 114 | 51 | 124 | 61 | < 6 |
| TRC12R080... | ø80 | 148 | 68 | 158 | 78 | < 6 |
| ERC16R040... | ø40 | 64 | 24 | 78 | 38 | < 8 |
| T/ERC16R050... | ø50 | 84 | 34 | 98 | 48 | < 8 |
| TRC16R063... | ø63 | 110 | 47 | 124 | 61 | < 8 |
| TRC16R080... | ø80 | 144 | 64 | 158 | 78 | < 8 |
| TRC16R100... | ø100 | 184 | 84 | 198 | 98 | < 8 |
| TRC16R125... | ø125 | 234 | 109 | 248 | 123 | < 8 |

When holemaking with a helical feed, the pitch (P) needs to be set at lower values than that shown above.

Ramping



| Designation | Tool ø DCX (mm) | Max. ramping angle RMPX | L: tool pass length when ramping angle is 2 degrees | | | | |
|----------------|-----------------|-------------------------|---|----|-----|-----|-----|
| | | | ap (mm) | | | | |
| | | | 2 | 3 | 4 | 6 | 8 |
| ERC12R032... | ø32 | 10° | 57 | 85 | 114 | 171 | - |
| ERC12R033... | ø33 | 9° | 57 | 85 | 114 | 171 | - |
| T/ERC12R040... | ø40 | 6° | 57 | 85 | 114 | 171 | - |
| T/ERC12R050... | ø50 | 4° | 57 | 85 | 114 | 171 | - |
| TRC12R063... | ø63 | 3° | 57 | 85 | 114 | 171 | - |
| TRC12R080... | ø80 | 2.3° | 57 | 85 | 114 | 171 | - |
| ERC16R040... | ø40 | 12° | 57 | 85 | 114 | 171 | 229 |
| T/ERC16R050... | ø50 | 7.4° | 57 | 85 | 114 | 171 | 229 |
| TRC16R063... | ø63 | 6° | 57 | 85 | 114 | 171 | 229 |
| TRC16R080... | ø80 | 4.3° | 57 | 85 | 114 | 171 | 229 |
| TRC16R100... | ø100 | 3° | 57 | 85 | 114 | 171 | 229 |
| TRC16R125... | ø125 | 2.4° | 57 | 85 | 114 | 171 | 229 |

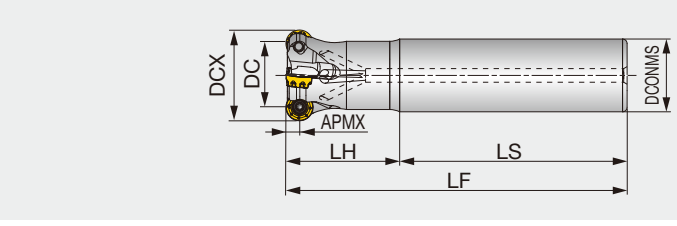
Tool pass length: $L = ap / \tan RMPX$, Ramping angle needs to be set at smaller than 2 degrees in order to prevent chips from getting tangled.



New
FIXRMILL
ERRQ12

Radius endmill with anti-rotation system, shank type

GAMP = +5°, GAMF = -3°

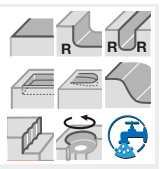
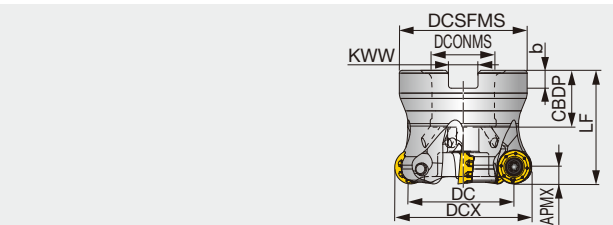


| Designation | APMX | DCX | CICT | DC | DCONMS | LF | LH | LS | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|----|--------|-----|----|-----|--------|----------|-----------|
| ERRQ12M040C32.0R04 | 6 | 40 | 4 | 28 | 32 | 150 | 50 | 100 | 0.84 | With | RQMT12... |

New
TRRQ12

Radius mill with anti-rotation system

GAMP = +5°, GAMF = -3°



| Designation | APMX | DCX | CICT | DC | DCSFMS | DCONMS | LF | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-----------------------------------|------|-----|------|----|--------|--------|----|------|------|-----|--------|----------|-----------|
| TRRQ12M040B16.0R04 ⁽¹⁾ | 6 | 40 | 4 | 28 | 34 | 16 | 40 | 24 | 8.4 | 5.6 | 0.16 | With | RQMT12... |
| TRRQ12M050B22.0R05 | 6 | 50 | 5 | 38 | 45 | 22 | 40 | 20 | 10.4 | 6.3 | 0.27 | With | RQMT12... |
| TRRQ12M050B22.0R06 | 6 | 50 | 6 | 38 | 45 | 22 | 40 | 20 | 10.4 | 6.3 | 0.26 | With | RQMT12... |
| TRRQ12M052B22.0R05 | 6 | 52 | 5 | 40 | 45 | 22 | 40 | 20 | 10.4 | 6.3 | 0.29 | With | RQMT12... |
| TRRQ12M063B22.0R06 | 6 | 63 | 6 | 51 | 50 | 22 | 40 | 20 | 10.4 | 6.3 | 0.44 | With | RQMT12... |
| TRRQ12M063B22.0R07 | 6 | 63 | 7 | 51 | 50 | 22 | 40 | 20 | 10.4 | 6.3 | 0.42 | With | RQMT12... |
| TRRQ12M080B27.0R06 | 6 | 80 | 6 | 68 | 56 | 27 | 50 | 22 | 12.4 | 7 | 0.88 | With | RQMT12... |

(1) Always use the dedicated shell locking bolt # SRPS118-0416 when assembling the cutter on the arbor. See page H082 for the instruction for the cutter-arbor assembly. Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the shell locking bolt.

SPARE PARTS



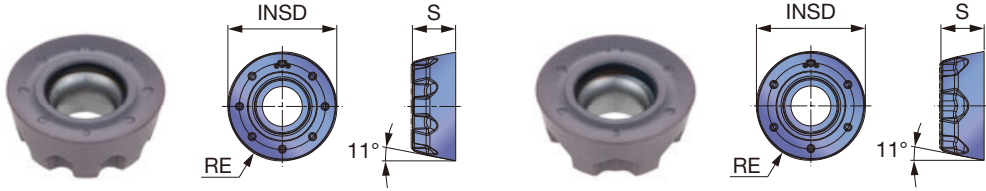
| Designation | Clamping screw | Torx bit (Optional) | Grip (Optional) | Shell locking bolt 1 | Shell locking bolt 2 |
|---------------------|----------------|---------------------|-----------------|----------------------|----------------------|
| ERRQ12M040C32.0R04 | CSPB-4S | (BLD IP15/S7) | (H-TB2W) | - | - |
| TRRQ12M040B16.0R04 | CSPB-4S | (BLD IP15/S7) | (H-TB2W) | - | SRPS118-0416 |
| TRRQ12M050 - 063... | CSPB-4S | (BLD IP15/S7) | (H-TB2W) | CM10X30H | - |
| TRRQ12M080B27.0R06 | CSPB-4S | (BLD IP15/S7) | (H-TB2W) | CM12X30H | - |

Recommended clamping torque (Torx size): 3.5 N·m (15IP)

INSERT

RQMT1204ENC8-MM

RQMT1204ENC6-MM



| | | | | | | | |
|-------------------------|---|---|--|--|--|--|--|
| P Steel | ★ | | | | | | |
| M Stainless | ★ | | | | | | |
| K Cast iron | | ★ | | | | | |
| N Non-ferrous | | | | | | | |
| S Superalloy | ★ | ★ | | | | | |
| H Hard materials | ☆ | ☆ | | | | | |

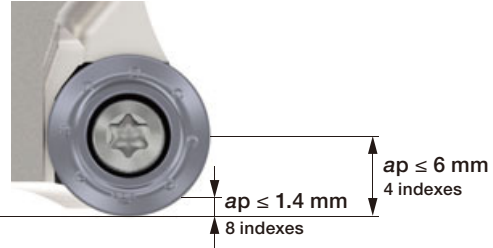
★ : First choice
 ☆ : Second choice

| Designation | RE | APMX | Coated | | INSD | S |
|-----------------|----|------|--------|--------|------|------|
| | | | AH3135 | AH8015 | | |
| RQMT1204ENC8-MM | 6 | 6 | ● | ● | 12 | 4.76 |
| RQMT1204ENC6-MM | 6 | 6 | ● | ● | 12 | 4.76 |

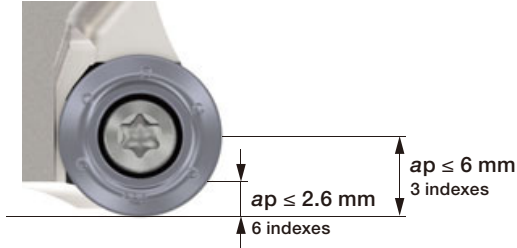
● : Line up

Two types of inserts

- Both inserts can be clamped in the same pocket
- Inserts can be selected based on the required depth of cut for best cost per edge



RQMT1204ENC8-MM
 Allows up to 8 indexes for 1.4 mm or smaller D.O.C. and up to 4 indexes for up to 6 mm D.O.C.

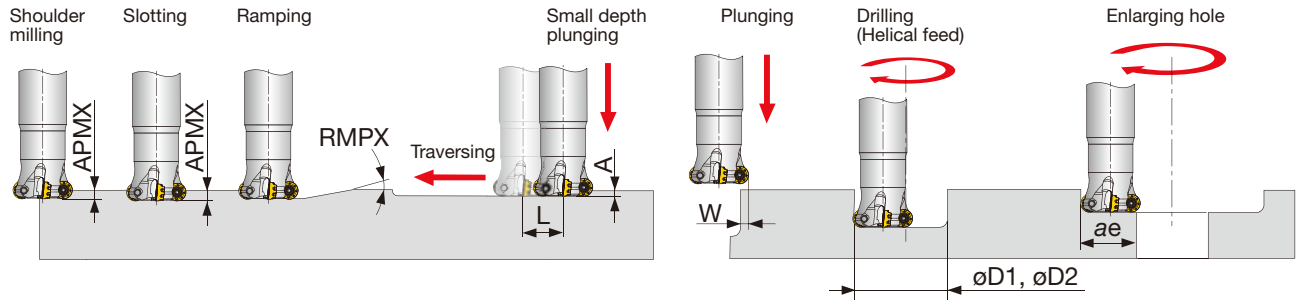


RQMT1204ENC6-MM
 Allows up to 6 indexes for 2.6 mm or smaller D.O.C. and up to 3 indexes for up to 6 mm D.O.C.

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Priority | Grades | Chipbreaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---|----------------------------------|--------------|--------------|-------------|--------------------------|---|
| P | Low carbon steel S15C, etc. C15E4, etc. | - 200 HB | First choice | AH3135 | MM | 100 - 300 | ap = 6 mm : 0.1 - 0.3 ap = 2 mm : 0.15 - 0.6 ap = 1 mm : 0.2 - 0.8 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3135 | MM | 100 - 250 | |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3135, etc. | MM | 100 - 200 | |
| M | Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200 HB | First choice | AH3135 | MM | 100 - 200 | ap = 6 mm : 0.1 - 0.25 ap = 2 mm : 0.15 - 0.5 ap = 1 mm : 0.2 - 0.65 |
| | Martensitic stainless steel SUS420J1, etc. X20Cr13, etc. | - 200 HB | First choice | AH3135 | MM | 100 - 300 | |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | First choice | AH8015 | MM | 100 - 300 | ap = 6 mm : 0.1 - 0.3 ap = 2 mm : 0.15 - 0.6 ap = 1 mm : 0.2 - 0.8 |
| | Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc. | 150 - 250 HB | First choice | AH8015 | MM | 80 - 250 | |
| S | Titanium alloys Ti-6Al-4V, etc. | - | First choice | AH3135 | MM | 30 - 60 | ap = 6 mm : 0.08 - 0.2 ap = 2 mm : 0.12 - 0.4 ap = 1 mm : 0.15 - 0.6 ap = 6 mm : 0.05 - 0.12 ap = 2 mm : 0.08 - 0.25 ap = 1 mm : 0.1 - 0.3 |
| | Heat-resistant alloys Inconel718, etc. | - | First choice | AH8015 | MM | 20 - 50 | |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50HRC | First choice | AH3135 | MM | ap = 6 mm : 0.05 - 0.12 ap = 2 mm : 0.08 - 0.25 ap = 1 mm : 0.1 - 0.3 ap = 6 mm : 0.03 - 0.1 ap = 2 mm : 0.05 - 0.12 ap = 1 mm : 0.05 - 0.15 |
| | | SKD11, etc. X153CrMoV12, etc. | 50 - 60HRC | First choice | AH8015 | MM | |

APPLICATION RANGE



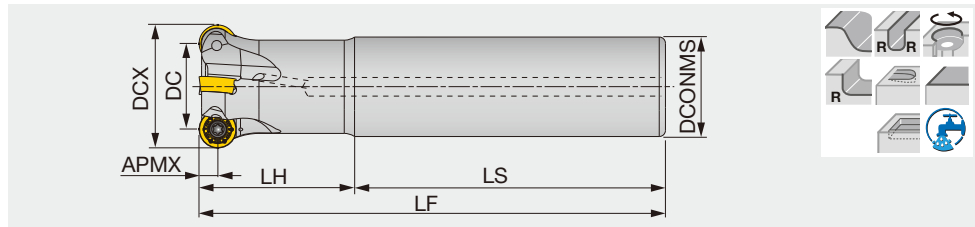
| Designation | DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Max. cutting width in plunging W | Machining length for removing uncut portion L | Min. machining diameter øD1 | Max. machining diameter øD2* | Max. cutting width engagement ae |
|--------------------|-----|---------------------------|----------------------------|--------------------------|-------------------------------------|--|--------------------------------|---------------------------------|-------------------------------------|
| T/ERRQ12M040... | 40 | 6 | 5.1° | 2.4 | 6 | 29 | 59 | 79 | 32 |
| TRRQ12M050B22.0... | 50 | 6 | 3.6° | 2.4 | 6 | 39 | 79 | 99 | 42 |
| TRRQ12M052B22.0R05 | 52 | 6 | 3.4° | 2.4 | 6 | 41 | 83 | 103 | 44 |
| TRRQ12M063B22.0... | 63 | 6 | 3° | 2.4 | 6 | 52 | 105 | 125 | 55 |
| TRRQ12M080B27.0R06 | 80 | 6 | 2.1° | 2.4 | 6 | 69 | 139 | 159 | 72 |

* For flat bottom hole

FIXRMILL ERP

Radius endmill with anti-rotation system, shank type

GAMP = +10°~ +4°, GAMF = -2°~ -8.5°

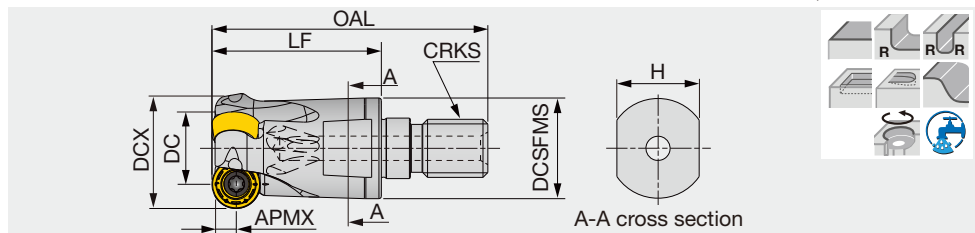


| Designation | APMX | DCX | DC | CICT | DCONMS | LS | LH | LF | Air hole | Insert |
|-------------------|------|-----|----|------|--------|-----|----|-----|----------|-------------|
| ERP10R020M20.0-02 | 5 | 20 | 10 | 2 | 20 | 100 | 50 | 150 | With | RPMT10T3... |
| ERP10R025M25.0-02 | 5 | 25 | 15 | 2 | 25 | 90 | 60 | 150 | With | RPMT10T3... |
| ERP10R032M32.0-04 | 5 | 32 | 22 | 4 | 32 | 80 | 70 | 150 | With | RPMT10T3... |
| ERP10R035M32.0-04 | 5 | 35 | 25 | 4 | 32 | 100 | 50 | 150 | With | RPMT10T3... |
| ERP12R032M32.0-03 | 6 | 32 | 20 | 3 | 32 | 100 | 50 | 150 | With | RPMT1204... |
| ERP12R040M32.0-04 | 6 | 40 | 28 | 4 | 32 | 100 | 50 | 150 | With | RPMT1204... |
| ERP16R040M32.0-02 | 8 | 40 | 24 | 2 | 32 | 100 | 50 | 150 | With | RPMT1606... |

HRP-M

Radius endmill with anti-rotation system, modular type (TungFlex)

GAMP = 1°~ 4°, GAMF = -8.5°~ 2°



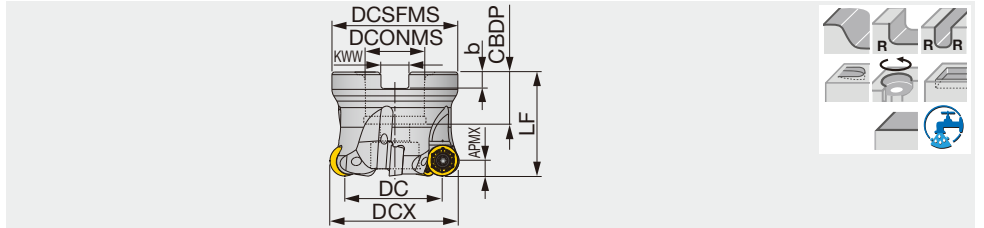
| Designation | APMX | DCX | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|-----|----|------|-----|----|----|--------|------|--------|----------|-------------|
| HRP10R020MM10-02 | 5 | 20 | 10 | 2 | 49 | 30 | 15 | 17.8 | M10 | 0.1 | With | RPMT10T3... |
| HRP10R025MM12-02 | 5 | 25 | 15 | 2 | 57 | 35 | 17 | 20.8 | M12 | 0.1 | With | RPMT10T3... |
| HRP10R032MM16-04 | 5 | 32 | 22 | 4 | 63 | 40 | 22 | 28.8 | M16 | 0.2 | With | RPMT10T3... |
| HRP12R032MM16-03 | 6 | 32 | 20 | 3 | 63 | 40 | 22 | 28.8 | M16 | 0.2 | With | RPMT1204... |

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench | Wrench (Optional) | |
|-------------|----------------|----------------------|--------|-------------------|---------|
| | | | | Bit | Grip |
| ERP10R... | CSPB-3.5S | (M-1000) | IP-15D | - | - |
| ERP12R... | CSTR-4L100 | (M-1000) | T-15DB | - | - |
| ERP16R... | CSPB-5 | (M-1000) | IP-20D | - | - |
| HRP10R** | CSPB-3.5S | (M-1000) | - | (BLD IP15/S7) | (H-TBS) |
| HRP12R** | CSTR-4L100 | (M-1000) | - | (BT15S) | (H-TBS) |

Reference pages: [TungFlex](#) → [H036 - H037](#)

Recommended clamping torque (Torx size): CSPB-3.5S = 3.5 N·m (BLD IP15/S7=15IP), CSTR-4L100 = 3.5 N·m (BT15S=T15), CSPB-5 = 5 N·m



| Designation | APMX | DCX | DC | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Air hole | Insert |
|-------------------|------|-----|----|------|--------|--------|------|----|-----|------|--------|----------|-------------|
| TRP10R040M16.0E05 | 5 | 40 | 30 | 5 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 0.2 | With | RPMT10T3... |
| TRP12R050M22.0E05 | 6 | 50 | 38 | 5 | 47 | 22 | 20 | 40 | 6.3 | 10.4 | 0.3 | With | RPMT1204... |
| TRP12R052M22.0E05 | 6 | 52 | 40 | 5 | 49 | 22 | 20 | 40 | 6.3 | 10.4 | 0.3 | With | RPMT1204... |
| TRP12R063M22.0E06 | 6 | 63 | 51 | 6 | 59 | 22 | 20 | 40 | 6.3 | 10.4 | 0.6 | With | RPMT1204... |
| TRP12R066M27.0E06 | 6 | 66 | 54 | 6 | 62 | 27 | 22 | 40 | 7 | 12.4 | 0.6 | With | RPMT1204... |
| TRP16R063M22.0E05 | 8 | 63 | 47 | 5 | 59 | 22 | 20 | 40 | 6.3 | 10.4 | 0.6 | With | RPMT1606... |
| TRP16R066M27.0E05 | 8 | 66 | 50 | 5 | 62 | 27 | 22 | 40 | 7 | 12.4 | 0.7 | With | RPMT1606... |

SPARE PARTS

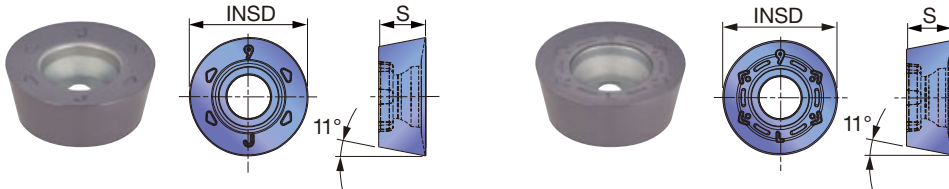
| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt | Torx bit (Optional) |
|-------------------------|----------------|-----------------|----------------------|--------------------|---------------------|
| TRP10R040M16.0E05 | CSPB-3.5S | (H-TBS) | (M-1000) | FSHM8-30H | (BLD IP15/S7) |
| TRP12R050 - 063M22.0... | CSTR-4L100 | (H-TBS) | (M-1000) | CM10X30H | (BT15S) |
| TRP12R066M27.0E06 | CSTR-4L100 | (H-TBS) | (M-1000) | CM12X30H | (BT15S) |
| TRP16R063M22.0E05 | CSPB-5 | (H-TBS) | (M-1000) | CM10X30H | (BLD IP20/S7) |
| TRP16R066M27.0E05 | CSPB-5 | (H-TBS) | (M-1000) | CM12X30H | (BLD IP20/S7) |

Recommended clamping torque (Torx size): CSPB-3.5S = 3.5 N·m (15IP), CSTR-4L100 = 3.5 N·m (T15), CSPB-5 = 5 N·m (20IP)

INSERT

RPMT-MJ

RPMT-ML



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ★ | | | | | |
| Stainless | ★ | ☆ | ★ | | | |
| Cast iron | | ☆ | | | | |
| Non-ferrous | | | | | | |
| Superalloy | | ☆ | ★ | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | INSD | S |
|---------------|----|------|--------|-------|--------|------|------|
| | | | AH130 | AH725 | AH4035 | | |
| RPMT10T3EN-MJ | | 5 | ● | ● | ● | 10 | 3.97 |
| RPMT10T3EN-ML | | 5 | ● | ● | ● | 10 | 3.97 |
| RPMT1204EN-MJ | | 6 | ● | ● | ● | 12 | 4.76 |
| RPMT1204EN-ML | | 6 | ● | ● | ● | 12 | 4.76 |
| RPMT1606EN-MJ | | 8 | ● | ● | ● | 16 | 6.35 |
| RPMT1606EN-ML | | 8 | ● | ● | ● | 16 | 6.35 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.



ERP



HRP-M



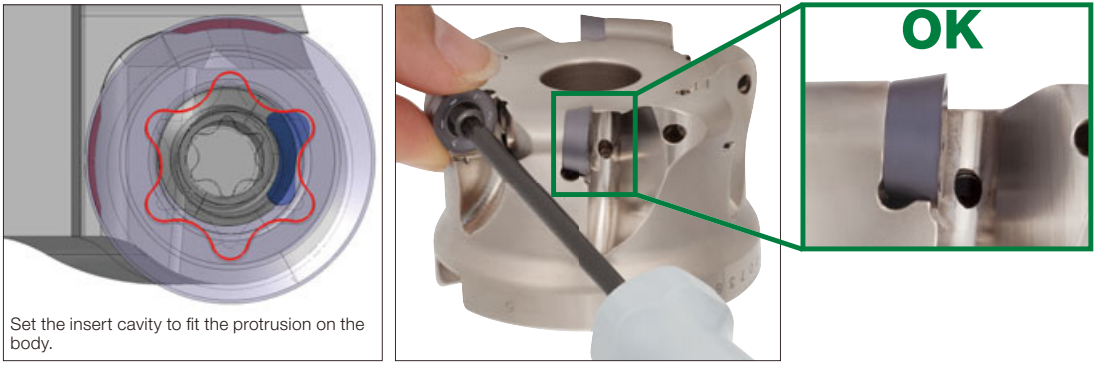
TRP10/12/16



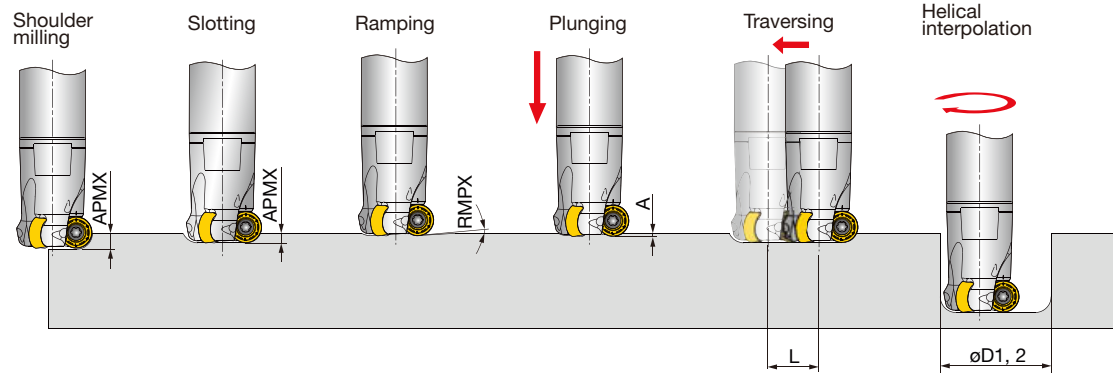
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

Caution for insert clamping

When clamping an insert, please carefully locate it in the seat, fasten the screw, and make sure there is no gap between it and the body.



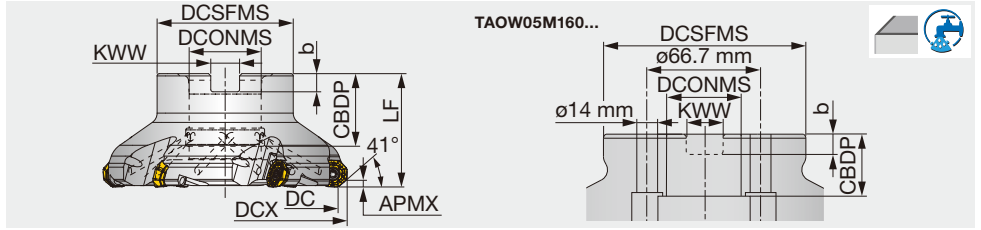
APPLICATION RANGE



| Designation | Tool-ø DCX (mm) | Max. depth of cut APMX (mm) | Max. ramping angle RMPX | Max. plunging depth A (mm) | Machining length for removing uncut portion L (mm) | Min. machining øD1 (mm) | *Max. machining øD2 (mm) |
|-------------------|--------------------|-----------------------------------|-------------------------------|----------------------------------|--|----------------------------|-----------------------------|
| E/HRP10R020M... | 20 | 5 | 2° | 0.3 | 12 | 27 | 39 |
| E/HRP10R025M... | 25 | 5 | 3.1° | 0.7 | 16 | 35 | 49 |
| E/HRP10R032M... | 32 | 5 | 8° | 2.5 | 23 | 46 | 63 |
| E/HRP12R032M... | 32 | 6 | 9.2° | 2.5 | 21 | 43 | 63 |
| ERP10R035M32.0-04 | 35 | 5 | 8.2° | 3 | 26 | 51 | 69 |
| ERP12R040M32.0-04 | 40 | 6 | 3.8° | 1.6 | 29 | 59 | 79 |
| ERP16R040M32.0-02 | 40 | 8 | 7° | 2.3 | 25 | 54 | 79 |
| TRP10R040M16.0E05 | 40 | 5 | 6° | 2.7 | 31 | 62 | 79 |
| TRP12R050M22.0E05 | 50 | 6 | 4° | 2.5 | 39 | 79 | 99 |
| TRP12R052M22.0E05 | 52 | 6 | 4° | 2.5 | 41 | 83 | 103 |
| TRP12R063M22.0E06 | 63 | 6 | 3° | 2.5 | 52 | 105 | 125 |
| TRP12R066M27.0E06 | 66 | 6 | 2.8° | 2.5 | 55 | 111 | 131 |
| TRP16R063M22.0E05 | 63 | 8 | 3.3° | 2.5 | 48 | 99 | 125 |
| TRP16R066M27.0E05 | 66 | 8 | 3.1° | 2.5 | 51 | 105 | 131 |

*For flat bottom hole

GAMP = +23°, GAMF = -5°



| Designation | APMX | DC | DCX | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-----|-------|------|--------|----|--------|------|------|-----|--------|----------|-----------|
| TAOW05M050B22.0R04 | 3 | 50 | 57.8 | 4 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.35 | With | OW*T05... |
| TAOW05M063B22.0R05 | 3 | 63 | 70.7 | 5 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.54 | With | OW*T05... |
| TAOW05M080B27.0R07 | 3 | 80 | 87.7 | 7 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.07 | With | OW*T05... |
| TAOW05J080B25.4R05 | 3 | 80 | 87.7 | 5 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.12 | With | OW*T05... |
| TAOW05M100B32.0R08 | 3 | 100 | 107.6 | 8 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.20 | With | OW*T05... |
| TAOW05J100B31.7R06 | 3 | 100 | 107.6 | 6 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.27 | With | OW*T05... |
| TAOW05M125B40.0R10 | 3 | 125 | 132.6 | 10 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.41 | With | OW*T05... |
| TAOW05J125B38.1R07 | 3 | 125 | 132.6 | 7 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.72 | With | OW*T05... |
| TAOW05M160B40.0R12 | 3 | 160 | 167.6 | 12 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.39 | Without | OW*T05... |
| TAOW05J160B50.8R08 | 3 | 160 | 167.6 | 8 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.22 | Without | OW*T05... |

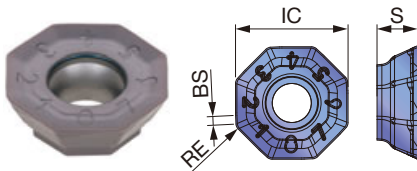
SPARE PARTS

| Designation | Clamping screw | Grip | Torx bit (Optional) | Shell locking bolt |
|----------------------------------|----------------|--------|---------------------|--------------------|
| TAOW05**050... TAOW05**063... | CSPB-4S | SW6-SD | (BLD IP15/S7) | CM10X30H |
| TAOW05**080... | CSPB-4S | SW6-SD | (BLD IP15/S7) | CM12X30H |
| TAOW05**100... | CSPB-4S | SW6-SD | (BLD IP15/S7) | TMBA-M16H |
| TAOW05**125... | CSPB-4S | SW6-SD | (BLD IP15/S7) | TMBA-M20H |
| TAOW05**160... | CSPB-4S | SW6-SD | (BLD IP15/S7) | - |

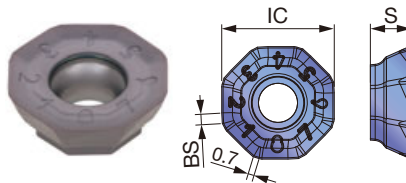
Recommended clamping torque (Torx size): 3.5 N·m (15IP)

INSERT

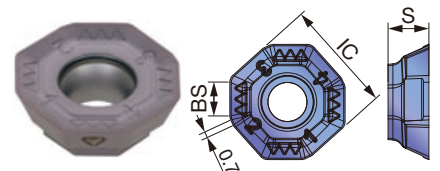
OWMT05T3AFER-MM



OWHT05T3C07AFER-MM



OWHT05T3C07AFER-MW



| | | | | | | | | | | | | |
|-------------------------|---|---|--|--|--|--|--|--|--|--|--|--|
| P Steel | ☆ | ★ | | | | | | | | | | |
| M Stainless | | ★ | | | | | | | | | | |
| K Cast iron | ★ | ☆ | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | |
| S Superalloys | ★ | ☆ | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | IC | S | BS |
|--------------------|-----|------|--------|--------|-------|-----|------|
| | | | AH120 | AH3135 | | | |
| OWMT05T3AFER-MM | 0.8 | 3 | ● | ● | 12.42 | 4.5 | 1 |
| OWHT05T3C07AFER-MM | - | 3 | ● | ● | 12.4 | 4.5 | 1.15 |
| OWHT05T3C07AFER-MW | - | 3 | ● | ● | 12.4 | 4.5 | 3.7 |

● : Line up

Reference pages: Standard cutting conditions → **H084**

STANDARD CUTTING CONDITIONS

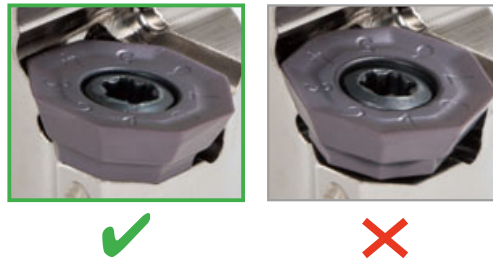
| ISO | Workpiece material | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|--------------|---------------------|--------|--------------|--------------------------|--------------------------|
| P | Low carbon steel (C15, etc.) | - 200 HB | First choice | AH3135 | MM | 100 - 300 | 0.05 - 0.35 |
| | | | Wear resistance | AH120 | MM | 100 - 300 | 0.05 - 0.35 |
| | High carbon and alloy steel (S55C / C55, SCM440 / 42CrMo4, etc.) | - 300 HB | First choice | AH3135 | MM | 100 - 250 | 0.05 - 0.3 |
| | | | Wear resistance | AH120 | MM | 100 - 250 | 0.05 - 0.3 |
| M | Prehardened steel (NAK80, PX5, etc.) | 30 - 40 HRC | First choice | AH3135 | MM | 80 - 200 | 0.05 - 0.3 |
| | | | Wear resistance | AH120 | MM | 80 - 200 | 0.05 - 0.3 |
| M | Austenitic stainless steel (SUS304 / 1.4301, SUS316 / 1.4401, etc.) | - 200 HB | First choice | AH3135 | MM | 100 - 200 | 0.05 - 0.35 |
| | | | Wear resistance | AH120 | MM | 100 - 200 | 0.05 - 0.35 |
| | Martensitic stainless steel (X20Cr13, etc.) | - 220 HB | First choice | AH3135 | MM | 100 - 300 | 0.05 - 0.3 |
| | | | Wear resistance | AH120 | MM | 100 - 300 | 0.05 - 0.3 |
| K | Gray cast iron (FC250 / 250, etc.) | 150 - 250 HB | First choice | AH120 | MM | 100 - 300 | 0.05 - 0.35 |
| | | | Fracture resistance | AH3135 | MM | 100 - 300 | 0.05 - 0.35 |
| | Ductile cast iron (FCD400 / 400-15, FCD600 / 600-3, etc.) | 150 - 250 HB | First choice | AH120 | MM | 80 - 250 | 0.05 - 0.3 |
| | | | Fracture resistance | AH3135 | MM | 80 - 250 | 0.05 - 0.3 |
| S | Titanium alloys (Ti-6Al-4V, etc.) | - 40 HRC | First choice | AH3135 | MM | 30 - 60 | 0.05 - 0.2 |
| | | | Wear resistance | AH120 | MM | 30 - 60 | 0.05 - 0.2 |
| | Heat-resistant alloys (Inconel718, etc.) | - 40 HRC | First choice | AH120 | MM | 20 - 50 | 0.05 - 0.15 |
| | | | Fracture resistance | AH3135 | MM | 20 - 50 | 0.05 - 0.15 |
| H | Hardened steel (SKD61 / X40CrMoV51, etc.) | 40 - 50 HRC | First choice | AH3135 | MM | 70 - 130 | 0.05 - 0.15 |
| | | | Wear resistance | AH120 | MM | 70 - 130 | 0.05 - 0.15 |

IMPORTANT NOTES

Installing MM inserts

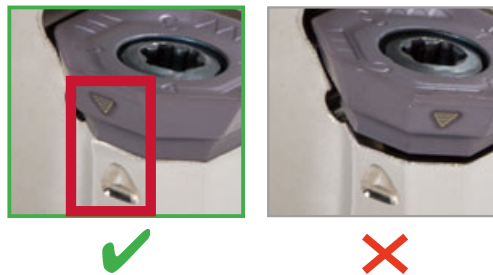
Before tightening the insert screw, make sure that the insert is correctly positioned in the pocket. If the screw is tightened with the insert not in place, the pocket may be damaged.

Do not use an excessive tightening torque as it may damage the pocket preventing proper positioning of the insert.



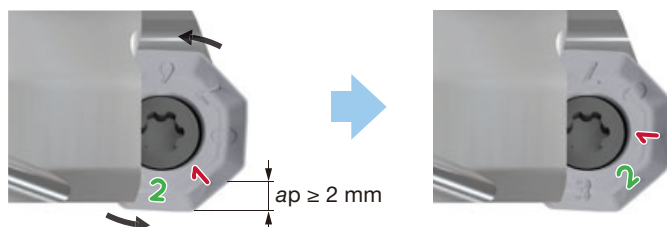
Installing MW (wiper) inserts

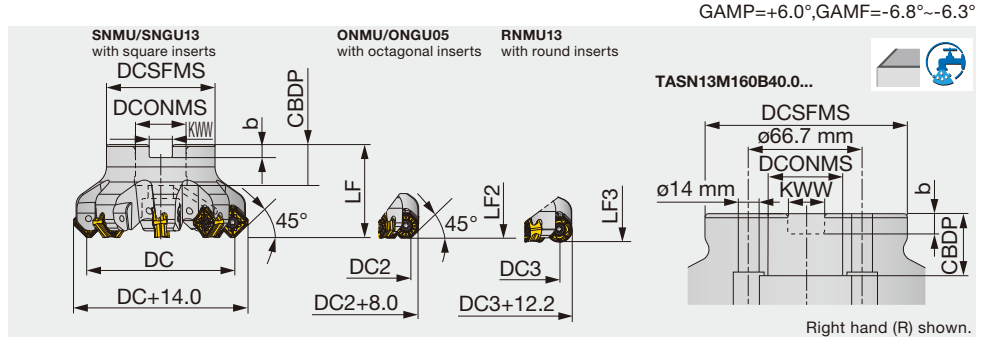
Wiper edge is identified with a ▼ inscribed on the insert flank. Make sure to match the ▼ mark to the ▲ mark on the cutter body when installing the wiper insert.



When indexing MM insert

When MM insert is used at a cutting depth of 2 mm or greater, the adjacent wiper is also engaged in the cut. Therefore, it is recommended that the insert is then rotated in the counter clockwise direction for indexing a new cutting edge.





| Designation | DC | DC2 | DC3 | CICT | DCSFMS | LF | LF2 | LF3 | DCONMS | CBDP | KWW | b | WT(kg) | Air hole |
|--------------------|-----|-----|-------|------|--------|----|------|------|--------|------|------|-----|--------|----------|
| TASN13M050B22.0R04 | 50 | 53 | 48.7 | 4 | 41 | 40 | 38.5 | 38.5 | 22 | 20 | 10.4 | 6.3 | 0.4 | With |
| TASN13M050B22.0R05 | 50 | 53 | 48.7 | 5 | 41 | 40 | 38.5 | 38.5 | 22 | 20 | 10.4 | 6.3 | 0.4 | With |
| TASN13M063B22.0R05 | 63 | 66 | 61.7 | 5 | 47 | 40 | 38.5 | 38.5 | 22 | 20 | 10.4 | 6.3 | 0.7 | With |
| TASN13M063B22.0R06 | 63 | 66 | 61.7 | 6 | 47 | 40 | 38.5 | 38.5 | 22 | 20 | 10.4 | 6.3 | 0.6 | With |
| TASN13M063B22.0R08 | 63 | 66 | 61.7 | 8 | 47 | 40 | 38.5 | 38.5 | 22 | 20 | 10.4 | 6.3 | 0.6 | With |
| TASN13M080B27.0R05 | 80 | 83 | 78.7 | 5 | 58 | 50 | 48.5 | 48.5 | 27 | 22 | 12.4 | 7 | 1.1 | With |
| TASN13M080B27.0R08 | 80 | 83 | 78.7 | 8 | 58 | 50 | 48.5 | 48.5 | 27 | 22 | 12.4 | 7 | 1.1 | With |
| TASN13M080B27.0R10 | 80 | 83 | 78.7 | 10 | 58 | 50 | 48.5 | 48.5 | 27 | 22 | 12.4 | 7 | 1.2 | With |
| TASN13J080B25.4R05 | 80 | 83 | 78.7 | 5 | 58 | 50 | 48.5 | 48.5 | 25.4 | 26 | 9.5 | 6 | 1.2 | With |
| TASN13J080B25.4R08 | 80 | 83 | 78.7 | 8 | 58 | 50 | 48.5 | 48.5 | 25.4 | 26 | 9.5 | 6 | 1.1 | With |
| TASN13J080B25.4R10 | 80 | 83 | 78.7 | 10 | 58 | 50 | 48.5 | 48.5 | 25.4 | 26 | 9.5 | 6 | 1.2 | With |
| TASN13M100B32.0R06 | 100 | 103 | 98.7 | 6 | 60 | 50 | 48.5 | 48.5 | 32 | 28.5 | 14.4 | 8 | 1.4 | With |
| TASN13M100B32.0R08 | 100 | 103 | 98.7 | 8 | 60 | 50 | 48.5 | 48.5 | 32 | 28.5 | 14.4 | 8 | 1.4 | With |
| TASN13M100B32.0R12 | 100 | 103 | 98.7 | 12 | 60 | 50 | 48.5 | 48.5 | 32 | 28.5 | 14.4 | 8 | 1.4 | With |
| TASN13J100B31.7R06 | 100 | 103 | 98.7 | 6 | 60 | 50 | 48.5 | 48.5 | 31.75 | 32 | 12.7 | 8 | 1.4 | With |
| TASN13J100B31.7R08 | 100 | 103 | 98.7 | 8 | 60 | 50 | 48.5 | 48.5 | 31.75 | 32 | 12.7 | 8 | 1.4 | With |
| TASN13J100B31.7R12 | 100 | 103 | 98.7 | 12 | 60 | 50 | 48.5 | 48.5 | 31.75 | 32 | 12.7 | 8 | 1.4 | With |
| TASN13M125B40.0R07 | 125 | 128 | 123.7 | 7 | 71 | 63 | 61.5 | 61.5 | 40 | 32 | 16.4 | 9 | 2.2 | With |
| TASN13M125B40.0R10 | 125 | 128 | 123.7 | 10 | 71 | 63 | 61.5 | 61.5 | 40 | 32 | 16.4 | 9 | 2.3 | With |
| TASN13M125B40.0R14 | 125 | 128 | 123.7 | 14 | 71 | 63 | 61.5 | 61.5 | 40 | 32 | 16.4 | 9 | 2.5 | With |
| TASN13J125B38.1R07 | 125 | 128 | 123.7 | 7 | 80 | 63 | 61.5 | 61.5 | 38.1 | 38 | 15.9 | 10 | 2.6 | With |
| TASN13J125B38.1R10 | 125 | 128 | 123.7 | 10 | 80 | 63 | 61.5 | 61.5 | 38.1 | 38 | 15.9 | 10 | 2.7 | With |
| TASN13J125B38.1R14 | 125 | 128 | 123.7 | 14 | 80 | 63 | 61.5 | 61.5 | 38.1 | 38 | 15.9 | 10 | 2.9 | With |
| TASN13M160B40.0R08 | 160 | 163 | 158.7 | 8 | 100 | 63 | 61.5 | 61.5 | 40 | 29 | 16.4 | 9 | 4.1 | Without |
| TASN13M160B40.0R12 | 160 | 163 | 158.7 | 12 | 100 | 63 | 61.5 | 61.5 | 40 | 29 | 16.4 | 9 | 4.2 | Without |
| TASN13J160B50.8R08 | 160 | 163 | 158.7 | 8 | 100 | 63 | 61.5 | 61.5 | 50.8 | 38 | 19 | 11 | 4.1 | Without |
| TASN13J160B50.8R12 | 160 | 163 | 158.7 | 12 | 100 | 63 | 61.5 | 61.5 | 50.8 | 38 | 19 | 11 | 4.2 | Without |

SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit (Optional) |
|--------------------|----------------|-----------------|----------------------|----------------------|----------------------|---------------------|
| TASN13M0**B22.0R0* | CSPB-4 | (H-TB2W) | (M-1000) | - | CM10X30H | (BLD IP15/S7) |
| TASN13*080B2*.R0* | CSPB-4 | (H-TB2W) | (M-1000) | - | CM12X30H | (BLD IP15/S7) |
| TASN13*100B3*.R0* | CSPB-4 | (H-TB2W) | (M-1000) | TMBA-M16H | - | (BLD IP15/S7) |
| TASN13*125B**.R** | CSPB-4 | (H-TB2W) | (M-1000) | TMBA-M20H | - | (BLD IP15/S7) |
| TASN13*160B0*.R** | CSPB-4 | (H-TB2W) | (M-1000) | - | - | (BLDIP15/M7) |

Recommended clamping torque (Torx size): 3.5 N·m (15IP)





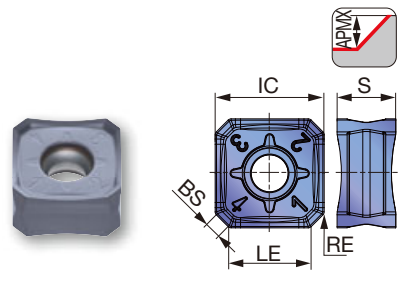
High Feed Milling

INSERTS

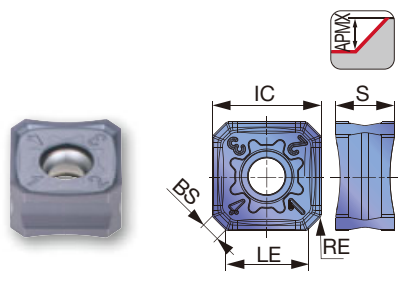


Face Milling

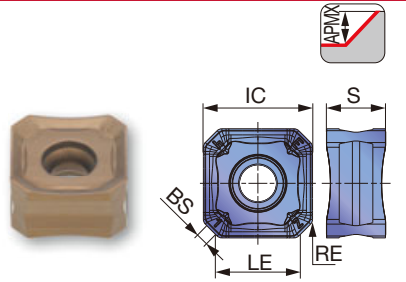
SNMU-MJ



SNGU-MJ



SNGU-MH

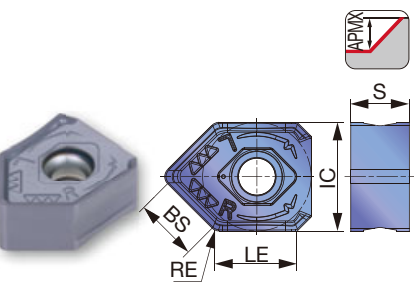


Shoulder Milling

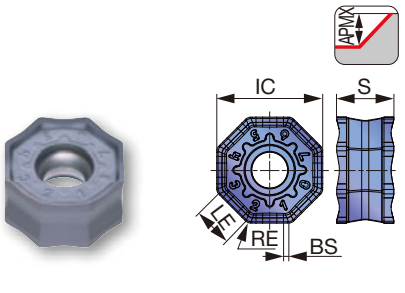


Slot Milling

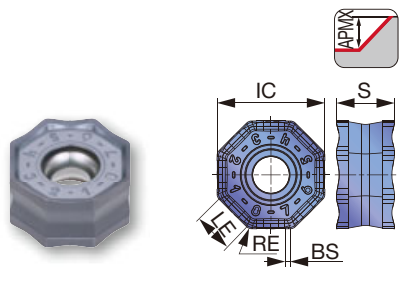
SNGU-W



ONMU-MJ



ONGU-MJ

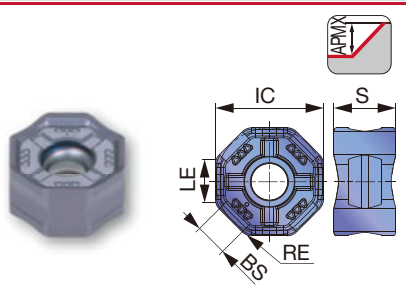


Profile Milling

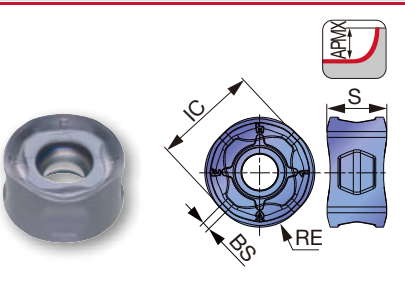


Chamfering, Counterbore

ONGU-W



RNMU-MJ



Approach angle



Others

| | | | | | | | | | |
|-------------------------|---|---|---|---|---|--|--|--|--|
| P Steel | ☆ | ★ | ☆ | ★ | | | | | |
| M Stainless | | ☆ | ★ | ★ | | | | | |
| K Cast iron | ★ | ☆ | | | ★ | | | | |
| N Non-ferrous | | | | | | | | | |
| S Superalloys | ★ | | ☆ | | | | | | |
| H Hard materials | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | LE | IC | S | BS |
|-----------------|-----|------|--------|--------|--------|-------|-------|-----|----|------|-----|
| | | | AH120 | AH3225 | AH3135 | T3225 | T1215 | | | | |
| SNMU1307ANEN-MJ | 0.5 | 6 | ● | ● | ● | ● | ● | 9.4 | 13 | 7 | 2 |
| SNGU1307ANEN-MJ | 0.5 | 6 | ● | ● | ● | ● | ● | 9.4 | 13 | 7 | 2 |
| SNGU1307ANEN-MH | 0.8 | 6 | | | | ● | | 9 | 13 | 7 | 2 |
| SNGU1307ANEN-W | 1.2 | 6 | ● | ● | ● | | | 9.6 | 13 | 7 | 7.5 |
| ONMU0507ANEN-MJ | 0.8 | 3.4 | ● | ● | ● | ● | ● | 4.9 | 13 | 7 | 0.7 |
| ONGU0507ANEN-MJ | 0.8 | 3.4 | ● | ● | ● | ● | ● | 4.9 | 13 | 7 | 0.7 |
| ONGU0507ANEN-W | 1.6 | 3.4 | ● | ● | ● | | | 5 | 13 | 7.44 | 3.9 |
| RNMU1307ZNER-MJ | 6 | 6 | ● | ● | ● | ● | ● | - | 13 | 7.26 | 1 |

● : Line up

STANDARD CUTTING CONDITIONS

SNMU / SNGU / ONMU / ONGU

| ISO | Workpiece materials | Hardness | Priority | Grades | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|---------------------------------------|--|----------------------------------|---------------------|--------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, etc. C15, etc. | 200 - 300HB | First choice | AH3225 | MJ | 100 - 250 | 0.1 - 0.5 |
| | | | For wear resistance | T3225 | MJ | 200 - 350 | 0.1 - 0.4 |
| | High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | 150 - 300HB | First choice | AH3225 | MJ | 100 - 250 | 0.1 - 0.4 |
| | | | For wear resistance | T3225 | MJ | 180 - 300 | 0.1 - 0.4 |
| Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | MJ | 100 - 200 | 0.1 - 0.4 | |
| | | For wear resistance | T3225 | MJ | 150 - 250 | 0.1 - 0.4 | |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | AH3135 | MJ | 100 - 200 | 0.1 - 0.35 |
| | | | For wear resistance | T3225 | MJ | 100 - 250 | 0.1 - 0.3 |
| | Cast stainless steel SCH20XNb, 1.4849, etc. | - | First choice | T3225 | MH | 60 - 120 | 0.1 - 0.3 |
| For low cutting force | | | AH3135 | MJ | 60 - 120 | 0.1 - 0.3 | |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250HB | First choice | T1215 | MJ | 100 - 300 | 0.1 - 0.4 |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 250HB | First choice | AH120 | MJ | 100 - 250 | 0.1 - 0.5 |
| First choice | | | T1215 | MJ | 100 - 300 | 0.1 - 0.4 | |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | First choice | AH3135 | MJ | 30 - 60 | 0.1 - 0.3 |
| | Heat-resistant alloys Inconel718, etc. | - 40HRC | First choice | AH120 | MJ | 10 - 40 | 0.05 - 0.15 |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | First choice | AH3225 | MJ | 80 - 130 | 0.1 - 0.2 |
| | | SKD11, etc. X153CrMoV12, etc. | First choice | AH120 | MJ | 50 - 70 | 0.03 - 0.1 |

RNMU

| ISO | Workpiece materials | Hardness | Priority | Grades | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|---------------------------------------|--|----------------------------------|---------------------|--------|--------------|--------------------------|--|--|
| P | Low carbon steel S15C, etc. C15, etc. | 200 - 300HB | First choice | AH3225 | MJ | 100 - 250 | | |
| | | | For wear resistance | T3225 | MJ | 200 - 350 | | |
| | High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | 150 - 300HB | First choice | AH3225 | MJ | 100 - 250 | | ※ap = 6 mm : 0.1 - 0.3 |
| | | | For wear resistance | T3225 | MJ | 180 - 300 | | ※ap = 2 mm : 0.4 - 0.8 ※ap = 1 mm : 0.8 - 1.5 |
| Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | MJ | 100 - 200 | | | |
| | | For wear resistance | T3225 | MJ | 150 - 250 | | | |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | AH3135 | MJ | 100 - 200 | ※ap = 6 mm : 0.1 - 0.25 | |
| | | | For wear resistance | T3225 | MJ | 100 - 250 | ※ap = 2 mm : 0.3 - 0.7 ※ap = 1 mm : 0.6 - 1.3 | |
| | Cast stainless steel SCH20XNb, 1.4849, etc. | - | First choice | T3225 | MJ | 60 - 120 | ※ap = 2 mm : 0.2 - 0.4 | |
| For fracture resistance | | | AH3135 | MJ | 60 - 120 | ※ap = 1 mm : 0.3 - 0.8 | | |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250HB | First choice | AH120 | MJ | 100 - 300 | | |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 250HB | First choice | T1215 | MJ | 100 - 250 | | ※ap = 6 mm : 0.1 - 0.3 ※ap = 2 mm : 0.4 - 0.8 ※ap = 1 mm : 0.8 - 1.5 |
| First choice | | | AH120 | MJ | 100 - 300 | | | |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | First choice | AH3135 | MJ | 30 - 60 | ap = 1 mm : 0.15 - 0.8 | |
| | Heat-resistant alloys Inconel718, etc. | - 40HRC | First choice | AH120 | MJ | 10 - 40 | ap = 1 mm : 0.05 - 0.3 | |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | First choice | AH3225 | MJ | 80 - 130 | ap = 1 mm : 0.1 - 0.25 | |
| | | SKD11, etc. X153CrMoV12, etc. | First choice | AH120 | MJ | 50 - 70 | ap = 0.5 mm : 0.03 - 0.1 | |

※ When using T3225 or T1215, decrease the feed per tooth (fz) to 80% of the above mentioned value.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

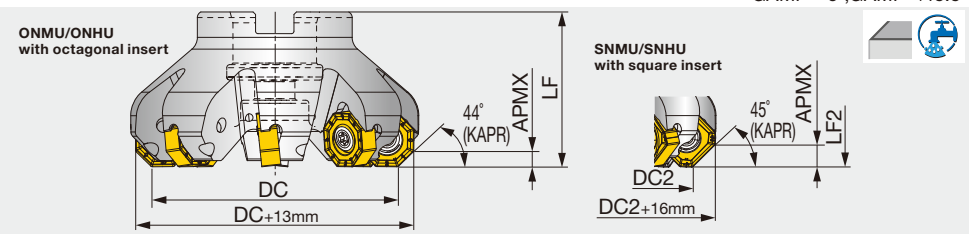


TAN07

Face mill, with screw clamp system

GAMP=-6°, GAMF=+15.5°

- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling



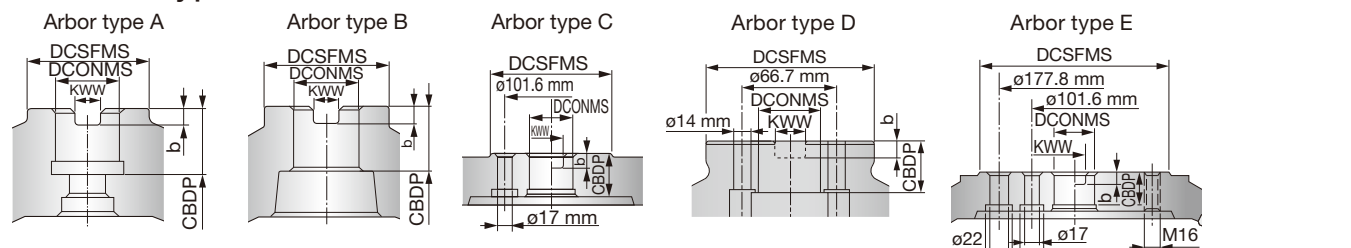
| Designation | DC | DC2 | CICT | DCSFMS | LF | LF2 | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert | Arbor type |
|-------------------|-----|-------|------|--------|----|------|--------|------|------|-----|--------|----------|--------------|------------|
| TAN07R063M22.0E05 | 63 | 60.3 | 5 | 41 | 40 | 41.4 | 22 | 20 | 10.4 | 6.3 | 0.5 | with | SN*U/ON*U... | A |
| TAN07R063M22.0E06 | 63 | 60.3 | 6 | 41 | 40 | 41.4 | 22 | 20 | 10.4 | 6.3 | 0.5 | with | SN*U/ON*U... | A |
| TAN07R080M25.4-06 | 80 | 77.3 | 6 | 50 | 50 | 51.4 | 25.4 | 26 | 9.5 | 6 | 1 | with | SN*U/ON*U... | A |
| TAN07R080M25.4-08 | 80 | 77.3 | 8 | 50 | 50 | 51.4 | 25.4 | 26 | 9.5 | 6 | 1 | with | SN*U/ON*U... | A |
| TAN07R080M27.0E06 | 80 | 77.3 | 6 | 50 | 50 | 51.4 | 27 | 22 | 12.4 | 7 | 1 | with | SN*U/ON*U... | A |
| TAN07R080M27.0E08 | 80 | 77.3 | 8 | 50 | 50 | 51.4 | 27 | 22 | 12.4 | 7 | 1 | with | SN*U/ON*U... | A |
| TAN07R100M31.7-07 | 100 | 97.3 | 7 | 60 | 50 | 51.4 | 31.75 | 32 | 12.7 | 8 | 1.5 | with | SN*U/ON*U... | B |
| TAN07R100M31.7-10 | 100 | 97.3 | 10 | 60 | 50 | 51.4 | 31.75 | 32 | 12.7 | 8 | 1.5 | with | SN*U/ON*U... | B |
| TAN07R100M32.0E07 | 100 | 97.3 | 7 | 60 | 50 | 51.4 | 32 | 28.5 | 14.4 | 8 | 1.5 | with | SN*U/ON*U... | B |
| TAN07R100M32.0E10 | 100 | 97.3 | 10 | 60 | 50 | 51.4 | 32 | 28.5 | 14.4 | 8 | 1.5 | with | SN*U/ON*U... | B |
| TAN07R125M38.1-08 | 125 | 122.3 | 8 | 80 | 63 | 64.4 | 38.1 | 38 | 15.9 | 10 | 2.5 | with | SN*U/ON*U... | B |
| TAN07R125M38.1-12 | 125 | 122.3 | 12 | 80 | 63 | 64.4 | 38.1 | 38 | 15.9 | 10 | 2.5 | with | SN*U/ON*U... | B |
| TAN07R125M40.0E08 | 125 | 122.3 | 8 | 71 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 2.5 | with | SN*U/ON*U... | B |
| TAN07R125M40.0E12 | 125 | 122.3 | 12 | 71 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 2.5 | with | SN*U/ON*U... | B |
| TAN07R160M40.0E10 | 160 | 157.3 | 10 | 100 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 4 | without | SN*U/ON*U... | D |
| TAN07R160M40.0E15 | 160 | 157.3 | 15 | 100 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 4 | without | SN*U/ON*U... | D |
| TAN07R160M50.8-10 | 160 | 157.3 | 10 | 100 | 63 | 64.4 | 50.8 | 38 | 19 | 11 | 4 | without | SN*U/ON*U... | B |
| TAN07R160M50.8-15 | 160 | 157.3 | 15 | 100 | 63 | 64.4 | 50.8 | 38 | 19 | 11 | 4 | without | SN*U/ON*U... | B |
| TAN07R200M47.6-12 | 200 | 197.3 | 12 | 130 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 6.6 | without | SN*U/ON*U... | C |
| TAN07R200M47.6-18 | 200 | 197.3 | 18 | 130 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 6.7 | without | SN*U/ON*U... | C |
| TAN07R200M60.0E12 | 200 | 197.3 | 12 | 135 | 63 | 64.4 | 60 | 38 | 25.7 | 14 | 6.5 | without | SN*U/ON*U... | C |
| TAN07R200M60.0E18 | 200 | 197.3 | 18 | 135 | 63 | 64.4 | 60 | 38 | 25.7 | 14 | 6.5 | without | SN*U/ON*U... | C |
| TAN07R250M47.6-15 | 250 | 247.3 | 15 | 130 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 9.3 | without | SN*U/ON*U... | C |
| TAN07R250M47.6-21 | 250 | 247.3 | 21 | 130 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 9.4 | without | SN*U/ON*U... | C |
| TAN07R250M60.0E15 | 250 | 247.3 | 15 | 130 | 63 | 64.4 | 60 | 38 | 25.7 | 14 | 9 | without | SN*U/ON*U... | C |
| TAN07R250M60.0E21 | 250 | 247.3 | 21 | 130 | 63 | 64.4 | 60 | 38 | 25.7 | 14 | 9 | without | SN*U/ON*U... | C |
| TAN07R315M47.6-18 | 315 | 312.3 | 18 | 220 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 17.9 | without | SN*U/ON*U... | C |
| TAN07R315M47.6-24 | 315 | 312.3 | 24 | 220 | 63 | 64.4 | 47.625 | 38 | 25.4 | 14 | 18 | without | SN*U/ON*U... | C |
| TAN07R315M60.0E18 | 315 | 312.3 | 18 | 220 | 80 | 81.4 | 60 | 38 | 25.7 | 14 | 18 | without | SN*U/ON*U... | E |
| TAN07R315M60.0E24 | 315 | 312.3 | 24 | 220 | 80 | 81.4 | 60 | 38 | 25.7 | 14 | 18 | without | SN*U/ON*U... | E |

Dimension when using positive type inserts (OWMT)

| Designation | OWMT-ML | | | OWMT-HJ | | | |
|---------------|---------|------|-----|---------|-------|-------|------|
| | DC3 | DCX3 | LF3 | DC4 | DC4-2 | DCX4 | LF4 |
| TAN07R063M... | 63.5 | 76 | 41 | 55.7 | 67.2 | 76.4 | 41.4 |
| TAN07R080M... | 80.5 | 93 | 51 | 72.7 | 84.2 | 93.4 | 51.4 |
| TAN07R100M... | 100.5 | 113 | 51 | 92.7 | 104.2 | 113.4 | 51.4 |
| TAN07R125M... | 125.5 | 138 | 64 | 117.7 | 129.2 | 138.4 | 64.4 |
| TAN07R160M... | 160.5 | 173 | 64 | 152.7 | 164.2 | 173.4 | 64.4 |
| TAN07R200M... | 200.5 | 213 | 64 | 192.7 | 204.2 | 213.4 | 64.4 |
| TAN07R250M... | 250.5 | 263 | 64 | 242.7 | 254.2 | 263.4 | 64.4 |
| TAN07R315M... | 315.5 | 328 | 64 | 307.7 | 319.2 | 328.4 | 64.4 |

Note: OWMT08 inserts can be only used with screw on type cutters.

Arbor type

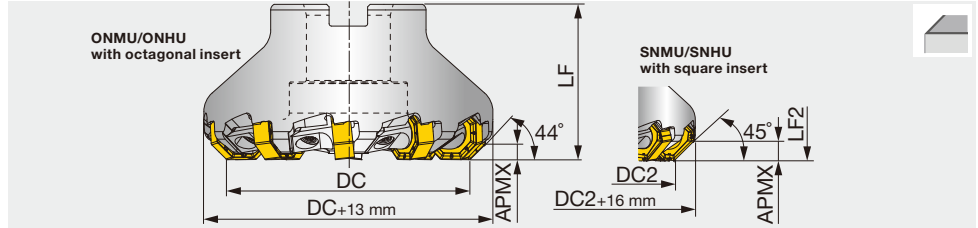


SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit (Optional) |
|--------------------|------------------------|-----------------|----------------------|----------------------|---------------------|
| TAN07R063M22.0... | SRM5X0.8IP20X+ACROLYTE | (H-TB) | - | CM10X30H | (BLD IP20/S7) |
| TAN07R080M25.4... | SRM5X0.8IP20X+ACROLYTE | (H-TB) | - | CM12X30H | (BLD IP20/S7) |
| TAN07R100M31.7... | SRM5X0.8IP20X+ACROLYTE | (H-TB) | TMBA-M16H | - | (BLD IP20/S7) |
| TAN07R125M38.1... | SRM5X0.8IP20X+ACROLYTE | (H-TB) | TMBA-M20H | - | (BLD IP20/S7) |
| TAN07R160 - 315... | SRM5X0.8IP20X+ACROLYTE | (H-TB) | - | - | (BLD IP20/M7) |

Recommended clamping torque (Torx size):
 7.5 N·m (20IP)

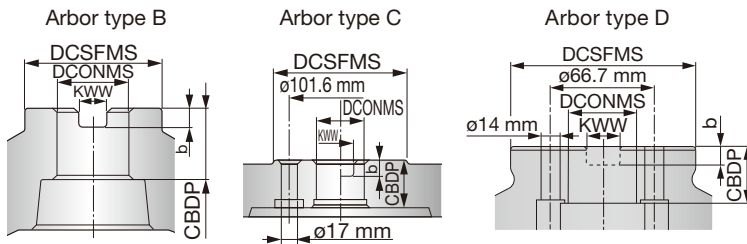
Reference pages: Inserts → **H090**, Standard cutting conditions → **H091**



| Designation | DC | DC2 | CICT | DCSFMS | LF | LF2 | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert | Arbor type |
|--------------------|-----|-------|------|--------|----|------|--------|------|------|-----|--------|----------|--------------|------------|
| TAN07R063M22.0E08W | 63 | 60.3 | 8 | 41 | 40 | 41.4 | 22 | 20 | 10.4 | 6.3 | 0.6 | Without | SN*U/ON*U... | B |
| TAN07R080M25.4-10W | 80 | 77.3 | 10 | 50 | 50 | 51.4 | 25.4 | 26 | 9.5 | 6 | 1 | Without | SN*U/ON*U... | B |
| TAN07R080M27.0E10W | 80 | 77.3 | 10 | 50 | 50 | 51.4 | 27 | 25 | 12.4 | 7 | 1.1 | Without | SN*U/ON*U... | B |
| TAN07R100M31.7-14W | 100 | 97.3 | 14 | 60 | 50 | 51.4 | 31.75 | 32 | 12.7 | 8 | 1.3 | Without | SN*U/ON*U... | B |
| TAN07R100M32.0E14W | 100 | 97.3 | 14 | 60 | 50 | 51.4 | 32 | 28.5 | 14.4 | 8 | 1.6 | Without | SN*U/ON*U... | B |
| TAN07R125M38.1-18W | 125 | 122.3 | 18 | 80 | 63 | 64.4 | 38.1 | 38 | 15.9 | 10 | 2.8 | Without | SN*U/ON*U... | B |
| TAN07R125M40.0E18W | 125 | 122.3 | 18 | 71 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 2.5 | Without | SN*U/ON*U... | B |
| TAN07R160M50.8-22W | 160 | 157.3 | 22 | 100 | 63 | 64.4 | 50.8 | 38 | 19 | 11 | 4 | Without | SN*U/ON*U... | B |
| TAN07R160M40.0E22W | 160 | 157.3 | 22 | 100 | 63 | 64.4 | 40 | 29 | 16.4 | 9 | 3.6 | Without | SN*U/ON*U... | D |
| TAN07R200M60.0E28W | 200 | 197.3 | 28 | 135 | 63 | 64.4 | 60 | 39 | 25.7 | 14 | 5.8 | Without | SN*U/ON*U... | C |

OWMT insert cannot be used with a wedge clamp type cutter.

Arbor type



SPARE PARTS

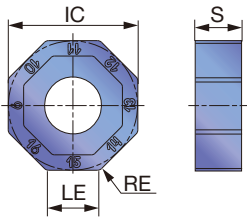
| Designation | Grip (Optional) | Wedge | Wedge fixing screw | Torx bit (Optional) |
|-------------|-----------------|------------------|--------------------|---------------------|
| TAN07-W | (H-TBS) | CL ARM-10-TUNG I | DS-6P | (BLD IP15/S7) |



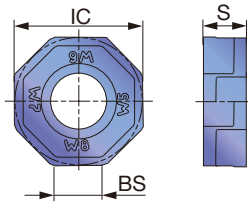


INSERT

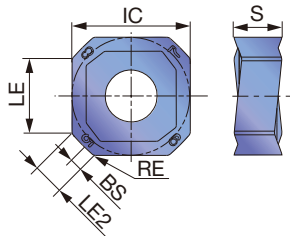
ONMU/ONHU0705-MJ / -ML



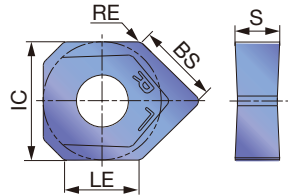
ONHU0705-W



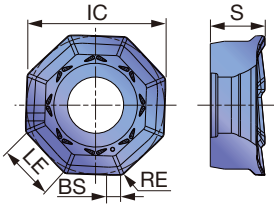
SNMU/SNHU1706 -MJ / -ML



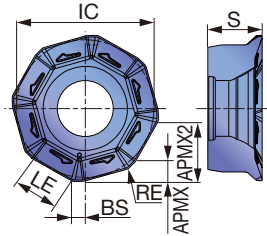
SNHU1706-W



OWMT0807-ML



OWMT0807-HJ



| | | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|--|--|---|--|--|--|--|--|--|--|--|--|--|--|
| P | Steel | | | ☆ | ★ | ★ | | | ★ | | | | | | | | | | | |
| M | Stainless | | ☆ | | | ★ | | | ★ | | | | | | | | | | | |
| K | Cast iron | ★ | | | ☆ | | | | ★ | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | | | |
| S | Superalloys | | ☆ | | | ☆ | | | | | | | | | | | | | | |
| H | Hard materials | | | | | ☆ | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice



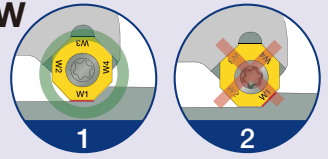
| Designation | RE | APMX | Coated | | | | | | | LE | S | LE2 | IC | BS | APMX2 | | | |
|------------------|-----|------|--------|-------|-------|-------|--------|-------|-------|----|---|-----|------|------|-------|-------|-----|-----|
| | | | AH120 | AH130 | AH140 | AH725 | AH3135 | T1115 | T1215 | | | | | | | T3225 | | |
| ONMU0705ANPN-MJ | 0.8 | 4.75 | | | ● | ● | ● | ● | ● | | | | 7.2 | 6.2 | - | 17.3 | - | - |
| ONHU0705ANPN-MJ | 0.8 | 4.75 | | | ● | ● | | | | | | | 7.2 | 6.2 | - | 17.3 | - | - |
| ONMU0705ANPN-ML | 0.8 | 4.75 | ● | | | | ● | | | | | | 7.2 | 6.2 | - | 17.3 | - | - |
| ONHU0705ANTN-ML | 0.8 | 4.75 | ● | | ● | ● | | | | | | | 7.2 | 6.2 | - | 17.3 | - | - |
| ONHU0705ANPR-W * | - | 4.75 | ● | | | | | | | | | | 7.2 | 5.8 | - | 17.5 | 6.4 | - |
| OWMT0807ZNER-HJ | 1.2 | 1.5 | | | | | | ● | | | | | - | 7.4 | - | 19 | 1 | 7.5 |
| OWMT0807AAER-ML | 0.8 | 3.5 | | ● | | | | ● | | | | | 5.2 | 7.4 | - | 18.9 | 1.2 | - |
| SNMU1706ANPR-MJ | 0.8 | 7.5 | | | ● | ● | ● | | | ● | ● | | 11 | 6.98 | 4.4 | 17.3 | 1.8 | - |
| SNHU1706ANPR-MJ | 0.8 | 7.5 | | | ● | ● | | | | | | | 11 | 6.98 | 4.4 | 17.3 | 1.8 | - |
| SNMU1706ANTR-ML | 0.8 | 7.5 | ● | | | | | ● | | | | | 11 | 6.98 | 4.4 | 17.3 | 1.8 | - |
| SNHU1706ANTR-ML | 0.8 | 7.5 | ● | | | | | | | | | | 11 | 6.98 | 4.4 | 17.3 | 1.8 | - |
| SNHU1706ANFN-W * | 0.4 | 7.5 | ● | | | | | | | | | | 17.3 | 6.5 | - | 17.3 | 11 | - |

* Pay attention to the wiper insert installation procedure below.

●: Line up

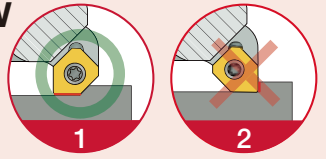
Attention for wiper inserts

ONHU0705ANPR-W



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.
Feed rate: $f < 5.5$ mm/rev

SNHU1706ANFN-W



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.
Feed rate: $f < 9.5$ mm/rev

STANDARD CUTTING CONDITIONS

Negative type

| ISO | Workpiece material | Hardness | Priority | Recommendation | | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---|--------------|---------------------|----------------|-------------|-----------------------------|-----------------------------|
| | | | | Grade | Chipbreaker | | |
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200 HB | First choice | AH3135 | MJ | 100 - 250 | 0.2 - 0.5 |
| | | - 200 HB | Wear resistance | T3225 | MJ | 200 - 350 | 0.2 - 0.4 |
| | | - 200 HB | Low cutting force | AH3135 | ML | 100 - 250 | 0.2 - 0.4 |
| | High carbon steel S45C, S55C, etc. C45, C55, etc. | 200 - 300 HB | First choice | AH3135 | MJ | 100 - 230 | 0.2 - 0.4 |
| | | 200 - 300 HB | Wear resistance | T3225 | MJ | 180 - 300 | 0.2 - 0.4 |
| | | 200 - 300 HB | Low cutting force | AH3135 | ML | 100 - 230 | 0.2 - 0.4 |
| | Alloy steel SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc. | 150 - 330 HB | First choice | AH3135 | MJ | 100 - 200 | 0.2 - 0.4 |
| | | 150 - 330 HB | Wear resistance | T3225 | MJ | 150 - 250 | 0.2 - 0.4 |
| | | 150 - 330 HB | Low cutting force | AH3135 | ML | 100 - 200 | 0.2 - 0.4 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | MJ | 100 - 200 | 0.1 - 0.3 |
| | | - 200 HB | Wear resistance | T3225 | MJ | 100 - 250 | 0.1 - 0.3 |
| K | Grey cast iron FC350, FC450 etc. GG35, GG45, etc. | 150 - 250 HB | First choice | T1215 | MJ | 150 - 300 | 0.1 - 0.5 |
| | | 150 - 250 HB | Fracture resistance | AH725 | MJ | 100 - 250 | 0.1 - 0.5 |
| | | 150 - 250 HB | Low cutting force | AH120 | ML | 100 - 250 | 0.1 - 0.5 |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 300 HB | First choice | T1215 | MJ | 100 - 300 | 0.1 - 0.5 |
| | | 150 - 300 HB | Fracture resistance | AH725 | MJ | 80 - 200 | 0.1 - 0.5 |
| | | 150 - 300 HB | Low cutting force | AH120 | ML | 80 - 200 | 0.1 - 0.5 |
| H | Hardened steel | 40 - 50 HRC | First choice | AH725 | MJ | 80 - 130 | 0.1 - 0.2 |
| | | 50 - 60 HRC | First choice | AH725 | MJ | 50 - 70 | 0.05 - 0.1 |

Positive type

| ISO | Workpiece material | Hardness | Priority | Grade | Cutting speed Vc (m/min) | Feed per tooth : fz (mm/t) | |
|----------|---|--------------|---------------------|--------|-----------------------------|----------------------------|-------------|
| | | | | | | ML | HJ* |
| P | Low carbon steel S15C, SS400, etc. C15E, etc. | - 200 HB | First choice | AH3135 | 100 - 300 | 0.1 - 0.4 | 0.5 - 1.5 |
| | | - 200 HB | Fracture resistance | AH130 | 100 - 300 | 0.1 - 0.4 | - |
| | High carbon steel S45C, S55C, etc. C45, C55, etc. | 200 - 300 HB | First choice | AH3135 | 100 - 230 | 0.1 - 0.3 | 0.5 - 1.5 |
| | | 200 - 300 HB | Fracture resistance | AH130 | 100 - 230 | 0.1 - 0.3 | - |
| M | Alloy steel SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc. | 150 - 330 HB | First choice | AH3135 | 100 - 200 | 0.1 - 0.3 | 0.5 - 1.5 |
| | | 150 - 330 HB | Fracture resistance | AH130 | 100 - 200 | 0.1 - 0.3 | - |
| K | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | 100 - 150 | 0.1 - 0.3 | 0.3 - 0.7 |
| | | - 200 HB | Fracture resistance | AH130 | 100 - 150 | 0.1 - 0.3 | - |
| K | Grey cast iron FC350, FC450 etc. GG35, GG45, etc. | 150 - 250 HB | First choice | AH3135 | 100 - 250 | 0.1 - 0.4 | 0.5 - 1.5 |
| | | 150 - 250 HB | Fracture resistance | AH130 | 100 - 250 | 0.1 - 0.4 | - |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 250 HB | First choice | AH3135 | 80 - 200 | 0.1 - 0.3 | 0.5 - 1.5 |
| | | 150 - 250 HB | Fracture resistance | AH130 | 80 - 200 | 0.1 - 0.3 | - |
| S | Titanium alloy Ti-6Al-4V, etc. | - HRC 40 | First choice | AH3135 | 30 - 60 | 0.1 - 0.3 | 0.3 - 0.7 |
| | | - HRC 40 | Fracture resistance | AH130 | 30 - 60 | 0.1 - 0.3 | - |
| | Heat resistant alloy Inconel718, etc. | - HRC 40 | First choice | AH3135 | 10 - 40 | 0.05 - 0.15 | 0.1 - 0.3 |
| | | - HRC 40 | Fracture resistance | AH130 | 10 - 40 | 0.05 - 0.15 | - |
| H | Hardened steel | 40 - 50 HRC | First choice | AH3135 | 80 - 130 | - | 0.1 - 0.3 |
| | | 50 - 60 HRC | First choice | AH3135 | 50 - 70 | - | 0.03 - 0.07 |

* Apply 20% of recommended feed when using HJ insert with ap over 1.5 mm.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





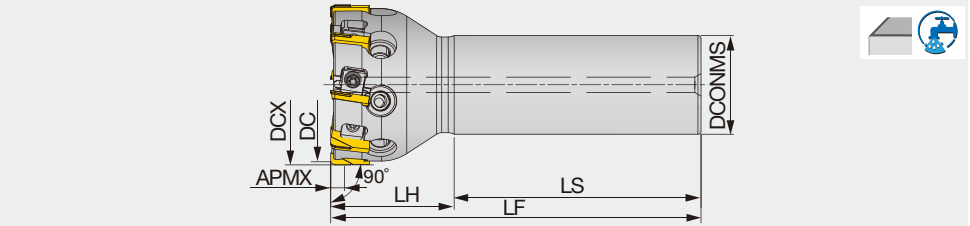
TUNGSPRILL

EPYD06



Face milling cutter for non-ferrous applications, shank type, with PCD inserts

GAMP = +9°, GAMF = +4°



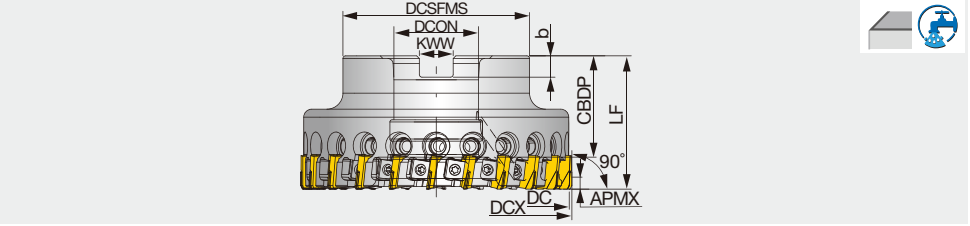
| Designation | APMX | DC | DCX | CICT | DCONMS | LF | LH | LS | WT(kg) | Air hole | RPMX(min ⁻¹) | Insert |
|--------------------|------|----|-----|------|--------|-----|----|----|--------|----------|--------------------------|-------------|
| EPYD06M050C32.0R06 | 4.5 | 50 | 52 | 6 | 32 | 120 | 40 | 80 | 0.91 | With | 20,000 | YDEN0603... |
| EPYD06M050C32.0R08 | 4.5 | 50 | 52 | 8 | 32 | 120 | 40 | 80 | 0.9 | With | 20,000 | YDEN0603... |



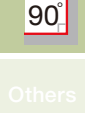
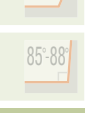
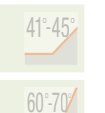
TPYD06

Face milling cutter for non-ferrous applications, bore type, with PCD inserts

GAMP = +9°, GAMF = +4°



| Designation | APMX | DC | DCX | CICT | DCSFMS | LF | DCON | CBDP | KWW | b | WT(kg) | Air hole | RPMX(min ⁻¹) | Insert |
|--------------------|------|-----|-----|------|--------|----|-------|------|------|-----|--------|----------|--------------------------|-------------|
| TPYD06M063B22.0R08 | 4.5 | 63 | 65 | 8 | 45 | 40 | 22 | 20 | 10.4 | 6.3 | 0.59 | With | 19,000 | YDEN0603... |
| TPYD06M063B22.0R10 | 4.5 | 63 | 65 | 10 | 45 | 40 | 22 | 20 | 10.4 | 6.3 | 0.57 | With | 19,000 | YDEN0603... |
| TPYD06M080B27.0R10 | 4.5 | 80 | 82 | 10 | 60 | 50 | 27 | 22 | 12.4 | 7 | 1.3 | With | 17,000 | YDEN0603... |
| TPYD06M080B27.0R16 | 4.5 | 80 | 82 | 16 | 60 | 50 | 27 | 22 | 12.4 | 7 | 1.24 | With | 17,000 | YDEN0603... |
| TPYD06J080B25.4R10 | 4.5 | 80 | 82 | 10 | 60 | 50 | 25.4 | 26 | 9.5 | 6 | 1.31 | With | 17,000 | YDEN0603... |
| TPYD06J080B25.4R16 | 4.5 | 80 | 82 | 16 | 60 | 50 | 25.4 | 26 | 9.5 | 6 | 1.26 | With | 17,000 | YDEN0603... |
| TPYD06M100B32.0R12 | 4.5 | 100 | 102 | 12 | 70 | 50 | 32 | 25 | 14.4 | 8 | 1.85 | With | 15,000 | YDEN0603... |
| TPYD06M100B32.0R22 | 4.5 | 100 | 102 | 22 | 70 | 50 | 32 | 25 | 14.4 | 8 | 1.78 | With | 15,000 | YDEN0603... |
| TPYD06J100B31.7R12 | 4.5 | 100 | 102 | 12 | 70 | 50 | 31.75 | 32 | 12.7 | 8 | 1.84 | With | 15,000 | YDEN0603... |
| TPYD06J100B31.7R22 | 4.5 | 100 | 102 | 22 | 70 | 50 | 31.75 | 32 | 12.7 | 8 | 1.76 | With | 15,000 | YDEN0603... |
| TPYD06M125B40.0R14 | 4.5 | 125 | 127 | 14 | 90 | 60 | 40 | 32 | 16.4 | 9 | 3.59 | With | 14,000 | YDEN0603... |
| TPYD06M125B40.0R26 | 4.5 | 125 | 127 | 26 | 90 | 60 | 40 | 32 | 16.4 | 9 | 3.48 | With | 14,000 | YDEN0603... |
| TPYD06J125B38.1R14 | 4.5 | 125 | 127 | 14 | 90 | 60 | 38.1 | 38 | 15.9 | 10 | 3.61 | With | 14,000 | YDEN0603... |
| TPYD06J125B38.1R26 | 4.5 | 125 | 127 | 26 | 90 | 60 | 38.1 | 38 | 15.9 | 10 | 3.56 | With | 14,000 | YDEN0603... |
| TPYD06M160B40.0R20 | 4.5 | 160 | 162 | 20 | 90 | 60 | 40 | 32 | 16.4 | 9 | 5.34 | With | 12,000 | YDEN0603... |
| TPYD06M160B40.0R34 | 4.5 | 160 | 162 | 34 | 90 | 60 | 40 | 32 | 16.4 | 9 | 5.2 | With | 12,000 | YDEN0603... |
| TPYD06J160B38.1R20 | 4.5 | 160 | 162 | 20 | 90 | 60 | 38.1 | 38 | 15.9 | 10 | 5.43 | With | 12,000 | YDEN0603... |
| TPYD06J160B38.1R34 | 4.5 | 160 | 162 | 34 | 90 | 60 | 38.1 | 38 | 15.9 | 10 | 5.29 | With | 12,000 | YDEN0603... |



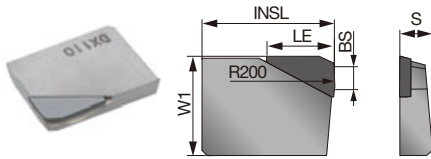
SPARE PARTS



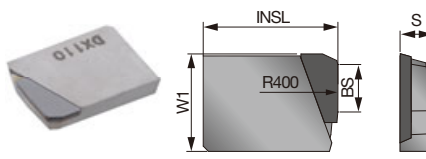
| Designation | Insert locking wedge | Wedge fixing screw | Adjusting cam | Torx bit | Cam tightening screw | Wrench | Grip | Shell locking bolt |
|--------------------|----------------------|--------------------|---------------|-------------|----------------------|--------|--------|--------------------|
| EPYD06M050C32.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | - |
| TPYD06M063B22.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | CM10x30H |
| TPYD06*080B27.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | CM12x30H |
| TPYD06M100B32.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | CM16x40H |
| TPYD06J100B31.7R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | TMBA-M16H |
| TPYD06*125B40.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | TMBA-M20H |
| TPYD06*160B40.0R** | WF875N | DS-5T | AJC08 | BLDT10/S7-A | SSHM4-4 | P-2 | H-TB2W | TMBA-M20H |

INSERT

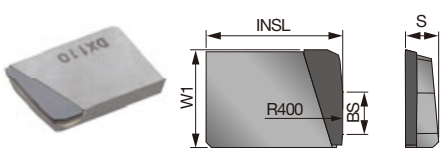
YDEN0603PD(F/S)R-D



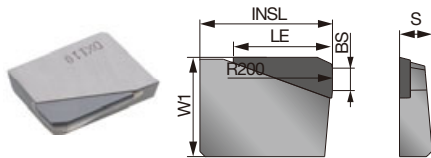
YDEN0603PDFR-WD



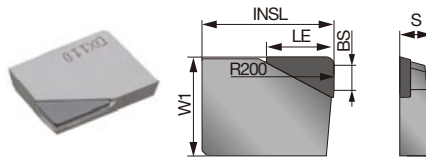
YDEN0603PDFR-BD



YDEN0603PDCR-LD



YDEN0603(04/08)PDFR-D



| | | | |
|---|----------------|---|--|
| P | Steel | | |
| M | Stainless | | |
| K | Cast iron | | |
| N | Non-ferrous | ★ | |
| S | Superalloys | | |
| H | Hard materials | | |

★ : First choice

| Designation | APMX | Edge prep. | PCD | | | | | | | | | | | | |
|------------------|------|------------|-------|------|---|----|----|--|-----|------|-----|-----|-----|--|--|
| | | | DX110 | | | | | | | | | | | | |
| | | | W1 | INSL | S | BS | LE | | | | | | | | |
| YDEN0603PDFR-D | 4.5 | Without | ● | | | | | | 9.5 | 12.7 | 3.1 | 2.2 | 6.5 | | |
| YDEN0603PDSR-D | 4.5 | With | ● | | | | | | 9.5 | 12.7 | 3.1 | 2.2 | 6.5 | | |
| YDEN060304PDFR-D | 4.5 | Without | ● | | | | | | 9.5 | 12.7 | 3.1 | 2.8 | 6.5 | | |
| YDEN060308PDFR-D | 4.5 | Without | ● | | | | | | 9.5 | 12.7 | 3.1 | 2.4 | 6.5 | | |
| YDEN0603PDCR-LD | 7.5 | With* | ● | | | | | | 9.5 | 12.7 | 3.1 | 2.2 | 9.5 | | |
| YDEN0603PDFR-WD | - | Without | ● | | | | | | 9.2 | 12.8 | 3.1 | 4.5 | - | | |
| YDEN0603PDFR-BD | - | Without | ● | | | | | | 9.2 | 12.9 | 3.1 | 4 | - | | |

* Edge preparation is applied only on the peripheral and chamfered sections. The remaining section of the cutting edge is left sharp.

● : Line up
Package quantity = 1 pc. per box

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------|-----------------------------|-----------------------------|
| N | Cast aluminum alloy / Die-cast (Si < 13%) | DX110 | 500 - 4,000 | 0.05 - 0.2 |
| | Cast aluminum alloy / Die-cast (Si ≥ 13%) | DX110 | 200 - 800 | 0.05 - 0.2 |
| | Aluminum alloy (1000 - 7000 series) | DX110 | 500 - 4,000 | 0.05 - 0.2 |
| | Copper alloy | DX110 | 200 - 500 | 0.05 - 0.2 |

- The values in the above list are of standard recommendations and may require adjustments in consideration with cutting depths and/or workpiece/machine rigidity.
- Use wiper inserts (-WD) for better surface requirements and deburring inserts (-BD) to remove burrs.
- Always use wet cutting (emulsion coolant) for machining aluminum or copper alloys.
- To make the best of the cutter's deburring ability, make sure to place a deburring insert immediately behind every standard insert on the cutter.





High Feed Milling

TUNGSMILL TPYP12



Face Milling

High speed PCD mill for non ferrous metal



Shoulder Milling



Slot Milling



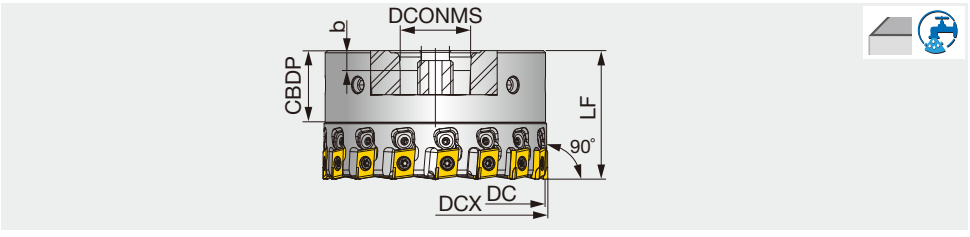
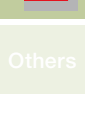
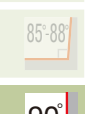
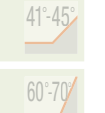
Profile Milling



Chamfering, Counterbore



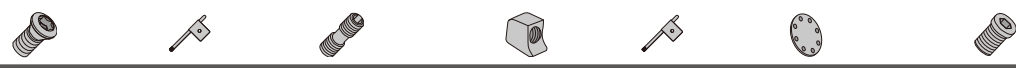
Finish Face Milling



| Designation | DC | DCX | CICT | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|-----|-------|------|----|--------|------|------|-----|--------|----------|----------------|
| TPYP12M050B22.0R08 | 50 | 51.4 | 8 | 55 | 22 | 20 | 10.4 | 6.3 | 0.9 | With | YPEB12X3-*P... |
| TPYP12M063B22.0R10 | 63 | 64.4 | 10 | 55 | 22 | 20 | 10.4 | 6.3 | 1.3 | With | YPEB12X3-*A... |
| TPYP12M080B27.0R12 | 80 | 81.4 | 12 | 58 | 27 | 22 | 12.4 | 7 | 2.2 | With | YPEB12X3-*A... |
| TPYP12J080B25.4R12 | 80 | 81.4 | 12 | 58 | 25.4 | 26 | 9.5 | 6 | 2.2 | With | YPEB12X3-*A... |
| TPYP12M100B32.0R16 | 100 | 101.4 | 16 | 58 | 32 | 25 | 14.4 | 8 | 1.9 | With | YPEB12X3-*A... |
| TPYP12J100B31.7R16 | 100 | 101.4 | 16 | 58 | 31.75 | 32 | 12.7 | 8 | 1.9 | With | YPEB12X3-*A... |
| TPYP12M125B40.0R20 | 125 | 126.4 | 20 | 58 | 40 | 28 | 16.4 | 9 | 2.9 | With | YPEB12X3-*A... |
| TPYP12J125B38.1R20 | 125 | 126.4 | 20 | 58 | 38.1 | 38 | 15.9 | 10 | 2.9 | With | YPEB12X3-*A... |

DCX: Outside diameter
DC: Diameter with 01 type insert

SPARE PARTS



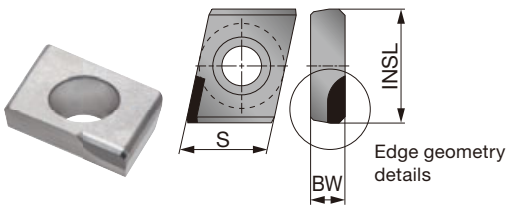
| Designation | Clamping screw | Wrench | Wedge fixing screw | Wedge | Wrench | Cover | Shell locking bolt |
|---|----------------|--------|--------------------|-----------|--------|------------|--------------------|
| TPYP12M050B22.0R08 | VX040024A | T-15F | RSRGR7M40 | RSFTC1008 | T-8F | - | RSFTS-050M |
| TPYP12M063B22.0R10 | VX040024A | T-15F | RSRGR7M40 | RSFTC1008 | T-8F | RSFTS6063M | VC004762110035F |
| TPYP12M080B27.0R12, TPYP12J080B25.4R12 | VX040024A | T-15F | RSRGR7M40 | RSFTC1008 | T-8F | RSFTS6080 | VC00TED112040F |
| TPYP12M100B32.0R16, TPYP12J100B31.7R16 | VX040024A | T-15F | RSRGR7M40 | RSFTC1008 | T-8F | RSFTS6100 | VC00TANG16040F |
| TPYP12M125B40.0R20, TPYP12J125B38.1R20 | VX040024A | T-15F | RSRGR7M40 | RSFTC1008 | T-8F | RSFTS6125 | VC00TEDI20040F |

Recommended clamping torque: 4.5 N·m

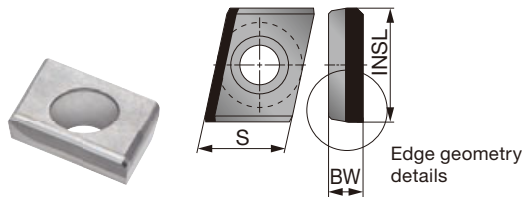
Approach angle
7°-25°
41°-45°
60°-70°
85°-88°
90°
Others

INSERT

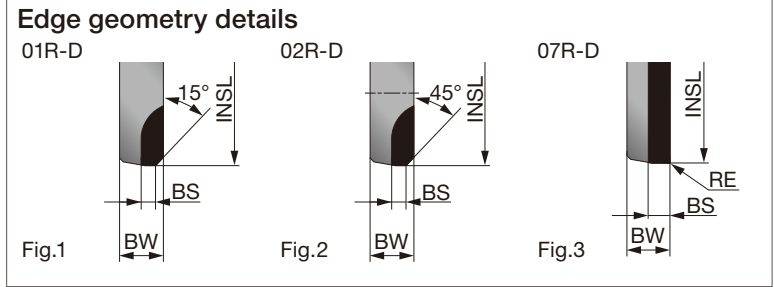
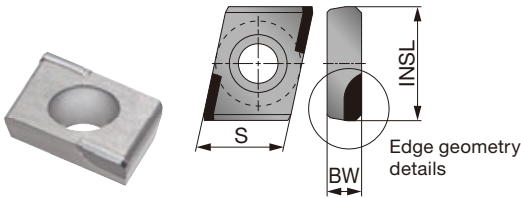
YPEB12X3-1A



YPEB12X-FP



YPEB12X3-2A/P



| | | | |
|----------|----------------|---|--|
| P | Steel | | |
| M | Stainless | | |
| K | Cast iron | | |
| N | Non-ferrous | ★ | |
| S | Superalloys | | |
| H | Hard materials | | |

★ : First choice
☆ : Second choice

| Designation | No. of corner | RE | APMX | PCD | | | | INSL | S | BW | BS | Applicable cutter diameter | Fig. |
|------------------|---------------|-----|------|-------|--|--|--|--------|-------|-------|------|----------------------------|------|
| | | | | DX160 | | | | | | | | | |
| YPEB12X3-1A01R-D | 1 | - | 4 | ● | | | | 12.77 | 9.525 | 3.85 | 1.59 | DC > ø50 mm | 1 |
| YPEB12X3-1A02R-D | 1 | - | 4 | ● | | | | 12.756 | 9.525 | 3.85 | 1.29 | DC > ø50 mm | 2 |
| YPEB12X3-1A07R-D | 1 | 0.4 | 4 | ● | | | | 12.756 | 9.525 | 3.85 | 1.34 | DC > ø50 mm | 3 |
| YPEB12X3-1P02R-D | 1 | - | 4 | ● | | | | 12.817 | 9.525 | 3.85 | 1.37 | DC ≤ ø50 mm | 2 |
| YPEB12X3-1P07R-D | 1 | 0.4 | 4 | ● | | | | 12.817 | 9.525 | 3.85 | 1.37 | DC ≤ ø50 mm | 3 |
| YPEB12X3-FP02R-D | 1 | - | 11 | ● | | | | 12.817 | 9.525 | 3.85 | 1.37 | DC ≤ ø50 mm | 2 |
| YPEB12X3-FP07R-D | 1 | 0.4 | 11 | ● | | | | 12.817 | 9.525 | 3.85 | 1.37 | DC ≤ ø50 mm | 3 |
| YPEB12X3-2A01R-D | 2 | - | 4 | ● | | | | 12.8 | 9.525 | 3.868 | 1.59 | DC > ø50 mm | 1 |
| YPEB12X3-2A02R-D | 2 | - | 4 | ● | | | | 12.8 | 9.525 | 3.868 | 2.07 | DC > ø50 mm | 2 |
| YPEB12X3-2A07R-D | 2 | 0.4 | 4 | ● | | | | 12.8 | 9.525 | 3.868 | 2.07 | DC > ø50 mm | 3 |
| YPEB12X3-2P07R-D | 2 | 0.4 | 4 | ● | | | | 12.876 | 9.525 | 3.85 | 2.07 | DC ≤ ø50 mm | 3 |

● : Line up
2 pieces per package

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/z) |
|----------|---------------------------|-------|--------------------------|--------------------------|
| N | Aluminum cast Si < 13% | DX160 | ≤ 6000 | 0.05 - 0.25 |
| | Aluminum cast Si ≥ 13% | DX160 | ≤ 1500 | 0.05 - 0.25 |
| | Copper, brass, etc. | DX160 | ≤ 2000 | 0.05 - 0.25 |
| | Non metallic material | DX160 | ≤ 3000 | 0.05 - 0.25 |

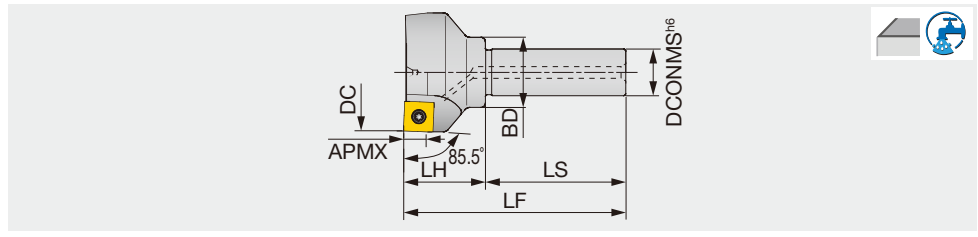


EFE / TFE

EFE12R

Face endmill for aluminium machining, shank type, with screw clamp system

GAMP = +13°, GAMF = +7°



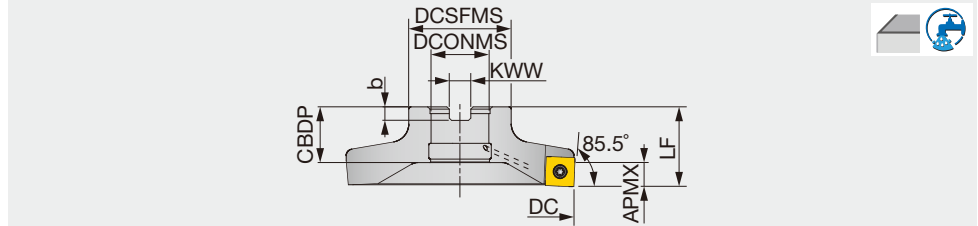
| Designation | APMX | DC | CICT | DCONMS | BD | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------|------|----|------|--------|----|----|----|----|--------|----------|-------------|
| EFE12050R | 8 | 50 | 3 | 20 | 30 | 60 | 35 | 95 | 0.37 | With | SEG*12X4... |



TFE12R

Face mill for aluminium machining, with screw clamp system, light weight

GAMP = +13°, GAMF = +7°



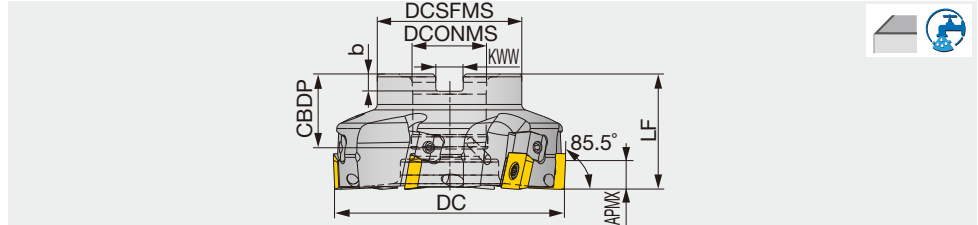
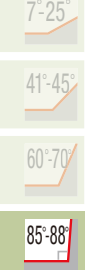
| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------|------|-----|------|--------|----|--------|------|-----|---|--------|----------|-------------|
| TFE12063R | 8 | 63 | 3 | 45 | 35 | 22 | 19 | 10 | 6 | 0.34 | With | SEG*12X4... |
| TFE12080R | 8 | 80 | 4 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 0.45 | With | SEG*12X4... |
| TFE12100R | 8 | 100 | 6 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 0.59 | With | SEG*12X4... |
| TFE12125R | 8 | 125 | 6 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 0.9 | With | SEG*12X4... |



TFE12R...-...A

Face mill for aluminium machining, with screw clamp system

GAMP = +13°, GAMF = +7°



| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|--------|----|--------|------|------|---|--------|----------|-------------|
| TFE12R080M25.4-06A | 8 | 80 | 6 | 50 | 40 | 25.4 | 26 | 9.5 | 6 | 0.70 | With | SEG*12X4... |
| TFE12R080M27.0E06A | 8 | 80 | 6 | 55 | 40 | 27 | 22 | 12.4 | 7 | 0.69 | With | SEG*12X4... |
| TFE12R100M25.4-08A | 8 | 100 | 8 | 50 | 40 | 25.4 | 26 | 9.5 | 6 | 1.15 | With | SEG*12X4... |
| TFE12R100M27.0E08A | 8 | 100 | 8 | 55 | 40 | 27 | 22 | 12.4 | 7 | 1.11 | With | SEG*12X4... |
| TFE12R125M31.7-10A | 8 | 125 | 10 | 70 | 50 | 31.7 | 32 | 12.7 | 8 | 2.24 | With | SEG*12X4... |
| TFE12R125M32.0E10A | 8 | 125 | 10 | 70 | 50 | 32 | 28.5 | 14.4 | 8 | 2.14 | With | SEG*12X4... |

SPARE PARTS



| Designation | Clamping screw | Adjustable Wedge | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Right-left screw | Wrench | Wrench |
|-----------------------|----------------|------------------|----------------------|----------------------|----------------------|------------------|--------|--------|
| EFE12000R | CSPB-4S | - | (M-1000) | - | - | - | - | IP-15D |
| TFE12063R | CSPB-4S | - | (M-1000) | - | CM10X30H | - | - | IP-15D |
| TFE12080R - TFE12125R | CSPB-4S | - | (M-1000) | TMBA-M12H | - | - | - | IP-15D |
| TFE12R**A | CSTB-4 | FW-701R | (M-1000) | TMBA-M12H | - | MCS520-2.5 | P-2.5T | T-15LB |

Recommended clamping torque: 3.5 N·m

Reference pages: Inserts → **H098**, Standard cutting conditions → **H099**

INSERT SETTING PROCEDURE – ADJUSTABLE-TYPE TFE FACE MILLING CUTTER

1 Cleaning insert pockets



Remove all the inserts. Use air pressure to thoroughly clean the pockets of dust and chips.

2 Loosening wedges

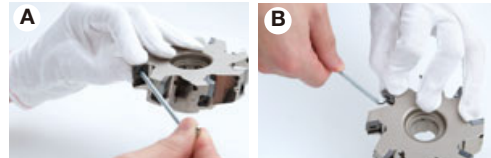


CCW rotation
- Insert screw loosens
- Wedge slides out
- Insert lowers

CW rotation
- Insert screw tightens
- Wedge slides in
- Insert lifts up

Use the included key for wedge adjustment to loosen all the wedges so that they do not exceed the cutter's outer diameter.

3 Clamping inserts for adjustments



Place the insert in the pocket and lightly tighten the clamping screw with the included key. Suggested method: Tighten the screw first with the straight end of the key (Fig A) until finger tight, then use the angled end to further tighten the screw for insert steadiness (Fig B). Do NOT fully tighten the screw at this moment as this procedure is prior to insert adjustment. Repeat the procedure for all inserts.

4 Axial height adjustment of inserts



Mount the cutter in Step ③ on the setting fixture of the pre-setter. Determine the highest insert, and, while carefully monitoring each insert's axial position, rotate the wedge screw in the CW direction to raise the insert in the axial direction, as close as possible to that of the highest insert. Repeat this procedure for all inserts.

Note:
Since the insert is clamped, loosening the wedge screw will not bring down the insert. To lower insert height, both the insert and wedge screws need to be loosened. Start the adjusting procedure for this insert again from Step 1.

5 Tighten insert screws



Tighten the insert clamping screw at 3.5 Nm, using the key as shown to the left. Repeat the procedure for all inserts.

6 Final adjustments



After final tightening of all insert screws, measure to ensure all inserts are at the desired axial heights. If necessary, further tighten any wedge screws in the CW direction for the final few microns. For inserts exceeding the required runout, re-start the adjustment procedure from Step ①.

Note:
Do not re-tighten the insert screw after insert adjustment is completed. Additional tightening may weaken wedge clamping torque.

Cautions:

- ① Always clean all the insert pockets thoroughly of dust and chips. Any objects present in the pocket may shift the insert's position during machining and cause poor surface finishing quality.
- ② Always loosen the wedge screw before installing the insert as described in Step ②. If the wedge is left tightened in the cutter, the adjustment range of the wedge will be limited, and insert height may not be as freely adjustable as possible.
- ③ With a finger, firmly press and hold the insert into the wedge while tightening the insert screw. If the insert is not in contact, the wedge has to be driven until the gap in between is closed, with no actual insert movement.
- ④ Loosening the wedge will not lower the insert. When the insert height exceeds the desired setting during adjustment, loosen both the insert and wedge screws and re-start the adjustment procedure from Step ①. If the insert slides downward when the wedge screw is loosened, the clamping torque of the insert screw is too low. Tighten the insert screw with a slightly higher torque. Suggested clamping method: First use the straight end of the key to tighten the screw until finger tight, then switch the key to the angled side and turn an additional 45°.
- ⑤ Do not exceed the recommended clamping torque when fixing the insert. This may damage or fracture the insert screw.



High Feed Milling



Face Milling



Shoulder Milling



Slot Milling



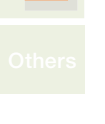
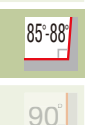
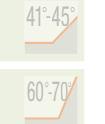
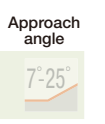
Profile Milling



Chamfering, Counterbore

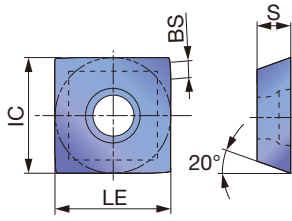


Finish Face Milling

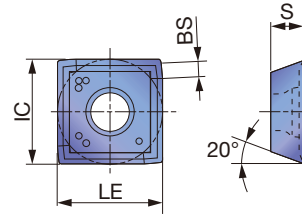


INSERT

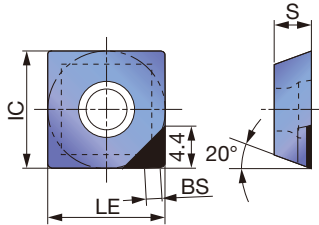
SEGW12X4ZEPR / ZEFR



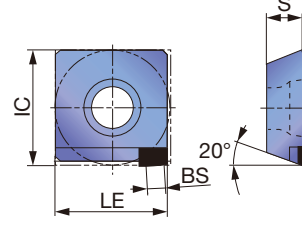
SEGT12X4-AJ



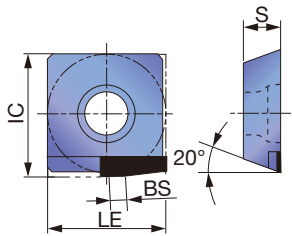
SEGW12X4ZEFR-D



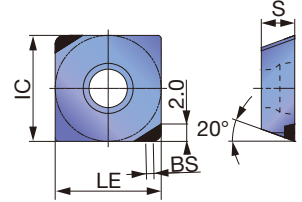
SEGW12X4ZEFR-WD



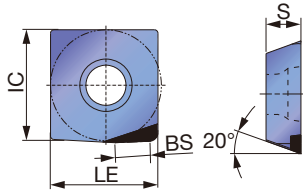
SEGW12X4ZEFR-BD



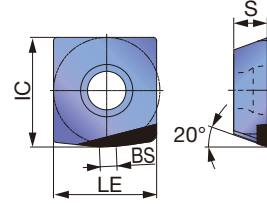
2QP-SECW12X412ZETR



1QP-SECW12X4ZETR-W



1QP-SECW12X4ZETR-B



| | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|--|--|---|--|---|--|--|--|--|--|--|--|--|---|
| P | Steel | ★ | | | ★ | | | | | | | | | | | | | | |
| M | Stainless | | ★ | | | | | | | | | | | | | | | | |
| K | Cast iron | ★ | | | | | | | | | | | | | | | | | ★ |
| N | Non-ferrous | | | ★ | | | | ★ | | ★ | | | | | | | | | |
| S | Superalloys | | | | | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | | | |

★ : First choice

| Designation | APMX | Coated | | Cermet | Uncoated | PCD | CBN | IC | LE | S | BS |
|--------------------|------|--------|-------|--------|----------|-------|-------|------|------|---|-----|
| | | AH120 | AH140 | DS1100 | NS740 | KS05F | DX140 | | | | |
| SEGW12X4ZEFR | 8 | | | | | | | 12.7 | 12.7 | 4 | 1.8 |
| SEGW12X4ZEPR | 8 | ● | ● | ● | | | | 12.7 | 12.7 | 4 | 1.4 |
| SEGT12X4ZEFR-AJ | 8 | | | | ● | | | 12.7 | 12.7 | 4 | 1.8 |
| SEGW12X4ZEFR-D | 3.5 | | | | | ● | | 12.7 | 12.7 | 4 | 1.8 |
| SEGW12X4ZEFR-WD | - | | | | | ● | | 12.8 | 12.4 | 4 | 2 |
| SEGW12X4ZEFR-BD | - | | | | | ● | | 13.1 | 12.4 | 4 | 1.8 |
| 2QP-SECW12X412ZETR | 1.5 | | | | | | ● | 12.7 | 12.7 | 4 | 0.9 |
| 1QP-SECW12X4ZETR-W | - | | | | | | ● | 12.9 | 12.3 | 4 | 4 |
| 1QP-SECW12X4ZETR-B | - | | | | | | ● | 13.1 | 12.3 | 4 | 2 |

● : Line up

DX140: 2 pieces per package

BX480: 1 piece per package

How to put each insert together

| | | For general | Accuracy of machining surface priority | Burr reduction priority |
|--|--------------------------|--------------------------|--|--|
| Applicable insert | General insert | SEGW12X4ZEFR-D DX140 | ◎ | ◎ |
| | | 2QP-SECW12X412ZETR BX480 | | |
| | Wiper insert | SEGW12X4ZEFR-WD DX140 | - | - |
| | | 1QP-SECW12X4ZETR-W BX480 | | |
| Wiper insert for burr reduction | SEGW12X4ZEFR-BD DX140 | - | ◎ | |
| | 1QP-SECW12X4ZETR-B BX480 | | | |
| Number of Inserts by type | | All general | 1 or 2 wiper inserts in cutter body | General insert : Burr wiper insert = 1 : 1 |
| Accuracy of machining surface (roughness and undulation) | | △ | ◎ | ○ |
| Burr of machining surface | | △ | ○ | ◎ |

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Grade | Designation | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|--------------|--|--------------|-----------------|---------------------|--------------------------|--------------------------|
| P | Carbon steels and alloy steels | < 300HB | AH120 | SEGW12X4ZEPR | 100 - 180 | 0.03 - 0.15 |
| | | < 300HB | NS740 | SEGW12X4ZEPR | 100 - 180 | 0.03 - 0.15 |
| M | Stainless steels | < 250HB | AH140 | SEGW12X4ZEPR | 80 - 180 | 0.03 - 0.15 |
| K | Grey and ductile cast irons | 150 - 250 HB | AH120 | SEGW12X4ZEPR | 100 - 200 | 0.03 - 0.15 |
| | Grey cast iron | 150 - 250 HB | BX480 | 2QP-SEC-W12X412ZETR | 800 - 1500 | 0.05 - 0.3 |
| | Ductile cast irons | 150 - 250 HB | BX480 | 2QP-SEC-W12X412ZETR | 500 - 800 | 0.05 - 0.2 |
| N | Cast aluminium alloy / Die-cast Si < 13% | - | KS05F | SEGT12X4ZEFR-AJ | 200 - 1500 | 0.05 - 0.2 |
| | | - | DX140 | SEGW12X4ZEFR-D | 200 - 1500 | 0.05 - 0.2 |
| | Cast aluminium alloy / Die-cast Si ≥ 13% | - | KS05F | SEGT12X4ZEFR-AJ | 80 - 200 | 0.05 - 0.2 |
| | | - | DX140 | SEGW12X4ZEFR-D | 200 - 500 | 0.05 - 0.2 |
| | Aluminium alloy Tensile strength < 350 N/mm ² | - | KS05F | SEGT12X4ZEFR-AJ | 200 - 1500 | 0.05 - 0.2 |
| | | - | DX140 | SEGW12X4ZEFR-D | 200 - 1500 | 0.05 - 0.2 |
| | Aluminium alloy Tensile strength > 350 N/mm ² | - | KS05F | SEGW12X4ZEFR | 200 - 1500 | 0.05 - 0.2 |
| | | - | DX140 | SEGW12X4ZEFR-D | 200 - 1500 | 0.05 - 0.2 |
| Copper alloy | - | KS05F | SEGT12X4ZEFR-AJ | 200 - 500 | 0.05 - 0.2 | |
| | - | DX140 | SEGW12X4ZEFR-D | 200 - 500 | 0.05 - 0.2 | |

Notes:

- In milling aluminium and copper alloys:
 - For improved surface finish, use together with wiper insert SEGW12X4ZEFR-WD
 - For reducing burr occurrence, use together with deburring inserts SEGW12X4ZEFR-BD
- When milling aluminium and copper alloys, use of a water soluble cutting fluid is recommended. When milling steels, cast irons, and stainless steels, dry cutting is recommended.
- When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80% of the values given in the table.

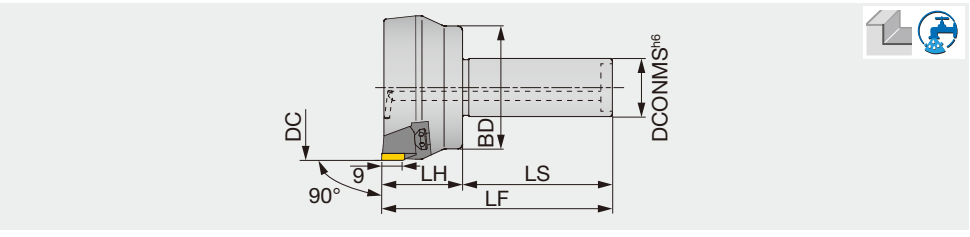


EDPD / DPD

EDPD09

Endmill for aluminium machining, shank type, for PCD inserts

GAMP = +8.5°, GAMF = +3°

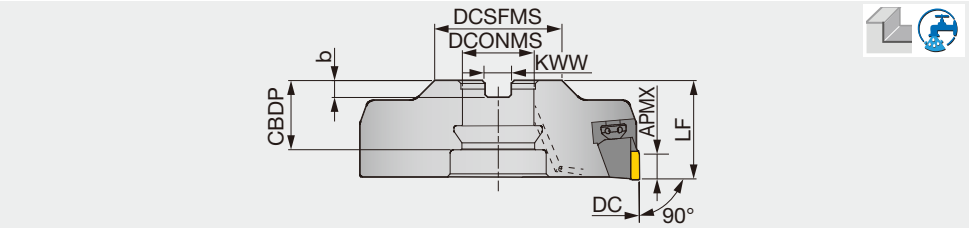


| Designation | APMX | DC | CICT | DCONMS | BD | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------|------|----|------|--------|----|----|----|-----|--------|----------|-------------|
| EDPD09063R | 7 | 63 | 3 | 25 | 37 | 60 | 40 | 100 | 0.75 | With | YDEN0905... |

DPD09

Face mill for aluminium machining, for PCD inserts

GAMP = +8.5°, GAMF = +3° ~ +5°



| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CDBP | KWW | b | WT(kg) | Air hole | Insert |
|-------------|------|-----|------|--------|----|--------|------|------|---|--------|----------|-------------|
| DPD09080R | 7 | 80 | 4 | 50 | 41 | 25.4 | 23 | 9.5 | 6 | 0.8 | With | YDEN0905... |
| DPD09080RB | 7 | 80 | 6 | 50 | 41 | 25.4 | 28.5 | 9.5 | 6 | 0.82 | With | YDEN0905... |
| DPD09100R | 7 | 100 | 6 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 1.13 | With | YDEN0905... |
| DPD09100RB | 7 | 100 | 8 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 1.17 | With | YDEN0905... |
| DPD09125R | 7 | 125 | 6 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 1.7 | With | YDEN0905... |
| DPD09125RB | 7 | 125 | 10 | 50 | 35 | 25.4 | 24.5 | 9.5 | 6 | 1.77 | With | YDEN0905... |
| DPD09160R | 7 | 160 | 8 | 60 | 52 | 31.75 | 40 | 12.7 | 8 | 3.28 | With | YDEN0905... |
| DPD09160RB | 7 | 160 | 12 | 60 | 52 | 31.75 | 40 | 12.7 | 8 | 3.25 | With | YDEN0905... |

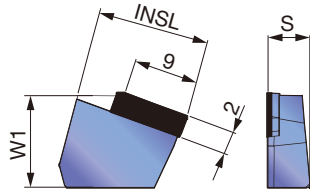
SPARE PARTS

| Designation | Clamping screw | Wedge fixing screw | Adjusting screw | Helisert | Shell locking bolt 1 | Shell locking bolt 2 | Wrench1 | Wrench 2 |
|------------------------|----------------|--------------------|-----------------|--------------|----------------------|----------------------|---------|----------|
| EDPD09063R | EDPD09063R | FDS-8SST | AJM5 | LM5-0.8X1DNS | - | - | T-27T | T-7F |
| DPD09080R* | FW-304R-T | FDS-8ST-18 | AJM5 | LM5-0.8X1DNS | - | CM12X30H | T-27T | T-7F |
| DPD09100R*, DPD09125R* | FW-304R-T | FDS-8ST-18 | AJM5 | LM5-0.8X1DNS | TMBA-M12H | - | T-27T | T-7F |
| DPD09160R* | FW-304R-T | FDS-8ST-18 | AJM5 | LM5-0.8X1DNS | TMBA-M16H | - | T-27T | T-7F |

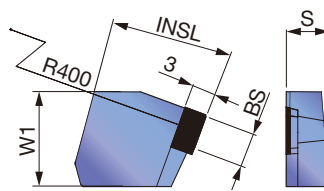
Recommended clamping torque: 10 N·m

INSERT

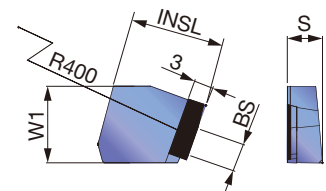
YDEN0905PDFR-D



YDEN0905PDFR-WD



YDEN0905PDFR-BD



| | |
|---|----------------|
| P | Steel |
| M | Stainless |
| K | Cast iron |
| N | Non-ferrous |
| S | Superalloys |
| H | Hard materials |

★ : First choice
☆ : Second choice

| Designation | APMX | PCD | | | | | | | | W1 | INSL | S | BS |
|-----------------|------|-------|--|--|--|--|--|--|--|------|------|-----|-----|
| | | DX140 | | | | | | | | | | | |
| YDEN0905PDFR-D | 7 | ● | | | | | | | | 12.4 | 15.1 | 5.7 | - |
| YDEN0905PDFR-WD | - | ● | | | | | | | | 12.4 | 15.2 | 5.7 | 4.5 |
| YDEN0905PDFR-BD | - | ● | | | | | | | | 12.4 | 15.2 | 5.7 | 4.5 |

Tungaloy provides refurbishing service for these inserts upon request.

● : Line up
1 piece per package

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Grade | Designation | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|-------|----------------|--------------------------|--------------------------|
| N | Aluminium alloy castings & die castings Si < 13% | DX140 | YDEN0905PDFR-D | 500 ~ 4000 | 0.05 ~ 0.2 |
| | Aluminium alloy castings & die castings Si ≥ 13% | DX140 | YDEN0905PDFR-D | 200 ~ 500 | 0.05 ~ 0.2 |
| | Rolled aluminium alloys | DX140 | YDEN0905PDFR-D | 500 ~ 4000 | 0.05 ~ 0.2 |
| | Copper alloys | DX140 | YDEN0905PDFR-D | 200 ~ 500 | 0.05 ~ 0.2 |

Notes:

- When requiring improved surface finish, use the wiper insert together with regular inserts YDEN0905PDFR-WD.
- When requiring reduced burr occurrence, use the deburring inserts together with regular inserts YDEN0905PDFR-BD.
- When using the cutter at speeds over 1500m/min, use an arbor or tool-holder balanced to within G16.
- Wet cutting, using a water soluble cutting fluid, is recommended.
- When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80% of the values given in the table.

How to put each insert together

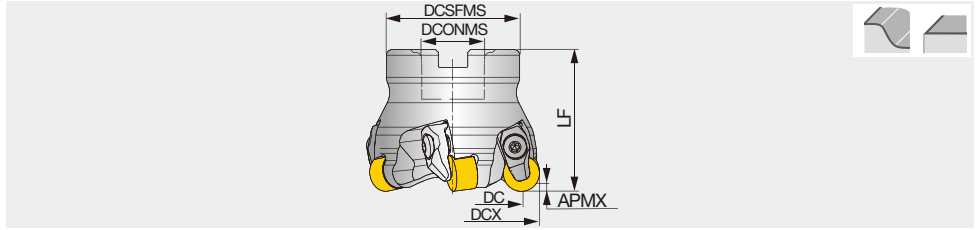
| | | For general | Accuracy of machining surface priority | Burr reduction priority |
|--|---|-------------|--|--|
| Applicable insert | General insert YDEN0905PDFR-D | ◎ | ◎ | ◎ |
| | Wiper insert YDEN0905PDFR-WD | - | ◎ | - |
| | Wiper insert for burr reduction YDEN0905PDFR-BD | - | - | ◎ |
| Number of Inserts by type | | All general | 1 or 2 wiper inserts in cutter body | General insert : Burr wiper insert = 1 : 1 |
| Specification of insert setting | | | | |
| Accuracy of machining surface (roughness and undulation) | | △ | ◎ | ○ |
| Burr of machining surface | | △ | ○ | ◎ |



CERAMIC^{SPEED} MILL TFMRN

Face milling cutter for high temperature alloy applications

GAMP = -7°, GAMF = +15°



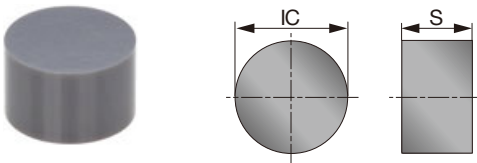
| Designation | APMX | DC | DCX | CICT | DCONMS | LF | DCSFMS | WT(kg) | Insert |
|-------------------|------|-------|-----|------|--------|----|--------|--------|---------------|
| TFMRN563-22R-12FL | 2 | 50.35 | 63 | 5 | 22 | 50 | 47 | 0.6 | RNGN120700... |
| TFMRN580-27R-12FL | 2 | 67.34 | 80 | 5 | 27 | 50 | 58 | 0.9 | RNGN120700... |

SPARE PARTS

| Designation | Clamp | Screw | Snap ring |
|------------------|----------|-------|-----------|
| TFMRN**-**R-12FL | CCL-5S-F | CLS3C | CSR2 |

INSERT

RNGN-E/T1



| | | | | | | | | |
|-------------------------|--|---|---|--|--|--|--|--|
| P Steel | | | | | | | | |
| M Stainless | | | | | | | | |
| K Cast iron | | | | | | | | |
| N Non-ferrous | | | | | | | | |
| S Superalloys | | ★ | ★ | | | | | |
| H Hard materials | | | | | | | | |

★ : First choice

| Designation | APMX | Edge prep.* | Ceramic | | IC | S |
|---------------|------|-------------|---------|-------|------|------|
| | | | TS200 | TS300 | | |
| RNGN120700-E | 2 | E | ● | | 12.7 | 7.94 |
| RNGN120700-T1 | 2 | T1 | ● | | 12.7 | 7.94 |
| RNGN120700-E | 2 | E | | ● | 12.7 | 7.94 |
| RNGN120700-T1 | 2 | T1 | | ● | 12.7 | 7.94 |

* Types of cutting edge preparations

● : Line up

Edge prep

E: Low cutting force

T1: Strong cutting edge



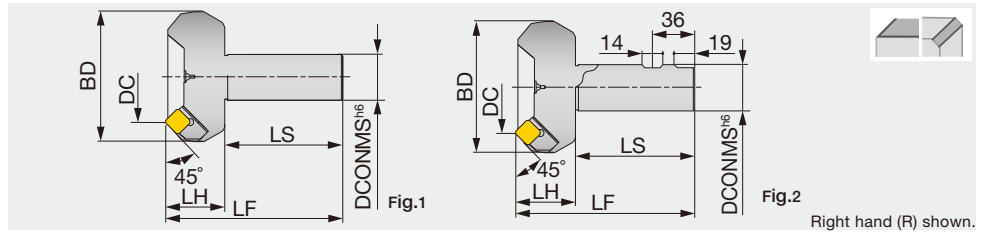
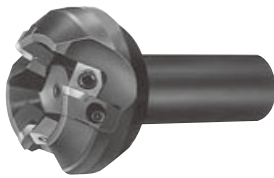
STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Depth of cut ap(mm) |
|----------|-----------------------|-----------------|--------|--------------------------|--------------------------|---------------------|
| S | Ni-based super alloys | Wear resistance | TS200 | 550 - 1300 | 0.05 - 0.2 | 0.1 - 2 |
| | | First choice | TS300 | 270 - 550 | 0.05 - 0.2 | 0.1 - 2 |
| | Co-based super alloys | Wear resistance | TS200 | 550 - 1500 | 0.05 - 0.2 | 0.1 - 2 |
| | | First choice | TS300 | 270 - 550 | 0.05 - 0.2 | 0.1 - 2 |

EME4400

Face endmill, shank type, with wedge clamp system

GAMP = +24°, GAMF = -13° ~ -8°

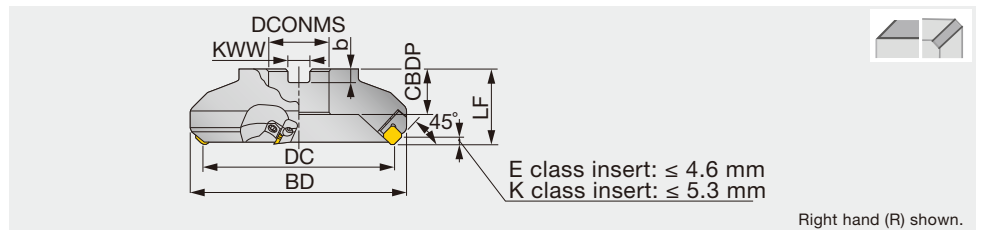


| Designation | APMX | DC | CICT | BD | DCONMS | LS | LH | LF | Fig. | Insert |
|-------------|------|-----|------|-------|--------|----|----|-----|------|-------------|
| EME4450R | 4 | 50 | 3 | 73.4 | 32 | 80 | 40 | 120 | 1 | SE*N1203... |
| EME4463R | 4 | 63 | 4 | 87.2 | 32 | 80 | 40 | 120 | 1 | SE*N1203... |
| EME4403RI | 4 | 80 | 5 | 101.5 | 32 | 80 | 40 | 120 | 2 | SE*N1203... |
| EME4404RI | 4 | 100 | 5 | 120.2 | 32 | 80 | 40 | 120 | 2 | SE*N1203... |

TME4400R/LI/B

Face mill, with wedge clamp system

GAMP = +24°, GAMF = -8° ~ -6°

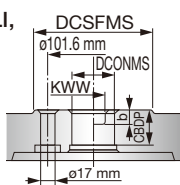


| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-------|----|--------|------|------|-----|--------|----------|
| TME4463RB-E | 4 | 63 | 5 | 87.2 | 40 | 22 | 20 | 10.4 | 6.3 | 1.0 | SE*N1203 |
| TME4403R/LI | 4 | 80 | 4 | 101.5 | 50 | 25.4 | 26 | 9.5 | 6 | 1.43 | SE*N1203 |
| TME4403RI-E | 4 | 80 | 4 | 101.5 | 50 | 27 | 26 | 12.4 | 7 | 1.43 | SE*N1203 |
| TME4403RB | 4 | 80 | 6 | 101.5 | 50 | 25.4 | 26 | 9.5 | 6 | 1.43 | SE*N1203 |
| TME4403RB-E | 4 | 80 | 6 | 101.5 | 50 | 27 | 26 | 12.4 | 7 | 1.43 | SE*N1203 |
| TME4404R/LI | 4 | 100 | 5 | 120.2 | 63 | 31.75 | 32 | 12.7 | 8 | 2.74 | SE*N1203 |
| TME4404RI-E | 4 | 100 | 5 | 120.2 | 63 | 32 | 32 | 14.4 | 8 | 2.74 | SE*N1203 |
| TME4404RB | 4 | 100 | 7 | 120.2 | 63 | 31.75 | 32 | 12.7 | 8 | 2.77 | SE*N1203 |
| TME4404RB-E | 4 | 100 | 7 | 120.2 | 50 | 32 | 28.5 | 14.4 | 8 | 2.77 | SE*N1203 |
| TME4405R/LI | 4 | 125 | 6 | 145.2 | 63 | 38.1 | 38 | 15.9 | 10 | 4.04 | SE*N1203 |
| TME4405RI-E | 4 | 125 | 6 | 145.2 | 63 | 40 | 32 | 16.4 | 9 | 4.04 | SE*N1203 |
| TME4405RB | 4 | 125 | 9 | 145.2 | 63 | 38.1 | 38 | 15.9 | 10 | 4.06 | SE*N1203 |
| TME4405RB-E | 4 | 125 | 9 | 145.2 | 63 | 40 | 32 | 16.4 | 9 | 4.06 | SE*N1203 |
| TME4406R/LI | 4 | 160 | 8 | 181.2 | 63 | 50.8 | 38 | 19 | 11 | 5.82 | SE*N1203 |
| TME4406RI-E | 4 | 160 | 8 | 181.2 | 63 | 40 | 29 | 16.4 | 9 | 5.82 | SE*N1203 |
| TME4406RB | 4 | 160 | 12 | 181.2 | 63 | 50.8 | 38 | 19 | 11 | 5.86 | SE*N1203 |
| TME4406RB-E | 4 | 160 | 12 | 181.2 | 63 | 40 | 29 | 16.4 | 9 | 5.86 | SE*N1203 |
| TME4408R/LI | 4 | 200 | 10 | 220.5 | 63 | 47.625 | 38 | 25.4 | 14 | 9.18 | SE*N1203 |
| TME4408RB | 4 | 200 | 15 | 220.5 | 63 | 47.625 | 38 | 25.4 | 14 | 9.24 | SE*N1203 |
| TME4410R/LI | 4 | 250 | 12 | 269.8 | 63 | 47.625 | 38 | 25.4 | 14 | 16.64 | SE*N1203 |
| TME4412RI | 4 | 315 | 14 | 334.4 | 63 | 47.625 | 38 | 25.4 | 14 | 25.72 | SE*N1203 |

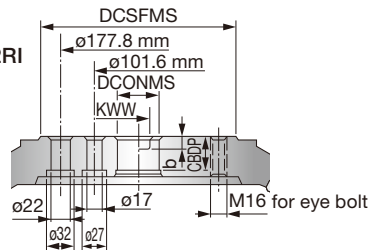
Cutting edge height (LF) is for when SEEN1203AG*N type inserts are used.

Arbor type

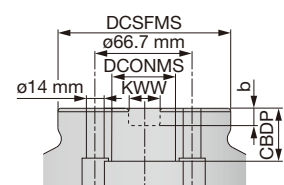
TME4408/10R/LI,
TME4408RB



TME4412RI



TME4406RI-E,
TME4406RB-E



SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|---|---------|--------------------|----------------------|--------|--------|
| TME4463RB-E | LE444R | DS-8 | CM4X0.7X14 | WT402R | TP-4 |
| EME4400..., TME4403R... - TME4405R... TME4403RB - TME4405RB | LE444R | FDS-8S | CM4X0.7X14 | WF444R | TP-4 |
| TME4403L... - TME4405L... | LE444L | FDS-8S | CM4X0.7X14 | WF444L | TP-4 |
| TME4406R... - TME4412R... TME4406RB, TME4408RB, TME4403 - 06RB-E | LE446R | FDS-8S | CM4X0.7X14 | WF444R | TP-4 |
| TME4406L... - TME4412L... | LE446L | FDS-8S | CM4X0.7X14 | WF444L | TP-4 |

Recommended clamping torque: 8 N·m

Reference pages: Inserts → H104

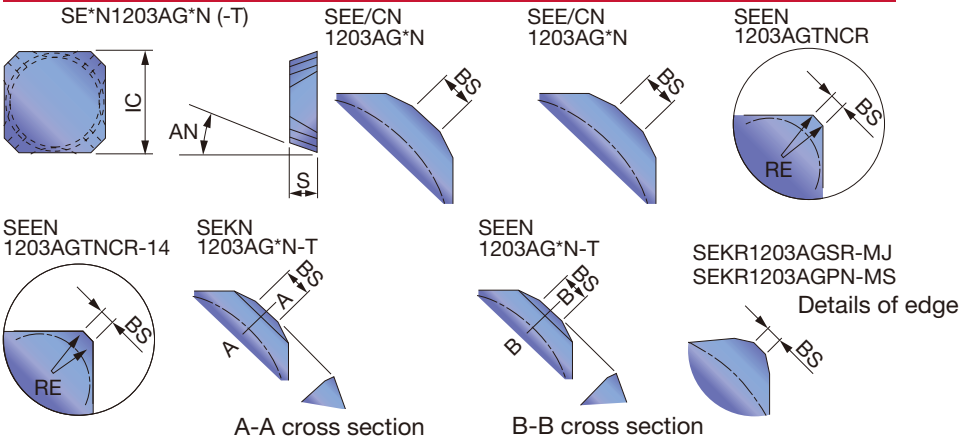
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





INSERT

SECN/SEEN/SEKN /SEKR 1203



| | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|---|---|--|--|--|--|---|--|--|--|--|--|--|--|--|
| P | Steel | ☆ | ☆ | ☆ | ★ | ☆ | ★ | ★ | ☆ | | | | | | | | | | | | | |
| M | Stainless | | ★ | ☆ | ☆ | ☆ | | | | | | | | | | | | | | | | |
| K | Cast iron | ★ | | | | | ★ | | | | | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | ★ | | | | | | | | |
| S | Superalloys | ☆ | ☆ | | | | | | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | | | | | Cermet | Uncoated | | IC | S | AN | BS |
|-------------------|------|--------|-------|-------|-------|-------|-------|-------|--------|----------|------|------|------|----|-----|
| | | AH120 | AH130 | AH140 | AH330 | GH330 | T1115 | T3130 | NS740 | UX30 | TH10 | | | | |
| SECN1203AGFN | 4 | | | | | | | | | ● | | 12.7 | 3.18 | 20 | 2.4 |
| SEEN1203AGFN | 4 | | | | | | | | | ● | | 12.7 | 3.18 | 20 | 2.4 |
| SEEN1203AGTN | 4 | ● | ● | ● | | ● | ● | ● | ● | | | 12.7 | 3.18 | 20 | 2.4 |
| SEEN1203AGTN-T | 4 | | | | | | ● | ● | ● | | | 12.7 | 3.18 | 20 | 2.4 |
| SEEN1203AGTNCR | 4 | ● | ● | ● | ● | | ● | | | | | 12.7 | 3.18 | 20 | 1.6 |
| SEEN1203AGTNCR-14 | 4 | | | | | | | ● | | | | 12.7 | 3.18 | 20 | 1.4 |
| SEKN1203AGFN-T | 4 | | | | | | | | | ● | | 12.7 | 3.18 | 20 | 1.6 |
| SEKN1203AGTN | 4 | ● | ● | ● | ● | | ● | ● | ● | | | 12.7 | 3.18 | 20 | 1.6 |
| SEKN1203AGTN-T | 4 | | | | | ● | ● | ● | | ● | | 12.7 | 3.18 | 20 | 1.6 |
| SEKN1203AGTNCR | 4 | | | | | | | ● | | | | 12.7 | 3.18 | 20 | 1.6 |
| SEKR1203AGSR-MJ | 4 | ● | | | ● | ● | ● | | | | | 12.7 | 3.18 | 20 | 1.6 |
| SEKR1203AGPN-MS | 4 | | ● | ● | | | | | | | | 12.7 | 3.18 | 20 | 1.6 |

●: Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EME4400

e-catalog



TME4400R/LI

e-catalog

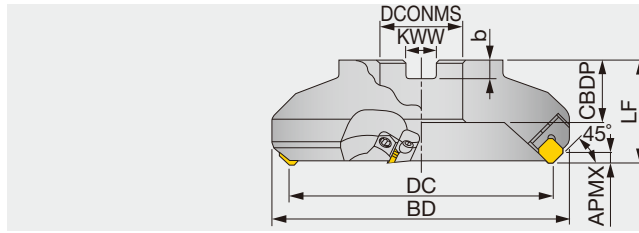
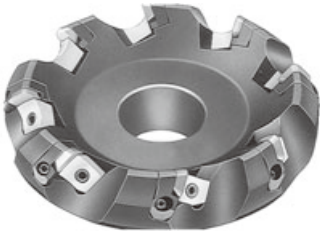


TME4400R/LB

TME5400RI

45° face mill, with wedge clamp system

GAMP = +24°, GAMF = -8° ~ -6°



Right hand (R) shown.

| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-------|----|--------|------|------|----|--------|-------------|
| TME5404RI | 6 | 100 | 5 | 123.6 | 63 | 31.75 | 32 | 12.7 | 8 | 2.82 | SE**1504... |
| TME5405RI | 6 | 125 | 6 | 148.6 | 63 | 38.1 | 38 | 15.9 | 10 | 4.08 | SE**1504... |
| TME5406RI | 6 | 160 | 8 | 183 | 63 | 50.8 | 38 | 19 | 11 | 5.99 | SE**1504... |
| TME5408RI | 6 | 200 | 10 | 223 | 63 | 47.625 | 38 | 25.4 | 14 | 9.23 | SE**1504... |
| TME5410RI | 6 | 250 | 12 | 273 | 63 | 47.625 | 38 | 25.4 | 14 | 16.94 | SE**1504... |
| TME5412RI | 6 | 315 | 14 | 338 | 63 | 47.625 | 38 | 25.4 | 14 | 25.94 | SE**1504... |

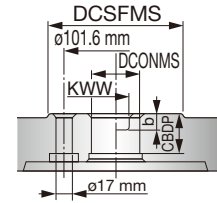
SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|--------|--------|
| TME5400RI | LE540R | FDS-8S | CM4X0.7X14 | WF540R | TP-4 |

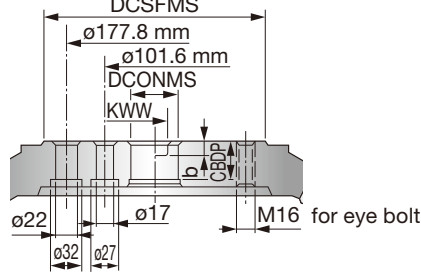
Recommended clamping torque: 8 N·m

Arbor type

TME5408/10RI

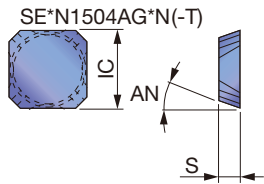


TME5412RI



INSERT

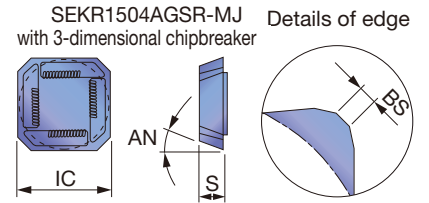
SECN/SEEN/SEKN 1504



Details of edge



SEKR1504-MJ



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ☆ | | ★ | ★ | | ★ |
| Stainless | | ★ | | | | |
| Cast iron | ★ | | | | | |
| Non-ferrous | | | | ★ | | |
| Superalloys | ★ | | | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | | Cermet | Uncoated | | IC | S | AN | BS |
|-----------------|------|--------|-------|-------|-------|--------|----------|------|--------|------|-----|-----|
| | | AH120 | AH140 | GH330 | T3130 | NS740 | TH10 | UX30 | | | | |
| SEEN1504AGTN | 6 | | | | | ● | | | 15.875 | 4.76 | 20° | 2.4 |
| SEKN1504AGFN | 6 | | | | | | | ● | 15.875 | 4.76 | 20° | 1.6 |
| SEKN1504AGTN | 6 | ● | ● | ● | ● | ● | ● | | 15.875 | 4.76 | 20° | 1.6 |
| SEKN1504AGTN-T | 6 | | | | ● | | | | 15.875 | 4.76 | 20° | 1.6 |
| SEKR1504AGSR-MJ | 6 | | | ● | ● | | | | 15.875 | 4.76 | 20° | 1.6 |

●: Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog

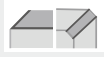
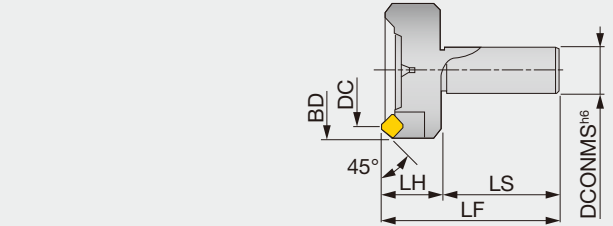




EMD4400RI

Endmill, shank type, with wedge clamp system

GAMP = +15°, GAMF = -3°



Right hand (R) shown.



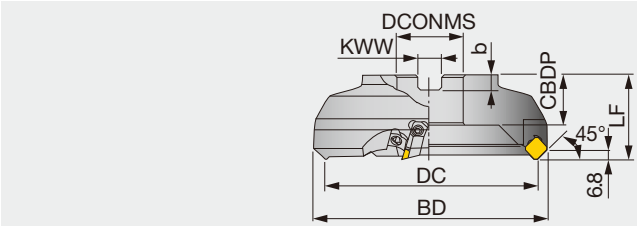
| Designation | APMX | DC | CICT | BD | DCONMS | LS | LH | LF | WT(kg) | Insert |
|---------------|------|----|------|----|--------|----|----|-----|--------|---|
| EMD4403RI-S32 | 4 | 80 | 4 | 95 | 32 | 80 | 40 | 120 | 2 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |



TMD4400R/LI

Face mill, with wedge clamp system

GAMP = +15°, GAMF = -3°



Right hand (R) shown.



| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|---|
| TMD4403R/LI | 4 | 80 | 4 | 96 | 50 | 25.4 | 26 | 9.5 | 6 | 1.4 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4404R/LI | 4 | 100 | 5 | 115 | 63 | 31.75 | 32 | 12.7 | 8 | 2.5 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4405R/LI | 4 | 125 | 6 | 139 | 63 | 38.1 | 38 | 15.9 | 10 | 3.60 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4406R/LI | 4 | 160 | 8 | 173 | 63 | 50.8 | 38 | 19 | 11 | 5.6 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4408R/LI | 4 | 200 | 10 | 213 | 63 | 47.625 | 38 | 25.4 | 14 | 8.7 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4410R/LI | 4 | 250 | 12 | 263 | 63 | 47.625 | 38 | 25.4 | 14 | 16.3 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TMD4412RI | 4 | 315 | 14 | 327 | 63 | 47.625 | 38 | 25.4 | 14 | 25.2 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |



7°-25°



41°-45°



60°-70°



85°-88°



90°

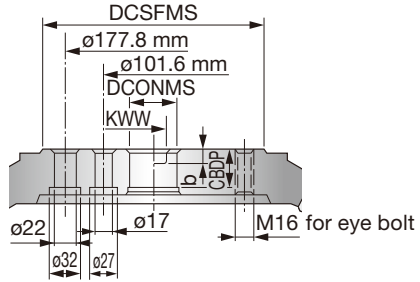
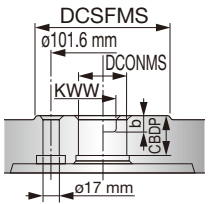


Others

Arbor type

TMD4408/10R/LI

TMD4412RI



SPARE PARTS

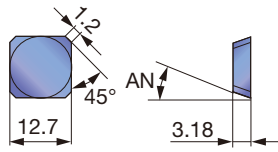
| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|--|---------|--------------------|----------------------|--------|--------|
| EMD4403RI-S32 TMD4403RI - TMD4412RI | LD440R | FDS-8S | CM4X0.7X14 | WP440R | TP-4 |
| TMD4403LI - TMD4410LI | LD440L | FDS-8S | CM4X0.7X14 | WP440L | TP-4 |

Recommended clamping torque: 8 N·m

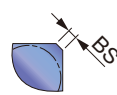
INSERT

SDCN/SDEN/SDKN 42Z

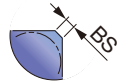
Regular edge
SD*N42Z*N



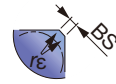
Details of edge
SDKN42ZTN16



SD*N42ZTN20

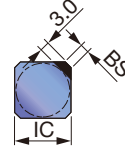


SDKN42ZTNCR
SDEN42ZTNCR



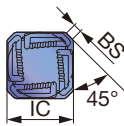
SDCN42ZFN-DIA

SDCN42ZFN-DIA

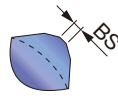


SDKR42Z-MJ

SDKR42ZSR-MJ
with 3-dimensional chipbreaker

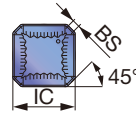


Details of edge

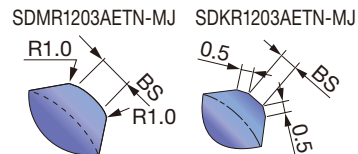


SDMR/SDKR 1203-MJ

SD*R1203AETN-MJ
with 3-dimensional chipbreaker

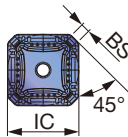


Details of edge

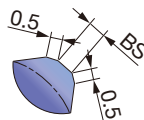


SDKR42Z-MS

SDKR42ZPN-MS

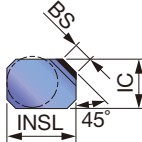


Details of edge



WDCN42ZFR-DIA

Wiper edge
WDCN42ZFR-DIA



| | | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|--|---|---|---|---|---|---|--|--|--|---|--|---|
| P | Steel | ★ | ★ | | ☆ | ☆ | | | ☆ | ☆ | ★ | ☆ | ☆ | | | | | | |
| M | Stainless | ★ | ★ | ☆ | | | | | ☆ | | | | | | | | | | |
| K | Cast iron | | ★ | | | | | ☆ | ★ | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | ★ | | ★ |
| S | Superalloys | | ★ | ☆ | | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | | | | | | Cermet | | Uncoated | | PCD | IC | INSL | S | AN | BS | | |
|-----------------|------|--------|-------|-------|-------|-------|-------|-------|-------|--------|-------|----------|------|------|----|------|------|-------|------|------|-------|
| | | AH3135 | AH120 | AH130 | AH140 | AH330 | GH330 | T1115 | T1215 | T3130 | T3225 | NS740 | N308 | UX30 | | | | | | TH10 | DX140 |
| SDCN42ZFN | 4 | | | | | | | | | | | | | | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDCN42ZTN | 4 | | | | | | | | | | ● | ● | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDCN42ZTN20 | 4 | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 2 |
| SDEN42ZFN | 4 | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDEN42ZTN | 4 | ● | ● | | ● | | ● | ● | ● | | ● | ● | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDEN42ZTNCR | 4 | ● | ● | | ● | ● | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDEN42ZTN20 | 4 | | | | | | | | | | | | | | ● | | 12.7 | - | 3.18 | 15° | 2 |
| SDKN42ZFN | 4 | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKN42ZTN | 4 | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKN42ZTNCR | 4 | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKN42ZTN16 | 4 | | | | | | | | | | | | | | ● | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDCN42ZFN-DIA | 2 | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKR42ZSR-MJ | 4 | ● | ● | | ● | ● | | | | | | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDMR1203AETN-MJ | 4 | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKR1203AETN-MJ | 4 | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKR42ZPN-MS | 4 | ● | | ● | ● | | | | | | | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| WDCN42ZFR-DIA | 0.5 | | | | | | | | | | | | | ● | | | 12.2 | 15.64 | 3.18 | 15° | 4.9 |

● : Line up

DX140: 1 piece per package

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



e-catalog



EMD4400RI TMD4400R/LI

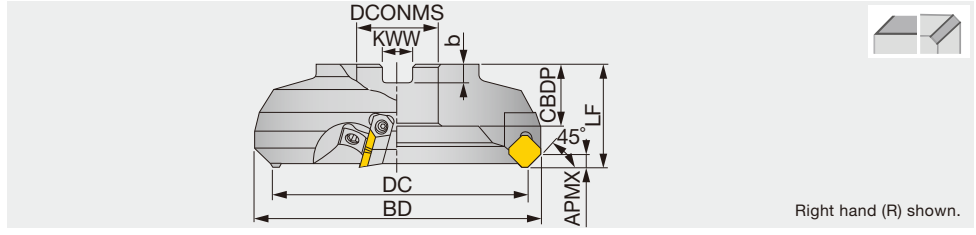




TMD5400RI

Face mill, with wedge clamp system

GAMP = +15°, GAMF = -3°



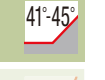
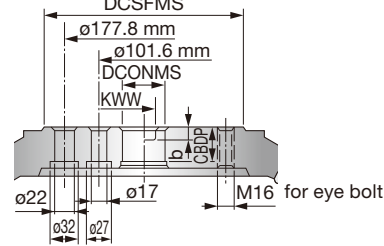
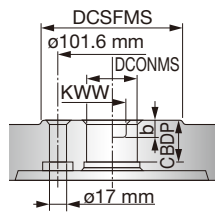
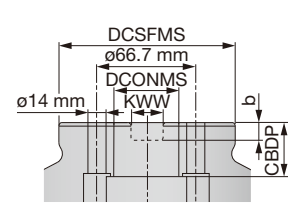
| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|------------|
| TMD5404RI | 6 | 100 | 4 | 118 | 63 | 31.75 | 32 | 12.7 | 8 | 2.5 | SD*N53Z... |
| TMD5404RI-E | 6 | 100 | 4 | 118 | 50 | 32 | 28.5 | 14.4 | 8 | 2.5 | SD*N53Z... |
| TMD5405RI | 6 | 125 | 6 | 142 | 63 | 38.1 | 38 | 15.9 | 10 | 2.5 | SD*N53Z... |
| TMD5405RI-E | 6 | 125 | 6 | 142 | 63 | 40 | 32 | 16.4 | 9 | 3.7 | SD*N53Z... |
| TMD5406RI | 6 | 160 | 6 | 176 | 63 | 50.8 | 38 | 19 | 11 | 5.8 | SD*N53Z... |
| TMD5406RI-E | 6 | 160 | 6 | 176 | 63 | 40 | 29 | 16.4 | 9 | 5.8 | SD*N53Z... |
| TMD5408RI | 6 | 200 | 8 | 216 | 63 | 47.625 | 38 | 25.4 | 14 | 9 | SD*N53Z... |
| TMD5408RI-E | 6 | 200 | 8 | 216 | 63 | 60 | 38 | 25.7 | 14 | 9 | SD*N53Z... |
| TMD5410RI | 6 | 250 | 10 | 265 | 63 | 47.625 | 38 | 25.4 | 14 | 16.3 | SD*N53Z... |
| TMD5410RI-E | 6 | 250 | 10 | 265 | 63 | 60 | 38 | 25.7 | 14 | 16.3 | SD*N53Z... |
| TMD5412RI | 6 | 315 | 12 | 330 | 63 | 47.625 | 38 | 25.4 | 14 | 25.2 | SD*N53Z... |
| TMD5412RI-E | 6 | 315 | 12 | 330 | 63 | 60 | 38 | 25.7 | 14 | 25.2 | SD*N53Z... |

Arbor type

TMD5406RI-E

TMD5408/10...

TMD5412RI



SPARE PARTS

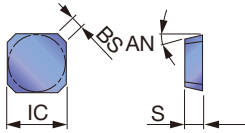
| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|--------|--------|
| TMD54**RI* | LD540R | FDS-8S | CM4X0.7X20 | WF500R | TP-4 |

Recommended clamping torque: 8 N·m

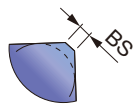
INSERT

SDCN/SDEN 53Z

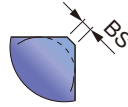
SD*N53Z*N



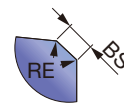
SDEN53ZTN20
Details of edge



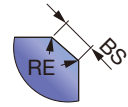
SDKN53ZTN16
Details of edge



SDEN53ZTNCR
Details of edge

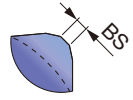
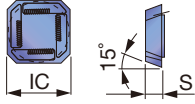


SDKN53ZTNCR
Details of edge



SDKR53-MJ

SDKR53ZSR-MJ
with 3-dimensional chipbreaker



| | | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|---|--|---|---|---|---|--|--|--|--|
| P Steel | ☆ | | | | ★ | | ★ | ☆ | ☆ | | | | | |
| M Stainless | | ★ | ☆ | ☆ | | | | | | | | | | |
| K Cast iron | ★ | | | | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | ★ | | | | |
| S Superalloys | | | | | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | | | Cermet | | Uncoated | | IC | S | AN | BS |
|--------------|------|--------|-------|-------|-------|-------|--------|------|----------|------|--------|------|-----|-----|
| | | AH120 | AH130 | AH140 | GH330 | T3130 | NS740 | N308 | UX30 | TH10 | | | | |
| SDCN53ZTN | 6 | | | | | | ● | ● | | | 15.875 | 4.76 | 15° | 1.2 |
| SDEN53ZFN | 6 | | | | | | | | ● | | 15.875 | 4.76 | 15° | 1.2 |
| SDEN53ZTN | 6 | | | | ● | | ● | | ● | | 15.875 | 4.76 | 15° | 1.2 |
| SDEN53ZTNCR | 6 | | | | | | ● | | | | 15.875 | 4.76 | 15° | 1.4 |
| SDEN53ZTN20 | 6 | | | | | ● | | | | | 15.875 | 4.76 | 15° | 2 |
| SDKN53ZFN | 6 | | | | | | | | ● | | 15.875 | 4.76 | 15° | 1.2 |
| SDKN53ZTN | 6 | ● | ● | ● | ● | | ● | ● | ● | | 15.875 | 4.76 | 15° | 1.2 |
| SDKN53ZTNCR | 6 | | | | | | ● | | | | 15.875 | 4.76 | 15° | 1.6 |
| SDKN53ZTN16 | 6 | | | | | ● | | | | | 15.875 | 4.76 | 15° | 1.6 |
| SDKR53ZSR-MJ | 6 | | | | ● | ● | | | | | 15.875 | 4.76 | 15° | 2 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

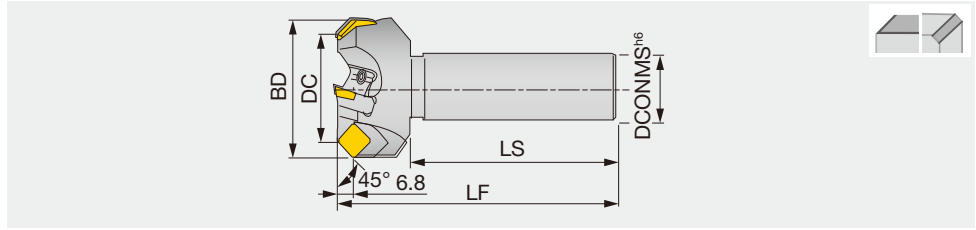


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

EGD4400

45° face endmill, shank type, with wedge clamp system

GAMP = +15°, GAMF = -3°

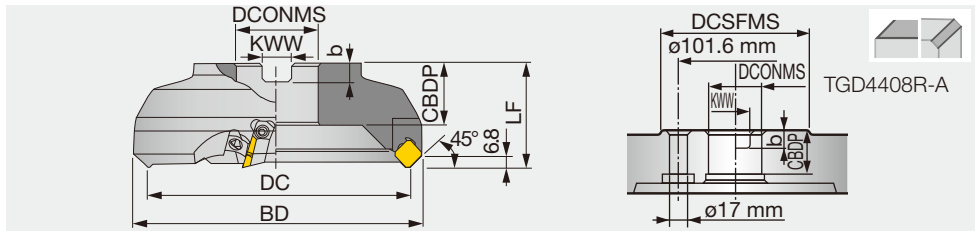


| Designation | APMX | DC | CICT | BD | DCONMS | LS | LH | LF | WT(kg) | Insert |
|-------------|------|----|------|----|--------|----|----|-----|--------|---|
| EGD4450R | 4 | 50 | 4 | 67 | 32 | 80 | 35 | 115 | 1.1 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| EGD4463R | 4 | 63 | 4 | 79 | 32 | 80 | 35 | 115 | 1.4 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |

TGD4400-A

45° face mill, with wedge clamp system

GAMP = +15°, GAMF = -3°



| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|---|
| TGD4403R-A | 4 | 80 | 6 | 96 | 50 | 25.4 | 26 | 9.5 | 6 | 1.4 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TGD4404R-A | 4 | 100 | 6 | 115 | 63 | 31.75 | 32 | 12.7 | 8 | 2.5 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TGD4405R-A | 4 | 125 | 8 | 139 | 63 | 38.1 | 38 | 15.9 | 10 | 3.6 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TGD4406R-A | 4 | 160 | 8 | 173 | 63 | 50.8 | 38 | 19 | 11 | 5.6 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |
| TGD4408R-A | 4 | 200 | 10 | 213 | 63 | 47.625 | 38 | 25.4 | 14 | 8.7 | SD*N42.../SD*R1203.../ WDCN42ZFR-DIA |

SPARE PARTS

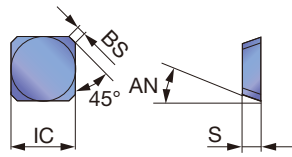
| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|---------|--------|
| EGD4400 | LD442R | DS-8 | BM3X0.5X6 | WP193TR | TP-4 |
| TGD4400-A | LD440R | FDS-8S | CM4X0.7X14 | WP440R | TP-4 |

Recommended clamping torque: 8 N·m

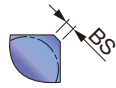
INSERT

SDCN/SDEN/SDKN 42Z

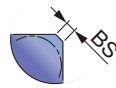
Regular edge
SD*N42Z*N



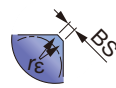
Details of edge
SDKN42ZTN16



SD*N42ZTN20

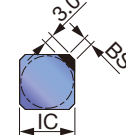


SDKN42ZTNCR
SDEN42ZTNCR



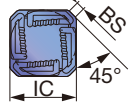
SDCN42ZFN-DIA

SDCN42ZFN-DIA

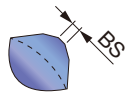


SDKR42Z-MJ

SDKR42ZSR-MJ
with 3-dimensional
chipbreaker

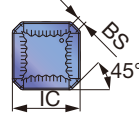


Details of edge

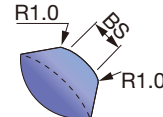


SDMR/SDKR 1203-MJ

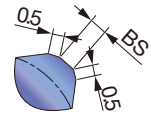
SD*R1203AETN-MJ
with 3-dimensional
chipbreaker



Details of edge
SDMR1203AETN-MJ

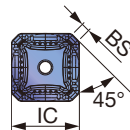


SDKR1203AETN-MJ

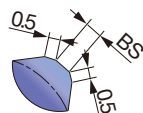


SDKR42Z-MS

SDKR42ZPN-MS

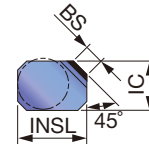


Details of edge



WDCN42ZFR-DIA

Wiper edge
WDCN42ZFR-DIA



| | | | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|---|--|
| P Steel | ★ | ★ | | ☆ | ☆ | | | ☆ | ☆ | ★ | ☆ | ☆ | | | | | |
| M Stainless | ★ | | ★ | ☆ | | | | | | ☆ | | | | | | | |
| K Cast iron | | ★ | | | | ☆ | ★ | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | | ★ | | | ★ | |
| S Superalloys | | ★ | ☆ | | | | | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | | | | | | | | | Cermet | | Uncoated | | PCD | IC | INSL | S | AN | BS | |
|-----------------|------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------|----------|------|-------|----|------|-------|------|-----|-----|
| | | AH3135 | AH120 | AH130 | AH140 | AH330 | GH330 | T1115 | T1215 | T3130 | T3225 | NS740 | N308 | UX30 | TH10 | DX140 | | | | | | |
| SDCN42ZFN | 4 | | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDCN42ZTN | 4 | | | | | | | | | | | | ● | ● | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDCN42ZTN20 | 4 | | | | | | | | | | | | ● | | | | | 12.7 | - | 3.18 | 15° | 2 |
| SDEN42ZFN | 4 | | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDEN42ZTN | 4 | ● | ● | | ● | | ● | ● | | | | ● | ● | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDEN42ZTNCR | 4 | ● | ● | | ● | ● | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDEN42ZTN20 | 4 | | | | | | | | | ● | ● | | | | | | | 12.7 | - | 3.18 | 15° | 2 |
| SDKN42ZFN | 4 | | | | | | | | | | | | | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKN42ZTN | 4 | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | | ● | | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKN42ZTNCR | 4 | | | | | | | | | | | | ● | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKN42ZTN16 | 4 | | | | | | | | | | | | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDCN42ZFN-DIA | 2 | | | | | | | | | | | | | | | ● | | 12.7 | - | 3.18 | 15° | 1.2 |
| SDKR42ZSR-MJ | 4 | ● | ● | | ● | ● | | | | ● | ● | | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDMR1203AETN-MJ | 4 | | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKR1203AETN-MJ | 4 | | | | | | | | | | | ● | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| SDKR42ZPN-MS | 4 | ● | | ● | ● | | | | | | | | | | | | | 12.7 | - | 3.18 | 15° | 1.6 |
| WDCN42ZFR-DIA | 0.5 | | | | | | | | | | | | | | | ● | | 12.2 | 15.64 | 3.18 | 15° | 4.9 |

● : Line up

DX140: Packing Quantity = 1 pc.

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EGD4400

e-catalog



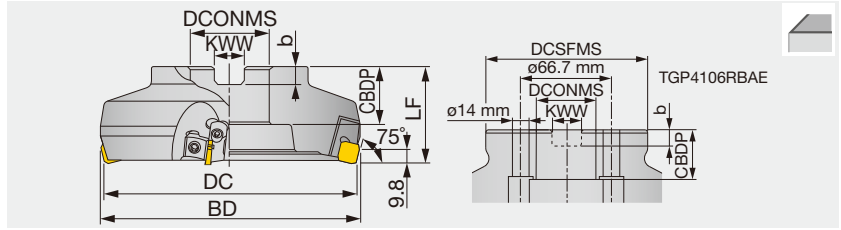
TGD4400-A



TGP4100RIA/BAA/RBAE

75° face mill, with wedge clamp system

GAMP = +7°, GAMF = +1°



| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|----------------------|
| TGP4103RIA | 7 | 80 | 5 | 89 | 50 | 25.4 | 26 | 9.5 | 6 | 1.3 | SP*N42..., WPAN42... |
| TGP4104RIA | 7 | 100 | 6 | 108 | 63 | 31.75 | 32 | 12.7 | 8 | 2.4 | SP*N42..., WPAN42... |
| TGP4104RBA | 7 | 100 | 8 | 108 | 63 | 31.75 | 32 | 12.7 | 8 | 2.4 | SP*N42..., WPAN42... |
| TGP4104RBAE | 7 | 100 | 8 | 108 | 63 | 32 | 25 | 14.4 | 8 | 2.4 | SP*N42..., WPAN42... |
| TGP4105RIA | 7 | 125 | 8 | 132 | 63 | 38.1 | 38 | 15.9 | 10 | 3.6 | SP*N42..., WPAN42... |
| TGP4105RBA | 7 | 125 | 10 | 132 | 63 | 38.1 | 38 | 15.9 | 10 | 3.6 | SP*N42..., WPAN42... |
| TGP4105RBAE | 7 | 125 | 10 | 132 | 63 | 40 | 32 | 16.4 | 9 | 3.6 | SP*N42..., WPAN42... |
| TGP4106RIA | 7 | 160 | 8 | 167 | 63 | 50.8 | 38 | 19 | 11 | 5.9 | SP*N42..., WPAN42... |
| TGP4106RBA | 7 | 160 | 12 | 167 | 63 | 50.8 | 38 | 19 | 11 | 5.8 | SP*N42..., WPAN42... |
| TGP4106RBAE | 7 | 160 | 12 | 167 | 63 | 40 | 29 | 16.4 | 9 | 5.8 | SP*N42..., WPAN42... |

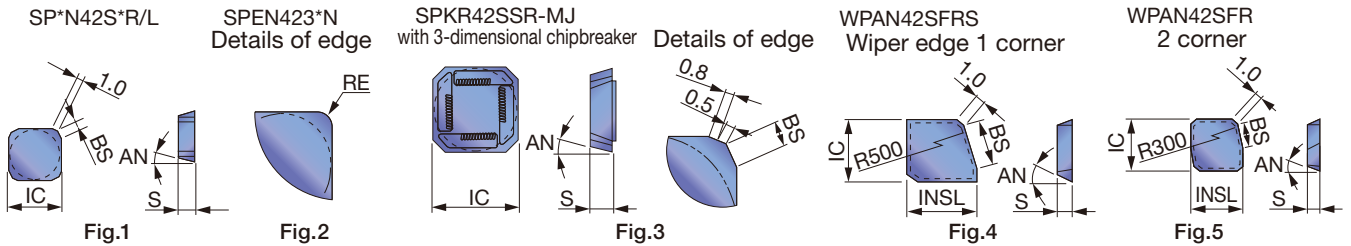
SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|---------------------|---------|--------------------|----------------------|--------|--------|
| TGP4103RIA | LP413R | FDS-8S | CM4X0.7X14 | WF310R | TP-4 |
| TGP4104, 05, 06RIA | LP413R | FDS-8S | CM4X0.7X14 | WP440R | TP-4 |
| TGP4104, 05, 06RBA | LP413R | FDS-8S | CM4X0.7X14 | WF310R | TP-4 |
| TGP4104, 05, 06RBAE | LP413R | FDS-8S | CM4X0.7X14 | WF310R | TP-4 |

Recommended clamping torque: 8 N·m

INSERT

SPCN/SPEN/SPKN 42S



Right hand (R) shown.

| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ☆ | ☆ | ★ | ★ | ☆ | ☆ |
| Stainless | ☆ | ★ | ★ | ★ | ☆ | ☆ |
| Cast iron | ☆ | ★ | ★ | ★ | ☆ | ☆ |
| Non-ferrous | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ |
| Superalloys | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ |
| Hard materials | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | Cermert | | Ceramic | Uncoated | | IC | INSL | S | AN | BS | Fig. |
|--------------|-----|------|--------|-------|-------|-------|-------|---------|------|---------|----------|------|------|------|------|-----|-----|------|
| | | | AH120 | AH140 | GH330 | T1115 | T3130 | NS740 | N308 | FX105 | UX30 | TH10 | | | | | | |
| SPCN42STR | 0 | 7 | | | | | | ● | ● | | | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPCN42SFR | 0 | 7 | | | | | | | | | ● | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPEN42STR | 0 | 7 | | | | | | ● | | | | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPKN42STR | 0 | 7 | ● | ● | ● | ● | ● | ● | ● | ● | | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPKN42STL | 0 | 7 | | | | | | ● | | | | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPKN42SFR | 0 | 7 | | | | | | | | | ● | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPKN42SFL | 0 | 7 | | | | | | | | | ● | | 12.7 | - | 3.18 | 11° | 1.4 | 1 |
| SPKR42SSR-MJ | 0 | 7 | | ● | ● | ● | | | | | | | 12.7 | - | 3.18 | 11° | 0 | 3 |
| WPAN42SFERS | 0 | - | | | | | | | | | ● | | 12.4 | 14.9 | 3.18 | 11° | 9.7 | 4 |
| WPAN42SFR | 0 | - | | | | | | ● | | | ● | | 12.4 | 13.8 | 3.18 | 11° | 5.2 | 5 |
| SPGN120312TN | 1.2 | 7 | | | | | | | ● | | | | 12.7 | - | 3.18 | 11° | - | 2 |
| SPEN423TN* | 1.2 | 7 | | | | ● | | ● | | | ● | | 12.7 | - | 3.18 | 11° | - | 2 |
| SPEN423FN* | 1.2 | 7 | | | | | | | | | ● | | 12.7 | - | 3.18 | 11° | - | 2 |

Note: Insert marked with * and a wiper insert should not be used together.

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

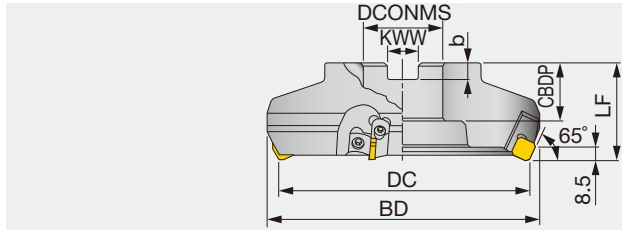
e-catalog



TGP4200R-A

Face mill, with wedge clamp system

GAMP = +5°, GAMF = +1°



Right hand (R) shown.

| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|-------------------------|
| TGP4203R-A | 6 | 80 | 5 | 95 | 50 | 25.4 | 26 | 9.5 | 6 | 1.4 | SP*N42.../ WPAN42ZFR |
| TGP4204R-A | 6 | 100 | 6 | 114 | 63 | 31.75 | 32 | 12.7 | 8 | 2.4 | SP*N42.../ WPAN42ZFR |
| TGP4205R-A | 6 | 125 | 8 | 139 | 63 | 38.1 | 38 | 15.9 | 10 | 3.9 | SP*N42.../ WPAN42ZFR |
| TGP4206R-A | 6 | 160 | 10 | 174 | 63 | 50.8 | 38 | 19 | 11 | 6.1 | SP*N42.../ WPAN42ZFR |

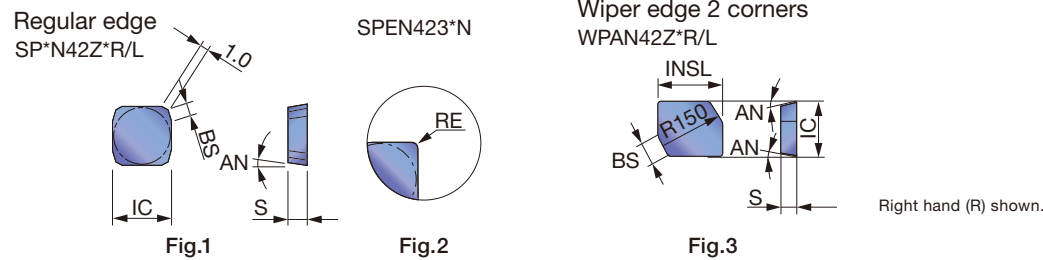
SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|--------|--------|
| TGP42**R-A | LP413R | FDS-8S | CM4X0.7X14 | WP440R | TP-4 |

Recommended clamping torque: 8 N·m

INSERT

SPAN/SPCN/SPEN/SPKN 42Z



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ★ | | | | | |
| Stainless | | | | | | |
| Cast iron | ★ | | | | | |
| Non-ferrous | | | | | | |
| Superalloys | | | | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | Cermet | | Uncoated | | IC | INSL | S | AN | BS | RE | Fig. |
|-------------|------|--------|-------|--------|------|----------|------|------|-------|------|-----|-----|-----|------|
| | | T1115 | T3130 | NS740 | X407 | N308 | UX30 | | | | | | | |
| SPAN42ZFR | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPCN42ZFL | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPCN42ZFR | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPCN42ZTR | 6 | | | | ● | ● | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPEN423TN | 6 | | ● | | ● | | ● | 12.7 | - | 3.18 | 11° | - | 1.2 | 2 |
| SPEN423FN | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | - | 1.2 | 2 |
| SPEN42ZTR | 6 | | | | ● | | | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPKN42ZFL | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPKN42ZFR | 6 | | | | | | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| SPKN42ZTR | 6 | ● | ● | | ● | ● | ● | 12.7 | - | 3.18 | 11° | 2 | - | 1 |
| WPAN42ZFR | 6 | | | | | | ● | 12.2 | 14.28 | 3.18 | 11° | 4.5 | - | 3 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog

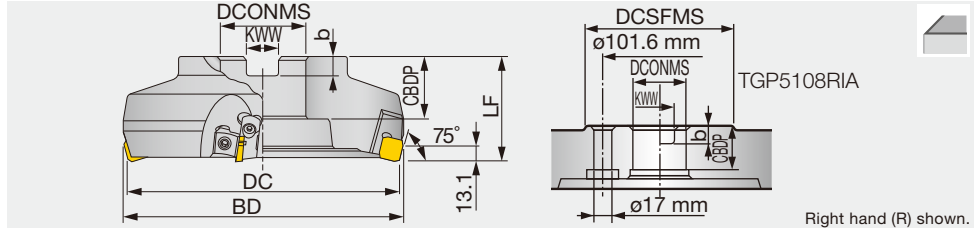




TGP5100RIA

Face mill, with wedge clamp system

GAMP = +7°, GAMF = +1°



| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|-----------|
| TGP5104RIA | 10 | 100 | 5 | 109 | 63 | 31.75 | 32 | 12.7 | 8 | 2.3 | SP*N53... |
| TGP5105RIA | 10 | 125 | 6 | 133 | 63 | 38.1 | 38 | 15.9 | 10 | 3.5 | SP*N53... |
| TGP5106RIA | 10 | 160 | 8 | 167 | 63 | 50.8 | 38 | 19 | 11 | 5.7 | SP*N53... |
| TGP5108RIA | 10 | 200 | 10 | 207 | 63 | 47.625 | 38 | 25.4 | 14 | 8.4 | SP*N53... |

SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|--------|--------|
| TGP51**RIA | LP514R | FDS-8S | CM4X0.7X14 | WF500R | TP-4 |

Recommended clamping torque: 8 N·m



INSERT

SPCN/SPKN 53S

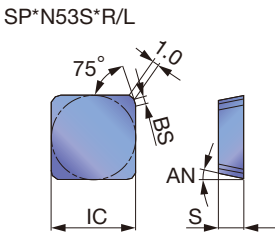


Fig.1

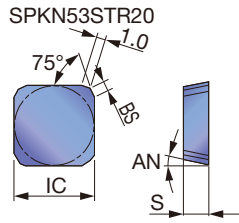


Fig.2

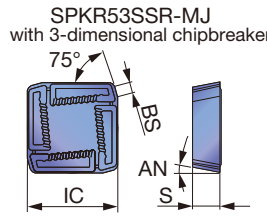


Fig.3

Right hand (R) shown.

Approach angle



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ★ | | | | | |
| Stainless | ★ | ☆ | | | | |
| Cast iron | | ★ | | | | |
| Non-ferrous | | | | | | |
| Superalloys | | | | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | Cermet | | Uncoated | | IC | S | AN | BS | Fig. |
|--------------|------|--------|-------|--------|-------|----------|------|--------|------|-----|-----|------|
| | | GH330 | T1115 | T3130 | NS740 | N308 | UX30 | | | | | |
| SPCN53SFR | 10 | | | | | | | 15.875 | 4.76 | 11° | 1.2 | 1 |
| SPCN53STR | 10 | | | | ● | | ● | 15.875 | 4.76 | 11° | 1.2 | 1 |
| SPKN53SFR | 10 | | | | | | ● | 15.875 | 4.76 | 11° | 1.2 | 1 |
| SPKN53STL | 10 | | | | | | ● | 15.875 | 4.76 | 11° | 1.2 | 1 |
| SPKN53STR | 10 | ● | ● | | ● | | ● | 15.875 | 4.76 | 11° | 1.2 | 1 |
| SPKN53STR20 | 10 | | | ● | | | | 15.875 | 4.76 | 11° | 2 | 2 |
| SPKR53SSR-MJ | 10 | ● | ● | | | | | 15.875 | 4.76 | 11° | 2 | 3 |

●: Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



S-TAQ System

The world's highest level repeatability

S-TAQ System

Improved surface quality and increased tool life

- Two-face restricted (1/10 short taper and flange face) coupling.
- High-level coupling performance contributes to high accuracy and excellent rigidity.
- Excellent dynamic balance reduces vibration, chatter, and cutting noise at high speeds.

Improved productivity

- High speed machining can reduce machining time.
- High repeatability can eliminate trial cut.

Performance

Original clamp system provides high rigidity, accuracy and operating speed.

Clamping force (Strong clamp system)

- Lubricant coating on clamping piece.
- 4-points balancing clamp.
- Sufficient clamping for the smaller diameter part of taper.

| Designation | Dimensions (mm) | | | | S/M | K | Recommend clamping torque (N·m) | Clamping force (N) |
|-------------|-----------------|-----|-----|-----|-------|----|---------------------------------|--------------------|
| | D CONWS | BD | ℓ 1 | ℓ 2 | | | | |
| TAQ32 | 19 | 32 | 18 | 8.5 | 3/M6 | 8 | 3 | 4×10^3 |
| TAQ40 | 24 | 40 | 21 | 10 | 3/M6 | 10 | 5 | 5.5×10^3 |
| TAQ50 | 30 | 50 | 25 | 12 | 4/M8 | 12 | 8 | 9×10^3 |
| TAQ63 | 38 | 63 | 32 | 15 | 4/M8 | 16 | 10 | 12×10^3 |
| TAQ80 | 48 | 80 | 40 | 18 | 5/M10 | 18 | 20 | 18×10^3 |
| TAQ100 | 60 | 100 | 50 | 22 | 6/M12 | 20 | 30 | 23×10^3 |

Comparison of clamping force

| | Taper | Taper dia.(mm) / holder dia.(mm) | Recommend clamping torque (N/m) | Draw-in force (N) | Draw-in force / Torque (m-1) |
|---------------|--------|----------------------------------|---------------------------------|-------------------|------------------------------|
| TAQ63 | 1 / 10 | 38 / 63 | 10 | 12×10^3 | 1200 |
| QC adapter | 10° | 35 / 70 | 20 | 9.8×10^3 | 490 |
| Other makes A | 4° | 35 / 62 | 22.5 | 9.8×10^3 | 436 |

Repeatability for accuracy

| | |
|----------------|-----------------|
| Radial run out | Within 0.003 mm |
| Axial run out | Within 0.002 mm |

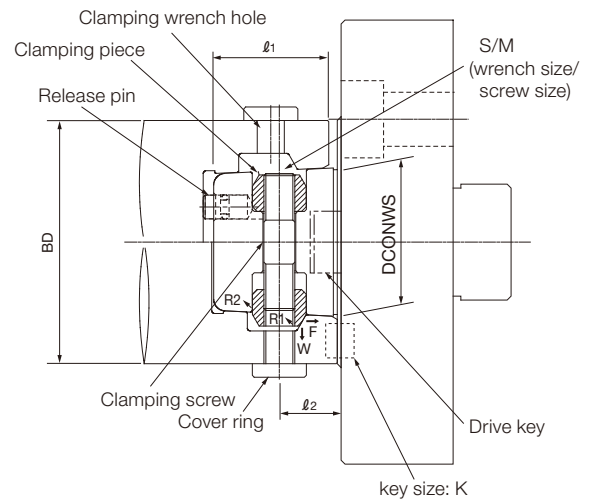
Note: Measured at 150 mm far from end face.



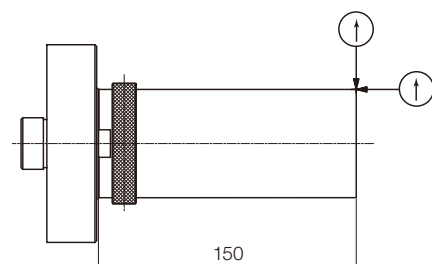
Labor-saving tool change

- Can eliminate detaching the toolholder from the main spindle.
- Can eliminate the brakes for the main spindle.
- Labor-saving clamping by only one T-wrench.

Part assembly



W: Driving force by clamping screw
 F: Clamping force
 R1 = R2: Receiving force of clamping piece



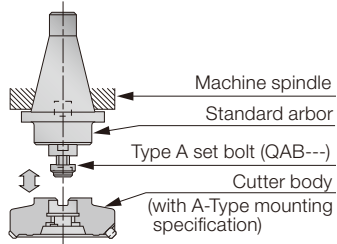


QC system for TAC Mills

TAC mills QC system facilitate easy and quick mounting of the cutter body (face milling cutter, etc.) to the machine tools.

Small dia. TAC mills QC system Dia. $\phi 80 \sim 160$ mm

Type A QC system



Features

- Cutter body replacement is possible without removing the bolt.
- A QC system is made up only by installing the Type A set bolt to our standard arbor. (The cutter body is made to A-Type mounting specification.)
- Standard arbor used ensures superior economy and rigidity.

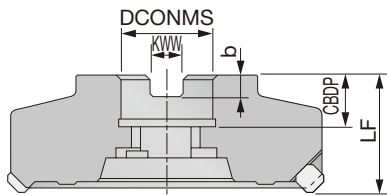
Replacement method

Mounting - Direct the set bolt direction to align with the cutter spot facing hole, then mount the cutter. Turn the set bolt one to two turns for tightening.

Removal - Loosen the bolt one turn, press the cutter to the spindle, and turn the set bolt one to two turns. The cutter can now be removed.

A-type QC Mounting System for Small Diameter TAC Mills

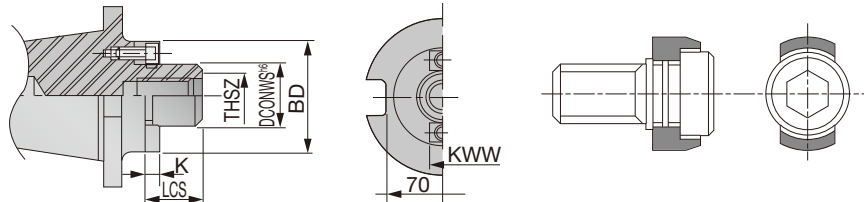
Dimensional details of mount (For $\phi 80$ to $\phi 160$ mm dia. TAC mills)



| Cutter dia. (mm) | Dimensions (mm) | | | | |
|------------------|-----------------|----|------|------|----|
| | DCONMS | b | KWW | CBDP | Lf |
| $\phi 80$ | 25.4 | 6 | 9.5 | 20 | 50 |
| $\phi 100$ | 31.75 | 8 | 12.7 | 22 | 50 |
| $\phi 125$ | 38.1 | 10 | 15.9 | 27 | 63 |
| $\phi 160$ | 50.8 | 11 | 19 | 27 | 63 |

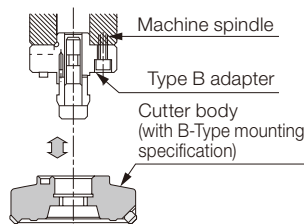
Arbors

Standard arbors (FMA, FMC type) can't be used. Special arbors applicable for below dimensions can be made to order on request.



| Dimensions (mm) | | | | | | Cutter fixing screw for A-type | Hex wrench size(mm) |
|-----------------|-----|------|-----|-------|----|--------------------------------|---------------------------------------|
| DCONWS | BD | THSZ | LCS | KWW | K | | |
| 25.4 | 50 | M12 | 18 | 9.5 | 5 | QAB-3 (R/L) | Hex. Socket-head screw M12 x 30 10 |
| 31.75 | 60 | M16 | 20 | 12.7 | 7 | QAB-4 (R/L) | Hex. Socket-head screw M12 x 30 14 |
| 38.1 | 80 | M20 | 25 | 15.9 | 9 | QAB-5 (R/L) | 17 |
| 50.8 | 100 | M24 | 25 | 19.05 | 10 | QAB-6 (R/L) | 19 |

Type B QC system



Features

- Cutter body replacement is possible without removing the bolt.
- Loosening of the adapter is not enough to remove the cutter. This is to prevent the cutter from falling.
- Type B QC adapter and Type B cutter installation are necessary.
- It is not necessary to set the set bolt direction with that of the cutter hole. The cutter is fit into the adapter only by aligning the match marks.

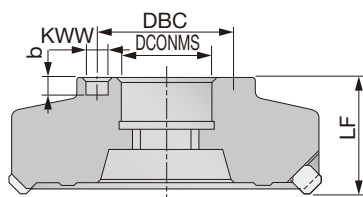
Replacement method

Mounting - Set the cutter into the adapter. Direct the cutter match mark to align with that of adapter, then the cutter enters the adapter. Turn the cutter by 90° and turn adapter bolt one to two turns for tightening.

Removal - Loosen adapter bolt by one or two turns and turn the cutter by 90°. The cutter can now be removed.

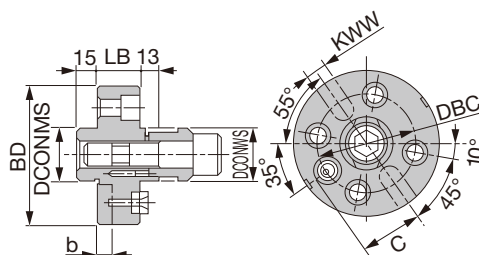
B-type QC Mounting System for Small Diameter TAC Mills

Dimensional details of mount (For $\phi 80$ to $\phi 160$ mm dia. TAC mills)



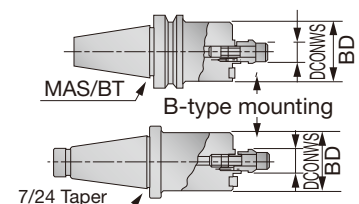
| Cutter dia. | Dimensions (mm) | | | | |
|-------------|-----------------|---|-----|----|-----|
| | DCONMS | b | KWW | Lf | DBC |
| $\phi 80$ | 25.4 | 7 | 10 | 50 | 45 |
| $\phi 100$ | 31.75 | 7 | 12 | 63 | 55 |
| $\phi 125$ | 38.1 | 7 | 15 | 63 | 70 |
| $\phi 160$ | 50.8 | 7 | 18 | 63 | 85 |

Dimensional details of B-type adapters



| Cutter dia. | Dimensions (mm) | | | | | | | | |
|-------------|-----------------|------|-----|--------|------|----|-----|-----|----|
| | DCONWS | c | BD | DCONMS | KWW | b | DBC | S | LB |
| $\phi 80$ | 25.4 | 22.5 | 80 | 25.4 | 9.5 | 7 | 45 | M10 | 25 |
| $\phi 100$ | 31.75 | 27.5 | 100 | 31.75 | 12.7 | 8 | 55 | M10 | 25 |
| $\phi 125$ | 38.1 | 35 | 100 | 38.1 | 15.9 | 10 | 70 | M12 | 30 |
| $\phi 160$ | 50.8 | 42.5 | 125 | 50.8 | 19 | 11 | 85 | M16 | 30 |

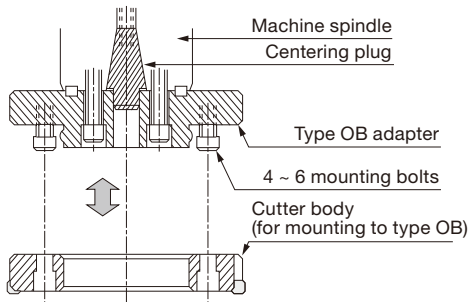
Instead of the above B-type adapters, BT- and T-type arbors can be also used for B-type QC mount cutters. These arbors are made to order on request.



QC system for TAC Mills

Large dia. TAC mills QC system Dia. $\phi 200$ mm -

Type OB QC system (Elongated mounting hole type)



Features

- The cutter body can be replaced without removing bolt.
- Cutter does not fall when only the bolt is removed.
- The cutter body weight is about one half of usual cutter.
- The cutter bolt is fixed to the adapter with four to six large bolts, ensuring high rigidity.

Replacement method

Mounting - Align the adapter tightening bolts (4 ~ 6) to the cutter mounting holes, turn the cutter whilst pressing it against the adapter, and turn the bolt to tighten.

Removal - Loosen the bolt slightly, and by one turn, turn the cutter to remove it from the adapter.

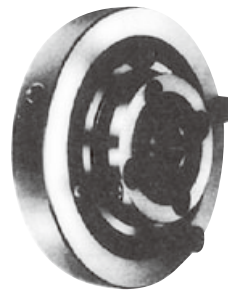
OB-type QC Mounting System for Large Diameter TAC Mills (Elongated mounting hole type)

Cutter body ($\phi 200$ - $\phi 400$ mm)

This system is applied to "flush edge-top" Standard type TAC mills with OB mount.

For the details of the OB-type cutter bodies.

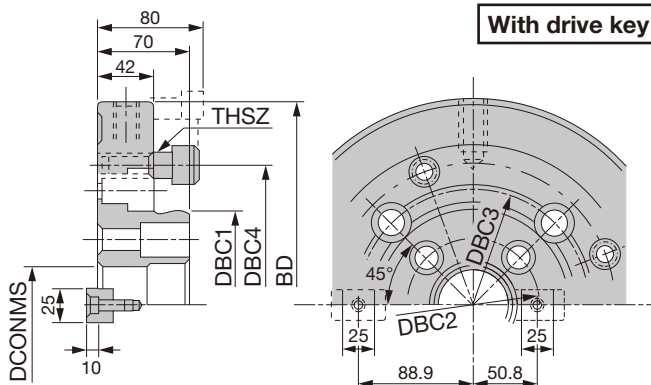
OB type adapter



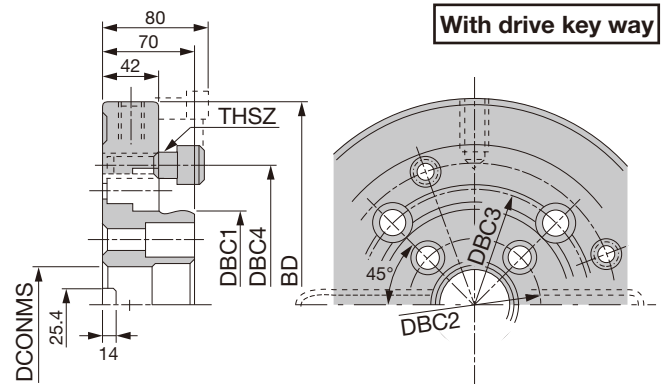
OB type cutter body



Dimensional details of mount of OB-type adapters



QA12K to QA16K type shown.



QA12M to QA16M type shown.

| Adapter Designation | Dimensions (mm) | | | | | | | |
|---------------------|-----------------|--------|--------|-------|-------|-------|--------|-------|
| | BD | DCONMS | DBC1 | DBC2 | DBC3 | DBC4 | THSZ | Bolts |
| QA08K/M | 198 | 47.625 | 63.5 | 101.6 | - | 114.3 | M16x40 | 4 |
| QA10K/M | 248 | 60 | 133.35 | 101.6 | - | 177.8 | M16x50 | 4 |
| QA12K/M | 313 | 60 | 146.05 | 101.6 | 177.8 | 215.9 | M20x50 | 4 |
| QA14K/M | 353 | 60 | 215.9 | 101.6 | 177.8 | 260.4 | M20x50 | 6 |
| QA16K/M | 398 | 60 | 254 | 101.6 | 177.8 | 304.8 | M20x50 | 6 |

- Notes:
- Dimension ϕd can be made to customer's specifications.
 - Special centering plugs for $\phi 60$ mm hole are made to order.

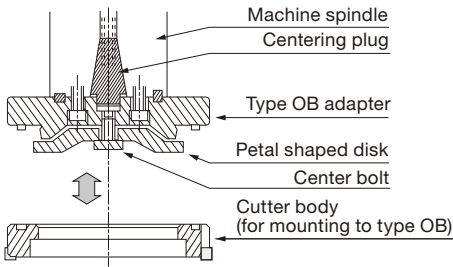
Notes: In Designation, K indicates "with drive key" type, and M indicates "with drive key way" type. ("N" shows number of tapped holes.)





Large dia. TAC mills QC system Dia. $\phi 200$ mm -

Type CB QC system (Center bolt type)



Features

- Move the petal-shaped disk up and down with one center bolt in the adapter, removing the cutter. Since only one bolt is used, replacement takes only one half of the time required by Type CB.
- The cutter body is lighter by 20% than that of OB type and easy to handle.
- Compatible with auto clamp unit.
- The cutter does not fall when the center bolt only is loosened.

Replacement method

- Mounting** - Align the cutter notch with the adapter clamber and turn the cutter whilst pressing it against the adapter. Tighten with the center bolt.
- Removal** - Loosen the center bolt once and lift the cutter upward in the spindle direction. Turn the cutter further slightly, and the cutter can be removed from the adapter.

CB-type QC Mounting System for Large Diameter TAC Mills (Center bolt type)

Cutter body ($\phi 200$ - $\phi 400$ mm)

This system is applied to "flush edge-top" type TAC mills with CB mount.

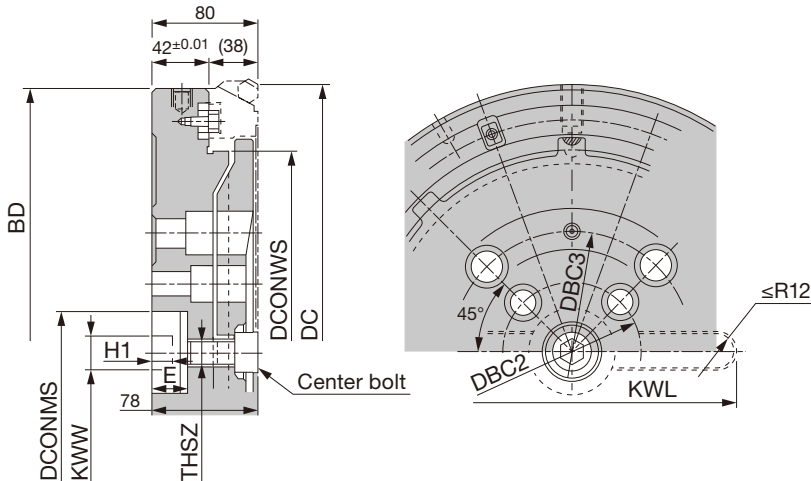
CB type adapter



CB type cutter body



Dimensional details of mount of CB-type adapters



| Adapter Designation | Dimensions (mm) | | | | | | | | | | | Center bolt |
|---------------------|-----------------|--------|-----|--------|-------|-------|------|----|-----|------|----|-------------|
| | DC | DCONMS | BD | DCONWS | DBC2 | DBC3 | KWW | H1 | KWL | THSZ | E | |
| QACB-08MR/L | 200 | 47.625 | 195 | 119.97 | 101.6 | - | 25.4 | 14 | 150 | M20 | 25 | TMBA-M20 |
| QACB-10MR/L | 250 | 60 | 245 | 159.97 | 101.6 | - | 25.4 | 14 | 150 | M20 | 25 | TMBA-M20 |
| QACB-12MR/L | 315 | 60 | 310 | 214.97 | 101.6 | - | 25.4 | 14 | 150 | M20 | 25 | TMBA-M20 |
| QACB-14MR/L | 355 | 60 | 350 | 254.97 | - | 177.8 | 25.4 | 14 | 245 | M20 | 25 | TMBA-M20 |
| QACB-16MR/L | 400 | 60 | 395 | 299.95 | - | 177.8 | 25.4 | 14 | 245 | M20 | 25 | TMBA-M20 |

Note: • Dimension ϕd can be made to customer's specifications.
 • Because of the dimensional restriction of "E", standard CO- type centering plugs can not be used for the adapters shown in the above table. Special centering plugs applicable for the above adapters can be made to order on request.

MEMO

A large grid of 20 columns and 30 rows for taking notes. The grid is composed of small squares, suitable for writing or drawing.

Grade

A

Insert

B

Ext. Toolholder

C

Int. Toolholder

D

Threading

E

Grooving

F

Miniature tool

G

Milling cutter

H

Endmill

I

Drilling tool

J

Tooling System

K

User's Guide

L

Index

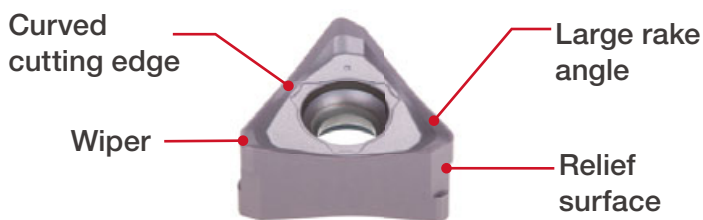
M



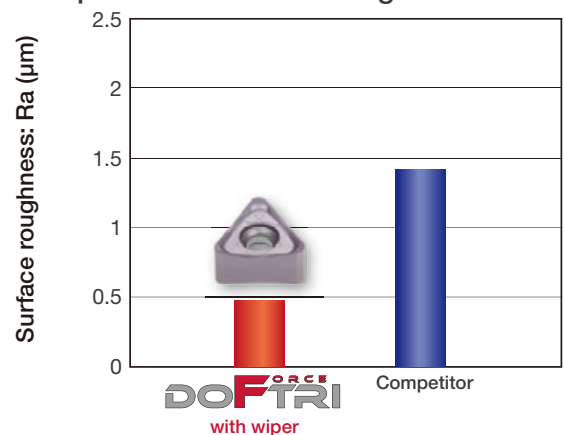
High precision shoulder mill series with economical double-sided triangular inserts

Innovative insert

- Highly economical 6-corner double sided inserts.
- Long effective cutting edge allows shoulder milling with large depth of cut.
- Low cutting force at low depth of cut, and high machining stability at large depth of cut.
 - Concave cutting edge and large rake angle produce barrel-shape chips, resulting in excellent chip evacuation.
 - The design with wiper edge (front cutting edge) is also suitable for face milling.



Comparison of surface roughness



Reference pages: [H150 - H153](#)

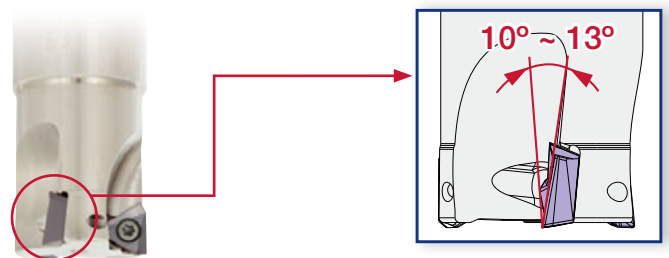


Excellent cutting performance with improved profitability

Economical 3 cutting-edge inserts



Drastically reduced cutting force



Low cutting force for all depths of cut due to helical cutting edge with large rake angle.

Large rake angle

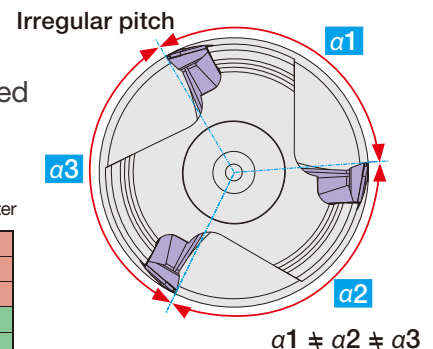


Good surface finish due to positive inclination on wiper edge

Uniquely designed flank face with built-in "margin" that prevents chattering and chipping.

Applicable for a wide range of cutting conditions

Insert positioning in irregular pitch, combined with uniquely designed flank face of inserts, prevents chattering during machining.

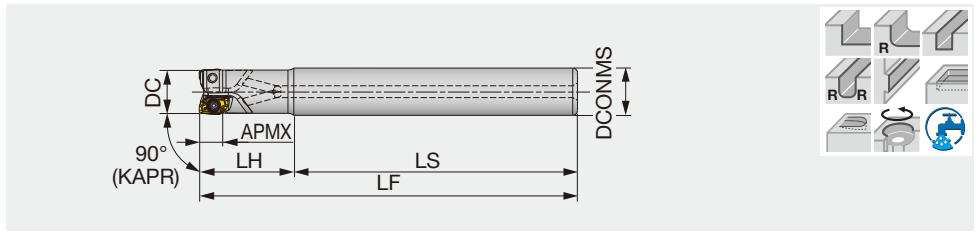


Cutting performance

| ap (mm) | 10 | | | | | |
|-----------------|------|-----------|--|--|--|--|
| | 9 | OK | | | | |
| 8 | | | | | | |
| 7 | | | | | | |
| 6 | | | | | | |
| 5 | | | | | | |
| 4 | | | | | | |
| 3 | | | | | | |
| 2 | | | | | | |
| 1 | | | | | | |
| Applicable area | 0.05 | | | | | |
| | | fz (mm/t) | | | | |

| ap (mm) | 10 | | | | | |
|-----------------|------|-----------|--|--|--|--|
| | 9 | OK | | | | |
| 8 | | | | | | |
| 7 | | | | | | |
| 6 | | | | | | |
| 5 | | | | | | |
| 4 | | | | | | |
| 3 | | | | | | |
| 2 | | | | | | |
| 1 | | | | | | |
| Applicable area | 0.05 | | | | | |
| | | fz (mm/t) | | | | |

Cutter : EPA10R032M32.0-03N (DC = 32 mm, CICT = 3)
 Insert : TOMT100404PDER-MJ
 Grade : AH3135
 Workpiece : S55C (200 HB)
 Cutting speed : Vc = 150 m/min
 Width of cut : ae = 32 mm
 Machine : Vertical M/C, BT50



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|---------------------|------|----|------|--------|-----|----|-----|--------|----------|-------------|
| EPAV04M006C06.0R01 | 4 | 6 | 1 | 6 | 48 | 12 | 60 | 0.01 | With | AVMT04... |
| EPAV04M008C08.0R02 | 4 | 8 | 2 | 8 | 48 | 12 | 60 | 0.02 | With | AVMT04... |
| EPAV04M008C08.0R02L | 4 | 8 | 2 | 8 | 60 | 20 | 80 | 0.03 | With | AVMT04... |
| EPAV06M008C10.0R01 | 6 | 8 | 1 | 10 | 60 | 20 | 80 | 0.04 | With | AVGT06... |
| EPAV04M010C10.0R02 | 4 | 10 | 2 | 10 | 60 | 20 | 80 | 0.04 | With | AVMT04... |
| EPAV04M010C10.0R03 | 4 | 10 | 3 | 10 | 60 | 20 | 80 | 0.04 | With | AVMT04... |
| EPAV04M010C10.0R02L | 4 | 10 | 2 | 10 | 65 | 35 | 100 | 0.05 | With | AVMT04... |
| EPAV06M010C10.0R02 | 6 | 10 | 2 | 10 | 60 | 20 | 80 | 0.04 | With | AVGT06... |
| EPAV06M010C10.0R02L | 6 | 10 | 2 | 10 | 65 | 35 | 100 | 0.06 | With | AVGT06... |
| EPAV06M010C08.0R02L | 6 | 10 | 2 | 8 | 80 | 20 | 100 | 0.04 | With | AVGT06... |
| EPAV04M012C12.0R03 | 4 | 12 | 3 | 12 | 60 | 20 | 80 | 0.06 | With | AVMT04... |
| EPAV04M012C12.0R04 | 4 | 12 | 4 | 12 | 60 | 20 | 80 | 0.06 | With | AVMT04... |
| EPAV04M012C12.0R03L | 4 | 12 | 3 | 12 | 85 | 35 | 120 | 0.09 | With | AVMT04... |
| EPAV06M012C12.0R02 | 6 | 12 | 2 | 12 | 60 | 20 | 80 | 0.06 | With | AVGT06... |
| EPAV06M012C12.0R03 | 6 | 12 | 3 | 12 | 60 | 20 | 80 | 0.06 | With | AVGT06... |
| EPAV06M012C12.0R02L | 6 | 12 | 2 | 12 | 85 | 35 | 120 | 0.09 | With | AVGT06... |
| EPAV06M012C10.0R02L | 6 | 12 | 2 | 10 | 100 | 20 | 120 | 0.07 | With | AVGT06... |
| EPAV06M012C10.0R03 | 6 | 12 | 3 | 10 | 60 | 20 | 80 | 0.04 | With | AVGT06... |
| EPAV12M012C12.0R01 | 11.5 | 12 | 1 | 12 | 60 | 25 | 85 | 0.06 | With | AVM/GT12... |
| EPAV06M014C12.0R03 | 6 | 14 | 3 | 12 | 60 | 20 | 80 | 0.07 | With | AVGT06... |
| EPAV06M014C12.0R03L | 6 | 14 | 3 | 12 | 120 | 20 | 140 | 0.11 | With | AVGT06... |
| EPAV04M016C16.0R04 | 4 | 16 | 4 | 16 | 70 | 20 | 90 | 0.12 | With | AVMT04... |
| EPAV04M016C16.0R05 | 4 | 16 | 5 | 16 | 70 | 20 | 90 | 0.12 | With | AVMT04... |
| EPAV04M016C16.0R04L | 4 | 16 | 4 | 16 | 105 | 35 | 140 | 0.19 | With | AVMT04... |
| EPAV12M016C16.0R02 | 11.5 | 16 | 2 | 16 | 60 | 25 | 85 | 0.12 | With | AVM/GT12... |
| EPAV12M016C16.0R03 | 11.5 | 16 | 3 | 16 | 60 | 25 | 85 | 0.12 | With | AVM/GT12... |
| EPAV12M016C16.0R02L | 11.5 | 16 | 2 | 16 | 105 | 40 | 145 | 0.20 | With | AVM/GT12... |
| EPAV06M016C16.0R03 | 6 | 16 | 3 | 16 | 70 | 20 | 90 | 0.12 | With | AVGT06... |
| EPAV06M016C16.0R04 | 6 | 16 | 4 | 16 | 70 | 20 | 90 | 0.12 | With | AVGT06... |
| EPAV06M016C16.0R03L | 6 | 16 | 3 | 16 | 105 | 35 | 140 | 0.20 | With | AVGT06... |
| EPAV06M018C16.0R03 | 6 | 18 | 3 | 16 | 70 | 20 | 90 | 0.13 | With | AVGT06... |
| EPAV06M018C16.0R04 | 6 | 18 | 4 | 16 | 70 | 20 | 90 | 0.13 | With | AVGT06... |
| EPAV06M018C16.0R03L | 6 | 18 | 3 | 16 | 160 | 20 | 180 | 0.26 | With | AVGT06... |
| EPAV06M020C20.0R04 | 6 | 20 | 4 | 20 | 70 | 30 | 100 | 0.23 | With | AVGT06... |
| EPAV06M020C20.0R05 | 6 | 20 | 5 | 20 | 70 | 30 | 100 | 0.21 | With | AVGT06... |
| EPAV06M020C20.0R04L | 6 | 20 | 4 | 20 | 165 | 35 | 200 | 0.45 | With | AVGT06... |
| EPAV06M020C16.0R04 | 6 | 20 | 4 | 16 | 80 | 30 | 110 | 0.17 | With | AVGT06... |
| EPAV12M020C20.0R03 | 11.5 | 20 | 3 | 20 | 70 | 30 | 100 | 0.22 | With | AVM/GT12... |
| EPAV12M020C20.0R04 | 11.5 | 20 | 4 | 20 | 70 | 30 | 100 | 0.21 | With | AVM/GT12... |
| EPAV12M020C20.0R02L | 11.5 | 20 | 2 | 20 | 135 | 50 | 185 | 0.41 | With | AVM/GT12... |
| EPAV06M025C25.0R05 | 6 | 25 | 5 | 25 | 80 | 35 | 115 | 0.4 | With | AVGT06... |
| EPAV06M025C25.0R06 | 6 | 25 | 6 | 25 | 80 | 35 | 115 | 0.4 | With | AVGT06... |
| EPAV06M025C25.0R04L | 6 | 25 | 4 | 25 | 160 | 40 | 200 | 0.72 | With | AVGT06... |
| EPAV06M025C20.0R06 | 6 | 25 | 6 | 20 | 80 | 35 | 115 | 0.27 | With | AVGT06... |
| EPAV12M025C25.0R04 | 11.5 | 25 | 4 | 25 | 80 | 35 | 115 | 0.38 | With | AVM/GT12... |
| EPAV12M025C25.0R06 | 11.5 | 25 | 6 | 25 | 80 | 35 | 115 | 0.39 | With | AVM/GT12... |
| EPAV12M025C25.0R03L | 11.5 | 25 | 3 | 25 | 150 | 70 | 220 | 0.74 | With | AVM/GT12... |
| EPAV06M032C32.0R08 | 6 | 32 | 8 | 32 | 80 | 40 | 120 | 0.7 | With | AVGT06... |
| EPAV06M032C32.0R06L | 6 | 32 | 6 | 32 | 155 | 45 | 200 | 1.2 | With | AVGT06... |
| EPAV12M032C32.0R06 | 11.5 | 32 | 6 | 32 | 80 | 40 | 120 | 0.68 | With | AVM/GT12... |
| EPAV12M032C32.0R08 | 11.5 | 32 | 8 | 32 | 80 | 40 | 120 | 0.68 | With | AVM/GT12... |
| EPAV12M032C32.0R03L | 11.5 | 32 | 3 | 32 | 175 | 80 | 255 | 1.47 | With | AVM/GT12... |

Reference pages: Inserts → **H126**, Standard cutting conditions → **H127 - H128**

SPARE PARTS



| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------------------------|----------------|----------------------|--------|
| EPAV04M006C06.0R01 | CSPB-1.8L3.3 | (M-1000) | IP-6DB |
| EPAV04M008... - EPAV04M016... | CSPB-1.8L3.6 | (M-1000) | IP-6DB |
| EPAV06M... | CSPB-2H | (M-1000) | IP-6DB |
| EPAV12M012C12.0R01 | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M016C16.0R02 | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M016C16.0R03 | CSPB-2.5S | (M-1000) | IP-8D |
| EPAV12M016C16.0R02L | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M020C20.0R03 | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M020C20.0R04 | CSPB-2.5S | (M-1000) | IP-8D |
| EPAV12M020C20.0R02L | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M025C25.0R04 | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M025C25.0R06 | CSPB-2.5S | (M-1000) | IP-8D |
| EPAV12M025C25.0R03L | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M032C32.0R06 | CSPB-2.5 | (M-1000) | IP-8D |
| EPAV12M032C32.0R08 | CSPB-2.5S | (M-1000) | IP-8D |
| EPAV12M032C32.0R03L | CSPB-2.5 | (M-1000) | IP-8D |

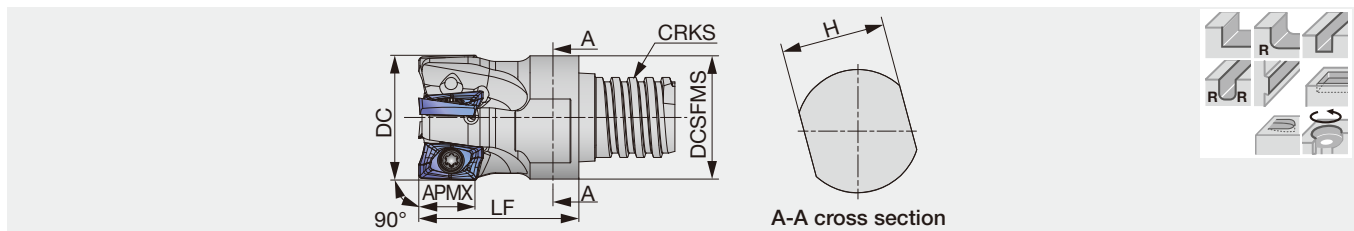
Recommended clamping torque:
 CSPB-1.8L3.3, CSPB-1.8L3.6 = 0.5 N-m, CSPB-2H = 0.7 N-m, CSPB-2.5, CSPB-2.5S = 1.3 N-m

TUNG FORCE REC

HPAV06-S

Square shoulder endmill, modular type (TungMeister), with screw clamp system

GAMP = +6.9° ~ +7.6°, GAMF = -35.2° ~ -32.4°



| Designation | APMX | DC | CICT | LF | H | DCSFMS | CRKS | WT(kg) | Insert |
|------------------|------|----|------|----|----|--------|------|--------|-----------|
| HPAV06M010S05R02 | 6 | 10 | 2 | 10 | 8 | 8 | S05 | 0.01 | AVGT06... |
| HPAV06M010S06R02 | 6 | 10 | 2 | 16 | 8 | 9.8 | S06 | 0.01 | AVGT06... |
| HPAV06M012S08R02 | 6 | 12 | 2 | 18 | 10 | 11.7 | S08 | 0.02 | AVGT06... |
| HPAV06M012S08R03 | 6 | 12 | 3 | 18 | 10 | 11.7 | S08 | 0.02 | AVGT06... |
| HPAV06M016S10R03 | 6 | 16 | 3 | 20 | 13 | 15.4 | S10 | 0.03 | AVGT06... |
| HPAV06M016S10R04 | 6 | 16 | 4 | 20 | 13 | 15.4 | S10 | 0.03 | AVGT06... |

For connections between metric shank and TungMeister thread, please use VAD-M type connector

SPARE PARTS



| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------|----------------|----------------------|--------|
| HPAV06M... | CSPB-2H | (M-1000) | IP-6DB |

Recommended clamping torque: 0.7 N-m

| Designation | Wrench* |
|----------------|----------|
| HPAV06M010S... | KEYV-S06 |
| HPAV06M012S... | KEYV-S08 |
| HPAV06M016S... | KEYV-S10 |

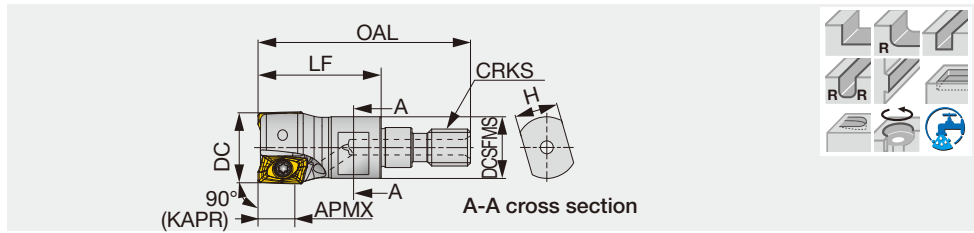
*sold separately

Reference pages: Inserts → **H126**, Standard cutting conditions → **H127 - H128**, TungMeister shank → **I100**

HPAV06/12-M

Square shoulder endmill, modular type (TungFlex), with screw clamp system

HPAV06-M: GAMP = +6.9°~ +7.6°, GAMF = -35.2°~ -32.4°
 HPAV12-M: GAMP = +6°~ +7.6°, GAMF = -37.1°~ -32.4°



| Designation | APMX | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|----|------|------|----|----|--------|------|--------|----------|-------------|
| HPAV06M010M06R02 | 6 | 10 | 2 | 34.5 | 20 | 7 | 9.5 | M6 | 0.01 | Without | AVGT06... |
| HPAV06M012M06R02 | 6 | 12 | 2 | 34.5 | 20 | 7 | 10 | M6 | 0.01 | Without | AVGT06... |
| HPAV06M012M06R03 | 6 | 12 | 3 | 34.5 | 20 | 7 | 10 | M6 | 0.01 | Without | AVGT06... |
| HPAV06M016M08R03 | 6 | 16 | 3 | 42 | 25 | 10 | 13 | M8 | 0.03 | Without | AVGT06... |
| HPAV06M016M08R04 | 6 | 16 | 4 | 42 | 25 | 10 | 13 | M8 | 0.03 | Without | AVGT06... |
| HPAV12M016M08R02 | 11.5 | 16 | 2 | 42 | 25 | 10 | 14.5 | M8 | 0.03 | With | AVM/GT12... |
| HPAV12M016M08R03 | 11.5 | 16 | 3 | 42 | 25 | 10 | 14.5 | M8 | 0.03 | With | AVM/GT12... |
| HPAV12M020M10R03 | 11.5 | 20 | 3 | 49 | 30 | 15 | 17.8 | M10 | 0.06 | With | AVM/GT12... |
| HPAV12M020M10R04 | 11.5 | 20 | 4 | 49 | 30 | 15 | 17.8 | M10 | 0.05 | With | AVM/GT12... |
| HPAV12M025M12R04 | 11.5 | 25 | 4 | 57 | 35 | 17 | 23 | M12 | 0.1 | With | AVM/GT12... |
| HPAV12M025M12R06 | 11.5 | 25 | 6 | 57 | 35 | 17 | 23 | M12 | 0.1 | With | AVM/GT12... |
| HPAV12M032M16R06 | 11.5 | 32 | 6 | 63 | 40 | 22 | 28.8 | M16 | 0.21 | With | AVM/GT12... |
| HPAV12M032M16R08 | 11.5 | 32 | 8 | 63 | 40 | 22 | 28.8 | M16 | 0.21 | With | AVM/GT12... |
| HPAV12M040M16R06 | 11.5 | 40 | 6 | 63 | 40 | 22 | 28.8 | M16 | 0.25 | With | AVM/GT12... |
| HPAV12M040M16R08 | 11.5 | 40 | 8 | 63 | 40 | 22 | 28.8 | M16 | 0.24 | With | AVM/GT12... |

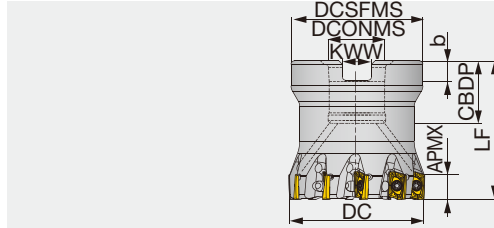
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|------------------|----------------|----------------------|--------|
| HPAV06M... | CSPB-2H | (M-1000) | IP-6DB |
| HPAV12M016M08R02 | CSPB-2.5 | - | IP-8D |
| HPAV12M016M08R03 | CSPB-2.5S | - | IP-8D |
| HPAV12M020M10R03 | CSPB-2.5 | - | IP-8D |
| HPAV12M020M10R04 | CSPB-2.5S | - | IP-8D |
| HPAV12M025M12R04 | CSPB-2.5 | - | IP-8D |
| HPAV12M025M12R06 | CSPB-2.5S | - | IP-8D |
| HPAV12M032M16R06 | CSPB-2.5 | - | IP-8D |
| HPAV12M032M16R08 | CSPB-2.5S | - | IP-8D |
| HPAV12M040M16R06 | CSPB-2.5 | - | IP-8D |
| HPAV12M040M16R08 | CSPB-2.5 | - | IP-8D |

Recommended clamping torque: 1.3 N·m

Square shoulder mill, bore type, with screw clamp system

TPAV06: GAMP = +7.7°, GAMF = -29.8°
TPAV12: GAMP = +6° ~ +7.6°, GAMF = -37.1° ~ -32.4°



| Designation | APMX | DC | CICT | DCSFMS | DCONMS | CBDP | LF | KWW | b | WT(kg) | Insert |
|--------------------|------|----|------|--------|--------|------|----|------|-----|--------|-------------|
| TPAV06M040B16.0R10 | 6 | 40 | 10 | 38 | 16 | 18 | 40 | 8.4 | 5.6 | 0.24 | AVGT06... |
| TPAV12M050B22.0R08 | 11.5 | 50 | 8 | 47 | 22 | 20 | 40 | 10.4 | 6.3 | 0.37 | AVM/GT12... |
| TPAV12M050B22.0R12 | 11.5 | 50 | 12 | 47 | 22 | 20 | 40 | 10.4 | 6.3 | 0.37 | AVM/GT12... |
| TPAV12M063B22.0R08 | 11.5 | 63 | 8 | 47 | 22 | 20 | 40 | 10.4 | 6.3 | 0.52 | AVM/GT12... |
| TPAV12M063B22.0R14 | 11.5 | 63 | 14 | 47 | 22 | 20 | 40 | 10.4 | 6.3 | 0.54 | AVM/GT12... |

SPARE PARTS



| Designation | Clamping screw | Lubricant (Optional) | Wrench | Center bolt |
|--------------------|----------------|----------------------|--------|-------------|
| TPAV06M040B16.0R10 | CSPB-2H | (M-1000) | IP-6DB | CM8X30H |
| TPAV12M... | CSPB-2.5 | - | IP-8D | CM10x30H |

Recommended clamping torque: CSPB-2H = 0.7 N·m, CSPB-2.5 = 1.3 N·m

STANDARD CUTTING CONDITIONS

EPAV04

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|-----------------------------|--------------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E, C15E4, E275A, etc. | - 200 HB | First choice | AH3225 | 100 - 300 | 0.05 - 0.12 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3225 | 100 - 250 | 0.05 - 0.12 |
| M | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | 100 - 200 | 0.05 - 0.1 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200 HB | First choice | AH3225 | 80 - 180 | 0.05 - 0.1 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | 100 - 300 | 0.05 - 0.12 |
| | Ductile cast iron FCD400, FCD600, etc. GGG60, 600-3, etc. | 150 - 250 HB | First choice | AH120 | 100 - 250 | 0.05 - 0.12 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3225 | 20 - 60 | 0.04 - 0.07 |
| | Superalloys Inconel 718, etc. | - 40 HRC | First choice | AH120 | 20 - 40 | 0.04 - 0.07 |
| H | Hardened steel | SKD61, X40CrMoV5-1, etc. | 40 - 50 HRC | First choice | AH120 | 50 - 150 |
| | | SKD11, X153CrMoV12, etc. | 50 - 60 HRC | First choice | AH120 | 40 - 70 |

EPAV06, HPAV06-M, HPAV06-S, TPAV06

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|-----------------------------|--------------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E, C15E4, E275A, etc. | - 200 HB | First choice | AH3225 | 230 - 430 | 0.07 - 0.12 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3225 | 150 - 350 | 0.07 - 0.12 |
| M | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | 100 - 230 | 0.07 - 0.12 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200 HB | First choice | AH3135 | 150 - 220 | 0.06 - 0.1 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | 200 - 330 | 0.07 - 0.12 |
| | Ductile cast iron FCD400, FCD600, etc. GGG60, 600-3, etc. | 150 - 250 HB | First choice | AH120 | 150 - 240 | 0.07 - 0.12 |
| N | Aluminium alloys Si < 13% | - | First choice | KS05F | 650 - 1000 | 0.07 - 0.12 |
| | Aluminium alloys Si ≥ 13% | - | First choice | KS05F | 100 - 230 | 0.04 - 0.12 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH130 | 40 - 90 | 0.04 - 0.1 |
| | Superalloys Inconel 718, etc. | - 40 HRC | First choice | AH130 | 45 - 65 | 0.04 - 0.09 |
| H | Hardened steel | SKD61, X40CrMoV5-1, etc. | 40 - 50 HRC | First choice | AH120 | 45 - 70 |
| | | SKD11, X153CrMoV12, etc. | 50 - 60 HRC | First choice | AH120 | 40 - 65 |

Grade
Insert
Toolholder
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



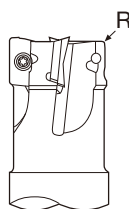
STANDARD CUTTING CONDITIONS

EPAV12, HPAV12-M, TPAV12

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
|-----|--|-----------------------------|-----------------|--------------|--------------------------|--------------------------|-------------|
| P | Low carbon steel S15C, SS400, etc. C15E, C15E4, E275A, etc. | - 200 HB | First choice | AH3225 | 100 - 300 | 0.06 - 0.22 | |
| | | - 200 HB | Wear resistance | T3225 | 200 - 400 | 0.06 - 0.18 | |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3225 | 100 - 250 | 0.06 - 0.22 | |
| | | - 300 HB | Wear resistance | T3225 | 200 - 400 | 0.06 - 0.18 | |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | 100 - 200 | 0.06 - 0.22 | |
| | | 30 - 40 HRC | Wear resistance | T3225 | 200 - 400 | 0.06 - 0.15 | |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200 HB | First choice | AH3225 | 80 - 180 | 0.07 - 0.2 | |
| K | Grey cast iron FC250, FC300, etc. GG25, GG30, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | 100 - 300 | 0.05 - 0.18 | |
| | | 150 - 250 HB | Wear resistance | T1215 | 200 - 400 | 0.05 - 0.12 | |
| | Ductile cast iron FCD400, FCD600, etc. GGG60, 600-3, etc. | 150 - 250 HB | First choice | AH120 | 100 - 250 | 0.05 - 0.18 | |
| | | 150 - 250 HB | Wear resistance | T1215 | 150 - 300 | 0.05 - 0.12 | |
| N | Aluminum alloys Si < 13% | - | First choice | KS05F | 300 - 1500 | 0.05 - 0.32 | |
| | Aluminum alloys Si ≥ 13% | - | First choice | KS05F | 100 - 200 | 0.05 - 0.32 | |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3225 | 20 - 60 | 0.04 - 0.15 | |
| | Superalloys Inconel 718, etc. | - 40 HRC | First choice | AH120 | 20 - 40 | 0.04 - 0.15 | |
| H | Hardened steel | SKD61, X40CrMoV5-1, etc. | 40 - 50 HRC | First choice | AH120 | 50 - 150 | 0.04 - 0.07 |
| | | SKD11, X153CrMoV12, etc. | 50 - 60 HRC | First choice | AH120 | 40 - 70 | 0.04 - 0.07 |

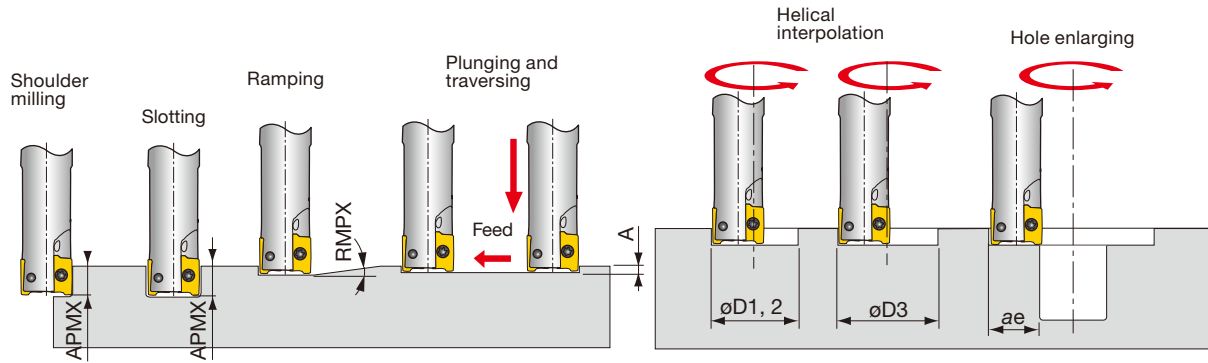
Cautionary point in modifying cutter bodies

When using inserts with corner radius RE ≥ 2 mm, standard cutter bodies have to be modified "R". (EPAV12, TPAV12, HPAV12)



| Corner radius RE (mm) | The dimension of modifying (mm) |
|-----------------------|---------------------------------|
| 0.4 - 1.6 | Unnecessary |
| 2 - 3 | 2 |

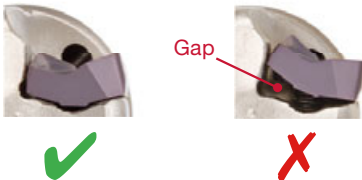
MACHINING APPLICATIONS



| Designation | DC | Max. depth of cut | | Max. plunging | Min. machining | Max. machining | | Max. cutting width in enlarging |
|---------------------|----|-------------------|------|---------------|----------------|----------------|------|---------------------------------|
| | | APMX | RMPX | | | øD1 | øD3* | |
| EPAV04M006C06.0R01 | 6 | 4 | 0.4° | 0.03 | 9.3 | 11.6 | 9.9 | 5.5 |
| EPAV04M008C08.0R02 | 8 | 4 | 0.5° | 0.04 | 12.7 | 15.6 | 13.6 | 7.5 |
| EPAV04M008C08.0R02L | 8 | 4 | 0.5° | 0.04 | 12.7 | 15.6 | 13.6 | 7.5 |
| EPAV04M010C10.0R02 | 10 | 4 | 4.1° | 0.4 | 15.3 | 19.6 | 17.5 | 9.5 |
| EPAV04M010C10.0R03 | 10 | 4 | 1.7° | 0.2 | 16.1 | 19.6 | 17.5 | 9.5 |
| EPAV04M010C10.0R02L | 10 | 4 | 4.1° | 0.4 | 16.1 | 19.6 | 17.5 | 9.5 |
| EPAV04M012C12.0R03 | 12 | 4 | 2.7° | 0.4 | 19.3 | 23.6 | 21.5 | 11.5 |
| EPAV04M012C12.0R04 | 12 | 4 | 1.3° | 0.2 | 20.1 | 23.6 | 21.5 | 11.5 |
| EPAV04M012C12.0R03L | 12 | 4 | 2.7° | 0.4 | 19.3 | 23.6 | 21.5 | 11.5 |
| EPAV04M016C16.0R04 | 16 | 4 | 2° | 0.4 | 27.2 | 31.6 | 29.5 | 15.5 |
| EPAV04M016C16.0R05 | 16 | 4 | 2° | 0.4 | 27.2 | 31.6 | 29.5 | 15.5 |
| EPAV04M016C16.0R04L | 16 | 4 | 2° | 0.4 | 27.2 | 31.6 | 29.5 | 15.5 |
| EPAV06M008... | 8 | 6 | - | - | - | - | - | - |
| EPAV/HPAV06M010... | 10 | 6 | 3° | 0.3 | 15 | 19 | 18 | 9.5 |
| EPAV/HPAV06M012... | 12 | 6 | 3° | 0.3 | 18 | 23 | 22 | 11.5 |
| EPAV/HPAV06M014... | 14 | 6 | 2.3° | 0.3 | 22 | 27 | 26 | 13.5 |
| EPAV/HPAV06M016... | 16 | 6 | 2° | 0.3 | 28 | 31 | 30 | 15.5 |
| EPAV/HPAV06M018... | 18 | 6 | 1.6° | 0.3 | 30 | 35 | 34 | 17.5 |
| EPAV/HPAV06M020... | 20 | 6 | 1.4° | 0.3 | 34 | 39 | 38 | 19.5 |
| EPAV/HPAV06M025... | 25 | 6 | 1.1° | 0.3 | 44 | 49 | 48 | 24.5 |
| EPAV/HPAV06M032... | 32 | 6 | 0.8° | 0.3 | 58 | 63 | 62 | 31.5 |
| TPAV06M040... | 40 | 6 | 0.6° | 0.3 | 74 | 79 | 78 | 39.5 |
| EPAV12M012... | 12 | 11.5 | 4.5° | 0.5 | 17.8 | 23 | 22 | 11 |
| E/HPAV12M016... | 16 | 11.5 | 3.5° | 0.5 | 25.3 | 31 | 30 | 15 |
| E/HPAV12M020... | 20 | 11.5 | 3° | 0.5 | 33 | 39 | 38 | 19 |
| E/HPAV12M025... | 25 | 11.5 | 2.5° | 0.5 | 42.6 | 49 | 48 | 24 |
| E/HPAV12M032... | 32 | 11.5 | 2° | 0.5 | 56.4 | 63 | 62 | 31 |
| HPAV12M040... | 40 | 11.5 | 2° | 0.5 | 71.5 | 78 | 77 | 39 |
| TPAV12M050... | 50 | 11.5 | 2° | 0.5 | 90.4 | 99 | 98 | 49 |
| TPAV12M063... | 63 | 11.5 | 1.8° | 0.5 | 115.6 | 125 | 124 | 62 |

*Flat bottom hole

When clamping the insert, please confirm that there is no gap between the cutter body and the insert as shown in the picture.



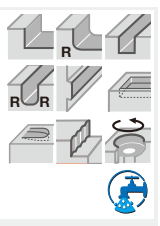
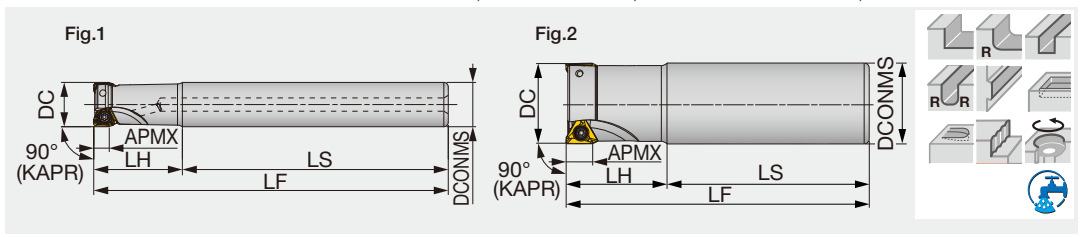
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M



High precision square shoulder endmill, shank type, with screw clamp system

EPA04: GAMP = +12.1°~ +12.2°, GAMF = -14.2°~ -18.3°, EPA06: GAMP = +8.5°~ +11.5°, GAMF = -5.5°~ -12.5°, EPA10: GAMP = +9.5°~ +11°, GAMF = -4.5°~ -0.5°, EPA15: GAMP = +12°~ +13.5°, GAMF = -6°~ -3.5°



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert | Fig. |
|--------------------|------|----|------|--------|-----|----|-----|--------|----------|-----------|------|
| EPA04R008M08.0-01 | 3.5 | 8 | 1 | 8 | 48 | 12 | 60 | 0.02 | with | TOMT04... | 1 |
| EPA04R010M10.0-02 | 3.5 | 10 | 2 | 10 | 60 | 20 | 80 | 0.04 | with | TOMT04... | 1 |
| EPA04R010M10.0-02L | 3.5 | 10 | 2 | 10 | 65 | 35 | 100 | 0.05 | with | TOMT04... | 1 |
| EPA04R012M12.0-02 | 3.5 | 12 | 2 | 12 | 60 | 20 | 80 | 0.06 | with | TOMT04... | 1 |
| EPA04R012M12.0-03 | 3.5 | 12 | 3 | 12 | 60 | 20 | 80 | 0.06 | with | TOMT04... | 1 |
| EPA04R012M12.0-02L | 3.5 | 12 | 2 | 12 | 85 | 35 | 120 | 0.09 | with | TOMT04... | 1 |
| EPA04R016M16.0-03 | 3.5 | 16 | 3 | 16 | 70 | 20 | 90 | 0.12 | with | TOMT04... | 1 |
| EPA04R016M16.0-04 | 3.5 | 16 | 4 | 16 | 70 | 20 | 90 | 0.12 | with | TOMT04... | 1 |
| EPA04R016M16.0-03L | 3.5 | 16 | 3 | 16 | 105 | 35 | 140 | 0.19 | with | TOMT04... | 1 |
| EPA04R020M20.0-04 | 3.5 | 20 | 4 | 20 | 70 | 30 | 100 | 0.21 | with | TOMT04... | 1 |
| EPA04R020M20.0-05 | 3.5 | 20 | 5 | 20 | 70 | 30 | 100 | 0.21 | with | TOMT04... | 1 |
| EPA04R020M20.0-04L | 3.5 | 20 | 4 | 20 | 165 | 35 | 200 | 0.44 | with | TOMT04... | 1 |
| EPA04R025M25.0-05 | 3.5 | 25 | 5 | 25 | 80 | 35 | 115 | 0.39 | with | TOMT04... | 1 |
| EPA04R025M25.0-06 | 3.5 | 25 | 6 | 25 | 80 | 35 | 115 | 0.39 | with | TOMT04... | 1 |
| EPA04R025M25.0-04L | 3.5 | 25 | 4 | 25 | 160 | 40 | 200 | 0.7 | with | TOMT04... | 1 |
| EPA06R012M16.0-01N | 6 | 12 | 1 | 16 | 50 | 18 | 68 | 0.09 | without | TO*T06... | 2 |
| EPA06R016M16.0-02N | 6 | 16 | 2 | 16 | 60 | 24 | 84 | 0.12 | without | TO*T06... | 2 |
| EPA06R016M16.0-02L | 6 | 16 | 2 | 16 | 105 | 40 | 145 | 0.2 | with | TO*T06... | 2 |
| EPA06R018M16.0-02N | 6 | 18 | 2 | 16 | 60 | 24 | 84 | 0.13 | without | TO*T06... | 2 |
| EPA06R018M16.0-02L | 6 | 18 | 2 | 16 | 115 | 30 | 145 | 0.21 | with | TO*T06... | 2 |
| EPA06R020M16.0-02N | 6 | 20 | 2 | 16 | 60 | 30 | 90 | 0.14 | without | TO*T06... | 2 |
| EPA06R020M20.0-02N | 6 | 20 | 2 | 20 | 70 | 30 | 100 | 0.23 | without | TO*T06... | 2 |
| EPA06R020M20.0-03N | 6 | 20 | 3 | 20 | 70 | 30 | 100 | 0.22 | without | TO*T06... | 2 |
| EPA06R020M20.0-02L | 6 | 20 | 2 | 20 | 135 | 50 | 185 | 0.41 | with | TO*T06... | 2 |
| EPA06R022M20.0-02N | 6 | 22 | 2 | 20 | 70 | 30 | 100 | 0.23 | without | TO*T06... | 2 |
| EPA06R022M20.0-03N | 6 | 22 | 3 | 20 | 70 | 30 | 100 | 0.23 | without | TO*T06... | 2 |
| EPA06R022M20.0-02L | 6 | 22 | 2 | 20 | 145 | 40 | 185 | 0.42 | with | TO*T06... | 2 |
| EPA06R025M25.0-03N | 6 | 25 | 3 | 25 | 80 | 35 | 115 | 0.41 | without | TO*T06... | 2 |
| EPA06R025M25.0-04N | 6 | 25 | 4 | 25 | 80 | 35 | 115 | 0.41 | without | TO*T06... | 2 |
| EPA06R025M25.0-02L | 6 | 25 | 2 | 25 | 150 | 70 | 220 | 0.78 | with | TO*T06... | 2 |
| EPA06R028M25.0-03N | 6 | 28 | 3 | 25 | 80 | 35 | 115 | 0.42 | without | TO*T06... | 2 |
| EPA06R028M25.0-04N | 6 | 28 | 4 | 25 | 80 | 35 | 115 | 0.42 | without | TO*T06... | 2 |
| EPA06R028M25.0-02L | 6 | 28 | 2 | 25 | 180 | 40 | 220 | 0.8 | with | TO*T06... | 2 |
| EPA10R025M25.0-02N | 10 | 25 | 2 | 25 | 80 | 35 | 115 | 0.38 | without | TO*T10... | 2 |
| EPA10R025M25.0-02L | 10 | 25 | 2 | 25 | 150 | 70 | 220 | 0.75 | with | TO*T10... | 2 |
| EPA10R028M25.0-02N | 10 | 28 | 2 | 25 | 80 | 35 | 115 | 0.39 | without | TO*T10... | 2 |
| EPA10R028M25.0-02L | 10 | 28 | 2 | 25 | 185 | 35 | 220 | 0.78 | with | TO*T10... | 2 |
| EPA10R032M32.0-02N | 10 | 32 | 2 | 32 | 80 | 40 | 120 | 0.66 | without | TO*T10... | 2 |
| EPA10R032M32.0-03N | 10 | 32 | 3 | 32 | 80 | 40 | 120 | 0.65 | without | TO*T10... | 2 |
| EPA10R032M32.0-02L | 10 | 32 | 2 | 32 | 175 | 80 | 255 | 1.46 | with | TO*T10... | 2 |
| EPA10R035M32.0-02N | 10 | 35 | 2 | 32 | 80 | 40 | 120 | 0.7 | without | TO*T10... | 2 |
| EPA10R035M32.0-03N | 10 | 35 | 3 | 32 | 80 | 40 | 120 | 0.68 | without | TO*T10... | 2 |
| EPA10R035M32.0-02L | 10 | 35 | 2 | 32 | 215 | 40 | 255 | 1.52 | with | TO*T10... | 2 |
| EPA10R040M32.0-03N | 10 | 40 | 3 | 32 | 80 | 40 | 120 | 0.72 | without | TO*T10... | 2 |
| EPA10R040M32.0-04N | 10 | 40 | 4 | 32 | 80 | 40 | 120 | 0.73 | without | TO*T10... | 2 |
| EPA10R040M32.0-02L | 10 | 40 | 2 | 32 | 205 | 50 | 255 | 1.57 | with | TO*T10... | 2 |
| EPA15R040M32.0-03N | 15 | 40 | 3 | 32 | 80 | 40 | 120 | 0.73 | without | TO*T15... | 2 |
| EPA15R040M32.0-02L | 15 | 40 | 2 | 32 | 205 | 50 | 255 | 1.56 | with | TO*T15... | 2 |
| EPA15R050M32.0-04N | 15 | 50 | 4 | 32 | 80 | 40 | 120 | 0.83 | without | TO*T15... | 2 |
| EPA15R050M42.0-02L | 15 | 50 | 2 | 42 | 310 | 50 | 360 | 3.84 | with | TO*T15... | 2 |

Reference pages: Inserts → [H136](#), Standard cutting conditions → [H137 - H138](#)

SPARE PARTS

| Designation | Clamping screw | Grip 1 | Grip 2 (Optional) | Lubricant (Optional) | Wrench | Torx bit 1 | Torx bit 2 (Optional) |
|---------------------|----------------|--------|-------------------|----------------------|--------|------------|-----------------------|
| EPA04R008M08.0-01 | CSPB-1.8L3.3 | IP-6DB | - | - | - | - | - |
| EPA04R010 - 025... | CSPB-1.8L3.6 | IP-6DB | - | - | - | - | - |
| EPA06R012 - 018M... | CSTB-2.5S | - | - | (M-1000) | T-8D | - | - |
| EPA06R020 - 028M... | CSTB-2.5 | - | - | (M-1000) | T-8D | - | - |
| EPA10... | SR 14-562/S | SW6-SD | - | (M-1000) | - | BLD T10/S7 | - |
| EPA15... | TS45120I | - | (H-TB2W) | (M-1000) | - | - | (BT20S) |

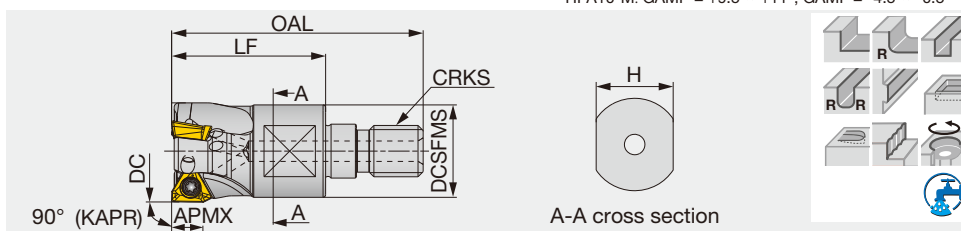
Recommended clamping torque (Torx size): CSPB-1.8L3.6 = 0.5 N·m, CSTB-2.5S, CSTB-2.5 = 1.3 N·m, SR 14-562/S = 3.5 N·m, CSPB-1.8L3.3, TS45120I = 5 N·m (T20)

TUNG-TRI

HPA06/10-M

High precision square shoulder endmill, modular type (TungFlex)

HPA06-M: GAMP = +8.5°~ +11.5°, GAMF = -12.5°~ -5.5°
 HPA10-M: GAMP = +9.5°~ +11°, GAMF = -4.5°~ -0.5°



| Designation | APMX | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|----|------|-----|----|----|--------|------|--------|----------|-----------|
| HPA06R016MM08-02 | 6 | 16 | 2 | 42 | 25 | 10 | 13 | M8 | 0.03 | with | TO*T06... |
| HPA06R020MM10-03 | 6 | 20 | 3 | 49 | 30 | 15 | 18 | M10 | 0.06 | with | TO*T06... |
| HPA06R025MM12-04 | 6 | 25 | 4 | 57 | 35 | 17 | 21 | M12 | 0.1 | with | TO*T06... |
| HPA06R032MM16-05 | 6 | 32 | 5 | 63 | 40 | 22 | 29 | M16 | 0.20 | with | TO*T06... |
| HPA10R025MM12-02 | 10 | 25 | 2 | 57 | 35 | 17 | 21 | M12 | 0.08 | with | TO*T10... |
| HPA10R032MM16-03 | 10 | 32 | 3 | 63 | 40 | 22 | 29 | M16 | 0.18 | with | TO*T10... |

SPARE PARTS

| Designation | Clamping screw | Grip | Lubricant (Optional) | Wrench | Torx bit |
|----------------------|----------------|--------|----------------------|--------|------------|
| HPA06R016MM08-02 | CSTB-2.5S | - | (M-1000) | T-8D | - |
| HPA06R020 - 032MM... | CSTB-2.5 | - | (M-1000) | T-8D | - |
| HPA10... | SR 14-562/S | SW6-SD | (M-1000) | - | BLD T10/S7 |

Recommended clamping torque: CSTB-2.5, CSTB-2.5S = 1.3 N·m, SR 14-562/S = 3.5 N·m

Reference pages: Inserts → **H136**, Standard cutting conditions → **H137 - H138**, TungFlex → **H036 - H037**

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





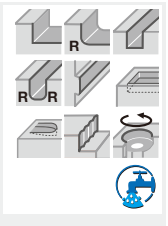
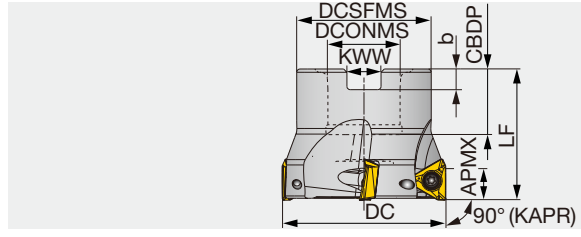
TUNG-TRI

TPA06/10/15



High precision square shoulder mill, with screw clamp system

TPA06: GAMP = +8.5°~ +11.5°, GAMF = -5.5°~ -12.5°
 TPA10: GAMP = +9.5°~ +11°, GAMF = -4.5°~ -0.5°
 TPA15: GAMP = +12°~ +13.5°, GAMF = -6°~ -3.5°



| Designation | APMX | DC | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|--------|--------|------|----|-----|------|--------|----------|-----------|
| TPA06R032M16.0E05 | 6 | 32 | 5 | 30 | 16 | 18 | 40 | 5.6 | 8.4 | 0.14 | with | TO*T06... |
| TPA06R040M16.0E06 | 6 | 40 | 6 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 0.22 | with | TO*T06... |
| TPA10R040M16.0E04 | 10 | 40 | 4 | 35 | 16 | 18 | 40 | 5.6 | 8.4 | 0.2 | with | TO*T10... |
| TPA06R050M22.0E08 | 6 | 50 | 8 | 41 | 22 | 20 | 40 | 6.3 | 10.4 | 0.31 | with | TO*T06... |
| TPA10R050M22.0E04 | 10 | 50 | 4 | 41 | 22 | 20 | 40 | 6.3 | 10.4 | 0.31 | with | TO*T10... |
| TPA15R050M22.0E04 | 15 | 50 | 4 | 41 | 22 | 20 | 40 | 6.3 | 10.4 | 0.27 | with | TO*T15... |
| TPA10R063M22.0E06 | 10 | 63 | 6 | 41 | 22 | 20 | 40 | 6.3 | 10.4 | 0.51 | with | TO*T10... |
| TPA15R063M22.0E05 | 15 | 63 | 5 | 41 | 22 | 20 | 40 | 6.3 | 10.4 | 0.41 | with | TO*T15... |
| TPA10R080M25.4-07 | 10 | 80 | 7 | 58 | 25.4 | 26 | 50 | 6 | 9.5 | 1.04 | with | TO*T10... |
| TPA10R080M27.0E07 | 10 | 80 | 7 | 58 | 27 | 22 | 50 | 7 | 12.4 | 1.04 | with | TO*T10... |
| TPA15R080M25.4-06 | 15 | 80 | 6 | 46 | 25.4 | 26 | 50 | 6 | 9.5 | 0.83 | with | TO*T15... |
| TPA15R080M27.0E06 | 15 | 80 | 6 | 50 | 27 | 22 | 50 | 7 | 12.4 | 0.86 | with | TO*T15... |
| TPA10R100M31.7-08 | 10 | 100 | 8 | 70 | 31.75 | 32 | 63 | 8 | 12.7 | 2.02 | with | TO*T10... |
| TPA10R100M32.0E08 | 10 | 100 | 8 | 60 | 32 | 28.5 | 50 | 8 | 14.4 | 2.02 | with | TO*T10... |
| TPA15R100M31.7-07 | 15 | 100 | 7 | 60 | 31.75 | 32 | 50 | 8 | 12.7 | 1.3 | with | TO*T15... |
| TPA15R100M32.0E07 | 15 | 100 | 7 | 60 | 32 | 28.5 | 50 | 8 | 14.4 | 1.27 | with | TO*T15... |
| TPA15R125M38.1-08 | 15 | 125 | 8 | 80 | 38.1 | 38 | 63 | 10 | 15.9 | 2.7 | with | TO*T15... |
| TPA15R125M40.0E08 | 15 | 125 | 8 | 71 | 40 | 32 | 63 | 9 | 16.4 | 2.47 | with | TO*T15... |
| TPA15R160M40.0E10N | 15 | 160 | 10 | 100 | 40 | 32 | 63 | 9 | 16.4 | 4.77 | without | TO*T15... |
| TPA15R160M50.8-10N | 15 | 160 | 10 | 100 | 50.8 | 46 | 63 | 11 | 19 | 4.4 | without | TO*T15... |



SPARE PARTS



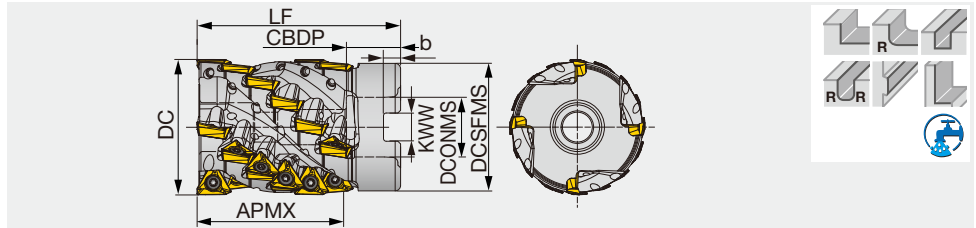
| Designation | Clamping screw | Grip 1 (Optional) | Grip 2 | Lubricant (Optional) | Center bolt 1 | Center bolt 2 | Wrench | Torx bit 1 | Torx bit 2 (Optional) |
|--------------------|----------------|-------------------|--------|----------------------|---------------|---------------|--------|------------|-----------------------|
| TPA06R032M16.0E05 | CSTB-2.5 | - | - | (M-1000) | - | FSHM8-30H | T-8D | - | - |
| TPA06R040M16.0E06 | CSTB-2.5 | - | - | (M-1000) | - | CM8X30H | T-8D | - | - |
| TPA06R050M22.0E08 | CSTB-2.5 | - | - | (M-1000) | - | CM10X30H | T-8D | - | - |
| TPA10R040M16.0E04 | SR 14-562/S | - | SW6-SD | (M-1000) | - | CM8X30H | - | BLD T10/S7 | - |
| TPA10R050, 063M... | SR 14-562/S | - | SW6-SD | (M-1000) | - | CM10X30H | - | BLD T10/S7 | - |
| TPA10R080M... | SR 14-562/S | - | SW6-SD | (M-1000) | - | CM12X30H | - | BLD T10/S7 | - |
| TPA10R100M... | SR 14-562/S | - | SW6-SD | (M-1000) | - | CM16X40H | - | BLD T10/S7 | - |
| TPA15R050M22.0E04 | TS45120I | (H-TB2W) | - | (M-1000) | - | - | - | - | (BT20S) |
| TPA15R063M22.0E05 | TS45120I | (H-TB2W) | - | (M-1000) | - | - | - | - | (BT20S) |
| TPA15R080M... | TS45120I | (H-TB2W) | - | (M-1000) | - | - | - | - | (BT20S) |
| TPA15R100M... | TS45120I | (H-TB2W) | - | (M-1000) | TMBA-M16H | TMBA-M16H | - | - | (BT20S) |
| TPA15R125M... | TS45120I | (H-TB2W) | - | (M-1000) | TMBA-M20H | TMBA-M20H | - | - | (BT20M) |
| TPA15R160M... | TS45120I | (H-TB2W) | - | (M-1000) | - | - | - | - | (BT20M) |

Recommended clamping torque (Torx size): CSTB-2.5 = 1.3 N·m, SR 14-562/S = 3.5 N·m
 TS45120I = 5 N·m (T20)

Reference pages: Inserts → **H136**, Standard cutting conditions → **H137 - H138**

Square shoulder mill for roughing, with screw clamp system

GAMP = +9.5° ~ +11°, GAMF = -4.5° ~ -0.5°



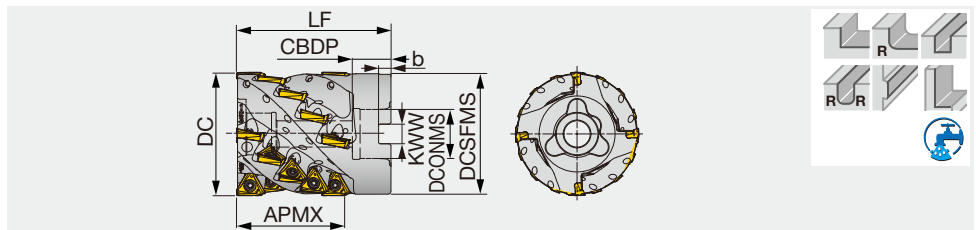
| Designation | APMX | DC | ZEPF | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Air hole | Insert |
|-----------------------|------|----|------|------|--------|--------|------|----|-----|------|--------|----------|-----------|
| TLA10R050L054M22.0E04 | 54 | 50 | 4 | 24 | 47 | 22 | 20 | 75 | 6.3 | 10.4 | 0.64 | with | TO*T10... |
| TLA10R063L054M25.4-04 | 54 | 63 | 4 | 24 | 60 | 25.4 | 26 | 80 | 6 | 9.5 | 1.26 | with | TO*T10... |
| TLA10R063L054M27.0E04 | 54 | 63 | 4 | 24 | 60 | 27 | 22 | 80 | 7 | 12.4 | 1.25 | with | TO*T10... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

TLA15-M

Square shoulder mill for roughing, with screw clamp system

GAMP = +12° ~ +13.5°, GAMF = -6° ~ -3.5°



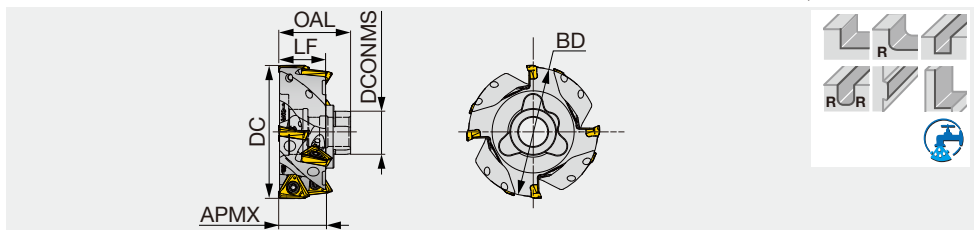
| Designation | APMX | DC | ZEPF | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Air hole | Insert |
|------------------------|------|-----|------|------|--------|--------|------|-----|----|------|--------|----------|-----------|
| TLA15R080L070M31.7-04M | 70 | 80 | 4 | 20 | 78 | 31.75 | 32 | 100 | 8 | 12.7 | 2.29 | with | TO*T15... |
| TLA15R080L070M32.0E04M | 70 | 80 | 4 | 20 | 78 | 32 | 25 | 100 | 8 | 14.4 | 2.38 | with | TO*T15... |
| TLA15R100L083M38.1-05M | 83 | 100 | 5 | 30 | 98 | 38.1 | 38 | 110 | 10 | 15.9 | 4.24 | with | TO*T15... |
| TLA15R100L083M40.0E05M | 83 | 100 | 5 | 30 | 98 | 40 | 32 | 110 | 9 | 16.4 | 4.26 | with | TO*T15... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

TLA15-S

Subunit for TLA15-M, square shoulder mill for roughing, with screw clamp system, for triangular inserts

GAMP = +12° ~ +13.5°, GAMF = -6° ~ -3.5°



| Designation | APMX | DC | ZEPF | CICT | BD | DCONMS | OAL | LF | WT(kg) | Air hole | Insert |
|-------------------|------|-----|------|------|------|--------|-----|------|--------|----------|-----------|
| TLA15R080L028-04S | 28 | 80 | 4 | 8 | 77.6 | 27 | 43 | 28.2 | 0.65 | with | TO*T15... |
| TLA15R100L028-05S | 28 | 100 | 5 | 10 | 97.2 | 33 | 46 | 28 | 1.05 | with | TO*T15... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Torx bit (Optional) | Center bolt 1 | Center bolt 2 | Wrench |
|-----------------------|----------------|-----------------|----------------------|---------------------|-------------------|------------------|--------|
| TLA10R050L054M22.0E04 | SR 14-562 | - | (M-1000) | - | CAP-CM10X1.5X55-H | - | T-10D |
| TLA10R063L... | SR 14-562 | - | (M-1000) | - | - | CAP-CM12X1.75X50 | T-10D |
| TLA15R080L*M... | TS45120I | (H-TB2W) | (M-1000) | (BT20S) | - | CM16X75 | - |
| TLA15R100*M... | TS45120I | (H-TB2W) | (M-1000) | (BT20S) | - | CM20X80 | - |
| TLA15R**L028-**S | TS45120I | (H-TB2W) | (M-1000) | (BT20S) | - | - | - |

Recommended clamping torque (Torx size): SR 14-562 = 3.5 N·m
TS45120I = 5 N·m (T20)

CENTER BOLT

| (Optional parts) | No. of subunits | 1 | 2 |
|-------------------|-----------------|----------|----------|
| TLA15R080L028-04S | | CM16x120 | CM16x140 |
| TLA15R100L028-05S | | CM20x120 | CM20x150 |

Reference pages: Inserts → **H136**, Standard cutting conditions → **H137 - H138**

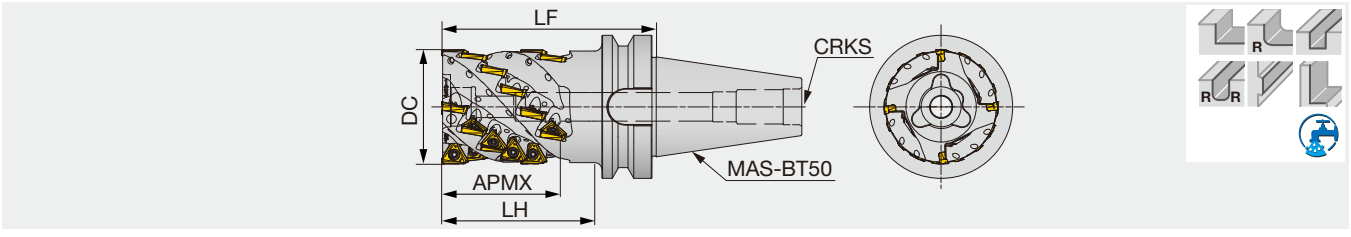


TUNG-TRI

TLA15-BT

Square shoulder mill for roughing, with BT tapered shank

GAMP = +12°~ +13.5°, GAMF = -6°~ -3.5°



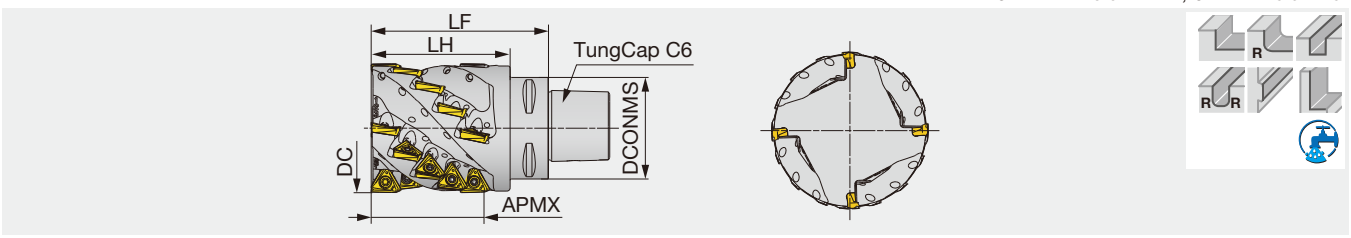
| Designation | APMX | DC | ZEFP | CICT | LF | LH | WT(kg) | Air hole | CRKS | Insert |
|-----------------------|------|-----|------|------|-----|-------|--------|----------|------|-----------|
| TLA15R080L083BT50-04M | 83 | 80 | 4 | 24 | 150 | 107 | 6.29 | with | M24 | TO*T15... |
| TLA15R100L097BT50-05M | 97 | 100 | 5 | 35 | 165 | 126.5 | 8.92 | with | M24 | TO*T15... |



C-TLA

Square shoulder mill for roughing

GAMP = +13.5°~ +17°, GAMF = -5.5°~ -5°



| Designation | APMX | DC | ZEFP | CICT | LF | LH | DCONMS | WT(kg) | Air hole | Insert |
|--------------------|------|----|------|------|-----|------|--------|--------|----------|-----------|
| C6TLA15M063R03L100 | 55 | 63 | 3 | 12 | 100 | 78 | 63 | 2.13 | with | TO*T15... |
| C6TLA15M080R04L110 | 70 | 80 | 4 | 20 | 110 | 86.2 | 63 | 3.17 | with | TO*T15... |

Applicable for 7 MPa coolant

Approach angle



Others

SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Torx bit (Optional) | Shell locking bolt |
|-----------------------|----------------|-----------------|----------------------|---------------------|--------------------|
| TLA15R080L083BT50-04M | TS45120I | (H-TB2W) | (M-1000) | (BT20S) | CAP-CM16x2.0x55 |
| TLA15R100L097BT50-05M | TS45120I | (H-TB2W) | (M-1000) | (BT20S) | CAP-CM20x2.5x50 |
| C6TLA15M0**R0*L1** | TS45120I | (H-TB2W) | - | (BT20S) | - |

Recommended clamping torque (Torx size): 5 N·m (T20)

CENTER BOLT

(Optional parts)

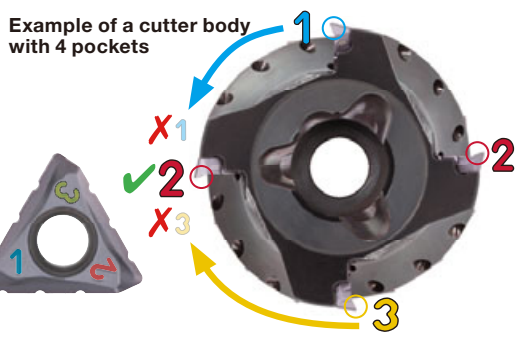
| No. of subunits | 1 | 2 |
|-----------------------|-----------------|---------|
| TLA15R080L083BT50-04M | CAP-CM16x2.0x55 | CM16x90 |
| TLA15R100L097BT50-05M | CAP-CM20x2.5x50 | CM20x80 |

Caution for using NMJ chipbreaker

! Insert with NMJ chipbreaker has a number marked on each corner.
DO NOT place the corners with the same number in adjacent flute as the cutter may be damaged.

For example, if you place the corner #1 in one flute, be sure to use #2 or #3 (and avoid #1) in the next one.

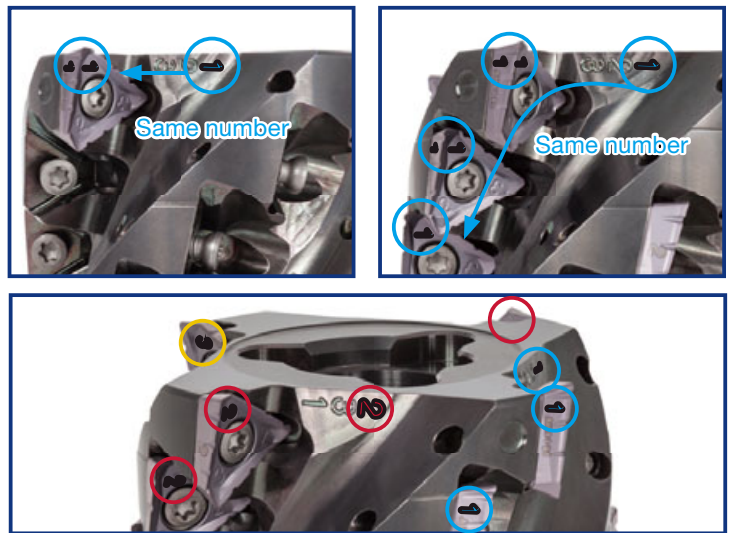
Item: TOMT150608PDER-NMJ



Reference pages: Inserts → **H136**, Standard cutting conditions → **H137 - H138**

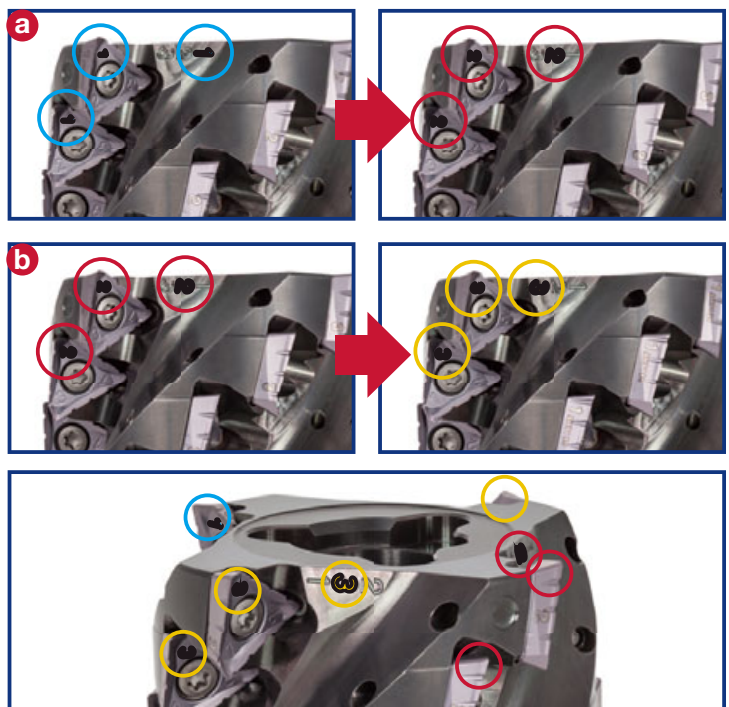
Directions for setting NMJ inserts on roughing type bodies

- 1 Attach the insert on the cutter body so that the number on the working cutting edge matches the first number marked on the cutter body.
(See the image on the right.)
- 2 Attach the remaining inserts on the same flute with the same number marked on the working cutting edge.
- 3 Repeat steps 1 and 2 for the other flutes.
- 4 Make sure the number on the working cutting edge is different from the number used on the adjacent flutes.



Directions for changing corners for inserts on roughing type bodies

- 1
 - a First time to change the corner rotate the insert clock-wise to match the number on the working cutting edge with the second number marked on the cutter body.
(See the image on the right.)
Ex: 1 → 2
2 → 3
3 → 1
 - b Second time to change the corner rotate the insert clock-wise to match the number on the working cutting edge with the last number marked on the cutter body.
(See the image on the right.)
Ex: 2 → 3
3 → 1
1 → 2
- 2 Repeat step 1 for all inserts.
- 3 Make sure the number on the working cutting edge is different from the number used on the adjacent flutes.

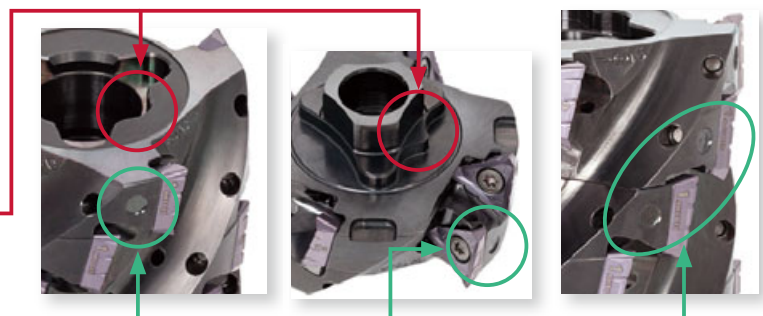


How to set a sub-unit

When setting a sub-unit on the main unit or another sub-unit, be sure to match the markings on the units. Sub-unit has a projection for error-proofing to avoid setting error.

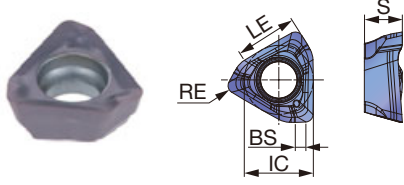
Projection for error-proofing
(Poka-yoke)

Marking

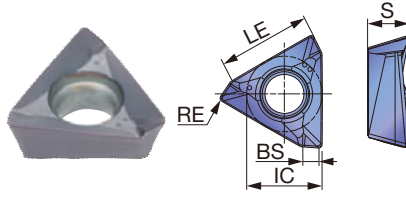


INSERTS

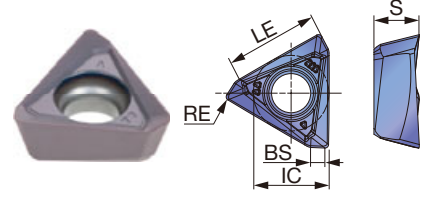
TOMT-MM



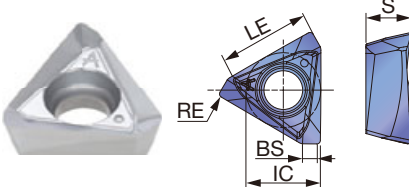
TOMT-MJ



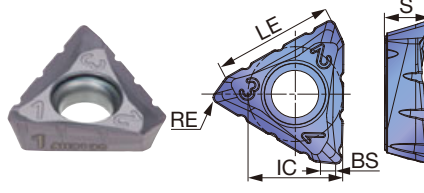
TOET-MJ



TOGT-AJ



TOMT-NMJ



| | | | | | | | | | | | | |
|-------------------------|---|---|---|---|---|---|--|--|---|--|--|--|
| P Steel | ☆ | ★ | ★ | | | ☆ | | | | | | |
| M Stainless | | ★ | ★ | | | ☆ | | | | | | |
| K Cast iron | ★ | | | | ★ | | | | | | | |
| N Non-ferrous | | | | | | | | | ★ | | | |
| S Superalloys | ★ | ☆ | ★ | ★ | | | | | | | | |
| H Hard materials | | | | ★ | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | Un-coated | LE | IC | S | BS |
|--------------------|-----|------|--------|--------|--------|--------|-------|-----------|------|------|-----|-----|
| | | | AH120 | AH3135 | AH3225 | AH8015 | T1215 | T3225 | | | | |
| TOMT040204PXER-MM | 0.4 | 3.5 | ● | ● | ● | | | | 3.6 | 4 | 2.2 | 0.6 |
| TOMT040208PXER-MM | 0.8 | 3.5 | ● | ● | ● | | | | 3.6 | 4 | 2.2 | 0.2 |
| TOMT060302PDER-MJ | 0.2 | 6 | ● | ● | ● | | | | 6.2 | 5.6 | 3.2 | 1.4 |
| TOMT060304PDER-MJ | 0.4 | 6 | ● | ● | ● | | ● | | 6.2 | 5.6 | 3.2 | 1.2 |
| TOMT060308PDER-MJ | 0.8 | 6 | ● | ● | ● | | ● | ● | 6.2 | 5.6 | 3.2 | 0.8 |
| TOGT060304PDFR-AJ | 0.4 | 6 | | | | | ● | | 6.2 | 5.6 | 3.3 | 1.2 |
| TOGT060308PDFR-AJ | 0.8 | 6 | | | | | ● | | 6.2 | 5.6 | 3.3 | 0.8 |
| TOET060302PDER-MJ | 0.2 | 6 | | ● | ● | | | | 6.2 | 5.6 | 3.3 | 1.3 |
| TOET060304PDER-MJ | 0.4 | 6 | | ● | ● | | | | 6.2 | 5.6 | 3.3 | 1.1 |
| TOMT100404PDER-MJ | 0.4 | 10 | ● | ● | ● | | ● | | 10.5 | 8.6 | 4.7 | 1.5 |
| TOMT100408PDER-MJ | 0.8 | 10 | ● | ● | ● | | ● | ● | 10.5 | 8.6 | 4.7 | 1.1 |
| TOMT100416PDER-MJ | 1.6 | 10 | ● | ● | ● | | | | 10.5 | 8.6 | 4.7 | 0.2 |
| TOGT100404PDFR-AJ | 0.4 | 10 | | | | | ● | | 10.5 | 8.6 | 5.2 | 1.5 |
| TOGT100408PDFR-AJ | 0.8 | 10 | | | | | ● | | 10.5 | 8.6 | 5.1 | 1.1 |
| TOET100404PDER-MJ | 0.4 | 10 | | ● | ● | | | | 10.5 | 8.6 | 5.1 | 1.5 |
| TOET100408PDER-MJ | 0.8 | 10 | | ● | ● | | | | 10.5 | 8.6 | 5.1 | 1.1 |
| TOMT150604PDER-MJ | 0.4 | 15 | ● | ● | ● | | ● | | 15.7 | 12.7 | 6 | 2.2 |
| TOMT150608PDER-MJ | 0.8 | 15 | ● | ● | ● | | ● | ● | 15.7 | 12.7 | 6 | 1.9 |
| TOMT150616PDER-MJ | 1.6 | 15 | ● | ● | ● | | | | 15.7 | 12.7 | 6 | 1.1 |
| TOMT150620PDER-MJ | 2 | 15 | ● | ● | ● | | | | 15.7 | 12.7 | 6 | 0.7 |
| TOMT150608PDER-NMJ | 0.8 | 15 | ● | ● | ● | | ● | | 15.7 | 12.7 | 6 | 1.9 |
| TOGT150604PDFR-AJ | 0.4 | 15 | | | | | ● | | 15.7 | 12.5 | 5.6 | 2.1 |
| TOGT150608PDFR-AJ | 0.8 | 15 | | | | | ● | | 15.7 | 12.5 | 5.5 | 1.8 |
| TOET150604PDER-MJ | 0.4 | 15 | | ● | ● | | | | 15.7 | 12.5 | 5.6 | 2.2 |
| TOET150608PDER-MJ | 0.8 | 15 | | ● | ● | | | | 15.7 | 12.5 | 5.6 | 1.9 |

● : Line up

STANDARD CUTTING CONDITIONS

EPA04

| ISO | Workpiece materials | Hardness | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|----------------------------------|--------|--------------------------|--------------------------|
| P | Low carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 HB | AH3225 | 100 - 250 | 0.05 - 0.12 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | AH3225 | 100 - 230 | 0.05 - 0.12 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | AH3225 | 100 - 180 | 0.05 - 0.1 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | AH3225 | 90 - 200 | 0.05 - 0.1 |
| K | Grey cast iron FC250, etc. 250, etc., GG25, etc. | 150 - 250 HB | AH120 | 100 - 300 | 0.05 - 0.12 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG45, etc. | 150 - 250 HB | AH120 | 100 - 200 | 0.05 - 0.12 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | AH3225 | 20 - 60 | 0.04 - 0.07 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | AH8015 | 20 - 40 | 0.04 - 0.07 |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | AH8015 | 50 - 150 | 0.04 - 0.07 |
| | | SKD11, etc. X153CrMoV12, etc. | AH8015 | 40 - 70 | 0.04 - 0.07 |

· Remove excessive chip accumulation with an air blast.
· For an operation when the depth of cut varies (ex.casting skin) or machining of workpiece materials with interrupted surface, the feed per tooth (fz) should be set to the lower recommended value shown in the above table.

· Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

T/E/HPA06, T/E/HPA10, T/EPA15

| ISO | Workpiece materials | Hardness | Priority | Chip-breakers | Grades | T/E/HPA06 | | T/E/HPA10 | | T/EPA15 | | |
|-----|--|--------------|-----------------|---------------|--------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| | | | | | | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
| P | Low carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 HB | First choice | MJ/NMJ | AH3225 | 100 - 220 | 0.05 - 0.15 | 100 - 250 | 0.08 - 0.2 | 100 - 300 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 250 | 0.08 - 0.1 | 100 - 300 | 0.08 - 0.12 | 100 - 300 | 0.08 - 0.15 | 0.08 - 0.15 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | MJ/NMJ | AH3225 | 100 - 170 | 0.05 - 0.12 | 100 - 250 | 0.06 - 0.22 | 100 - 250 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 250 | 0.05 - 0.1 | 100 - 300 | 0.05 - 0.12 | 100 - 300 | 0.05 - 0.15 | 0.05 - 0.15 |
| | Prehardened steel and tool steel NAK80, PX5, SKD61, etc. X40CrMoV5-1, etc. | 30 - 40 HRC | First choice | MJ/NMJ | AH3225 | 100 - 120 | 0.05 - 0.12 | 100 - 200 | 0.06 - 0.22 | 100 - 200 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 250 | 0.05 - 0.1 | 100 - 300 | 0.05 - 0.12 | 100 - 300 | 0.05 - 0.15 | 0.05 - 0.15 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | MJ/NMJ | AH3135 | 80 - 150 | 0.05 - 0.15 | 80 - 200 | 0.08 - 0.2 | 90 - 200 | 0.08 - 0.2 | 0.08 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 90 - 200 | 0.05 - 0.1 | 90 - 250 | 0.05 - 0.12 | 90 - 250 | 0.05 - 0.15 | 0.05 - 0.15 |
| K | Grey cast iron FC250, etc. 250, etc., GG25, etc. | 150 - 250 HB | First choice | MJ/NMJ | AH120 | 100 - 200 | 0.05 - 0.15 | 100 - 250 | 0.05 - 0.15 | 140 - 250 | 0.08 - 0.25 | 0.08 - 0.15 |
| | | | Wear resistance | MJ | T1215 | 150 - 250 | 0.05 - 0.12 | 150 - 300 | 0.08 - 0.2 | 200 - 300 | 0.08 - 0.18 | - |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG45, etc. | 150 - 250 HB | First choice | MJ/NMJ | AH120 | 80 - 150 | 0.05 - 0.15 | 80 - 200 | 0.08 - 0.2 | 110 - 200 | 0.08 - 0.25 | 0.08 - 0.15 |
| | | | Wear resistance | MJ | T1215 | 100 - 200 | 0.05 - 0.12 | 130 - 250 | 0.05 - 0.15 | 150 - 250 | 0.08 - 0.18 | - |
| N | Aluminium Si < 13% | - | First choice | AJ | KS05F | 300 - 900 | 0.08 - 0.22 | 300 - 1000 | 0.08 - 0.22 | 300 - 1000 | 0.08 - 0.22 | - |
| | Aluminium Si ≥ 13% | - | First choice | AJ | KS05F | 100 - 200 | 0.08 - 0.22 | 100 - 200 | 0.08 - 0.22 | 100 - 200 | 0.08 - 0.22 | - |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | MJ/NMJ | AH3135 | 20 - 50 | 0.05 - 0.1 | 20 - 60 | 0.05 - 0.1 | 20 - 60 | 0.08 - 0.15 | 0.08 - 0.15 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | First choice | MJ/NMJ | AH120 | 20 - 35 | 0.03 - 0.08 | 20 - 40 | 0.05 - 0.13 | 20 - 40 | 0.07 - 0.15 | 0.07 - 0.15 |

· When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.
· Remove excessive chip accumulation with an air blast.
· For an operation when the depth of cut varies (ex.casting skin) or machining of workpiece materials with interrupted surface, the feed per tooth (fz) should be set to the lower recommended value shown in the above table.

· Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.



STANDARD CUTTING CONDITIONS

TLA (Roughing type)

| ISO | Workpiece materials | Hardness | Priority | Chip-breakers | Grades | TLA10 | | TLA15 | | |
|-----|--|--------------|-----------------|---------------|--------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| | | | | | | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | |
| | | | | | | | | | MJ/AJ | NMJ |
| P | Low carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 HB | First choice | MJ/NMJ | AH3225 | 100 - 250 | 0.08 - 0.2 | 100 - 300 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 300 | 0.08 - 0.12 | 100 - 300 | 0.08 - 0.15 | 0.08 - 0.15 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | MJ/NMJ | AH3225 | 100 - 250 | 0.06 - 0.22 | 100 - 250 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 300 | 0.05 - 0.12 | 100 - 300 | 0.05 - 0.15 | 0.05 - 0.15 |
| M | Prehardened steel and tool steel NAK80, PX5, SKD61, etc. X40CrMoV5-1, etc. | 30 - 40 HRC | First choice | MJ/NMJ | AH3225 | 100 - 200 | 0.06 - 0.22 | 100 - 200 | 0.06 - 0.22 | 0.06 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 100 - 300 | 0.05 - 0.12 | 100 - 300 | 0.05 - 0.15 | 0.05 - 0.15 |
| K | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | MJ/NMJ | AH3135 | 80 - 200 | 0.08 - 0.2 | 90 - 200 | 0.08 - 0.2 | 0.08 - 0.15 |
| | | | Wear resistance | MJ/NMJ | T3225 | 90 - 250 | 0.05 - 0.12 | 90 - 250 | 0.05 - 0.15 | 0.05 - 0.15 |
| N | Grey cast iron FC250, etc. 250, etc. GG25, etc. | 150 - 250 HB | First choice | MJ/NMJ | AH120 | 100 - 250 | 0.05 - 0.15 | 140 - 250 | 0.08 - 0.25 | 0.08 - 0.15 |
| | | | Wear resistance | MJ | T1215 | 150 - 300 | 0.08 - 0.2 | 200 - 300 | 0.08 - 0.18 | - |
| S | Ductile cast iron FCD450, etc. 450-10S, etc. GGG45, etc. | 150 - 250 HB | First choice | MJ/NMJ | AH120 | 80 - 200 | 0.08 - 0.2 | 110 - 200 | 0.08 - 0.25 | 0.08 - 0.15 |
| | | | Wear resistance | MJ | T1215 | 130 - 250 | 0.05 - 0.15 | 150 - 250 | 0.08 - 0.18 | - |
| N | Aluminium Si < 13% | - | First choice | AJ | KS05F | 300 - 1000 | 0.08 - 0.22 | 300 - 1000 | 0.08 - 0.22 | - |
| | Aluminium Si ≥ 13% | - | First choice | AJ | KS05F | 100 - 200 | 0.08 - 0.22 | 100 - 200 | 0.08 - 0.22 | - |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | MJ/NMJ | AH3135 | 20 - 60 | 0.05 - 0.1 | 20 - 60 | 0.08 - 0.15 | 0.08 - 0.15 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | First choice | MJ/NMJ | AH120 | 20 - 40 | 0.05 - 0.13 | 20 - 40 | 0.07 - 0.15 | 0.07 - 0.15 |

• When using NMJ chipbreaker, please set up the feed not to exceed 0.15 mm/t.

7°-25°

41°-45°

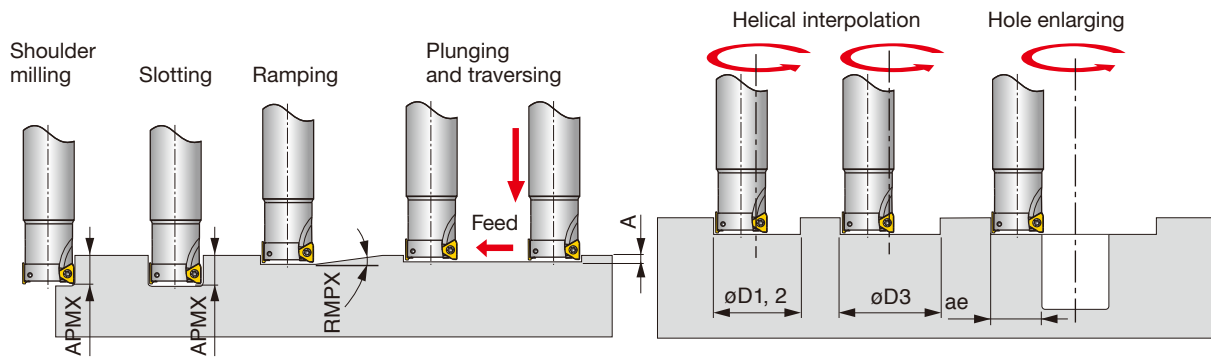
60°-70°

85°-88°

90°

Others

APPLICATION RANGE



| Designation | DC | Max. depth of cut | | Max. plunging depth | Min. machining diameter | Max. machining diameter | | Max. cutting width in enlarging |
|----------------|-----|-------------------|-------|---------------------|-------------------------|-------------------------|-------|---------------------------------|
| | | APMX | RMPX | | | øD2 | øD3* | |
| EPA04R008... | 8 | 3.5 | 0.3° | 0.02 | 12.8 | 15.6 | 13.6 | 7.5 |
| EPA04R010... | 10 | 3.5 | 0.2° | 0.02 | 16.8 | 19.6 | 17.6 | 9.5 |
| EPA04R012... | 12 | 3.5 | 0.15° | 0.02 | 20.8 | 23.6 | 21.6 | 11.5 |
| EPA04R016... | 16 | 3.5 | 0.1° | 0.02 | 28.8 | 31.6 | 29.6 | 15.5 |
| EPA04R020... | 20 | 3.5 | 0.1° | 0.02 | 36.8 | 39.6 | 37.6 | 19.5 |
| EPA04R025... | 25 | 3.5 | 0.1° | 0.02 | 46.8 | 49.6 | 47.6 | 24.5 |
| EPA06R012... | 12 | 6 | 5° | 0.6 | 18 | 23.6 | 21 | 11.5 |
| E/HPA06R016... | 16 | 6 | 4.3° | 0.6 | 25 | 31.6 | 29 | 15.5 |
| EPA06R018... | 18 | 6 | 3.5° | 0.6 | 29.5 | 35.6 | 33 | 17.5 |
| E/HPA06R020... | 20 | 6 | 2.8° | 0.6 | 33.5 | 39.6 | 37 | 19.5 |
| EPA06R022... | 22 | 6 | 2.5° | 0.6 | 37.5 | 43.6 | 41 | 21.5 |
| E/HPA06R025... | 25 | 6 | 2° | 0.6 | 43.5 | 49.6 | 47 | 24.5 |
| E/HPA10R025... | 25 | 10 | 2° | 0.6 | 42.1 | 49.6 | 47 | 24.5 |
| EPA06R028... | 28 | 6 | 1.8° | 0.6 | 49.5 | 55.6 | 53 | 27.5 |
| EPA10R028... | 28 | 10 | 2° | 0.6 | 48.1 | 55.6 | 53 | 27.5 |
| T/HPA06R032... | 32 | 6 | 1.5° | 0.6 | 57.5 | 63.6 | 61 | 31.5 |
| E/HPA10R032... | 32 | 10 | 2° | 0.6 | 56.1 | 63.6 | 61 | 31.5 |
| EPA10R035... | 35 | 10 | 1.7° | 0.6 | 62.1 | 69.6 | 67 | 34.5 |
| TPA06R040... | 40 | 6 | 1° | 0.6 | 73.5 | 79.6 | 77 | 39.5 |
| T/EPA10R040... | 40 | 10 | 1.4° | 0.6 | 72.1 | 79.6 | 77 | 39.5 |
| EPA15R040... | 40 | 15 | 2.3° | 0.8 | 68.5 | 79.2 | 75.5 | 39 |
| TPA06R050... | 50 | 6 | 0.7° | 0.6 | 94 | 99.6 | 97 | 49.5 |
| TPA10R050... | 50 | 10 | 0.9° | 0.6 | 92.1 | 99.6 | 97 | 49.5 |
| T/EPA15R050... | 50 | 15 | 1.7° | 0.8 | 88.5 | 99.2 | 95.5 | 49 |
| TPA10R063... | 63 | 10 | 0.8° | 0.6 | 118.1 | 125.6 | 123 | 62.5 |
| TPA15R063... | 63 | 15 | 1.4° | 0.8 | 114.5 | 125.2 | 121.5 | 62 |
| TPA10R080... | 80 | 10 | 0.6° | 0.6 | 152.1 | 159.6 | 157 | 79.5 |
| TPA15R080... | 80 | 15 | 1° | 0.8 | 148.5 | 159.2 | 155.5 | 79 |
| TPA10R100... | 100 | 10 | 0.5° | 0.6 | 192.1 | 199.6 | 197 | 99.5 |
| TPA15R100... | 100 | 15 | 0.8° | 0.8 | 188.5 | 199.2 | 195.5 | 99 |
| TPA15R125... | 125 | 15 | 0.6° | 0.8 | 238.5 | 249.2 | 245.5 | 124 |
| TPA15R160... | 160 | 15 | 0.5° | 0.8 | 308.5 | 319.2 | 315.5 | 159 |

* Flat bottom hole

Note: Corner RE for dimensions of øD1, øD2 and øD3: RE = 0.4 for EPA04, T/E/HPA06, T/E/HPA10 and RE = 0.8 for T/EPA15.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M



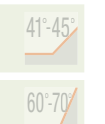
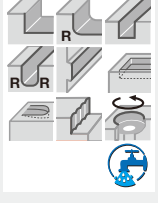
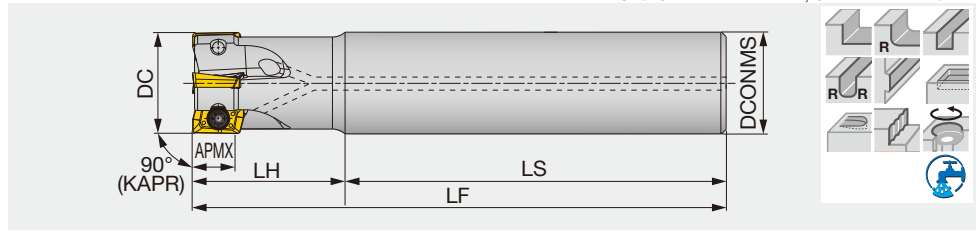
TUNGREC

EPO07/11/18



High precision square shoulder endmill, shank type, with screw clamp system

EPO07: GAMP = +7°, GAMF = +13° ~ +18°
 EPO11: GAMP = +8.7° ~ +18°, GAMF = -5.3° ~ -19.4°
 EPO18: GAMP = +14° ~ +17°, GAMF = +22° ~ +31°



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|--------------------|------|----|------|--------|-----|----|-----|--------|----------|-------------|
| EPO07R012M12.0-02 | 7 | 12 | 2 | 12 | 50 | 18 | 68 | 0.1 | With | AO*T0702... |
| EPO07R012M12.0-02L | 7 | 12 | 2 | 12 | 95 | 30 | 125 | 0.1 | With | AO*T0702... |
| EPO11R012M16.0-01 | 10.6 | 12 | 1 | 16 | 60 | 25 | 85 | 0.11 | With | AS*T11T3... |
| EPO11R012M16.0-01L | 10.6 | 12 | 1 | 16 | 95 | 30 | 125 | 0.16 | With | AS*T11T3... |
| EPO07R016M12.0-02 | 7 | 16 | 2 | 12 | 50 | 20 | 70 | 0.1 | With | AO*T0702... |
| EPO07R016M16.0-02L | 7 | 16 | 2 | 16 | 105 | 40 | 145 | 0.2 | With | AO*T0702... |
| EPO07R016M16.0-04 | 7 | 16 | 4 | 16 | 60 | 24 | 84 | 0.1 | With | AO*T0702... |
| EPO11R016M16.0-02 | 10.6 | 16 | 2 | 16 | 60 | 25 | 85 | 0.12 | With | AS*T11T3... |
| EPO11R016M16.0-02L | 10.6 | 16 | 2 | 16 | 105 | 40 | 145 | 0.2 | With | AS*T11T3... |
| EPO07R018M16.0-02L | 7 | 18 | 2 | 16 | 105 | 40 | 145 | 0.2 | With | AO*T0702... |
| EPO07R018M16.0-04 | 7 | 18 | 4 | 16 | 60 | 24 | 84 | 0.1 | With | AO*T0702... |
| EPO11R018M16.0-02 | 10.6 | 18 | 2 | 16 | 60 | 25 | 85 | 0.12 | With | AS*T11T3... |
| EPO11R018M16.0-02L | 10.6 | 18 | 2 | 16 | 105 | 40 | 145 | 0.21 | With | AS*T11T3... |
| EPO07R020M16.0-03 | 7 | 20 | 3 | 16 | 60 | 30 | 90 | 0.1 | With | AO*T0702... |
| EPO07R020M20.0-03L | 7 | 20 | 3 | 20 | 135 | 50 | 185 | 0.4 | With | AO*T0702... |
| EPO07R020M20.0-05 | 7 | 20 | 5 | 20 | 70 | 30 | 100 | 0.2 | With | AO*T0702... |
| EPO11R020M20.0-02 | 10.6 | 20 | 2 | 20 | 70 | 30 | 100 | 0.22 | With | AS*T11T3... |
| EPO11R020M20.0-02L | 10.6 | 20 | 2 | 20 | 135 | 50 | 185 | 0.41 | With | AS*T11T3... |
| EPO11R020M20.0-03 | 10.6 | 20 | 3 | 20 | 70 | 30 | 100 | 0.21 | With | AS*T11T3... |
| EPO07R022M20.0-05 | 7 | 22 | 5 | 20 | 70 | 30 | 100 | 0.2 | With | AO*T0702... |
| EPO11R022M20.0-02 | 10.6 | 22 | 2 | 20 | 70 | 30 | 100 | 0.22 | With | AS*T11T3... |
| EPO11R022M20.0-02L | 10.6 | 22 | 2 | 20 | 155 | 30 | 185 | 0.42 | With | AS*T11T3... |
| EPO11R022M20.0-03 | 10.6 | 22 | 3 | 20 | 70 | 30 | 100 | 0.22 | With | AS*T11T3... |
| EPO07R025M20.0-03 | 7 | 25 | 3 | 20 | 60 | 35 | 95 | 0.3 | With | AO*T0702... |
| EPO07R025M25.0-03L | 7 | 25 | 3 | 25 | 150 | 70 | 220 | 0.7 | With | AO*T0702... |
| EPO07R025M25.0-07 | 7 | 25 | 7 | 25 | 80 | 35 | 115 | 0.4 | With | AO*T0702... |
| EPO11R025M25.0-02L | 10.6 | 25 | 2 | 25 | 150 | 70 | 220 | 0.76 | With | AS*T11T3... |
| EPO11R025M25.0-03 | 10.6 | 25 | 3 | 25 | 80 | 35 | 115 | 0.39 | With | AS*T11T3... |
| EPO11R025M25.0-04 | 10.6 | 25 | 4 | 25 | 80 | 35 | 115 | 0.38 | With | AS*T11T3... |
| EPO18R025M25.0-02 | 16.7 | 25 | 2 | 25 | 80 | 35 | 115 | 0.4 | With | AO*T1805... |
| EPO18R025M25.0-02L | 16.7 | 25 | 2 | 25 | 150 | 70 | 220 | 0.8 | With | AO*T1805... |
| EPO07R028M25.0-03L | 7 | 28 | 3 | 25 | 150 | 70 | 220 | 0.7 | With | AO*T0702... |
| EPO07R028M25.0-07 | 7 | 28 | 7 | 25 | 80 | 35 | 115 | 0.4 | With | AO*T0702... |
| EPO11R028M25.0-02L | 10.6 | 28 | 2 | 25 | 185 | 35 | 220 | 0.8 | With | AS*T11T3... |
| EPO11R028M25.0-03 | 10.6 | 28 | 3 | 25 | 80 | 35 | 115 | 0.4 | With | AS*T11T3... |
| EPO11R028M25.0-04 | 10.6 | 28 | 4 | 25 | 80 | 35 | 115 | 0.39 | With | AS*T11T3... |
| EPO18R028M25.0-02 | 16.7 | 28 | 2 | 25 | 80 | 35 | 115 | 0.4 | With | AO*T1805... |
| EPO18R028M25.0-02L | 16.7 | 28 | 2 | 25 | 150 | 70 | 220 | 0.8 | With | AO*T1805... |
| EPO11R030M25.0-02L | 10.6 | 30 | 2 | 25 | 180 | 40 | 220 | 0.8 | With | AS*T11T3... |
| EPO11R030M25.0-03 | 10.6 | 30 | 3 | 25 | 80 | 40 | 120 | 0.43 | With | AS*T11T3... |
| EPO11R030M25.0-04 | 10.6 | 30 | 4 | 25 | 80 | 40 | 120 | 0.42 | With | AS*T11T3... |
| EPO18R030M32.0-02 | 16.7 | 30 | 2 | 32 | 80 | 40 | 120 | 0.6 | With | AO*T1805... |
| EPO18R030M32.0-02L | 16.7 | 30 | 2 | 32 | 175 | 80 | 255 | 1.4 | With | AO*T1805... |
| EPO18R030M32.0-03 | 16.7 | 30 | 3 | 32 | 80 | 40 | 120 | 0.6 | With | AO*T1805... |
| EPO11R032M32.0-02L | 10.6 | 32 | 2 | 32 | 175 | 80 | 255 | 1.48 | With | AS*T11T3... |
| EPO11R032M32.0-03 | 10.6 | 32 | 3 | 32 | 80 | 40 | 120 | 0.68 | With | AS*T11T3... |
| EPO11R032M32.0-05 | 10.6 | 32 | 5 | 32 | 80 | 40 | 120 | 0.67 | With | AS*T11T3... |
| EPO18R032M32.0-02 | 16.7 | 32 | 2 | 32 | 80 | 40 | 120 | 0.7 | With | AO*T1805... |
| EPO18R032M32.0-02L | 16.7 | 32 | 2 | 32 | 175 | 80 | 255 | 1.5 | With | AO*T1805... |
| EPO18R032M32.0-03 | 16.7 | 32 | 3 | 32 | 80 | 40 | 120 | 0.6 | With | AO*T1805... |
| EPO11R035M32.0-02L | 10.6 | 35 | 2 | 32 | 215 | 40 | 255 | 1.49 | With | AS*T11T3... |
| EPO11R035M32.0-03 | 10.6 | 35 | 3 | 32 | 80 | 40 | 120 | 0.69 | With | AS*T11T3... |
| EPO11R035M32.0-05 | 10.6 | 35 | 5 | 32 | 80 | 40 | 120 | 0.67 | With | AS*T11T3... |
| EPO18R035M32.0-02 | 16.7 | 35 | 2 | 32 | 80 | 40 | 120 | 0.7 | With | AO*T1805... |
| EPO18R035M32.0-02L | 16.7 | 35 | 2 | 32 | 175 | 80 | 255 | 1.5 | With | AO*T1805... |
| EPO18R035M32.0-03 | 16.7 | 35 | 3 | 32 | 80 | 40 | 120 | 0.7 | With | AO*T1805... |
| EPO11R040M32.0-02L | 10.6 | 40 | 2 | 32 | 205 | 50 | 255 | 1.53 | With | AS*T11T3... |

| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|--------------------|------|----|------|--------|-----|-----|-----|--------|----------|-------------|
| EPO11R040M32.0-04 | 10.6 | 40 | 4 | 32 | 80 | 40 | 120 | 0.72 | With | AS*T11T3... |
| EPO11R040M32.0-06 | 10.6 | 40 | 6 | 32 | 80 | 40 | 120 | 0.71 | With | AS*T11T3... |
| EPO18R040M32.0-02L | 16.7 | 40 | 2 | 32 | 205 | 50 | 255 | 1.6 | With | AO*T1805... |
| EPO18R040M32.0-03 | 16.7 | 40 | 3 | 32 | 80 | 40 | 120 | 0.7 | With | AO*T1805... |
| EPO18R040M32.0-04 | 16.7 | 40 | 4 | 32 | 80 | 40 | 120 | 0.7 | With | AO*T1805... |
| EPO18R040M42.0-02L | 16.7 | 40 | 2 | 42 | 210 | 100 | 310 | 3 | With | AO*T1805... |
| EPO11R050M32.0-05 | 10.6 | 50 | 5 | 32 | 80 | 40 | 120 | 0.83 | With | AS*T11T3... |
| EPO11R050M32.0-07 | 10.6 | 50 | 7 | 32 | 80 | 40 | 120 | 0.82 | With | AS*T11T3... |
| EPO11R050M42.0-03L | 10.6 | 50 | 3 | 42 | 310 | 50 | 360 | 3.78 | With | AS*T11T3... |
| EPO18R050M32.0-03 | 16.7 | 50 | 3 | 32 | 80 | 40 | 120 | 0.8 | With | AO*T1805... |
| EPO18R050M32.0-05 | 16.7 | 50 | 5 | 32 | 80 | 40 | 120 | 0.8 | With | AO*T1805... |
| EPO18R050M42.0-03L | 16.7 | 50 | 3 | 42 | 310 | 50 | 360 | 3.8 | With | AO*T1805... |
| EPO18R063M32.0-04 | 16.7 | 63 | 4 | 32 | 80 | 45 | 125 | 1 | With | AO*T1805... |
| EPO18R063M32.0-06 | 16.7 | 63 | 6 | 32 | 80 | 45 | 125 | 1.1 | With | AO*T1805... |
| EPO18R063M42.0-03L | 16.7 | 63 | 3 | 42 | 310 | 50 | 360 | 4 | With | AO*T1805... |

EPO07:

- The APMX is the diameter when using MJ chipbreaker.

- The DC is the diameter when using MJ or AJ chipbreaker. With HJ chipbreaker, the tool diameter is (DC + 0.6 mm).

- The LF and L are the lengths when using MJ chipbreaker. With AJ chipbreaker, the length is (LF, L + 0.1 mm). With HJ chipbreaker, the length is (LF, L + 0.5 mm).

EPO11:

- The APMX is the diameter when using MJ, MS and AJ chipbreaker.

EPO18:

The DC is the diameter when using MJ chipbreaker. With AJ chipbreaker, the tool diameter is (DC above + 0.2 mm).

SPARE PARTS



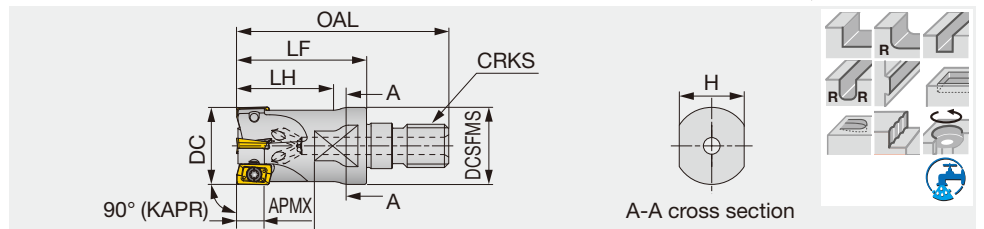
| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|--------------------|----------------|----------------------|--------|
| EPO07R012... | SR 10503833-S | - | T-7DB |
| EPO07R016 - 028... | CSTB-2.5L046 | - | T-7DB |
| EPO11R012 - 022... | CSPB-2.5S | (M-1000) | IP-8D |
| EPO11R025 - 050... | CSPB-2.5 | (M-1000) | IP-8D |
| EPO18R025 - 030... | CSTB-4L085 | - | T-15DB |
| EPO18R032 - 050... | CSTB-4L093 | - | T-15DB |
| EPO18R063M... | CSTB-4L120 | - | T-15DB |

Recommended clamping torque: SR 10503833-S, CSTB-2.5L046 = 0.9 N·m, CSPB-2.5, CSPB-2.5S = 1.3 N·m, CSTB-4L085, CSTB-4L093, CSTB-4L120 = 3.5 N·m

HPO07/11-M

High precision square shoulder endmill, modular type (TungFlex)

HPO07-M: GAMP = +7°, GAMF = +13°~ +18°
HPO11-M: GAMP = +8.7° ~ +18°, GAMF = -5.3° ~ -19.4°



| Designation | APMX | DC | CICT | OAL | LF | LH | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|----|------|------|----|----|----|--------|------|--------|----------|-------------|
| HPO07R012MM06-02 | 7 | 12 | 2 | 39.5 | 25 | - | 7 | 9.8 | M6 | 0.01 | With | AO*T0702... |
| HPO07R012MM08-02 | 7 | 12 | 2 | 42 | 25 | 20 | 10 | 12.8 | M8 | 0.02 | With | AO*T0702... |
| HPO07R016MM08-04 | 7 | 16 | 4 | 42 | 25 | - | 10 | 12.8 | M8 | 0.03 | With | AO*T0702... |
| HPO07R016MM10-04 | 7 | 16 | 4 | 49 | 30 | 20 | 15 | 17.8 | M10 | 0.05 | With | AO*T0702... |
| HPO07R020MM10-05 | 7 | 20 | 5 | 49 | 30 | - | 15 | 17.8 | M10 | 0.06 | With | AO*T0702... |
| HPO11R020MM10-02 | 10.6 | 20 | 2 | 49 | 30 | - | 15 | 17.8 | M10 | 0.06 | With | AS*T11T3... |
| HPO07R025MM12-07 | 7 | 25 | 7 | 57 | 35 | - | 17 | 20.8 | M12 | 0.1 | With | AO*T0702... |
| HPO11R025MM12-03 | 10.6 | 25 | 3 | 57 | 35 | - | 17 | 20.8 | M12 | 0.1 | With | AS*T11T3... |
| HPO11R032MM16-03 | 10.6 | 32 | 3 | 63 | 40 | - | 22 | 28.8 | M16 | 0.2 | With | AS*T11T3... |

SPARE PARTS



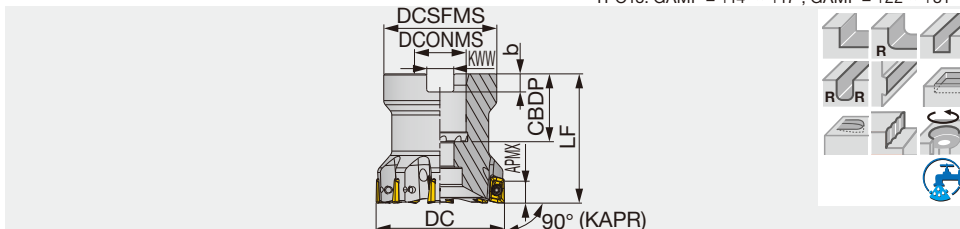
| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|--------------------|----------------|----------------------|--------|
| HPO07R012MM0*-02 | SR 10503833-S | (M-1000) | T-7DB |
| HPO07R016 - 025... | CSTB-2.5L046 | (M-1000) | T-7DB |
| HPO11R020MM10-02 | CSPB-2.5S | (M-1000) | IP-8D |
| HPO11R025, 032... | CSPB-2.5 | (M-1000) | IP-8D |

Recommended clamping torque: SR 10503833-S, CSTB-2.5L046 = 0.9 N·m, CSPB-2.5, CSPB-2.5S = 1.3 N·m

Reference pages: Inserts → **H144 - H145**, TungFlex → **H036 - H037**

High precision square shoulder mill, with screw clamp system

TPO07: GAMP = +7°, GAMF = +13°~ +18°
 TPO11: GAMP = +8.7° ~ +18°, GAMF = -5.3°~ -19.4°
 TPO18: GAMP = +14° ~ +17°, GAMF = +22° ~ +31°



| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TPO07R032M16.0E08 | 7 | 32 | 8 | 30 | 40 | 16 | 21 | 8.4 | 5.6 | 0.1 | With | AO*T0702... |
| TPO07R040M16.0E10 | 7 | 40 | 10 | 35 | 40 | 16 | 21 | 8.4 | 5.6 | 0.2 | With | AO*T0702... |
| TPO07R050M22.0E12 | 7 | 50 | 12 | 41 | 40 | 22 | 22 | 10.4 | 6.3 | 0.3 | With | AO*T0702... |
| TPO11R040M16.0E06 | 10.6 | 40 | 6 | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.21 | With | AS*T11T3... |
| TPO18R040M16.0-04 | 16.7 | 40 | 4 | 35 | 40 | 16 | 18 | 8.2 | 5.6 | 0.2 | With | AO*T1805... |
| TPO18R040M16.0E04 | 16.7 | 40 | 4 | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.2 | With | AO*T1805... |
| TPO11R050M22.0E07 | 10.6 | 50 | 7 | 45 | 40 | 22 | 20 | 10.4 | 6.3 | 0.35 | With | AS*T11T3... |
| TPO18R050M22.0-05 | 16.7 | 50 | 5 | 41 | 40 | 22 | 20 | 10 | 6 | 0.2 | With | AO*T1805... |
| TPO18R050M22.0E05 | 16.7 | 50 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | AO*T1805... |
| TPO11R063M22.0E08 | 10.6 | 63 | 8 | 47 | 45 | 22 | 20 | 10.4 | 6.3 | 0.59 | With | AS*T11T3... |
| TPO18R063M22.0-06 | 16.7 | 63 | 6 | 41 | 40 | 22 | 20 | 10 | 6 | 0.4 | With | AO*T1805... |
| TPO18R063M22.0E06 | 16.7 | 63 | 6 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | AO*T1805... |
| TPO11R080M25.4-10 | 10.6 | 80 | 10 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.07 | With | AS*T11T3... |
| TPO11R080M27.0E10 | 10.6 | 80 | 10 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.05 | With | AS*T11T3... |
| TPO18R080M25.4-07 | 16.7 | 80 | 7 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.8 | With | AO*T1805... |
| TPO18R080M27.0E07 | 16.7 | 80 | 7 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1.0 | With | AO*T1805... |
| TPO11R100M31.75-11 | 10.6 | 100 | 11 | 70 | 63 | 31.75 | 32 | 12.7 | 8 | 1.95 | With | AS*T11T3... |
| TPO11R100M32.0E11 | 10.6 | 100 | 11 | 70 | 63 | 32 | 25 | 14.4 | 8 | 2.01 | With | AS*T11T3... |
| TPO18R100M31.7-08 | 16.7 | 100 | 8 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.2 | With | AO*T1805... |
| TPO18R100M32.0E08 | 16.7 | 100 | 8 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | With | AO*T1805... |
| TPO18R125M38.1-09 | 16.7 | 125 | 9 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.8 | With | AO*T1805... |
| TPO18R125M40.0E09 | 16.7 | 125 | 9 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.8 | With | AO*T1805... |
| TPO18R160M40.0E10 | 16.7 | 160 | 10 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.9 | Without | AO*T1805... |
| TPO18R160M50.8-10 | 16.7 | 160 | 10 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.9 | Without | AO*T1805... |

TPO07:

- The APMX is the diameter when using MJ chipbreaker.
- The DC is the diameter when using MJ or AJ chipbreaker. With HJ chipbreaker, the tool diameter is (DC + 0.6 mm).
- The LF and L are the lengths when using MJ chipbreaker. With AJ chipbreaker, the length is (LF, L + 0.1 mm). With HJ chipbreaker, the length is (LF, L + 0.5 mm).

TPO11:

- The APMX is the diameter when using MJ, MS and AJ chipbreaker.

TPO18:

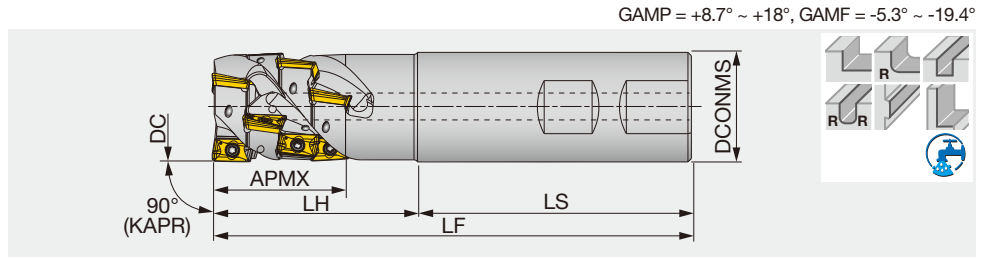
- The DC is the diameter when using MJ chipbreaker. With AJ chipbreaker, the tool diameter is (DC above + 0.2 mm).

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Grip (Optional) | Shell locking bolt 1 | Shell locking bolt 2 | Wrench | Torx bit (Optional) |
|--|----------------|----------------------|-----------------|----------------------|----------------------|--------|---------------------|
| TPO07R032, 040... | CSTB-2.5L046 | - | - | - | CM8X30H | T-7DB | - |
| TPO07R050M22.0E12 | CSTB-2.5L046 | - | - | - | CM10X30H | T-7DB | - |
| TPO11R040M16.0E06 | CSPB-2.5 | (M-1000) | - | - | CM8X30H | IP-8D | - |
| TPO11R050M, 063M... | CSPB-2.5 | (M-1000) | - | - | CM10X30H | IP-8D | - |
| TPO11R080M25.4-10 TPO11R080M27.0E10 | CSPB-2.5 | (M-1000) | - | - | CM12X30H | IP-8D | - |
| TPO11R100M31.75-11 | CSPB-2.5 | (M-1000) | - | - | CM16X40H | IP-8D | - |
| TPO11R100M32.0E11 | CSPB-2.5 | (M-1000) | - | - | CM16X40H | IP-8D | - |
| TPO18R040M... | CSTB-4L093 | - | (H-TBS) | - | FSHM8-30H | - | (BT15M) |
| TPO18R050M..., 063M... | CSTB-4L093 | - | (H-TBS) | - | CM10X30H | - | (BT15M) |
| TPO18R080M... | CSTB-4L120 | - | (H-TBS) | - | CM12X30H | - | (BT15M) |
| TPO18R100M... | CSTB-4L120 | - | (H-TBS) | TMBA-M16H | - | - | (BT15M) |
| TPO18R125M... | CSTB-4L120 | - | (H-TBS) | TMBA-M20H | - | - | (BT15M) |
| TPO18R160M... | CSTB-4L120 | - | (H-TBS) | - | - | - | (BT15M) |

Recommended clamping torque (Torx size): CSTB-2.5L046 = 0.9 N·m, CSPB-2.5 = 1.3 N·m
 CSTB-4L093, CSTB-4L120 = 3.5 N·m (T15)

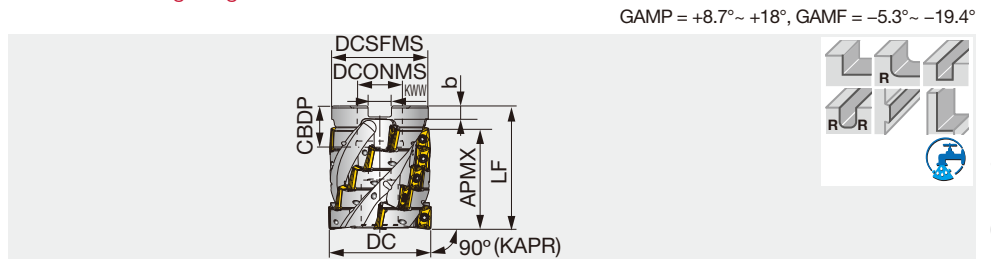
Reference pages: Inserts → [H144 - H145](#)



| Designation | APMX | DC | ZEFP | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|------|--------|----|----|-----|--------|----------|-------------|
| ELS11R025M25.0W02 | 30.4 | 25 | 2 | 6 | 25 | 80 | 40 | 120 | 0.4 | With | AS*T11T3... |
| ELS11R032M32.0W03 | 39.4 | 32 | 3 | 12 | 32 | 80 | 60 | 140 | 0.8 | With | AS*T11T3... |
| ELS11R040M42.0W03 | 40 | 40 | 3 | 12 | 42 | 90 | 60 | 150 | 1.4 | With | AS*T11T3... |

TLS11

High efficiency square shoulder mill for roughing



| Designation | APMX | DC | ZEFP | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TLS11R050M22.0E04 | 48.8 | 50 | 4 | 20 | 47 | 60 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | AS*T11T3... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

SPARE PARTS



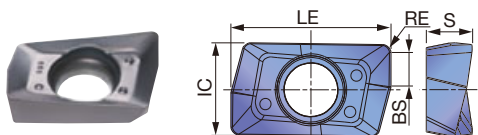
| Designation | Clamping screw | Lubricant (Optional) | Shell locking bolt | Wrench |
|-------------------|----------------|----------------------|--------------------|--------|
| ELS11... | CSPB-2.5 | (M-1000) | - | IP-8D |
| TLS11R050M22.0E04 | CSPB-2.5 | (M-1000) | CM10X40H | IP-8D |

Recommended clamping torque: 1.3 N·m

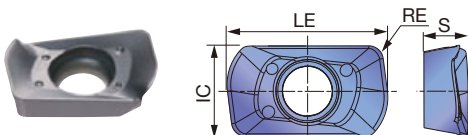
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

INSERT

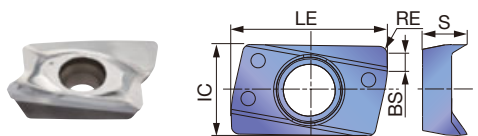
AOMT07-MJ



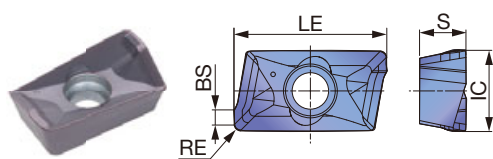
AOMT07-HJ



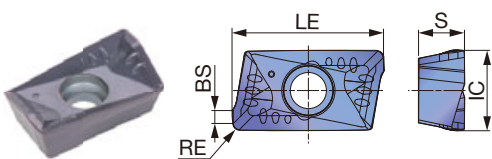
AOGT07-AJ



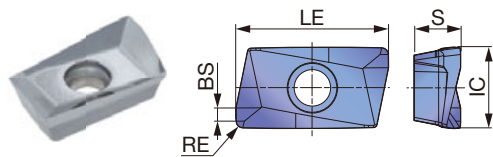
ASMT11-MJ



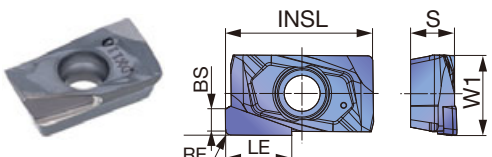
ASMT11-MS



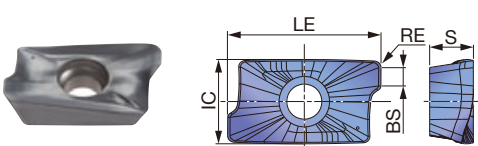
ASGT11-AJ



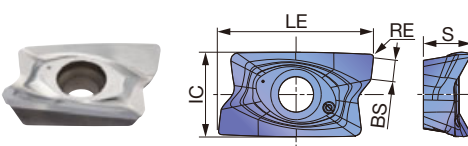
ASGW11-D



AOMT18-MJ



AOGT18-AJ



| | | | | | | | | | | | | | | | | | | |
|----------|----------------|---|---|---|---|---|---|--|--|---|--|--|--|--|--|--|--|--|
| P | Steel | ☆ | | | ☆ | ★ | ☆ | | | ★ | | | | | | | | |
| M | Stainless | | ☆ | ☆ | ☆ | ★ | ☆ | | | | | | | | | | | |
| K | Cast iron | ★ | | | ☆ | ☆ | ☆ | | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | | |
| S | Superalloys | | ★ | | ★ | ☆ | | | | | | | | | | | | |
| H | Hard materials | | | | ★ | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | Cermet | Uncoated | PCD | | LE | INSL | IC | W1 | S | BS |
|-------------------|-----|------|--------|-------|-------|-------|--------|-------|-------|--------|----------|--------|-------|------|------|------|-----|-----|------|
| | | | AH120 | AH130 | AH140 | AH725 | AH3225 | T3225 | T1215 | | | DS1100 | NS740 | | | | | | |
| AOMT070202PDPR-MJ | 0.2 | 7 | | | ● | ● | | | | | | | | 8 | - | 4.7 | - | 2.3 | 2.12 |
| AOMT070204PDPR-MJ | 0.4 | 7 | | | ● | ● | | | | | | | | 8 | - | 4.7 | - | 2.3 | 1.85 |
| AOMT070208PDPR-MJ | 0.8 | 7 | | | ● | ● | | | | | | | | 8 | - | 4.7 | - | 2.3 | 1.52 |
| AOMT070216PDPR-MJ | 1.6 | 7 | | | ● | ● | | | | | | | | 8 | - | 4.7 | - | 2.3 | 0.69 |
| AOMT070208PDPR-HJ | 0.8 | 0.8 | | | ● | ● | | | | | | | | 8.8 | - | 4.9 | - | 2.4 | - |
| AOGT070204PDRF-AJ | 0.4 | 6.4 | | | | | | | | ● | | | | 8.1 | - | 4.7 | - | 2.3 | 1.85 |
| ASMT11T304PDPR-MJ | 0.4 | 10.6 | ● | ● | | ● | ● | ● | ● | ● | | | | 12.3 | - | 6.7 | - | 3.7 | 1.4 |
| ASMT11T308PDPR-MJ | 0.8 | 10.6 | ● | ● | | ● | ● | ● | ● | ● | | | | 12.3 | - | 6.7 | - | 3.7 | 1.4 |
| ASMT11T312PDPR-MJ | 1.2 | 10.6 | ● | ● | | ● | ● | ● | | | | | | 12.3 | - | 6.7 | - | 3.7 | 1 |
| ASMT11T316PDPR-MJ | 1.6 | 10.6 | ● | ● | | ● | ● | ● | ● | ● | | | | 12.3 | - | 6.7 | - | 3.7 | 0.6 |
| ASMT11T320PDPR-MJ | 2 | 10.6 | ● | | | | ● | ● | | | | | | 12.3 | - | 6.7 | - | 3.7 | 0.5 |
| ASMT11T330PDPR-MJ | 3 | 10.6 | ● | ● | | | ● | ● | ● | | | | | 12.3 | - | 6.7 | - | 3.7 | 0.2 |
| ASMT11T304PDPR-MS | 0.4 | 10.6 | | ● | ● | | ● | | | | | | | 12.3 | - | 6.7 | - | 3.7 | 1.4 |
| ASGT11T304PDRF-AJ | 0.4 | 10.6 | | | | | | | ● | | | | | 12.3 | - | 6.7 | - | 3.7 | 1.4 |
| ASGT11T308PDRF-AJ | 0.8 | 10.6 | | | | | | | ● | | | | | 12.3 | - | 6.7 | - | 3.7 | 1.4 |
| ASGW11T302PDRF-D | 0.2 | 4.5 | | | | | | | | | | ● | | 5.2 | 11.8 | - | 6.4 | 3.7 | 1.8 |
| ASGW11T304PDRF-D | 0.4 | 4.5 | | | | | | | | | | ● | | 5.2 | 11.8 | - | 6.4 | 3.7 | 1.6 |
| AOMT180508PDPR-MJ | 0.8 | 16.7 | | | ● | ● | | | | | | | | 19.5 | - | 10.7 | - | 5.6 | 2.33 |
| AOMT180516PDPR-MJ | 1.6 | 16.7 | | | ● | ● | | | | | | | | 19.5 | - | 10.7 | - | 5.6 | 1.58 |
| AOMT180524PDPR-MJ | 2.4 | 16.7 | | | ● | ● | | | | | | | | 19.5 | - | 10.7 | - | 5.6 | 1.53 |
| AOMT180532PDPR-MJ | 3.2 | 16.7 | | | ● | ● | | | | | | | | 19.5 | - | 10.7 | - | 5.6 | - |
| AOGT180504PDRF-AJ | 0.4 | 16.7 | | | | | | | | ● | | | | 19.8 | - | 10.8 | - | 6.1 | 2.33 |
| AOGT180508PDRF-AJ | 0.8 | 16.7 | | | | | | | | ● | | | | 19.8 | - | 10.8 | - | 6.1 | 2.33 |

Caution : The contour radius when using the tool is smaller than the RE value.
If RE is 1.2 mm or more, it will be about 10% smaller than RE.
PCD inserts listed above are not designed to be re-ground and re-used

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.



EPO07



EPO11



EPO18



HPO07-M



HPO11-M



TPO07



TPO11



TPO18



ELS11

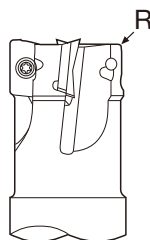


TLS11

CAUTIONARY POINT IN MODIFYING CUTTER BODIES

When using inserts with corner radius
RE ≥ 2.0 mm, standard cutter bodies have
to be modified "R". (Only for TPO11, EPO11,
TLS11, ELS11, HPO11)

About roughing type TLS11, ELS11
From 2nd row onwards, please use insert
with RE = 0.4 or 0.8 mm

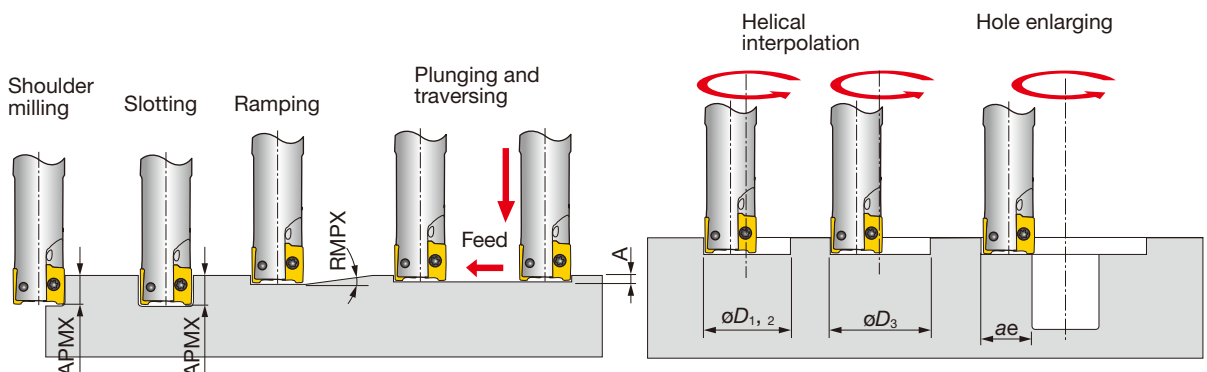


| Corner radius RE (mm) | The dimension of modifying (mm) |
|-----------------------|---------------------------------|
| 0.4 ~ 1.6 | Unnecessary |
| 2.0 ~ 3.2 | 2 |

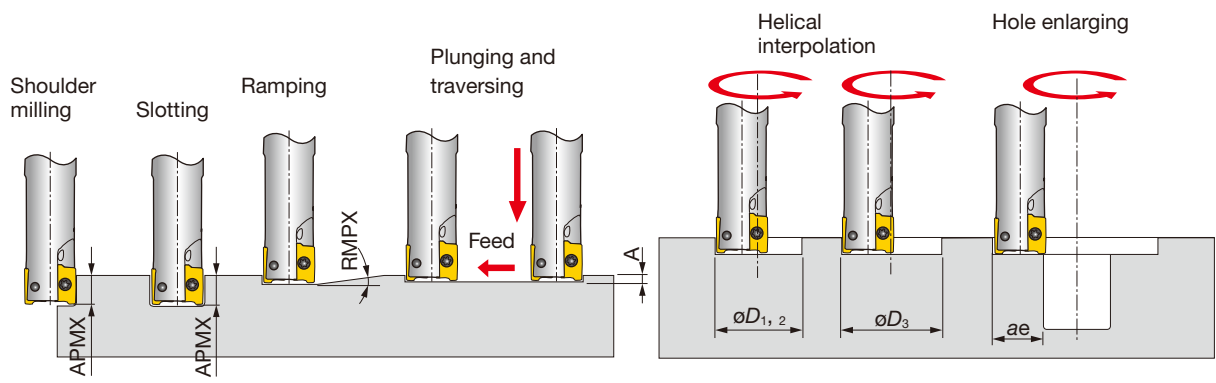




APPLICATION RANGE



| Designation | Tool dia. | Chipbreaker | Max. depth of cut | Max. ramping angle | Max. plunging depth | Min. machining | Max. machining | | | Max. cutting width in enlarging |
|----------------|-----------|-------------|-------------------|--------------------|---------------------|----------------|----------------|------|------|---------------------------------|
| | DC | | APMX | RMPX | A | øD1 | øD2 | øD3* | ae | |
| E/HPO07R012... | 12 | MJ | 7 | 8° | 0.5 | 16 | 23 | 20.5 | 11.5 | |
| E/HPO07R016... | 16 | MJ | 7 | 5° | 0.5 | 24 | 31 | 28.5 | 15.5 | |
| EPO07R018... | 18 | MJ | 7 | 4° | 0.5 | 28 | 35 | 32.5 | 17.5 | |
| E/HPO07R020... | 20 | MJ | 7 | 3.5° | 0.5 | 32 | 39 | 36.5 | 19.5 | |
| EPO07R022... | 22 | MJ | 7 | 3° | 0.5 | 36 | 43 | 40.5 | 21.5 | |
| E/HPO07R025... | 25 | MJ | 7 | 2.5° | 0.5 | 42 | 49 | 46.5 | 24.5 | |
| EPO07R028... | 28 | MJ | 7 | 2° | 0.5 | 48 | 55 | 52.5 | 27.5 | |
| TPO07R032... | 32 | MJ | 7 | 1.8° | 0.5 | 56 | 63 | 60.5 | 31.5 | |
| TPO07R040 | 40 | MJ | 7 | 1.2° | 0.5 | 72 | 79 | 76.5 | 39.5 | |
| TPO07R050... | 50 | MJ | 7 | 0.9° | 0.5 | 92 | 99 | 96.5 | 49.5 | |
| E/HPO07R012... | 12 | AJ | 6.4 | 8° | 0.5 | 16 | 23 | 20.5 | 11.5 | |
| E/HPO07R016... | 16 | AJ | 6.4 | 5° | 0.5 | 24 | 31 | 28.5 | 15.5 | |
| EPO07R018... | 18 | AJ | 6.4 | 4° | 0.5 | 28 | 35 | 32.5 | 17.5 | |
| E/HPO07R020... | 20 | AJ | 6.4 | 3.5° | 0.5 | 32 | 39 | 36.5 | 19.5 | |
| EPO07R022... | 22 | AJ | 6.4 | 3° | 0.5 | 36 | 43 | 40.5 | 21.5 | |
| E/HPO07R025... | 25 | AJ | 6.4 | 2.5° | 0.5 | 42 | 49 | 46.5 | 24.5 | |
| EPO07R028... | 28 | AJ | 6.4 | 2° | 0.5 | 48 | 55 | 52.5 | 27.5 | |
| TPO07R032... | 32 | AJ | 6.4 | 1.8° | 0.5 | 56 | 63 | 60.5 | 31.5 | |
| TPO07R040 | 40 | AJ | 6.4 | 1.2° | 0.5 | 72 | 79 | 76.5 | 39.5 | |
| TPO07R050... | 50 | AJ | 6.4 | 0.9° | 0.5 | 92 | 99 | 96.5 | 49.5 | |
| E/HPO07R012... | 12.6 | HJ | 0.8 | 5° | 0.5 | 17 | 24 | - | 9.6 | |
| E/HPO07R016... | 16.6 | HJ | 0.8 | 3° | 0.5 | 25 | 32 | - | 13.6 | |
| EPO07R018... | 18.6 | HJ | 0.8 | 2.5° | 0.5 | 29 | 36 | - | 15.6 | |
| E/HPO07R020... | 20.6 | HJ | 0.8 | 2.1° | 0.5 | 33 | 40 | - | 17.6 | |
| EPO07R022... | 22.6 | HJ | 0.8 | 1.9° | 0.5 | 37 | 44 | - | 19.6 | |
| E/HPO07R025... | 25.6 | HJ | 0.8 | 1.6° | 0.5 | 43 | 50 | - | 22.6 | |
| EPO07R028... | 28.6 | HJ | 0.8 | 1.3° | 0.5 | 49 | 56 | - | 25.6 | |
| TPO07R032... | 32.6 | HJ | 0.8 | 1.1° | 0.5 | 57 | 64 | - | 29.6 | |
| TPO07R040 | 40.6 | HJ | 0.8 | 0.8° | 0.5 | 73 | 80 | - | 37.6 | |
| TPO07R050... | 50.6 | HJ | 0.8 | 0.6° | 0.5 | 93 | 100 | - | 47.6 | |
| EPO11R012... | 12 | MJ, MS, AJ | 10.6 | 6° | 0.5 | 15 | 23 | 21 | 11.5 | |
| EPO11R016... | 16 | MJ, MS, AJ | 10.6 | 5° | 0.5 | 20 | 31 | 29 | 15.5 | |
| EPO11R018... | 18 | MJ, MS, AJ | 10.6 | 4° | 0.5 | 26 | 35 | 33 | 17.5 | |
| E/HPO11R020... | 20 | MJ, MS, AJ | 10.6 | 3° | 0.5 | 28 | 39 | 37 | 19.5 | |
| EPO11R022... | 22 | MJ, MS, AJ | 10.6 | 2.5° | 0.5 | 31 | 43 | 41 | 21.5 | |



| Designation | Tool dia. DC | Chipbreaker | Max. depth of cut APMX | Max. ramping angle RMPX | Max. plunging depth A | Min. machining øD1 | Max. machining øD2 | øD3* | Max. cutting width in enlarging ae |
|----------------|-----------------|-------------|---------------------------|----------------------------|--------------------------|-----------------------|-----------------------|------|---------------------------------------|
| E/HPO11R025... | 25 | MJ, MS, AJ | 10.6 | 2° | 0.5 | 38 | 49 | 47 | 24.5 |
| EPO11R028... | 28 | MJ, MS, AJ | 10.6 | 1.5° | 0.5 | 42 | 53 | 51 | 27.5 |
| EPO11R030... | 30 | MJ, MS, AJ | 10.6 | 1.5° | 0.5 | 48 | 55 | 53 | 29.5 |
| E/HPO11R032... | 32 | MJ, MS, AJ | 10.6 | 1.5° | 0.5 | 52 | 59 | 57 | 31.5 |
| EPO11R035... | 35 | MJ, MS, AJ | 10.6 | 1° | 0.5 | 56 | 67 | 65 | 34.5 |
| E/TPO11R040... | 40 | MJ, MS, AJ | 10.6 | 1° | 0.5 | 68 | 79 | 77 | 39.5 |
| TPO11R050... | 50 | MJ, MS, AJ | 10.6 | 0.7° | 0.5 | 68 | 99 | 97 | 49.5 |
| TPO11R063... | 63 | MJ, MS, AJ | 10.6 | 0.5° | 0.5 | 114 | 125 | 123 | 62.5 |
| TPO11R080... | 80 | MJ, MS, AJ | 10.6 | 0.4° | 0.5 | 148 | 159 | 157 | 79.5 |
| TPO11R100... | 100 | MJ, MS, AJ | 10.6 | 0.3° | 0.5 | 188 | 199 | 197 | 99.5 |
| EPO18R025... | 25 | MJ, AJ | 16.7 | 6° | 1 | 32 | 48 | 44 | 24 |
| EPO18R028... | 28 | MJ, AJ | 16.7 | 4.5° | 1 | 38 | 54 | 50 | 27 |
| EPO18R030... | 30 | MJ, AJ | 16.7 | 4° | 1 | 42 | 58 | 54 | 29 |
| EPO18R032... | 32 | MJ, AJ | 16.7 | 3.5° | 1 | 46 | 62 | 58 | 31 |
| EPO18R035... | 35 | MJ, AJ | 16.7 | 3° | 1 | 52 | 68 | 64 | 34 |
| E/TPO18R040... | 40 | MJ, AJ | 16.7 | 2.5° | 1 | 62 | 78 | 74 | 39 |
| E/TPO18R050... | 50 | MJ, AJ | 16.7 | 1.9° | 1 | 82 | 98 | 94 | 49 |
| E/TPO18R063 | 63 | MJ, AJ | 16.7 | 1.4° | 1 | 108 | 124 | 120 | 62 |
| TPO18R080... | 80 | MJ, AJ | 16.7 | 1° | 1 | 142 | 158 | 154 | 79 |
| TPO18R100... | 100 | MJ, AJ | 16.7 | 0.8° | 1 | 182 | 198 | 194 | 99 |
| TPO18R125... | 125 | MJ, AJ | 16.7 | 0.6° | 1 | 232 | 248 | 244 | 124 |
| TPO18R160... | 160 | MJ, AJ | 16.7 | 0.4° | 1 | 302 | 318 | 314 | 159 |

*Flat bottom hole

Note: Corner RE for dimensions of øD1, øD2, and øD3: RE = 0.4 for EPO07 / EPO11 and RE = 0.8 for EPO18.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



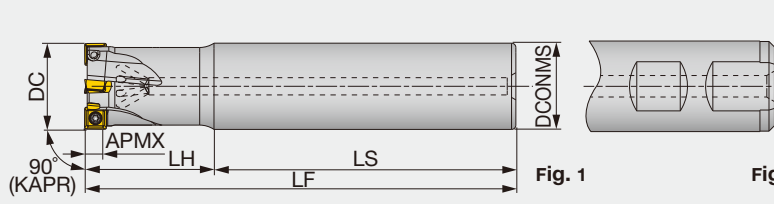
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

TUNGQUAD

EPD05

High density square shoulder endmill, shank type, with screw clamp system

GAMP = +5°, GAMF = -7° ~ +12°



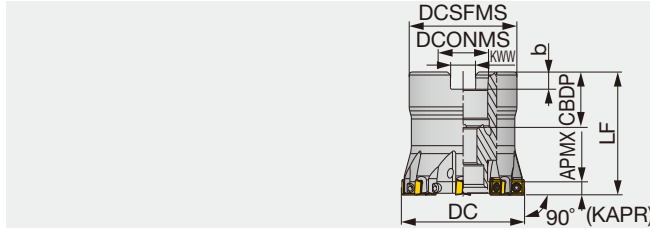
Right hand (R) shown.

| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Shank | Insert | Shank type |
|-------------------|------|----|------|--------|-----|----|-----|--------|----------|----------|-------------|------------|
| EPD05R012M12.0-02 | 4 | 12 | 2 | 12 | 62 | 18 | 80 | 0.1 | With | Straight | SD*T0502... | Fig .1 |
| EPD05R016M16.0-03 | 4 | 16 | 3 | 16 | 90 | 20 | 110 | 0.2 | With | Straight | SD*T0502... | Fig .1 |
| EPD05R020M20.0W04 | 4 | 20 | 4 | 20 | 80 | 25 | 105 | 0.2 | With | Weldon | SD*T0502... | Fig .2 |
| EPD05R025M20.0W05 | 4 | 25 | 5 | 20 | 90 | 25 | 115 | 0.3 | With | Weldon | SD*T0502... | Fig .2 |
| EPD05R032M25.0W06 | 4 | 32 | 6 | 25 | 98 | 32 | 130 | 0.5 | With | Weldon | SD*T0502... | Fig .2 |
| EPD05R040M32.0W08 | 4 | 40 | 8 | 32 | 100 | 40 | 140 | 0.8 | With | Weldon | SD*T0502... | Fig .2 |

TPD05

High density square shoulder mill, with screw clamp system

GAMP = +5°, GAMF = -7° ~ +12°



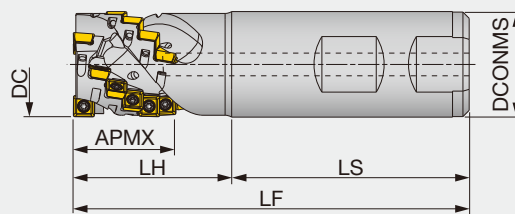
Right hand (R) shown.

| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TPD05R032M16.0E06 | 4 | 32 | 6 | 30 | 32 | 16 | 20 | 8.4 | 5.6 | 0.1 | With | SD*T0502... |
| TPD05R040M22.0E08 | 4 | 40 | 8 | 38 | 40 | 22 | 22 | 10.4 | 6.3 | 0.2 | With | SD*T0502... |

ELD05

High density square shoulder endmill for roughing, shank type, with screw clamp system

GAMP = +5°, GAMF = -3°



| Designation | APMX | DC | ZEFP | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|------|--------|----|----|----|--------|----------|-------------|
| ELD05R020M20.0W02 | 20.3 | 20 | 2 | 10 | 20 | 53 | 32 | 85 | 0.2 | With | SD*T0502... |
| ELD05R025M25.0W03 | 24.2 | 25 | 3 | 18 | 25 | 59 | 36 | 95 | 0.3 | With | SD*T0502... |

SPARE PARTS

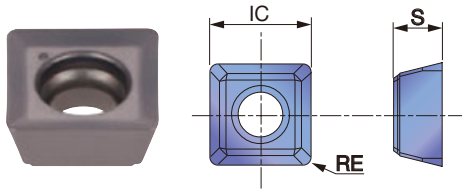


| Designation | Clamping screw | Shell locking bolt | Wrench |
|--------------------|----------------|--------------------|--------|
| EPD05..., ELD05... | CSPB-2L043 | - | IP-6DB |
| TPD05R032M16.0E06 | CSPB-2L043 | CM8X30H | IP-6DB |
| TPD05R040M22.0E08 | CSPB-2L043 | CM10X30H | IP-6DB |

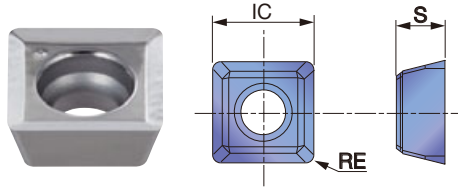
Recommended clamping torque: 0.7 N·m

INSERT

SDMT05-MJ



SDHT05-AJ



| | | | | | | | | | |
|---|----------------|---|---|---|--|--|--|--|--|
| P | Steel | | ★ | | | | | | |
| M | Stainless | ★ | ☆ | | | | | | |
| K | Cast iron | | ★ | | | | | | |
| N | Non-ferrous | | | ★ | | | | | |
| S | Superalloys | | ★ | | | | | | |
| H | Hard materials | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | Uncoated | S | IC |
|-----------------|-----|------|--------|-------|----------|------|------|
| | | | AH140 | AH725 | TH10 | | |
| SDMT050204PN-MJ | 0.4 | 4 | ● | ● | | 2.38 | 5.09 |
| SDHT050204FN-AJ | 0.4 | 4 | | | ● | 2.39 | 5.09 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EPD05

e-catalog



TPD05

e-catalog



ELD05

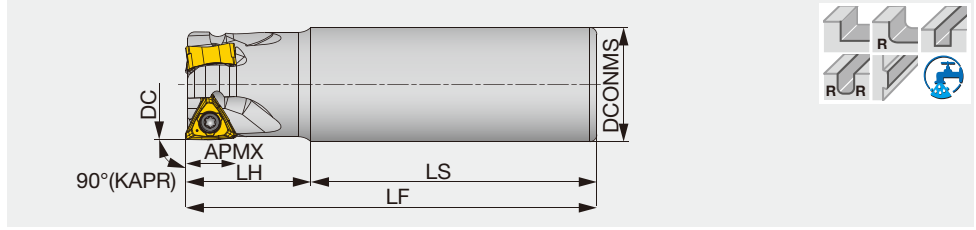
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





Square shoulder endmill, with screw clamp system

GAMP = +4.2°~ +4.7°, GAMF = -15.4°~ -11.2°



| Designation | APMX | DC | CICT | DCONMS | LS | LH ⁽¹⁾ | LF ⁽¹⁾ | WT(kg) | Air hole | Insert |
|---------------------|------|----|------|--------|-----|-------------------|-------------------|--------|----------|-----------------------|
| EPTN07M018C16.0R02 | 6.5 | 18 | 2 | 16 | 60 | 25 | 85 | 0.13 | With | TN ^U 07... |
| EPTN07M020C20.0R02 | 6.5 | 20 | 2 | 20 | 70 | 30 | 100 | 0.22 | With | TN ^U 07... |
| EPTN07M020C20.0R02L | 6.5 | 20 | 2 | 20 | 135 | 50 | 185 | 0.41 | With | TN ^U 07... |
| EPTN07M020C20.0R03 | 6.5 | 20 | 3 | 20 | 70 | 30 | 100 | 0.215 | With | TN ^U 07... |
| EPTN07M025C25.0R03 | 6.5 | 25 | 3 | 25 | 80 | 35 | 115 | 0.41 | With | TN ^U 07... |
| EPTN07M025C25.0R03L | 6.5 | 25 | 3 | 25 | 150 | 70 | 220 | 0.78 | With | TN ^U 07... |
| EPTN07M025C25.0R04 | 6.5 | 25 | 4 | 25 | 80 | 35 | 115 | 0.41 | With | TN ^U 07... |
| EPTN07M032C32.0R04 | 6.5 | 32 | 4 | 32 | 80 | 35 | 115 | 0.66 | With | TN ^U 07... |
| EPTN07M032C32.0R05 | 6.5 | 32 | 5 | 32 | 80 | 35 | 115 | 0.67 | With | TN ^U 07... |
| EPTN12M032C32.0R02N | 11 | 32 | 2 | 32 | 80 | 35 | 115 | 0.7 | Without | TN ^U 12... |
| EPTN12M032C32.0R03N | 11 | 32 | 3 | 32 | 80 | 35 | 115 | 0.7 | Without | TN ^U 12... |
| EPTN12M040C32.0R03N | 11 | 40 | 3 | 32 | 80 | 35 | 115 | 0.8 | Without | TN ^U 12... |
| EPTN12M040C32.0R04N | 11 | 40 | 4 | 32 | 80 | 35 | 115 | 0.8 | Without | TN ^U 12... |

(1) The value is true with R0.8 insert. For other Corner R, please refer to page H152.

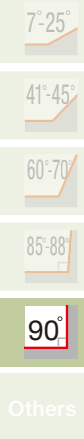
SPARE PARTS



| Designation | Clamping screw | Grip (Optional) | Wrench | Torx bit (Optional) | Lubricant (Optional) |
|-------------|----------------|-----------------|--------|---------------------|----------------------|
| EPTN07... | CSPB-2.5SH | - | IP-7D | - | - |
| EPTN12... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) |

Recommended clamping torque (Torx size): CSPB-2.5SH = 1.1 N·m
CSPB-3.5 = 3.5 N·m (15IP)

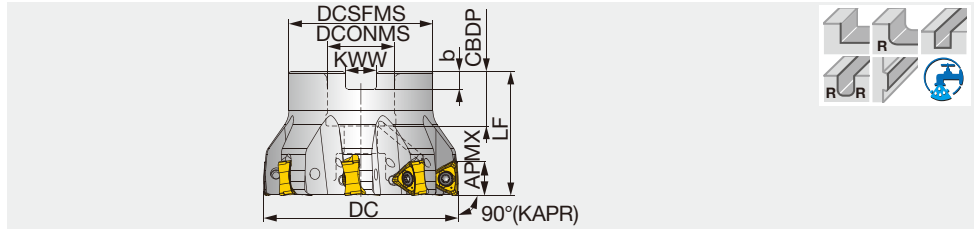
Approach angle



Reference pages: Inserts → H152, Standard cutting conditions → H153

Square shoulder mill, with screw clamp system

GAMP = +4.2°~ +4.7°, GAMF = -15.4°~ -11.2°



| Designation | APMX | DC | CICT | DCSFMS | LF ⁽¹⁾ | DCONMS | CDBP | KWW | b | WT(kg) | Air hole | Shell locking bolt | Insert |
|---------------------|------|-----|------|--------|-------------------|--------|------|------|-----|--------|----------|--------------------|-----------|
| TPTN07M040B16.0R06 | 6.5 | 40 | 6 | 35 | 40 | 16 | 18 | 8.4 | 5.6 | 0.24 | With | CM8X30H | TN*U07... |
| TPTN07M050B22.0R08 | 6.5 | 50 | 8 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.41 | With | CM10X30H | TN*U07... |
| TPTN12M050B22.0R04 | 11 | 50 | 4 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | CM10X30H | TN*U12... |
| TPTN12M050B22.0R05 | 11 | 50 | 5 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | CM10X30H | TN*U12... |
| TPTN12M063B22.0R05 | 11 | 63 | 5 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.6 | With | CM10X30H | TN*U12... |
| TPTN12M063B22.0R06 | 11 | 63 | 6 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.6 | With | CM10X30H | TN*U12... |
| TPTN12J080B25.4R06 | 11 | 80 | 6 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.1 | With | CM12X30H | TN*U12... |
| TPTN12J080B25.4R08 | 11 | 80 | 8 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.1 | With | CM12X30H | TN*U12... |
| TPTN12M080B27.0R06 | 11 | 80 | 6 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.1 | With | CM12X30H | TN*U12... |
| TPTN12M080B27.0R08 | 11 | 80 | 8 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.1 | With | CM12X30H | TN*U12... |
| TPTN12J100B31.7R07 | 11 | 100 | 7 | 67 | 50 | 31.75 | 32 | 12.7 | 8 | 1.4 | With | TMBA-M16H | TN*U12... |
| TPTN12J100B31.7R10 | 11 | 100 | 10 | 67 | 50 | 31.75 | 32 | 12.7 | 8 | 1.4 | With | TMBA-M16H | TN*U12... |
| TPTN12M100B32.0R07 | 11 | 100 | 7 | 67 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | With | TMBA-M16H | TN*U12... |
| TPTN12M100B32.0R10 | 11 | 100 | 10 | 67 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | With | TMBA-M16H | TN*U12... |
| TPTN12J125B38.1R08 | 11 | 125 | 8 | 71 | 63 | 38.1 | 38 | 15.9 | 10 | 2.4 | With | TMBA-M20H | TN*U12... |
| TPTN12J125B38.1R12 | 11 | 125 | 12 | 71 | 63 | 38.1 | 38 | 15.9 | 10 | 2.5 | With | TMBA-M20H | TN*U12... |
| TPTN12M125B40.0R08 | 11 | 125 | 8 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.3 | With | TMBA-M20H | TN*U12... |
| TPTN12M125B40.0R12 | 11 | 125 | 12 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.4 | With | TMBA-M20H | TN*U12... |
| TPTN12M160B40.0R10N | 11 | 160 | 10 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.5 | Without | - | TN*U12... |
| TPTN12J160B50.8R10N | 11 | 160 | 10 | 100 | 63 | 50.8 | 41 | 19 | 11 | 4.5 | Without | - | TN*U12... |

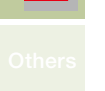
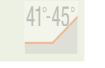
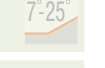
(1) The value is true with R0.8 insert. For other Corner R, please refer to page H152.

SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Wrench | Torx bit (Optional) | Lubricant (Optional) | Shell locking bolt 1 | Shell locking bolt 2 |
|---------------------|----------------|-----------------|--------|---------------------|----------------------|----------------------|----------------------|
| TPTN07... | CSPB-2.5SH | - | IP-7D | - | - | - | - |
| TPTN12M050, 063B... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) | - | CM10X30H |
| TPTN12*080B... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) | - | CM12X30H |
| TPTN12*100B... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) | TMBA-M16H | - |
| TPTN12*125B... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) | TMBA-M20H | - |
| TPTN12*160B... | CSPB-3.5 | (H-TB2W) | - | (BLD IP15/S7) | (M-1000) | - | - |

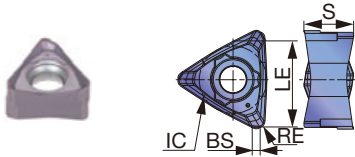
Recommended clamping torque (Torx size): CSPB-2.5SH = 1.1 N·m
CSPB-3.5 = 3.5 N·m (15IP)





INSERT

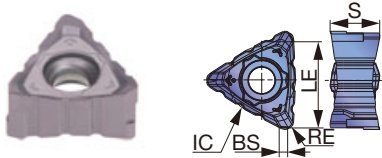
TNMU07-MJ



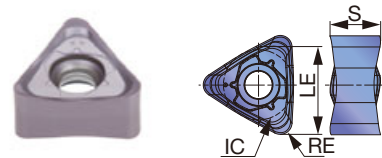
TNGU12-MJ/TNMU12-MJ



TNMU12-NMJ



TNMU12-R-MJ



| | | | | | | | | | |
|---|----------------|---|---|---|---|--|--|--|--|
| P | Steel | ☆ | ★ | ☆ | ☆ | | | | |
| M | Stainless | | ☆ | ★ | ☆ | | | | |
| K | Cast iron | ★ | ☆ | | ☆ | | | | |
| N | Non-ferrous | | | | | | | | |
| S | Superalloy | ★ | | ☆ | | | | | |
| H | Hard materials | | | | | | | | |

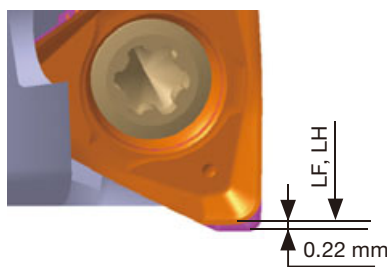
★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | LE | IC | S | BS |
|-------------------|-----|------|--------|--------|--------|-------|-------|----|----|---|----|
| | | | AH120 | AH3225 | AH3135 | T1215 | T3225 | | | | |
| TNMU070304PER-MJ | 0.4 | 6.5 | ● | ● | ● | | | | | | |
| TNMU070308PER-MJ | 0.8 | 6.5 | ● | ● | ● | | | | | | |
| TNGU120708PER-MJ | 0.8 | 11 | ● | ● | ● | ● | | | | | |
| TNMU120708PER-MJ | 0.8 | 11 | ● | ● | ● | ● | | | | | |
| TNMU120708PER-NMJ | 0.8 | 11 | ● | ● | ● | | | | | | |
| TNMU1207R16PER-MJ | 1.6 | 11 | ● | ● | ● | | | | | | |
| TNMU1207R20PER-MJ | 2 | 11 | ● | ● | ● | ● | | | | | |

● : Line up

Notes

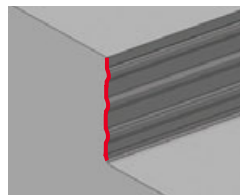
LF and LH dimensions for R0.4, size 07 insert



Add 0.22 mm to LH and LF measurements when R0.4 insert is used.

Serrated size 12 insert (NMJ)

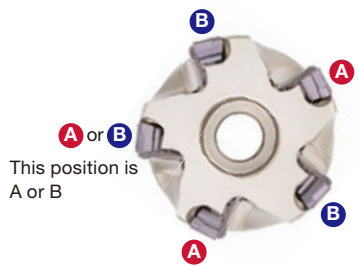
To obtain good wall accuracy, the serrated inserts must be arranged in alternative orders on the cutter so that the same serrated edge will not cut the same surface twice, generating steps on the wall. One of the serration grooves (marked in red) on the cutting edge has a irregular shape, and this must be placed alternatively as shown below by A and B.



Check the insert orientations if steps are produced on the wall surface.

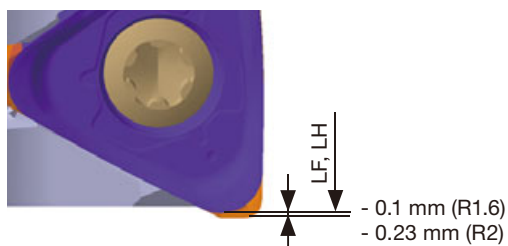


The groove in red is asymmetric for easy identification



Insert orientation for odd number of teeth

LF and LH dimensions for R1.6 / 2, size 12 insert



- 0.1 mm (R1.6)
- 0.23 mm (R2)
Subtract 0.1 mm (R1.6) or 0.23 mm (R2) to LH and LF measurements when R1.6 or R2 insert is used.

STANDARD CUTTING CONDITIONS

Size 07 inserts

| ISO | Workpiece material | Hardness | Priority | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------------|-------------------------|--------|--------------------------|--------------------------|
| P | Carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 HB | First choice | AH3225 | 100 - 250 | 0.07 - 0.2 |
| | | | For fracture resistance | AH3135 | 100 - 250 | 0.07 - 0.2 |
| | High Carbon steel, Alloy steel S45C, SCM440, etc. C45, 42CrMo4, etc. | - 300 HB | First choice | AH3225 | 100 - 230 | 0.07 - 0.15 |
| | | | For fracture resistance | AH3135 | 100 - 230 | 0.07 - 0.15 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3225 | 100 - 180 | 0.07 - 0.15 |
| | | | For fracture resistance | AH3135 | 100 - 180 | 0.07 - 0.15 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | 90 - 200 | 0.07 - 0.15 |
| | | | For wear resistance | AH3225 | 90 - 200 | 0.07 - 0.15 |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | First choice | AH120 | 140 - 250 | 0.07 - 0.2 |
| | | | For fracture resistance | AH3225 | 140 - 250 | 0.07 - 0.2 |
| | Ductile cast iron FCD450, etc. 450-10S, etc. | 150 - 250 HB | First choice | AH120 | 110 - 200 | 0.07 - 0.15 |
| | | | For fracture resistance | AH3225 | 110 - 200 | 0.07 - 0.15 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH3135 | 20 - 60 | 0.07 - 0.15 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | First choice | AH120 | 20 - 40 | 0.07 - 0.1 |

Size 12 inserts

| ISO | Workpiece material | Hardness | Priority | Grade | Chipbreaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------------|-------------------------|--------|-------------|--------------------------|--------------------------|
| P | Carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 HB | First choice | AH3225 | MJ | 100 - 250 | 0.08 - 0.3 |
| | | | For fracture resistance | AH3135 | MJ | 100 - 250 | 0.08 - 0.3 |
| | | | For wear resistance | T3225 | MJ | 100 - 300 | 0.08 - 0.3 |
| | High Carbon steel, Alloy steel S45C, SCM440, etc. C45, 42CrMo4, etc. | - 300 HB | Low cutting force | AH3225 | NMJ | 100 - 250 | 0.08 - 0.14 |
| | | | First choice | AH3225 | MJ | 100 - 230 | 0.08 - 0.3 |
| | | | For fracture resistance | AH3135 | MJ | 100 - 230 | 0.08 - 0.3 |
| | | | For wear resistance | T3225 | MJ | 100 - 280 | 0.08 - 0.3 |
| | | | Low cutting force | AH3225 | NMJ | 100 - 230 | 0.08 - 0.14 |
| | | | First choice | AH3225 | MJ | 100 - 180 | 0.08 - 0.25 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | For fracture resistance | AH3135 | MJ | 100 - 180 | 0.08 - 0.25 |
| | | | For wear resistance | T3225 | MJ | 100 - 200 | 0.08 - 0.25 |
| | | | Low cutting force | AH3225 | NMJ | 100 - 180 | 0.08 - 0.14 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | MJ | 90 - 200 | 0.08 - 0.25 |
| | | | For wear resistance | T3225 | MJ | 90 - 250 | 0.08 - 0.25 |
| | | | Low cutting force | AH3135 | NMJ | 90 - 200 | 0.08 - 0.14 |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | First choice | AH120 | MJ | 140 - 250 | 0.08 - 0.3 |
| | | | For fracture resistance | AH3225 | MJ | 140 - 250 | 0.08 - 0.3 |
| | | | For wear resistance | T1215 | MJ | 140 - 300 | 0.08 - 0.3 |
| | Ductile cast iron FCD450, etc. 450-10S, etc. | 150 - 250 HB | Low cutting force | AH120 | NMJ | 140 - 250 | 0.08 - 0.14 |
| | | | First choice | AH120 | MJ | 110 - 200 | 0.08 - 0.25 |
| | | | For fracture resistance | AH3225 | MJ | 110 - 200 | 0.08 - 0.25 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | For wear resistance | T1215 | MJ | 110 - 250 | 0.08 - 0.25 |
| | | | Low cutting force | AH120 | NMJ | 110 - 200 | 0.08 - 0.14 |
| | | | First choice | AH120 | MJ | 20 - 60 | 0.08 - 0.2 |
| S | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | Low cutting force | AH120 | NMJ | 20 - 60 | 0.08 - 0.14 |
| | | | First choice | AH120 | MJ | 20 - 40 | 0.07 - 0.18 |
| | | | Low cutting force | AH120 | NMJ | 20 - 40 | 0.07 - 0.14 |

Note: For NMJ chipbreaker, use a feed rate that satisfies the following theoretical chip thickness:

| Designation | Chip thickness (mm) |
|-------------------|---------------------|
| TNMM120708PER-NMJ | < 0.2 |

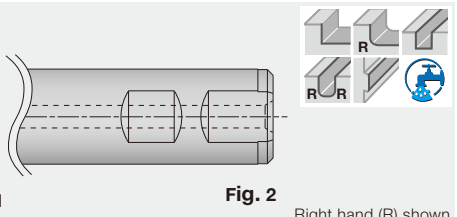
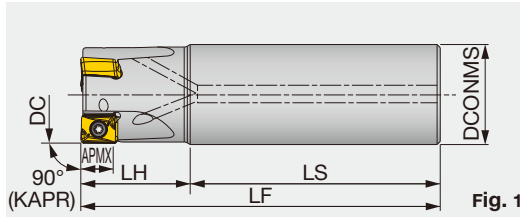
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index





DOREC EPQ11,18

Square shoulder endmill, shank type, with screw clamp system

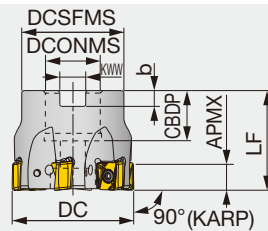


GAMP = +4° ~ +5°, GAMF = +13° ~ +15°

| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert | Shank type |
|-------------------|------|----|------|--------|----|----|-----|--------|----------|-------------|------------|
| EPQ11R025M25.0-02 | 9 | 25 | 2 | 25 | 70 | 30 | 100 | 0.3 | With | LQMU1107... | Fig. 1 |
| EPQ11R032M32.0-03 | 9 | 32 | 3 | 32 | 80 | 35 | 115 | 0.7 | With | LQMU1107... | Fig. 1 |
| EPQ11R040M32.0-04 | 9 | 40 | 4 | 32 | 80 | 35 | 115 | 0.8 | With | LQMU1107... | Fig. 1 |
| EPQ18R040M32.0W03 | 16 | 40 | 3 | 32 | 75 | 35 | 110 | 0.7 | With | LQMU1808... | Fig. 2 |
| EPQ11R050M32.0-05 | 9 | 50 | 5 | 32 | 80 | 40 | 120 | 0.9 | With | LQMU1107... | Fig. 1 |
| EPQ18R050M32.0W04 | 16 | 50 | 4 | 32 | 75 | 40 | 115 | 0.9 | With | LQMU1808... | Fig. 2 |
| EPQ11R063M32.0-06 | 9 | 63 | 6 | 32 | 80 | 40 | 120 | 1.1 | With | LQMU1107... | Fig. 1 |
| EPQ11R080M32.0-07 | 9 | 80 | 7 | 32 | 80 | 40 | 120 | 1.4 | With | LQMU1107... | Fig. 1 |

TPQ11,18

Square shoulder mill, with screw clamp system



GAMP = +4° ~ +5°, GAMF = +13° ~ +15°

| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|-----|------|--------|----|--------|------|-------|-----|--------|----------|-------------|
| TPQ11R040M16.0E04 | 9 | 40 | 4 | 35 | 40 | 16 | 20 | 8.4 | 5.6 | 0.2 | With | LQMU1107... |
| TPQ11R050M22.0E06 | 9 | 50 | 6 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | LQMU1107... |
| TPQ18R050M22.0E03 | 16 | 50 | 3 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | LQMU1808... |
| TPQ11R063M22.0E07 | 9 | 63 | 7 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | LQMU1107... |
| TPQ18R063M25.4-04 | 16 | 63 | 4 | 55 | 50 | 25.4 | 26 | 9.5 | 6 | 0.7 | With | LQMU1808... |
| TPQ18R063M27.0E04 | 16 | 63 | 4 | 58 | 50 | 27 | 26 | 12.4 | 7 | 0.5 | With | LQMU1808... |
| TPQ11R080M25.4-10 | 9 | 80 | 10 | 55 | 50 | 25.4 | 26 | 9.5 | 6 | 1.1 | With | LQMU1107... |
| TPQ11R080M27.0E10 | 9 | 80 | 10 | 58 | 50 | 27 | 26 | 12.4 | 7 | 1 | With | LQMU1107... |
| TPQ18R080M25.4-05 | 16 | 80 | 5 | 55 | 50 | 25.4 | 26 | 9.5 | 6 | 0.9 | With | LQMU1808... |
| TPQ18R080M27.0E05 | 16 | 80 | 5 | 58 | 50 | 27 | 26 | 12.4 | 7 | 0.9 | With | LQMU1808... |
| TPQ11R100M31.7-12 | 9 | 100 | 12 | 66 | 50 | 31.75 | 32 | 12.95 | 8 | 1.6 | With | LQMU1107... |
| TPQ11R100M32.0E12 | 9 | 100 | 12 | 66 | 50 | 32 | 32 | 14.4 | 8 | 1.6 | With | LQMU1107... |
| TPQ18R100M31.7-06 | 16 | 100 | 6 | 70 | 50 | 31.75 | 32 | 12.95 | 8 | 1.4 | With | LQMU1808... |
| TPQ18R100M32.0E06 | 16 | 100 | 6 | 66 | 50 | 32 | 32 | 14.4 | 8 | 1.4 | With | LQMU1808... |
| TPQ18R125M38.1-08 | 16 | 125 | 8 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 2.9 | With | LQMU1808... |
| TPQ18R125M40.0E08 | 16 | 125 | 8 | 82 | 63 | 40 | 38 | 16.4 | 9 | 2.9 | With | LQMU1808... |
| TPQ18R160M50.8-09 | 16 | 160 | 9 | 100 | 63 | 50.8 | 38 | 19 | 11 | 4.1 | Without | LQMU1808... |
| TPQ18R160M40.0E09 | 16 | 160 | 9 | 100 | 63 | 40 | 38 | 16.4 | 9 | 4.1 | Without | LQMU1808... |

Reference pages: Standard cutting conditions → **H156**

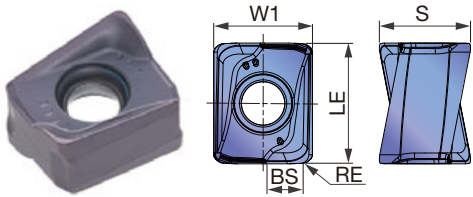
SPARE PARTS

| Designation | Clamping screw | Grip 1 | Grip 2 (Optional) | Torx bit 1 | Torx bit 2 (Optional) | Shell locking bolt | Wrench |
|------------------------|----------------|--------|-------------------|------------|-----------------------|--------------------|--------|
| EPQ11... | CSTB-3.5L115 | SW6-SD | - | BLD T10/S7 | - | - | T-10D |
| EPQ18... | SR 14-591 | - | (H-TB) | - | (BT20M) | - | T-20D |
| TPQ11R040M... | CSTB-3.5L115 | SW6-SD | - | BLD T10/S7 | - | CM8×30H | - |
| TPQ11R050M..., 063M... | CSTB-3.5L115 | SW6-SD | - | BLD T10/S7 | - | CM10×30H | - |
| TPQ11R080M... | CSTB-3.5L115 | SW6-SD | - | BLD T10/S7 | - | CM12×30H | - |
| TPQ11R100M... | CSTB-3.5L115 | SW6-SD | - | BLD T10/S7 | - | TMBA-M16H | - |
| TPQ18R050M... | SR 14-591 | - | (H-TB) | - | (BT20M) | CM10×30H | - |
| TPQ18R063M..., 080M... | SR 14-591 | - | (H-TB) | - | (BT20M) | CM12×30H | - |
| TPQ18R100M... | SR 14-591 | - | (H-TB) | - | (BT20M) | TMBA-M16H | - |
| TPQ18R125M... | SR 14-591 | - | (H-TB) | - | (BT20M) | TMBA-M20H | - |
| TPQ18R160M... | SR 14-591 | - | (H-TB) | - | (BT20M) | - | - |

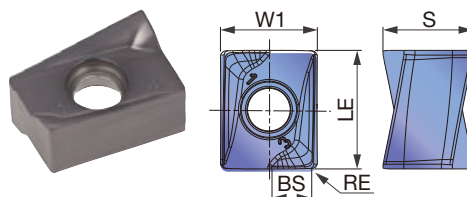
Recommended clamping torque (Torx size) : CSTB-3.5L115 = 2.5 N·m
 SR 14-591 = 5 N·m (T20)

INSERT

LQMU11-PXER-MJ



LQMU11/18-PNER-MJ



| | | | | |
|-------------------------|---|---|---|---|
| P Steel | ☆ | ★ | ★ | |
| M Stainless | | ★ | ☆ | ★ |
| K Cast iron | ★ | | ☆ | |
| N Non-ferrous | | | | |
| S Superalloys | ★ | ★ | ☆ | |
| H Hard materials | | | | |

★ : First choice
 ☆ : Second choice

| Designation | RE | APMX | Coated | | | | LE | S | W1 | BS |
|-------------------|-----|------|--------|-------|-------|--------|------|------|------|-----|
| | | | AH120 | AH140 | AH725 | AH3135 | | | | |
| LQMU110704PNER-MJ | 0.4 | 9 | ● | ● | ● | | 11 | 8.4 | 9 | 1.5 |
| LQMU110708PNER-MJ | 0.8 | 9 | ● | ● | ● | | 11 | 8.3 | 9 | 1.1 |
| LQMU110708PXER-MJ | 0.8 | 9 | ● | | | ● | 11 | 8.3 | 9 | 1.1 |
| LQMU110716PNER-MJ | 1.6 | 9 | ● | ● | ● | | 11 | 8.2 | 9 | 0.3 |
| LQMU110720PNER-MJ | 2 | 9 | ● | | | | 11 | 8.1 | 9 | - |
| LQMU180804PNER-MJ | 0.4 | 16 | ● | ● | ● | | 17.5 | 10.9 | 11.5 | 2.0 |
| LQMU180808PNER-MJ | 0.8 | 16 | ● | ● | ● | | 17.5 | 10.9 | 11.5 | 1.6 |
| LQMU180816PNER-MJ | 1.6 | 16 | ● | ● | ● | | 17.5 | 10.9 | 11.5 | 0.8 |
| LQMU180824PNER-MJ | 2.4 | 16 | ● | ● | ● | | 17.5 | 10.7 | 11.5 | - |

● : Line up

Grade
 Insert
 Ext. Toolholder
 Int. Toolholder
 Threading
 Grooving
 Miniature tool
 Milling cutter
 Endmill
 Drilling tool
 Tooling System
 User's Guide
 Index



STANDARD CUTTING CONDITIONS

LQMU11-PXER-MJ

| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---|----------------------------------|--------|-----------------------------|-----------------------------|
| P | Low carbon steel S15C, etc. C15E, etc. | - 200 HB | AH3135 | 100 - 250 | 0.1 - 0.25* |
| | Alloy steel S55C, etc. C55, etc. | - 300 HB | AH3135 | 100 - 230 | 0.1 - 0.2* |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | AH3135 | 100 - 230 | 0.1 - 0.2* |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | AH3135 | 90 - 180 | 0.1 - 0.25* |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | AH120 | 140 - 250 | 0.1 - 0.25* |
| | Ductile cast iron FCD400, etc. 450-10S, etc. | 150 - 250 HB | AH120 | 110 - 200 | 0.1 - 0.25* |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | AH120 | 30 - 60 | 0.08 - 0.2* |
| | Superalloys Inconel 718, etc. | - 40 HRC | AH120 | 20 - 50 | 0.06 - 0.1* |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | AH120 | 45 - 70 | 0.08 - 0.15* |
| | | SKD11, etc. X153CrMoV12, etc. | AH120 | 40 - 65 | 0.06 - 0.1* |

LQMU11/18-PNER-MJ

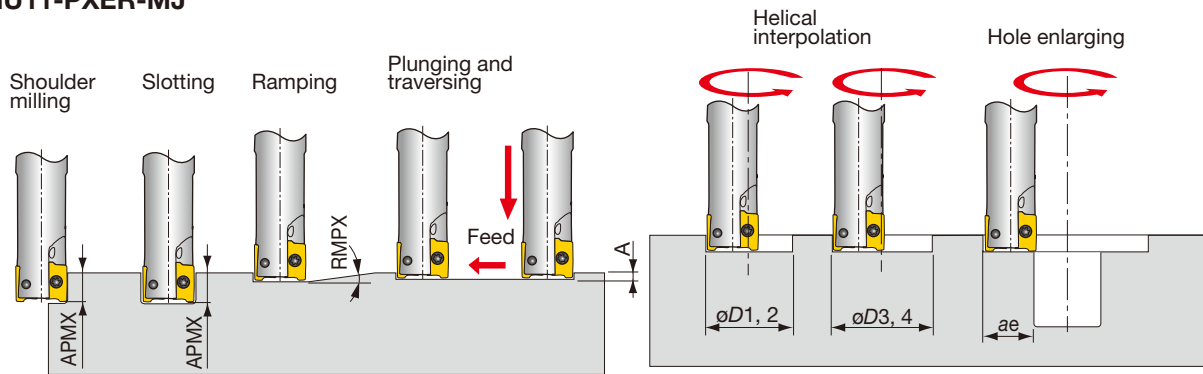
| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---|--------------|-------|-----------------------------|-----------------------------|
| P | Low carbon steel S15C, etc. C15E, etc. | - 200 HB | AH725 | 100 - 250 | 0.1 - 0.25* |
| | High carbon steel S45C, S55C, etc. C45, C55, etc. | 200 - 300 HB | AH725 | 100 - 230 | 0.1 - 0.2* |
| | Alloy steel SCM440, SCR415, etc. 42CrMo4, etc. | - 300 HB | AH725 | 100 - 230 | 0.1 - 0.2* |
| | Tool steel D2, etc. X153CrMoV12, etc. | 30 - 40 HRC | AH725 | 100 - 180 | 0.1 - 0.2* |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | AH140 | 90 - 180 | 0.1 - 0.25* |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | AH120 | 140 - 250 | 0.1 - 0.25* |
| | Ductile cast iron FCD400, etc. 450-10S, etc. | 150 - 250 HB | AH120 | 110 - 200 | 0.1 - 0.25* |
| S | Superalloys Inconel 718, Ti-6Al-4V, etc. | - 40 HRC | AH725 | 20 - 50 | 0.08 - 0.2* |

* When using LQMU11 inserts, see page **H157** for proper feed per tooth setting.

- For applications with poor chip evacuation, use air gun to remove chips from the machining area to avoid chip re-cutting and part damage.
- To machine cast surface with unstable cutting depths or interruptions, it is recommended to lower the feed rate (fz) to the lowest parameter in the recommended range.
- Rigidity of the machine and/or workpiece and the spindle power capability greatly influence the cutting conditions. For applications with large cutting width/depth and/or long tool overhang, start with a Vc and fz in the lower range of the recommended cutting parameters and monitor the machine stability.

APPLICATION RANGE

LQMU11-PXER-MJ



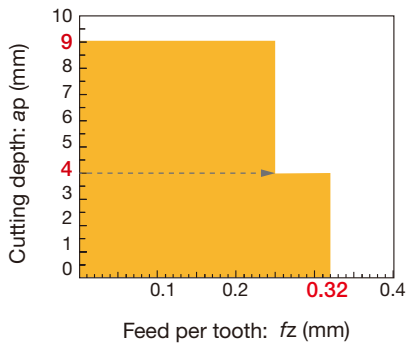
| Designation | DC | Max. depth of cut | | Max. ramping angle | Max. plunging | Min. machining | Max. machining | | | Max. cutting width in enlarging |
|--------------|-----|-------------------|------|--------------------|---------------|----------------|----------------|-----------|-------------|---------------------------------|
| | | APMX | RMPX | | | | A | $\phi D1$ | $\phi D2^*$ | |
| EPQ11R025... | 25 | 9 | 1.8° | 0.6 | 35 | 46.8 | 49 | 48.5 | 0.8 | 24.1 |
| EPQ11R032... | 32 | 9 | 1.3° | 0.6 | 48 | 60.8 | 63 | 62.5 | 0.8 | 31.1 |
| TPQ11R040... | 40 | 9 | 0.9° | 0.6 | 64 | 76.8 | 79 | 78.5 | 0.8 | 39.1 |
| TPQ11R050... | 50 | 9 | 0.7° | 0.6 | 84 | 96.8 | 99 | 98.5 | 0.8 | 49.1 |
| TPQ11R063... | 63 | 9 | 0.5° | 0.6 | 110 | 122.8 | 125 | 124.5 | 0.8 | 62.1 |
| TPQ11R080... | 80 | 9 | 0.4° | 0.6 | 144 | 156.8 | 159 | 158.5 | 0.8 | 79.1 |
| TPQ11R100... | 100 | 9 | 0.3° | 0.6 | 184 | 196.8 | 199 | 198.5 | 0.8 | 99.1 |

*For a flat bottom

NOTE WHEN USING LQMU11 INSERTS

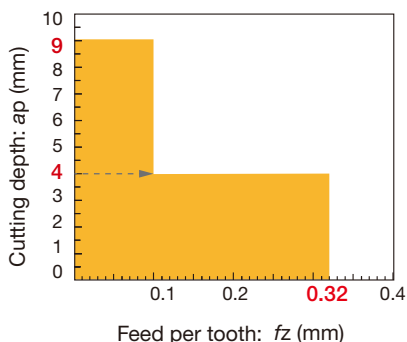
Maximum feed rate per tooth varies depending on the cutting depth and width.
Use proper feed rate as described below.
Use caution. Tool may damage if the parameters are not properly set.

Applicable feed rate (for $ae < 10\%$ of tool diameter)



Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
Insert : LQMU110708PXER-MJ
Grade : AH3135
Workpiece material : S55C (200HB)
Cutting Speed : $V_c = 200$ m/min
Cutting width : $ae = 5$ mm
Coolant : Dry
Machine : Vertical M/C, 22 kW

Applicable feed rate (for $ae > 10\%$ of tool diameter)



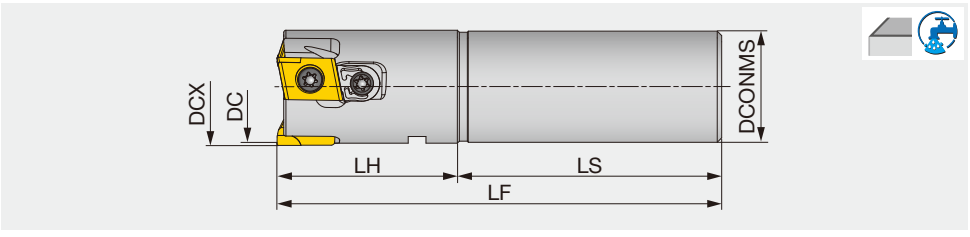
Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
Insert : LQMU110708PXER-MJ
Grade : AH3125
Workpiece material : S55C (200HB)
Cutting Speed : $V_c = 200$ m/min
Cutting width : $ae = 42.5$ mm
Coolant : Dry
Machine : Vertical M/C, 22 kW



TUNGSMILL

EPYP12

High speed PCD endmill for non ferrous metal



| Designation | DC | DCX | CICT | DCONMS | LF | LH | LS | WT(kg) | Air hole | Insert |
|--------------------|----|------|------|--------|-----|----|----|--------|----------|----------------|
| EPYP12M025C25.0R03 | 25 | 26.4 | 3 | 25 | 100 | 50 | 50 | 0.4 | With | YPEB12X3-*P... |
| EPYP12M032C25.0R05 | 32 | 33.4 | 5 | 25 | 100 | 45 | 55 | 0.5 | With | YPEB12X3-*P... |



DCX: Outside diameter
DC: Diameter with 01 type insert

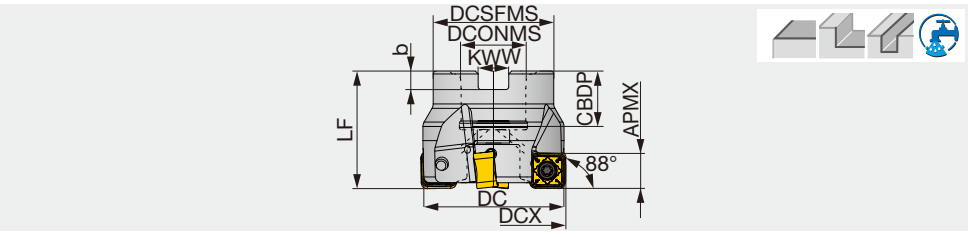
Reference pages: Inserts, Standard cutting conditions → **H095**



DOQMILL

THSN12

88° face mills with double sided square inserts



GAMP = +3°, GAMF = -11°

Approach angle

- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

| Designation | APMX | DC | DCX | CICT | DCSFMS | LF | DCONMS | CBDBP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-----|-------|------|--------|----|--------|-------|------|-----|--------|----------|-------------|
| THSN12M050B22.0R04 | 9.5 | 50 | 50.6 | 4 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.32 | with | SNMU1206... |
| THSN12M050B22.0R05 | 9.5 | 50 | 50.6 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.32 | with | SNMU1206... |
| THSN12M063B22.0R04 | 9.5 | 63 | 63.6 | 4 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.54 | with | SNMU1206... |
| THSN12M063B22.0R06 | 9.5 | 63 | 63.6 | 6 | 47 | 40 | 22 | 20 | 10.4 | 6.3 | 0.52 | with | SNMU1206... |
| THSN12J080B25.4R05 | 9.5 | 80 | 80.6 | 5 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.13 | with | SNMU1206... |
| THSN12J080B25.4R08 | 9.5 | 80 | 80.6 | 8 | 58 | 50 | 25.4 | 26 | 9.5 | 6 | 1.15 | with | SNMU1206... |
| THSN12M080B27.0R05 | 9.5 | 80 | 80.6 | 5 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.17 | with | SNMU1206... |
| THSN12M080B27.0R08 | 9.5 | 80 | 80.6 | 8 | 58 | 50 | 27 | 22 | 12.4 | 7 | 1.14 | with | SNMU1206... |
| THSN12J100B31.7R06 | 9.5 | 100 | 100.6 | 6 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.43 | with | SNMU1206... |
| THSN12J100B31.7R08 | 9.5 | 100 | 100.6 | 8 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.39 | with | SNMU1206... |
| THSN12M100B32.0R06 | 9.5 | 100 | 100.6 | 6 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | with | SNMU1206... |
| THSN12M100B32.0R08 | 9.5 | 100 | 100.6 | 8 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.38 | with | SNMU1206... |

SPARE PARTS

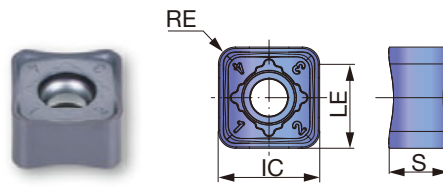
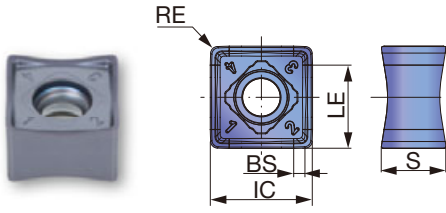
| Designation | Clamping screw 1 | Clamping screw 2 | Torx bit (Optional) | Grip (Optional) | Center bolt | Wrench 1 | Wrench 2 | Wedge fixing screw | Wedge |
|--------------------|------------------|------------------|---------------------|-----------------|-------------|----------|----------|--------------------|-----------|
| EPYP12M025C25.0R03 | - | VX040024A | - | - | - | T-15F | T-8F | VX040028A | RSFTC1011 |
| EPYP12M032C25.0R05 | - | VX040024A | - | - | - | T-15F | T-8F | RSRGR7M40 | RSFTC1009 |
| THSN12M050... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | CM10x30H | - | - | - | - |
| THSN12M063... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | CM12X30H | - | - | - | - |
| THSN12J080... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | TMBA-M16H | - | - | - | - |
| THSN12M080... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | - | - | - | - | - |
| THSN12J100... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | - | - | - | - | - |
| THSN12M100... | CSPB-4 | - | (BLD IP15/S7) | (H-TB2W) | - | - | - | - | - |

Recommended clamping torque (Torx size): VX040024A = 4.5 N·m
CSPB-4 = 3.5 N·m (15IP)

INSERTS

SNMU120608HNEN-MM

SNMU120612/20EN-MM



| Designation | RE | APMX | Coated | | | | | LE | S | IC | BS |
|-------------------|-----|------|--------|--------|--------|-------|-------|------|------|----|-----|
| | | | AH120 | AH3225 | AH3135 | T1215 | T3225 | | | | |
| SNMU120608HNEN-MM | 0.8 | 9.5 | ● | ● | ● | ● | ● | 9.8 | 7.5 | 12 | 1.4 |
| SNMU120612EN-MM | 1.2 | 9.5 | | | | | | 10.8 | 7.25 | 12 | - |
| SNMU120620EN-MM | 2 | 9.5 | | | | | | 10 | 7 | 12 | - |

★ : First choice
☆ : Second choice

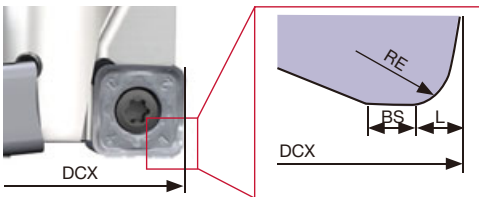
● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Priority | Grades | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|-------------|-------------------------|--------|--------------|--------------------------|--------------------------|
| P | Low carbon steels S15C, etc. C15E4, etc., C15E, etc. | - 200HB | First choice | AH3225 | MM | 100 - 250 | 0.06 - 0.3 |
| | | | For wear resistance | T3225 | MM | 200 - 350 | 0.06 - 0.25 |
| | High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300HB | First choice | AH3225 | MM | 100 - 250 | 0.06 - 0.3 |
| | | | For wear resistance | T3225 | MM | 180 - 300 | 0.06 - 0.25 |
| M | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3225 | MM | 100 - 200 | 0.06 - 0.25 |
| | | | For wear resistance | T3225 | MM | 150 - 250 | 0.06 - 0.2 |
| | Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | AH3135 | MM | 100 - 200 | 0.06 - 0.25 |
| | | | For wear resistance | T3225 | MM | 100 - 250 | 0.06 - 0.2 |
| K | Cast stainless steel SCH20XNb, 1.4849, etc. | - | First choice | T3225 | MM | 60 - 120 | 0.06 - 0.2 |
| | | | For fracture resistance | AH3135 | MM | 60 - 120 | 0.06 - 0.2 |
| K | Grey cast iron FC250, etc. 250, etc., GGG25, etc. | 150 - 250HB | First choice | T1215 | MM | 100 - 350 | 0.06 - 0.3 |
| | | | For fracture resistance | AH120 | MM | 100 - 250 | 0.06 - 0.3 |
| | Ductile cast iron FCD600, etc. 600-3, etc., GGG60, etc. | 150 - 250HB | First choice | T1215 | MM | 100 - 350 | 0.06 - 0.25 |
| | | | For fracture resistance | AH120 | MM | 80 - 200 | 0.06 - 0.3 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40HRC | First choice | AH3135 | MM | 30 - 60 | 0.06 - 0.2 |
| | Heat-resistant alloys Inconel718, etc. | - 40HRC | First choice | AH120 | MM | 10 - 40 | 0.04 - 0.16 |
| H | Hardened steel SKD61, etc., X40CrMoV5-1, etc. | 40 - 50HRC | First choice | AH3225 | MM | 80 - 130 | 0.04 - 0.16 |
| | Hardened steel SKD11, etc., X153CrMoV12, etc. | 50 - 60HRC | First choice | AH120 | MM | 50 - 70 | 0.02 - 0.08 |

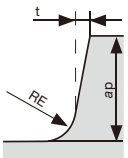
Tool offset

To eliminate uncut amount in face milling operation, adjust the programming according to the offset (L) listed below.



| Designation | RE | BS | L |
|-------------------|-----|-----|-----|
| SNMU120608HNEN-MM | 0.8 | 1.4 | 1.3 |
| SNMU120612EN-MM | 1.2 | - | 1.7 |
| SNMU120620EN-MM | 2 | - | 2.5 |

The following table shows the amount overcut (t) when the cutter is used as a shoulder milling cutter.



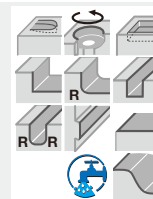
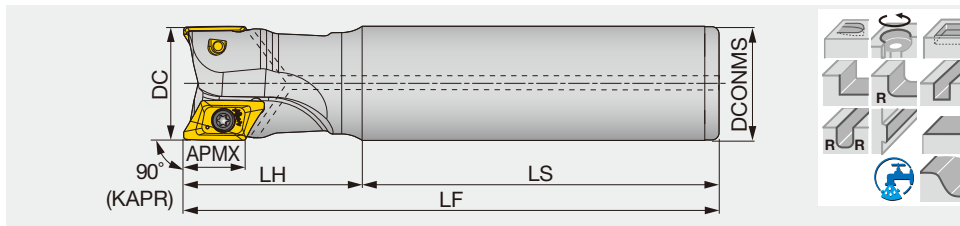
| Designation / ap (mm) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 9.5 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|
| SNMU120608HNEN-MM | 0.01 | 0.04 | 0.05 | 0.05 | 0.07 | 0.09 | 0.14 | 0.2 | 0.27 | 0.27 |
| SNMU120612EN-MM | - | 0 | 0 | 0.01 | 0.02 | 0.05 | 0.09 | 0.15 | 0.22 | 0.25 |
| SNMU120620EN-MM | - | 0 | 0 | 0 | 0.02 | 0.05 | 0.09 | 0.15 | 0.22 | 0.25 |

TUNG-ALUMILL

EPV16

90° shoulder endmill for aluminium machining, shank type, with screw clamp system

GAMP = +6° ~ +10°, GAMF = -12° ~ -9°

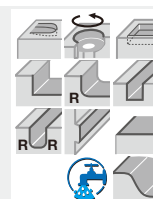
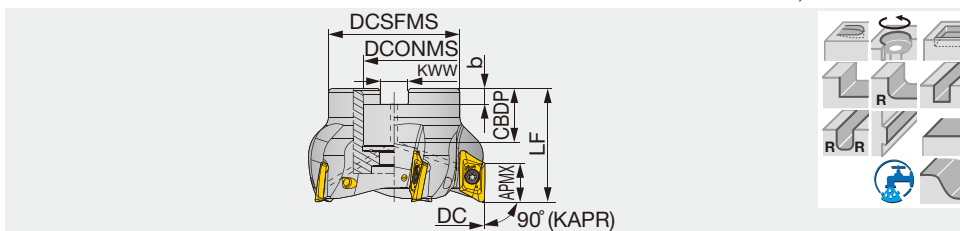


| Designation | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Max. RPM (min ⁻¹) | Insert |
|--------------------|----|------|--------|-----|----|-----|--------|----------|-------------------------------|-------------|
| EPV16R025M25.0-02 | 25 | 2 | 25 | 70 | 55 | 125 | 0.37 | With | 38,000 | XVCT1605... |
| EPV16R025M25.0-02L | 25 | 2 | 25 | 100 | 70 | 170 | 0.53 | With | 38,000 | XVCT1605... |
| EPV16R032M32.0-02 | 32 | 2 | 32 | 100 | 50 | 150 | 0.77 | With | 34,000 | XVCT1605... |
| EPV16R032M32.0-02L | 32 | 2 | 32 | 120 | 80 | 200 | 1.03 | With | 34,000 | XVCT1605... |
| EPV16R032M32.0-03 | 32 | 3 | 32 | 100 | 50 | 150 | 0.76 | With | 34,000 | XVCT1605... |
| EPV16R032M32.0-03L | 32 | 3 | 32 | 120 | 80 | 200 | 1.03 | With | 34,000 | XVCT1605... |
| EPV16R040M32.0-03 | 40 | 3 | 32 | 115 | 55 | 170 | 0.94 | With | 30,000 | XVCT1605... |
| EPV16R040M32.0-03L | 40 | 3 | 32 | 195 | 55 | 250 | 1.43 | With | 30,000 | XVCT1605... |

TPV16

90° shoulder mill for aluminium machining, with screw clamp system

GAMP = +10° ~ +11°, GAMF = -9° ~ -5.5°



| Designation | DC | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Air hole | Max. RPM (min ⁻¹) | Insert |
|-------------------|-----|------|--------|--------|------|----|-----|------|--------|----------|-------------------------------|-------------|
| TPV16R040M16.0E03 | 40 | 3 | 38 | 16 | 20 | 50 | 5.6 | 8.4 | 0.23 | With | 30,000 | XVCT1605... |
| TPV16R050M22.0E04 | 50 | 4 | 45 | 22 | 22 | 50 | 6.3 | 10.4 | 0.33 | With | 27,000 | XVCT1605... |
| TPV16R063M22.0E05 | 63 | 5 | 47 | 22 | 22 | 50 | 6.3 | 10.4 | 0.54 | With | 24,000 | XVCT1605... |
| TPV16R080M27.0E05 | 80 | 5 | 58 | 27 | 28 | 50 | 7 | 12.4 | 0.86 | With | 21,000 | XVCT1605... |
| TPV16R100M32.0E06 | 100 | 6 | 66 | 32 | 26 | 63 | 8 | 14.4 | 1.55 | With | 19,000 | XVCT1605... |
| TPV16R125M40.0E07 | 125 | 7 | 85 | 40 | 32 | 63 | 9 | 16.4 | 2.53 | With | 17,000 | XVCT1605... |

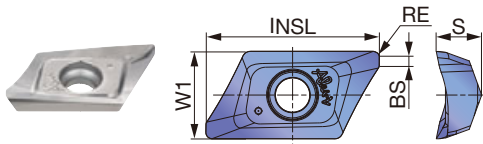
SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Shell locking bolt | Torx bit (Optional) |
|------------------------|----------------|-----------------|--------------------|---------------------|
| EPV16R025M... | TS40085I/HG | (H-TBS) | - | (BT15S) |
| EPV16R032M..., 040M... | TS40093I/HG | (H-TBS) | - | (BT15S) |
| TPV16R040M16.0E03 | TS40093I/HG | (H-TBS) | SHM8X1.25X35-C | (BT15S) |
| TPV16R050 - 063... | TS40093I/HG | (H-TBS) | SHM10X1.5X30-C | (BT15S) |
| TPV16R080M27.0E05 | TS40093I/HG | (H-TBS) | LHM12X1.75X30-C | (BT15S) |
| TPV16R100M32.0E06 | TS40093I/HG | (H-TBS) | SHM16X2X35-C | (BT15S) |
| TPV16R125M40.0E07 | TS40093I/HG | (H-TBS) | SHM20X2.5X40-C | (BT15S) |

Recommended clamping torque (Torx size): 4.5 N·m (T15)

INSERT

XVCT16-AJ



| | | | |
|---|----------------|---|--|
| P | Steel | | |
| M | Stainless | | |
| K | Cast iron | | |
| N | Non-ferrous | ★ | |
| S | Superalloys | | |
| H | Hard materials | | |

★ : First choice

| Designation | RE | APMX | Uncoated | | | | | | | | | | INSL | W1 | S | BS | |
|----------------|-----|------|----------|--|--|--|--|--|--|--|--|--|------|------|------|------|-----|
| | | | TH10 | | | | | | | | | | | | | | |
| XVCT160504R-AJ | 0.4 | 16 | ● | | | | | | | | | | | 22.2 | 11.2 | 5.9 | 1.3 |
| XVCT160508R-AJ | 0.8 | 16 | ● | | | | | | | | | | | 22.2 | 11.2 | 5.9 | 1 |
| XVCT160512R-AJ | 1.2 | 15.5 | ● | | | | | | | | | | | 21.8 | 11.2 | 5.8 | 1 |
| XVCT160516R-AJ | 1.6 | 15 | ● | | | | | | | | | | | 21.2 | 11.2 | 5.75 | 1 |
| XVCT160520R-AJ | 2 | 14.5 | ● | | | | | | | | | | | 20.8 | 11.2 | 5.75 | 1 |
| XVCT160525R-AJ | 2.5 | 14 | ● | | | | | | | | | | | 20.2 | 11.2 | 5.68 | 1 |
| XVCT160530R-AJ | 3 | 14 | ● | | | | | | | | | | | 19.6 | 11.2 | 5.6 | 1 |
| XVCT160532R-AJ | 3.2 | 14 | ● | | | | | | | | | | | 19.2 | 11.2 | 5.6 | 1 |
| XVCT160540R-AJ | 4 | 13 | ● | | | | | | | | | | | 18.5 | 11.2 | 5.5 | 1.2 |
| XVCT160550R-AJ | 5 | 13 | ● | | | | | | | | | | | 18.3 | 11.2 | 5.4 | 0.4 |

When using inserts with corner radius RE ≥ 3.2 mm, standard cutter body has to be modified with "R". "R" = RE - 0.3 mm

● : Line up

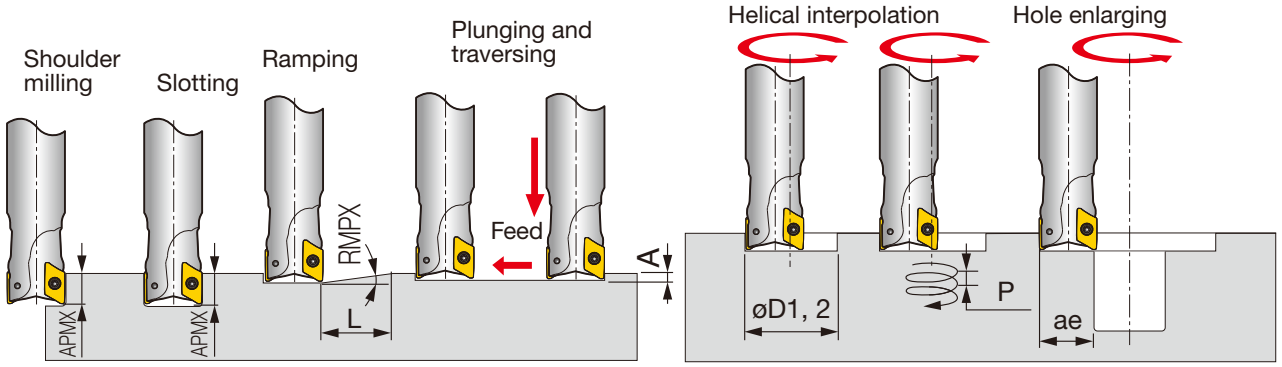
STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness HB | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|----------------------------------|-------------|-------|--------------|--------------------------|--------------------------|
| N | Aluminium alloy | 60 | TH10 | AJ | 300 - 5000 | 0.15 - 0.35 |
| | | 100 | TH10 | AJ | 200 - 2000 | 0.1 - 0.25 |
| | Cast aluminium alloy Si ≤ 12% | 75 | TH10 | AJ | 200 - 2000 | 0.15 - 0.3 |
| | | 90 | TH10 | AJ | 200 - 1500 | 0.1 - 0.25 |
| | Cast aluminium alloy Si > 12% | 130 | TH10 | AJ | 200 - 1000 | 0.07 - 0.15 |
| | Copper alloys Pb > 1% | 110 | TH10 | AJ | 200 - 800 | 0.07 - 0.15 |
| | Copper alloys | 90 | TH10 | AJ | 300 - 1000 | 0.1 - 0.15 |
| | | 100 | TH10 | AJ | 300 - 800 | 0.1 - 0.15 |
| | Duroplastics, fiber plastics | - | TH10 | AJ | 100 - 500 | 0.1 - 0.15 |
| | Hard rubber | - | TH10 | AJ | 100 - 300 | 0.1 - 0.15 |

Safety guidelines

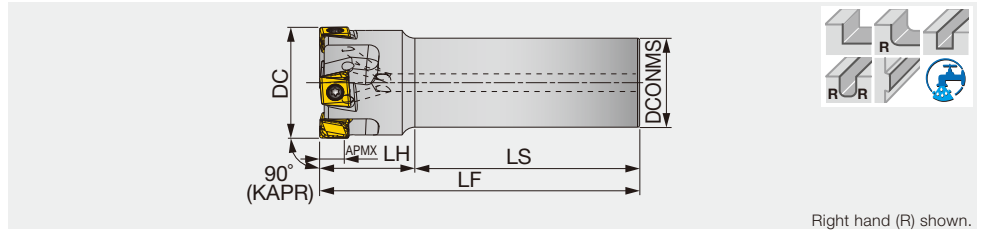
1. Use only the original inserts, cutters and spare parts.
2. Insert pocket must be cleaned before clamping the insert.
3. Clamp torque of screw should be 4.5 N-m.
4. For safety reasons, use a new screw when changing the insert.
5. Maximum RPM values are determined based on the burst test. Using RPM beyond maximum values may cause insert breakage, machine damage or personal injury.
6. XVCT insert has sharp cutting edges. Always wear gloves for protection from injury when handling.

APPLICATION RANGE



| Designation | Tool DC | Corner radius RE | Max. depth of cut APMX | Max. ramping angle RMPX | Min. length L | Max. plunging depth A | Straight ramp down | | Helical ramp down | | Hole enlarging Max. width |
|----------------|---------|------------------|------------------------|-------------------------|---------------|-----------------------|--------------------------|------------------|--------------------------|------------------|---------------------------|
| | | | | | | | Max. machining $\phi D1$ | Min. pitch/rev P | Min. machining $\phi D2$ | Max. pitch/rev P | |
| EPV16R025... | 25 | 0.4, 0.8 | 16 | 22 | 40 | 4.2 | 29.1 | 4.4 | 49 | 13.6 | 22.5 |
| EPV16R025... | 25 | 1.2 | 15.5 | 22 | 40 | 4.2 | 29.1 | 4.4 | 49 | 13.6 | 22.5 |
| EPV16R025... | 25 | 1.6 | 15 | 22 | 38 | 3.7 | 29.1 | 4.4 | 49 | 13.2 | 22.5 |
| EPV16R025... | 25 | 2 | 14.5 | 22 | 38 | 3.7 | 29.1 | 4.4 | 49 | 13.2 | 22.5 |
| EPV16R025... | 25 | 3, 3.2 | 14 | 21 | 38 | 2.5 | 29.1 | 4.2 | 49 | 12.3 | 22.5 |
| EPV16R025... | 25 | 4, 5 | 13 | 18.5 | 40 | 2.3 | 29.1 | 3.7 | 49 | 12.3 | 22.5 |
| EPV16R032... | 32 | 0.4, 0.8 | 16 | 16.5 | 54 | 4 | 43.1 | 8.8 | 63 | 13.6 | 28.8 |
| EPV16R032... | 32 | 1.2 | 15.5 | 16.5 | 54 | 4 | 43.1 | 8.8 | 63 | 13.6 | 28.8 |
| EPV16R032... | 32 | 1.6 | 15 | 16 | 54 | 3.5 | 43.1 | 8.5 | 63 | 13.2 | 28.8 |
| EPV16R032... | 32 | 2 | 14.5 | 16 | 54 | 3.5 | 43.1 | 8.5 | 63 | 13.2 | 28.8 |
| EPV16R032... | 32 | 3, 3.2 | 14 | 15 | 54 | 3 | 43.1 | 7.9 | 63 | 12.3 | 28.8 |
| EPV16R032... | 32 | 4, 5 | 13 | 13.5 | 56 | 2.5 | 43.1 | 7.1 | 63 | 12.3 | 28.8 |
| T/EPV16R040... | 40 | 0.4, 0.8 | 16 | 11.5 | 79 | 4 | 59.1 | 10.4 | 79 | 13.6 | 36 |
| T/EPV16R040... | 40 | 1.2 | 15.5 | 11.5 | 79 | 4 | 59.1 | 10.4 | 79 | 13.6 | 36 |
| T/EPV16R040... | 40 | 1.6 | 15 | 11 | 80 | 3.5 | 59.1 | 9.9 | 79 | 13.2 | 36 |
| T/EPV16R040... | 40 | 2 | 14.5 | 11 | 80 | 3.5 | 59.1 | 9.9 | 79 | 13.2 | 36 |
| T/EPV16R040... | 40 | 3, 3.2 | 14 | 10 | 82 | 3 | 59.1 | 9 | 79 | 12.3 | 36 |
| T/EPV16R040... | 40 | 4, 5 | 13 | 8.5 | 90 | 2.5 | 59.1 | 7.6 | 79 | 12.3 | 36 |
| TPV16R050... | 50 | 0.4, 0.8 | 16 | 9.5 | 96 | 4 | 79.1 | 13 | 99 | 13.6 | 45 |
| TPV16R050... | 50 | 1.2 | 15.5 | 9.5 | 96 | 4 | 79.1 | 13 | 99 | 13.6 | 45 |
| TPV16R050... | 50 | 1.6 | 15 | 9 | 98 | 3.5 | 79.1 | 12.3 | 99 | 13.2 | 45 |
| TPV16R050... | 50 | 2 | 14.5 | 9 | 98 | 3.5 | 79.1 | 12.3 | 99 | 13.2 | 45 |
| TPV16R050... | 50 | 3.0, 3.2 | 14 | 8 | 103 | 3 | 79.1 | 10.9 | 99 | 12.3 | 45 |
| TPV16R050... | 50 | 4, 5 | 13 | 7 | 110 | 2.5 | 79.1 | 9.5 | 99 | 12.3 | 45 |
| TPV16R063... | 63 | 0.4, 0.8 | 16 | 7 | 130 | 4 | 105.1 | 13.6 | 125 | 13.6 | 56.7 |
| TPV16R063... | 63 | 1.2 | 15.5 | 7 | 130 | 4 | 105.1 | 13.6 | 125 | 13.6 | 56.7 |
| TPV16R063... | 63 | 1.6 | 15 | 6.5 | 136 | 3.5 | 105.1 | 12.8 | 125 | 13.2 | 56.7 |
| TPV16R063... | 63 | 2 | 14.5 | 6.5 | 136 | 3.5 | 105.1 | 12.8 | 125 | 13.2 | 56.7 |
| TPV16R063... | 63 | 3.0, 3.2 | 14 | 6 | 136 | 3 | 105.1 | 11.8 | 125 | 12.3 | 56.7 |
| TPV16R063... | 63 | 4, 5 | 13 | 5.5 | 140 | 2.5 | 105.1 | 10.8 | 125 | 12.3 | 56.7 |
| TPV16R080... | 80 | 0.4, 0.8 | 16 | 5 | 183 | 4 | 139.1 | 13.6 | 159 | 13.6 | 72 |
| TPV16R080... | 80 | 1.2 | 15.5 | 5 | 183 | 4 | 139.1 | 13.6 | 159 | 13.6 | 72 |
| TPV16R080... | 80 | 1.6 | 15 | 4.5 | 197 | 3.5 | 139.1 | 12.4 | 159 | 13.2 | 72 |
| TPV16R080... | 80 | 2 | 14.5 | 4.5 | 197 | 3.5 | 139.1 | 12.4 | 159 | 13.2 | 72 |
| TPV16R080... | 80 | 3, 3.2 | 14 | 4 | 207 | 3 | 139.1 | 11 | 159 | 12.3 | 72 |
| TPV16R080... | 80 | 4, 5 | 13 | 3.5 | 221 | 2.5 | 139.1 | 9.6 | 159 | 12.3 | 72 |
| TPV16R100... | 100 | 0.4, 0.8 | 16 | 3.5 | 262 | 4 | 179.1 | 12.9 | 199 | 13.6 | 90 |
| TPV16R100... | 100 | 1.2 | 15.5 | 3.5 | 262 | 4 | 179.1 | 12.9 | 199 | 13.6 | 90 |
| TPV16R100... | 100 | 1.6 | 15 | 3 | 296 | 3.5 | 179.1 | 11.1 | 199 | 13.2 | 90 |
| TPV16R100... | 100 | 2 | 14.5 | 3 | 296 | 3.5 | 179.1 | 11.1 | 199 | 13.2 | 90 |
| TPV16R100... | 100 | 3, 3.2 | 14 | 2.5 | 332 | 3 | 179.1 | 9.2 | 199 | 12.3 | 90 |
| TPV16R100... | 100 | 4, 5 | 13 | 2.5 | 309 | 2.5 | 179.1 | 9.2 | 199 | 11.6 | 90 |
| TPV16R125... | 125 | 0.4, 0.8 | 16 | 2.5 | 367 | 4 | 229.1 | 12.1 | 249 | 13.6 | 112.5 |
| TPV16R125... | 125 | 1.2 | 15.5 | 2.5 | 367 | 4 | 229.1 | 12.1 | 249 | 13.6 | 112.5 |
| TPV16R125... | 125 | 1.6 | 15 | 2 | 444 | 3.5 | 229.1 | 9.7 | 249 | 13.2 | 112.5 |
| TPV16R125... | 125 | 2 | 14.5 | 2 | 444 | 3.5 | 229.1 | 9.7 | 249 | 13.2 | 112.5 |
| TPV16R125... | 125 | 3, 3.2 | 14 | 1.5 | 554 | 3 | 229.1 | 7.3 | 249 | 8.7 | 112.5 |
| TPV16R125... | 125 | 4, 5 | 13 | 1.5 | 516 | 2.5 | 229.1 | 7.3 | 249 | 8.7 | 112.5 |

Square shoulder endmill, shank type, with screw clamp system

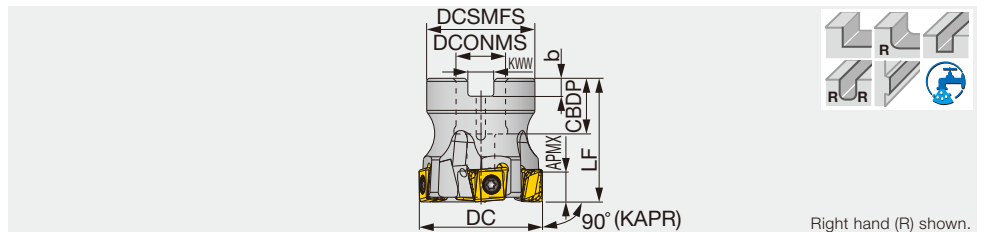


Right hand (R) shown.

| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|--------|----|----|-----|--------|----------|-------------|
| EPM11R032M32.0-03 | 9.7 | 32 | 3 | 32 | 80 | 35 | 115 | 0.6 | With | LMMU1107... |
| EPM11R040M32.0-04 | 9.7 | 40 | 4 | 32 | 80 | 35 | 115 | 0.7 | With | LMMU1107... |
| EPM11R050M32.0-04 | 9.7 | 50 | 4 | 32 | 80 | 40 | 120 | 0.9 | With | LMMU1107... |
| EPM11R063M32.0-06 | 9.7 | 63 | 6 | 32 | 80 | 40 | 120 | 1.2 | With | LMMU1107... |
| EPM11R080M32.0-07 | 9.7 | 80 | 7 | 32 | 80 | 40 | 120 | 1.6 | With | LMMU1107... |

TPM11,16

Square shoulder mill, with screw clamp system



Right hand (R) shown.

| Designation | APMX | DC | CICT | DCSMFS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|-----|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TPM11R050M22.0-05 | 9.7 | 50 | 5 | 41 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | LMMU1107... |
| TPM11R050M22.0E05 | 9.7 | 50 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | LMMU1107... |
| TPM11R063M22.0-06 | 9.7 | 63 | 6 | 41 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | LMMU1107... |
| TPM11R063M22.0E06 | 9.7 | 63 | 6 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | With | LMMU1107... |
| TPM11R080M25.4-07 | 9.7 | 80 | 7 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.9 | With | LMMU1107... |
| TPM11R080M25.4-09 | 9.7 | 80 | 9 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 1 | With | LMMU1107... |
| TPM11R080M27.0E07 | 9.7 | 80 | 7 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | LMMU1107... |
| TPM11R080M27.0E09 | 9.7 | 80 | 9 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | LMMU1107... |
| TPM16R080M25.4-05 | 15.1 | 80 | 5 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 1 | With | LMMU1609... |
| TPM16R080M27.0E05 | 15.1 | 80 | 5 | 50 | 50 | 27 | 22 | 12.4 | 7 | 1 | With | LMMU1609... |
| TPM11R100M31.7-08 | 9.7 | 100 | 8 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.4 | With | LMMU1107... |
| TPM11R100M31.7-11 | 9.7 | 100 | 11 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.5 | With | LMMU1107... |
| TPM11R100M32.0E08 | 9.7 | 100 | 8 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.4 | With | LMMU1107... |
| TPM11R100M32.0E11 | 9.7 | 100 | 11 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.5 | With | LMMU1107... |
| TPM16R100M31.7-06 | 15.1 | 100 | 6 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.6 | With | LMMU1609... |
| TPM16R100M32.0E06 | 15.1 | 100 | 6 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.5 | With | LMMU1609... |
| TPM16R125M38.1-07 | 15.1 | 125 | 7 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 3 | With | LMMU1609... |
| TPM16R125M40.0E07 | 15.1 | 125 | 7 | 71 | 63 | 40 | 32 | 16.4 | 9 | 2.7 | With | LMMU1609... |

SPARE PARTS



| Designation | Clamping screw | Wrench | Shell locking bolt 1 | Shell locking bolt 2 | Torx bit (Optional) |
|--------------------------------------|----------------|--------|----------------------|----------------------|---------------------|
| EPM11... | SM35-114-H0 | T-15DF | - | - | - |
| TPM11R050, 063... | SM35-114-H0 | T-15DF | - | CM10X30H | - |
| TPM11R080M... | SM35-114-H0 | T-15DF | - | CM12X30H | - |
| TPM11R100M... | SM35-114-H0 | T-15DF | TMBA-M16H | - | - |
| TPM16R080M25.4-05, TPM16R080M27.0E05 | CSTB-5L159 | - | - | CM12X30H | (BT20S) |
| TPM16R100M31.7-06, TPM16R100M32.0E06 | CSTB-5L159 | - | TMBA-M16H | - | (BT20S) |
| TPM16R125M38.1-07, TPM16R125M40.0E07 | CSTB-5L159 | - | TMBA-M20H | - | (BT20S) |

Recommended clamping torque (Torx size) : SM35-114-H0 = 3.5 N·m
CSTB-5L159 = 5 N·m (T20)

Reference pages: Inserts → **H165**, Standard cutting conditions → **H166**

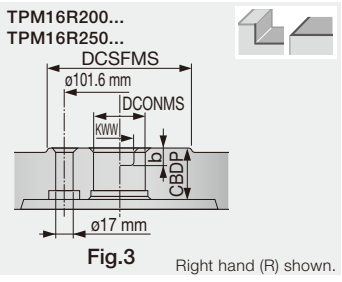
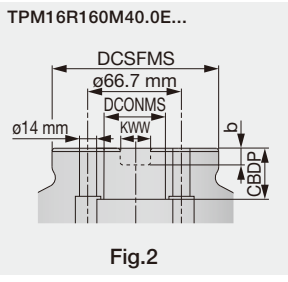
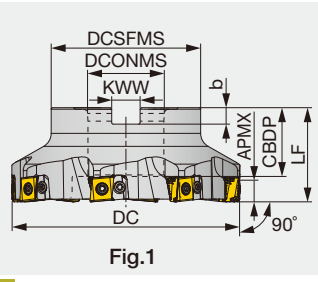




TECMILL

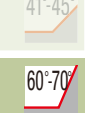
TPM16-SA

Square shoulder mill (shell mill)



GAMP = +4.9° ~ +5°, GAMF = -17.5°

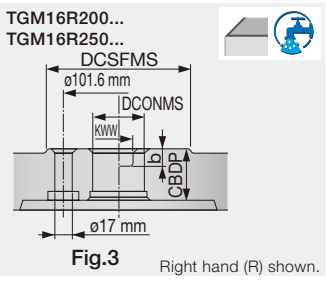
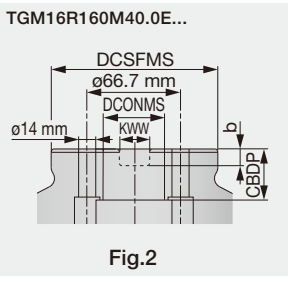
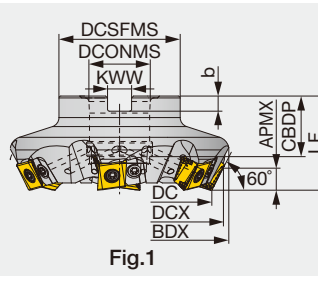
Right hand (R) shown.



| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert | Fig. |
|---------------------|------|-----|------|--------|----|--------|------|------|----|--------|----------|-------------|------|
| TPM16R160M50.8-08SA | 15.1 | 160 | 8 | 100 | 63 | 50.8 | 46 | 19 | 11 | 4.6 | Without | LMMU1609... | 1 |
| TPM16R160M40.0E08SA | 15.1 | 160 | 8 | 100 | 63 | 40 | 29 | 16.4 | 9 | 4.37 | Without | LMMU1609... | 2 |
| TPM16R200M47.6-10SA | 15.1 | 200 | 10 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 6.4 | Without | LMMU1609... | 3 |
| TPM16R200M60.0E10SA | 15.1 | 200 | 10 | 130 | 63 | 60 | 38 | 25.7 | 14 | 5.9 | Without | LMMU1609... | 3 |
| TPM16R250M47.6-12SA | 15.1 | 250 | 12 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 13.2 | Without | LMMU1609... | 3 |
| TPM16R250M60.0E12SA | 15.1 | 250 | 12 | 130 | 63 | 60 | 38 | 25.7 | 14 | 12.7 | Without | LMMU1609... | 3 |

TGM16-SA

60° face mill (shell mill)



GAMP = +11.4° ~ +11.5°, GAMF = -13.5°

Right hand (R) shown.

| Designation | APMX* | DC* | DCX* | BDX | CICT | DCSFMS | LF* | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert | Fig. |
|---------------------|-------|-----|-------|-------|------|--------|-----|--------|------|------|----|--------|----------|-------------|------|
| TGM16R100M31.7-06SA | 12.4 | 100 | 115.3 | 115.5 | 6 | 64 | 50 | 31.75 | 32 | 12.7 | 8 | 1.8 | With | LMMU1609... | 1 |
| TGM16R100M32.0E06SA | 12.4 | 100 | 115.3 | 115.5 | 6 | 66 | 50 | 32 | 28.5 | 14.4 | 8 | 1.8 | With | LMMU1609... | 1 |
| TGM16R125M38.1-07SA | 12.4 | 125 | 140.3 | 140.6 | 7 | 80 | 63 | 38.1 | 38 | 15.9 | 10 | 3.5 | With | LMMU1609... | 1 |
| TGM16R125M40.0E07SA | 12.4 | 125 | 140.3 | 140.6 | 7 | 85 | 63 | 40 | 32 | 16.4 | 9 | 3.4 | With | LMMU1609... | 1 |
| TGM16R160M50.8-08SA | 12.4 | 160 | 175.3 | 174.9 | 8 | 100 | 63 | 50.8 | 46 | 19 | 11 | 5.8 | Without | LMMU1609... | 1 |
| TGM16R160M40.0E08SA | 12.4 | 160 | 175.3 | 174.9 | 8 | 100 | 63 | 40 | 29 | 16.4 | 9 | 5.5 | Without | LMMU1609... | 2 |
| TGM16R200M47.6-10SA | 12.4 | 200 | 215.3 | 217.2 | 10 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 7.7 | Without | LMMU1609... | 3 |
| TGM16R200M60.0E10SA | 12.4 | 200 | 215.3 | 217.2 | 10 | 130 | 63 | 60 | 38 | 25.7 | 14 | 7.2 | Without | LMMU1609... | 3 |
| TGM16R250M47.6-12SA | 12.4 | 250 | 265.3 | 267 | 12 | 130 | 63 | 47.625 | 38 | 25.4 | 14 | 14.8 | Without | LMMU1609... | 3 |
| TGM16R250M60.0E12SA | 12.4 | 250 | 265.3 | 267 | 12 | 130 | 63 | 60 | 38 | 25.7 | 14 | 14.4 | Without | LMMU1609... | 3 |

*The dimensions are true with 1.6 mm-radius inserts

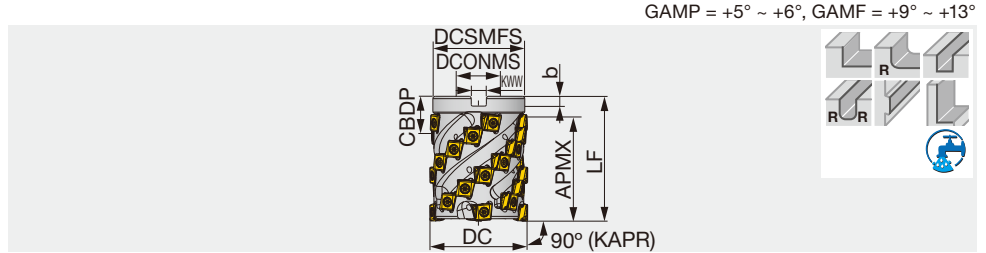
SPARE PARTS



| Designation | Clamping screw | Shim | Shim screw | Grip (Optional) | Torx bit (Optional) | Shell locking bolt |
|--------------------------------|----------------|--------------|------------|-----------------|---------------------|--------------------|
| TPM16... TGM16R160 - 250... | CSTB-5L159 | SA-LMMU1609R | CSTB-5L159 | (H-TB) | (BT20S) | - |
| TGM16R100... | CSTB-5L159 | SA-LMMU1609R | CSTB-5L159 | (H-TB) | (BT20S) | TMBA-M16H |
| TGM16R125... | CSTB-5L159 | SA-LMMU1609R | CSTB-5L159 | (H-TB) | (BT20S) | TMBA-M20H |

Recommended clamping torque (Torx size) : 5 N-m (T20)

Reference pages: Standard cutting conditions → **H166**



| Designation | APMX | DC | ZEFP | CICT | DCSMFS | LF | DCONMS | CBDP | KWW | b | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|------|--------|----|--------|------|------|-----|--------|----------|-------------|
| TLM11R050M22.0E03 | 58.5 | 50 | 3 | 21 | 47 | 70 | 22 | 20 | 10.4 | 6.3 | 0.8 | With | LMMU1107... |
| TLM11R063M25.4-04 | 66.9 | 63 | 4 | 32 | 59 | 80 | 25.4 | 26 | 9.5 | 6 | 1.4 | With | LMMU1107... |
| TLM11R063M27.0E04 | 66.9 | 63 | 4 | 32 | 59 | 80 | 27 | 22 | 12.4 | 7 | 1.4 | With | LMMU1107... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

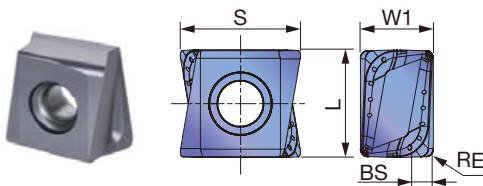
SPARE PARTS

| Designation | Clamping screw | Grip | Shell locking bolt |
|---|----------------|--------|--------------------|
| TLM11R050M22.0E03 | SM35-114-H0 | T-15DF | SD06-A3 |
| TLM11R063M25.4-04, TLM11R063M27.0E04 | SM35-114-H0 | T-15DF | SD08-98 |

Recommended clamping torque : 3.5 N-m

INSERT

LMMU11/16-MJ



| | P | M | K | N | S | H |
|----------------|-----|---|---|---|---|---|
| Steel | ★ ☆ | | | | | ☆ |
| Stainless | ★ | | | ☆ | | |
| Cast iron | | | ★ | | ☆ | |
| Non-ferrous | | | | | | |
| Superalloys | ☆ | ★ | ☆ | | | |
| Hard materials | | ★ | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | S | L | W1 | BS |
|-------------------|-----|------|--------|-------|-------|-------|-------|-------|------|------|-----|-----|
| | | | AH3135 | AH725 | AH120 | AH140 | T1215 | T3225 | | | | |
| LMMU110708PNER-MJ | 0.8 | 9.7 | ● | ● | ● | ● | ● | ● | 11.7 | 10.5 | 7.1 | 2 |
| LMMU110716PNER-MJ | 1.6 | 9.7 | ● | ● | ● | ● | ● | ● | 11.5 | 10.5 | 7.1 | 1.2 |
| LMMU110724PNER-MJ | 2.4 | 9.7 | | ● | ● | ● | | | 11.3 | 10.5 | 7.1 | 0.4 |
| LMMU110732PNER-MJ | 3.2 | 9.7 | | ● | ● | ● | | | 11.1 | 10.5 | 7.1 | - |
| LMMU160908PNER-MJ | 0.8 | 15.1 | ● | ● | ● | ● | ● | ● | 17.3 | 16 | 9.5 | 2.4 |
| LMMU160916PNER-MJ | 1.6 | 15.1 | ● | ● | ● | ● | | | 17.1 | 16 | 9.5 | 1.6 |
| LMMU160924PNER-MJ | 2.4 | 15.1 | | ● | ● | ● | | | 16.9 | 16 | 9.5 | 0.8 |
| LMMU160932PNER-MJ | 3.2 | 15.1 | | ● | ● | ● | | | 16.8 | 16 | 9.5 | - |

● : Line up



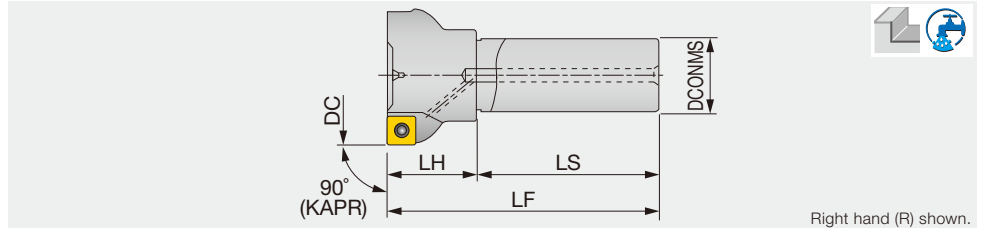
STANDARD CUTTING CONDITIONS

Bore, shank type

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | |
|-----|--|--|---------------------|--------|-----------------------------|---------------------------|-------------|
| | | | | | | TPM16... | TGM16... |
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200HB | First choice | AH3135 | 80 - 250 | 0.08 - 0.3 | 0.1 - 0.4 |
| | | | Wear resistance | T3225 | 100 - 350 | 0.08 - 0.3 | 0.1 - 0.4 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300HB | First choice | AH3135 | 80 - 250 | 0.08 - 0.3 | 0.1 - 0.4 |
| | | | Wear resistance | T3225 | 100 - 350 | 0.08 - 0.3 | 0.1 - 0.4 |
| M | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | First choice | AH3135 | 80 - 250 | 0.05 - 0.25 | 0.08 - 0.3 |
| | | | Wear resistance | T3225 | 100 - 250 | 0.05 - 0.25 | 0.08 - 0.3 |
| K | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200HB | First choice | AH3135 | 80 - 200 | 0.05 - 0.25 | 0.08 - 0.3 |
| | | | Wear resistance | T3225 | 100 - 250 | 0.05 - 0.25 | 0.08 - 0.3 |
| | Grey cast iron FC250, etc. 250, etc. | 150 - 250HB | First choice | T1215 | 100 - 350 | 0.08 - 0.3 | 0.1 - 0.4 |
| | | | Fracture resistance | AH120 | 80 - 250 | 0.08 - 0.3 | 0.1 - 0.4 |
| S | Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc. | 150 - 250HB | First choice | AH120 | 80 - 250 | 0.05 - 0.3 | 0.1 - 0.4 |
| | | | Wear resistance | T1215 | 100 - 350 | 0.08 - 0.3 | 0.1 - 0.4 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 45HRC | First choice | AH3135 | 30 - 60 | 0.05 - 0.2 | 0.08 - 0.25 |
| | | | Wear resistance | AH725 | 30 - 60 | 0.05 - 0.2 | 0.08 - 0.25 |
| H | Superalloys Inconel718, etc. | - 45HRC | First choice | AH725 | 20 - 50 | 0.04 - 0.14 | 0.05 - 0.18 |
| | | | Wear resistance | AH725 | 20 - 50 | 0.04 - 0.14 | 0.05 - 0.18 |
| | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. 40 - 55HRC | First choice | AH3135 | 50 - 130 | 0.03 - 0.17 | 0.05 - 0.2 |
| | | | Wear resistance | AH725 | 50 - 130 | 0.03 - 0.17 | 0.05 - 0.2 |
| H | Hardened steel | SKD11, etc. X153CrMoV12, etc. 55 - 60HRC | First choice | AH725 | 40 - 70 | 0.03 - 0.1 | 0.04 - 0.12 |

Roughing type

| ISO | Workpiece materials | Hardness | Priority | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|---|-----------------|--------|-----------------------------|-----------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200 HB | First choice | AH3135 | 100 - 250 | 0.1 - 0.25 |
| | | | Wear resistance | T3225 | 150 - 350 | 0.1 - 0.2 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3135 | 100 - 200 | 0.1 - 0.2 |
| | | | Wear resistance | T3225 | 150 - 300 | 0.1 - 0.2 |
| M | Prehardend steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3135 | 100 - 200 | 0.1 - 0.2 |
| | | | Wear resistance | T3225 | 120 - 300 | 0.1 - 0.2 |
| K | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH3135 | 90 - 150 | 0.1 - 0.25 |
| | | | Wear resistance | T3225 | 100 - 250 | 0.1 - 0.25 |
| K | Grey cast iron FC250, etc. 250, etc. | 150 - 250 HB | First choice | AH120 | 100 - 250 | 0.1 - 0.25 |
| | | | Wear resistance | T1215 | 120 - 350 | 0.1 - 0.25 |
| | Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc. | 150 - 250 HB | First choice | AH120 | 100 - 200 | 0.1 - 0.25 |
| | | | Wear resistance | T1215 | 120 - 350 | 0.1 - 0.25 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 45HRC | First choice | AH725 | 20 - 50 | 0.06 - 0.15 |
| | | | Wear resistance | AH725 | 20 - 40 | 0.06 - 0.1 |
| H | Superalloys Inconel718, etc. | - 45HRC | First choice | AH725 | 20 - 40 | 0.06 - 0.1 |
| | | | Wear resistance | AH725 | 20 - 40 | 0.06 - 0.1 |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. 40 - 50 HRC | First choice | AH725 | 30 - 60 | 0.08 - 0.15 |
| | | | Wear resistance | AH725 | 30 - 60 | 0.08 - 0.15 |
| H | Hardened steel | SKD11, etc. X153CrMoV12, etc. 50 - 60 HRC | First choice | AH725 | 25 - 55 | 0.06 - 0.1 |



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|-------------------|------|----|------|--------|----|----|-----|--------|----------|-------------|
| EPW13R032M32.0-02 | 10 | 32 | 2 | 32 | 80 | 35 | 115 | 0.6 | With | SW*T1304... |
| EPW13R040M32.0-03 | 10 | 40 | 3 | 32 | 80 | 35 | 115 | 0.7 | With | SW*T1304... |
| EPW13R050M32.0-03 | 10 | 50 | 3 | 32 | 80 | 40 | 120 | 0.9 | With | SW*T1304... |
| EPW13R050M32.0-04 | 10 | 50 | 4 | 32 | 80 | 40 | 120 | 0.9 | With | SW*T1304... |
| EPW13R063M32.0-04 | 10 | 63 | 4 | 32 | 80 | 40 | 120 | 1 | With | SW*T1304... |
| EPW13R063M32.0-05 | 10 | 63 | 5 | 32 | 80 | 40 | 120 | 1 | With | SW*T1304... |
| EPW13R080M32.0-04 | 10 | 80 | 4 | 32 | 80 | 40 | 120 | 1.3 | With | SW*T1304... |
| EPW13R080M32.0-06 | 10 | 80 | 6 | 32 | 80 | 40 | 120 | 0.8 | With | SW*T1304... |

SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Shim screw | Shim | Wrench | Wrench |
|--------------------|----------------|----------------------|------------|----------|--------|--------|
| EPW13R032, 040... | CSPB-3.5 | (M-1000) | - | - | IP-15D | - |
| EPW13R050 - 080... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | FSSP1102 | IP-15D | P-3.5 |

Recommended clamping torque : 3.5 N-m



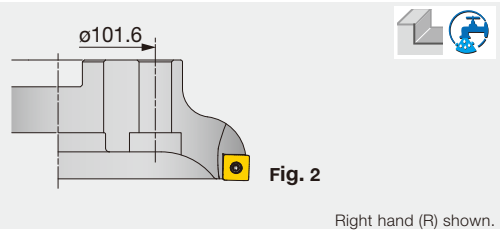
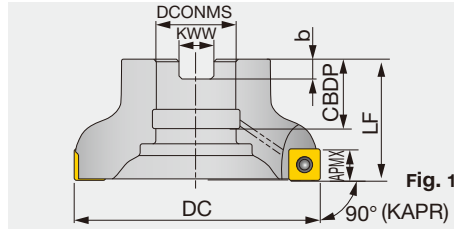


TUNG MILL

TPW13

Square shoulder mill, with screw clamp system

GAMP = +11.5°, GAMF = -13° ~ -10.5°



Right hand (R) shown.

| Designation | APMX | DC | CICT | LF | DCONMS | CBDDP | KWW | b | WT(kg) | Air hole | Insert | Fig. |
|-------------------|------|-----|------|----|--------|-------|------|-----|--------|----------|-------------|------|
| TPW13R050M22.0-03 | 10 | 50 | 3 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | SW*T1304... | 1 |
| TPW13R050M22.0-04 | 10 | 50 | 4 | 40 | 22 | 20 | 10 | 6 | 0.3 | With | SW*T1304... | 1 |
| TPW13R050M22.0E04 | 10 | 50 | 4 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | SW*T1304... | 1 |
| TPW13R050M22.0E05 | 10 | 50 | 5 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | With | SW*T1304... | 1 |
| TPW13R063M22.0-04 | 10 | 63 | 4 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | SW*T1304... | 1 |
| TPW13R063M22.0-05 | 10 | 63 | 5 | 40 | 22 | 20 | 10 | 6 | 0.5 | With | SW*T1304... | 1 |
| TPW13R063M22.0E05 | 10 | 63 | 5 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | SW*T1304... | 1 |
| TPW13R063M22.0E06 | 10 | 63 | 6 | 40 | 22 | 20 | 10.4 | 6.3 | 0.4 | With | SW*T1304... | 1 |
| TPW13R080M25.4-04 | 10 | 80 | 4 | 50 | 25.4 | 26 | 9.5 | 6 | 0.8 | With | SW*T1304... | 1 |
| TPW13R080M25.4-06 | 10 | 80 | 6 | 50 | 25.4 | 26 | 9.5 | 6 | 0.8 | With | SW*T1304... | 1 |
| TPW13R080M27.0E06 | 10 | 80 | 6 | 50 | 27 | 22 | 12.4 | 7 | 0.8 | With | SW*T1304... | 1 |
| TPW13R080M27.0E08 | 10 | 80 | 8 | 50 | 27 | 22 | 12.4 | 7 | 0.8 | With | SW*T1304... | 1 |
| TPW13R100M31.7-05 | 10 | 100 | 5 | 50 | 31.75 | 38 | 12.7 | 8 | 1.2 | With | SW*T1304... | 1 |
| TPW13R100M31.7-07 | 10 | 100 | 7 | 50 | 31.75 | 38 | 12.7 | 8 | 1.2 | With | SW*T1304... | 1 |
| TPW13R100M32.0E07 | 10 | 100 | 7 | 50 | 32 | 28.5 | 14.4 | 8 | 1.2 | With | SW*T1304... | 1 |
| TPW13R100M32.0E10 | 10 | 100 | 10 | 50 | 32 | 28.5 | 14.4 | 8 | 1.2 | With | SW*T1304... | 1 |
| TPW13R125M38.1-06 | 10 | 125 | 6 | 63 | 38.1 | 38 | 15.9 | 10 | 2.4 | With | SW*T1304... | 1 |
| TPW13R125M38.1-08 | 10 | 125 | 8 | 63 | 38.1 | 38 | 15.9 | 10 | 2.4 | With | SW*T1304... | 1 |
| TPW13R125M40.0E08 | 10 | 125 | 8 | 63 | 40 | 32 | 16.4 | 9 | 2.4 | With | SW*T1304... | 1 |
| TPW13R125M40.0E12 | 10 | 125 | 12 | 63 | 40 | 32 | 16.4 | 9 | 2.5 | With | SW*T1304... | 1 |
| TPW13R160M50.8-08 | 10 | 160 | 8 | 63 | 50.8 | 38 | 19 | 11 | 4 | Without | SW*T1304... | 1 |
| TPW13R160M50.8-12 | 10 | 160 | 12 | 63 | 50.8 | 38 | 19 | 11 | 4 | Without | SW*T1304... | 1 |
| TPW13R200M47.6-10 | 10 | 200 | 10 | 63 | 47.625 | 38 | 25.4 | 14 | 7.4 | Without | SW*T1304... | 2 |

SPARE PARTS

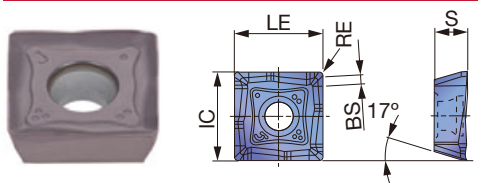


| Designation | Clamping screw | Lubricant (Optional) | Shim screw | Shell locking bolt 1 | Shell locking bolt 2 | Shim | Wrench | Wrench |
|-------------------|----------------|----------------------|------------|----------------------|----------------------|----------|--------|--------|
| TPW13R050, 063... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | CM10X30H | FSSP1102 | IP-15D | P-3.5 |
| TPW13R080M... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | CM12X30H | FSSP1102 | IP-15D | P-3.5 |
| TPW13R100M... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | TMBA-M16H | - | FSSP1102 | IP-15D | P-3.5 |
| TPW13R125M... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | TMBA-M20H | - | FSSP1102 | IP-15D | P-3.5 |
| TPW13R160, 200... | CSPB-3.5 | (M-1000) | DTS5-3.5SS | - | - | FSSP1102 | IP-15D | P-3.5 |

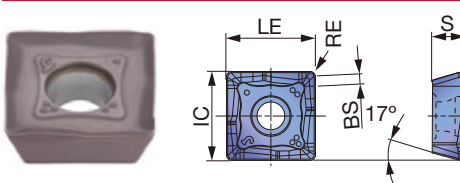
Recommended clamping torque : 3.5 N-m

INSERT

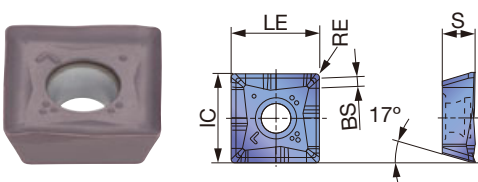
SWG1304-MJ



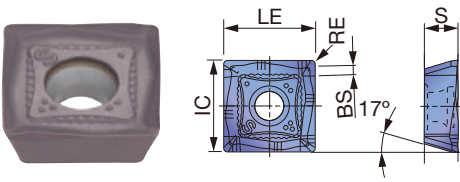
SWMT1304-MJ



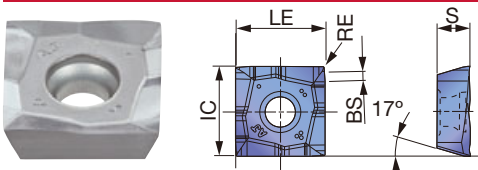
SWMT1304-ML



SWMT1304-MS



SWG1304-AJ



| | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|--|---|---|---|--|--|--|--|--|--|
| P | Steel | ☆ | | | | | | | ☆ | ☆ | | | | | | | |
| M | Stainless | | ★ | ☆ | ★ | | | | | ☆ | | | | | | | |
| K | Cast iron | ★ | | | | ☆ | ★ | | | | | | | | | | |
| N | Non-ferrous | | | | | | | | | | ★ | | | | | | |
| S | Superalloys | ★ | ☆ | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | Cermet | Uncoated | LE | IC | S | BS | | | |
|-----------------|-----|------|--------|-------|-------|--------|-------|-------|-------|--------|----------|----|----|---|----|-------|-------|--|
| | | | AH120 | AH130 | AH140 | AH3135 | T1115 | T1215 | T3130 | T3225 | DS1100 | | | | | NS740 | KS05F | |
| SWG1304PDPR-MJ | 0.8 | 10 | ● | | | | | | | | ● | | | | | | | |
| SWMT1304PDPR-MJ | 0.8 | 10 | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | | | | |
| SWMT1304PDER-ML | 0.8 | 10 | ● | | | ● | | | | | | | | | | | | |
| SWMT1304PDPR-MS | 0.8 | 10 | | ● | ● | | | | | | | | | | | | | |
| SWG1304PDFR-AJ | 0 | 10 | | | | | | | | ● | | ● | | | | | | |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

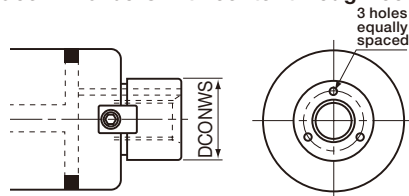


EPW13



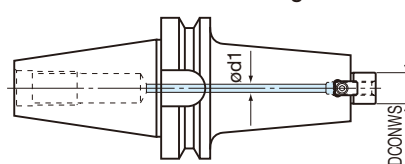
TPW13

Face mill arbors with center through-coolant hole



| | | | | | |
|------------------------------|-------|---------|----------|---------|---------|
| Cutter diameter DC (mm) | 50/63 | 80 | 100 | 125 | 160 |
| Nominal diameter DCONWS (mm) | 22 | 25.4 | 31.75 | 38.1 | 50.8 |
| Arbor type | FMH22 | FMH25.4 | FMH31.75 | FMH38.1 | FMH50.8 |

Notes on arbors: when using TAW13 or TPW13 type, use through center air.



| | | | | | | |
|--------------------------------|---------|---------|---------|---------|---------|---------|
| Nominal diameter DCONWS (mm) | 16 | 22 | 25.4 | 31.75 | 38.1 | 50.8 |
| Applicable arbor types | SMA SM1 | FMC SM1 | FMA FMC | FMA SMB | FMA | FMA |
| Through hole diameter ød1 (mm) | 4 ~ 6 | 5 ~ 8 | 6 ~ 9 | 10 ~ 13 | 10 ~ 15 | 10 ~ 15 |

When using the TAW13 or TPW13 type with through center air (coolant or mist), the correct arbor must be used with through center air supplying.

Cautionary notes in use

- In slotting or pocketing, when chips are likely to remain in the cutting zone, internal air supplying or air blow is recommended to prevent chip recutting.
- Use of inserts other than those specified, can result in poor cutting and cause damage to the cutter body. Therefore, specified inserts from the Tungaloy catalogue must be used.
- Before changing or indexing the inserts, remove chips or other foreign matter from the insert, insert pocket and cutter body by using an air blast or cloth.
- The inserts should be clamped by using the wrench supplied with the TAC Mill.
- After a long period of use, the clamping screws and wrench may become deformed or damaged. These elements must be replaced as soon as possible.

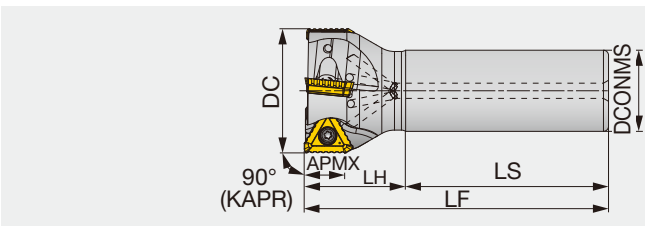


TUNGSHRED

EPTC16

Square shoulder endmill, shank type, with screw clamp system

GAMP = +5.5°~ +6.5°, GAMF = -11.5°~ -11.3°



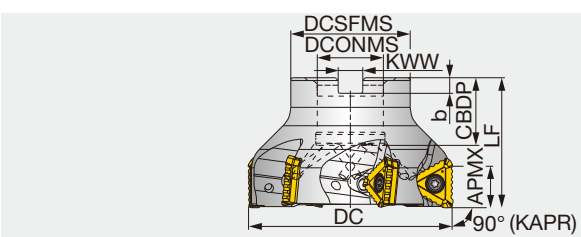
| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|---------------------|------|----|------|--------|-----|----|-----|--------|----------|-----------|
| EPTC16M050C32.0R04 | 16 | 50 | 4 | 32 | 80 | 40 | 120 | 0.8 | With | TC*T16... |
| EPTC16M050C42.0R02L | 16 | 50 | 2 | 42 | 310 | 50 | 360 | 3.8 | With | TC*T16... |



TPTC16

Square shoulder mill, with screw clamp system, for shred inserts

GAMP = +5.5°~ +6.5°, GAMF = -11.5°~ -11.3°



| Designation | APMX | DC | CICT | DCSFMS | LF | DCONMS | CBBDP | KWW | b | WT(kg) | Air hole | Insert |
|--------------------|------|-----|------|--------|----|--------|-------|------|-----|--------|----------|-----------|
| TPTC16M050B22.0R04 | 16 | 50 | 4 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.29 | With | TC*T16... |
| TPTC16M063B22.0R05 | 16 | 63 | 5 | 41 | 40 | 22 | 20 | 10.4 | 6.3 | 0.44 | With | TC*T16... |
| TPTC16J080B25.4R06 | 16 | 80 | 6 | 46 | 50 | 25.4 | 26 | 9.5 | 6 | 0.88 | With | TC*T16... |
| TPTC16M080B27.0R06 | 16 | 80 | 6 | 50 | 50 | 27 | 22 | 12.4 | 7 | 0.9 | With | TC*T16... |
| TPTC16J100B31.7R07 | 16 | 100 | 7 | 60 | 50 | 31.75 | 32 | 12.7 | 8 | 1.38 | With | TC*T16... |
| TPTC16M100B32.0R07 | 16 | 100 | 7 | 60 | 50 | 32 | 28.5 | 14.4 | 8 | 1.35 | With | TC*T16... |

Approach angle



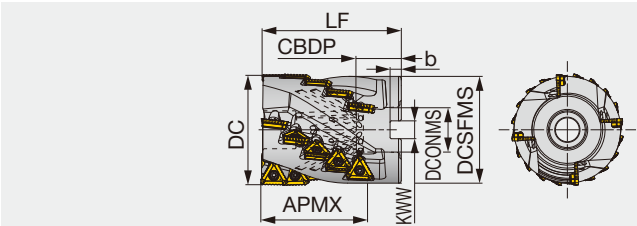
LPTC16

Square shoulder mill for roughing, with screw clamp system, for shred inserts

GAMP = +5.5°~ +6.5°, GAMF = -11.5°~ -11.3°



Others



| Designation | APMX | DC | ZEFP | CICT | DCSFMS | LF | DCONMS | CBBDP | KWW | b | WT(kg) | Air hole | Insert |
|------------------------|------|----|------|------|--------|-----|--------|-------|------|---|--------|----------|-----------|
| LPTC16J063B25.4L061R03 | 61 | 63 | 3 | 12 | 59 | 85 | 25.4 | 26 | 9.5 | 6 | 1.25 | With | TC*T16... |
| LPTC16M063B27.0L061R03 | 61 | 63 | 3 | 12 | 59 | 85 | 27 | 22 | 12.4 | 7 | 1.24 | With | TC*T16... |
| LPTC16J080B31.7L076R04 | 76 | 80 | 4 | 20 | 76 | 100 | 31.75 | 32 | 12.7 | 8 | 2.44 | With | TC*T16... |
| LPTC16M080B32.0L076R04 | 76 | 80 | 4 | 20 | 76 | 100 | 32 | 25 | 14.4 | 8 | 2.46 | With | TC*T16... |

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

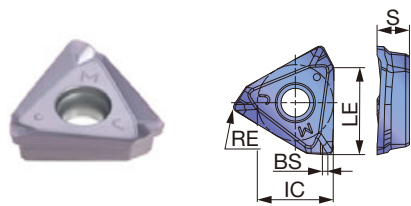
SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Shell locking bolt1 | Shell locking bolt2 | Shell locking bolt3 | Torx bit (Optional) |
|--------------------|----------------|-----------------|----------------------|---------------------|---------------------|---------------------|---------------------|
| EPTC16... | TS 40B100I | (H-TB2W) | (M-1000) | - | - | - | (BT15S) |
| TPTC16M050B22.0R04 | TS 40B100I | (H-TB2W) | (M-1000) | - | - | FSHM10-40H | (BT15S) |
| TPTC16M063B22.0R05 | TS 40B100I | (H-TB2W) | (M-1000) | - | - | CM10X30H | (BT15S) |
| TPTC16*080B... | TS 40B100I | (H-TB2W) | (M-1000) | - | - | CM12X30H | (BT15S) |
| TPTC16*100B... | TS 40B100I | (H-TB2W) | (M-1000) | - | TMBA-M16H | - | (BT15S) |
| LPTC16*063B... | TS 40B100I | (H-TB2W) | (M-1000) | CAP-CM12X1.75X50 | - | - | (BT15S) |
| LPTC16*080B... | TS 40B100I | (H-TB2W) | (M-1000) | CM16X75 | - | - | (BT15S) |

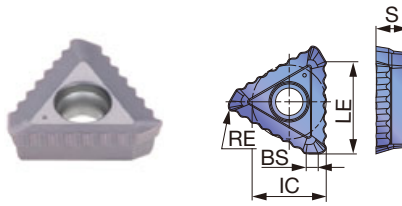
Recommended clamping torque (Torx size): 3.5 N·m (T15)

INSERT

TCGT-MJ



TCMT-NMJ



| | | | | |
|---|----------------|---|---|---|
| P | Steel | ☆ | ★ | ☆ |
| M | Stainless | | ★ | |
| K | Cast iron | ★ | | ☆ |
| N | Non-ferrous | | | |
| S | Superalloys | ★ | ☆ | |
| H | Hard materials | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | LE | IC | S | BS |
|--------------------|-----|------|--------|--------|-------|-------|----|------|-----|----|
| | | | AH120 | AH3135 | T1215 | T3225 | | | | |
| TCGT160608PDER-MJ | 0.8 | 16 | ● | ● | | | 16 | 13.7 | 5.8 | 1 |
| TCMT160620PDER-NMJ | 2 | 16 | ● | ● | ● | ● | 16 | 13.3 | 5.8 | 2 |

● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Priority | Grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|---------------------------------------|--|-----------------|-----------------|--------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, S20S, etc. C15, C20, etc. | - 300 HB | First choice | AH3135 | NMJ* | 100 - 250 | 0.08 - 0.15 |
| | | | Wear resistance | T3225 | NMJ* | 100 - 300 | 0.08 - 0.15 |
| | | | For finishing | AH3135 | MJ | 100 - 250 | 0.08 - 0.20 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | First choice | AH3135 | NMJ* | 100 - 230 | 0.08 - 0.15 |
| | | | Wear resistance | T3225 | NMJ* | 100 - 280 | 0.08 - 0.15 |
| | | | For finishing | AH3135 | MJ | 100 - 230 | 0.08 - 0.20 |
| Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | First choice | AH3135 | NMJ* | 100 - 180 | 0.08 - 0.15 | |
| | | Wear resistance | T3225 | NMJ* | 100 - 200 | 0.08 - 0.15 | |
| | | For finishing | AH3135 | MJ | 100 - 180 | 0.08 - 0.20 | |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 250 HB | First choice | AH3135 | NMJ* | 90 - 200 | 0.08 - 0.15 |
| | | | Wear resistance | T3225 | NMJ* | 90 - 250 | 0.08 - 0.15 |
| | | | For finishing | AH3135 | MJ | 90 - 200 | 0.08 - 0.20 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | First choice | AH120 | NMJ* | 140 - 250 | 0.08 - 0.15 |
| | | | Wear resistance | T1215 | NMJ* | 150 - 300 | 0.08 - 0.15 |
| | | | For finishing | AH120 | MJ | 140 - 250 | 0.08 - 0.25 |
| | Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc. | 150 - 250 HB | First choice | AH120 | NMJ* | 140 - 250 | 0.08 - 0.15 |
| | | | Wear resistance | T1215 | NMJ* | 150 - 300 | 0.08 - 0.15 |
| | | | For finishing | AH120 | MJ | 140 - 250 | 0.08 - 0.25 |
| S | Titanium alloys Ti-6Al-4V, etc. | - | First choice | AH120 | NMJ* | 20 - 60 | 0.08 - 0.15 |
| | | | For finishing | AH120 | MJ | 20 - 60 | 0.08 - 0.18 |
| | Heat-resistant alloys Inconel718, etc. | - | First choice | AH120 | NMJ* | 20 - 40 | 0.08 - 0.13 |
| | | | For finishing | AH120 | MJ | 20 - 40 | 0.08 - 0.15 |

* When using the -NMJ chipbreaker, do not feed higher than 0.15 mm/t.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



High Feed Milling

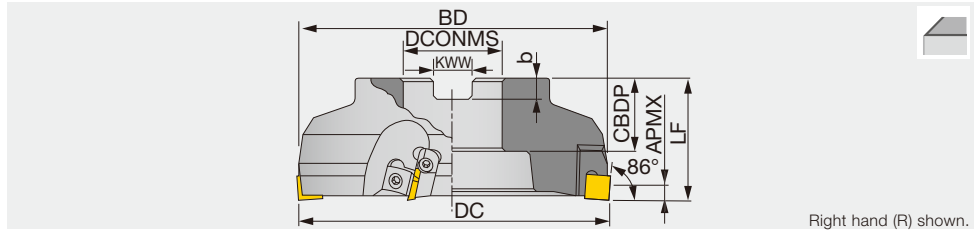
THE4000RIA

86° face mill for aluminium machining, with wedge clamp system, for positive square inserts

GAMP = 13°, GAMF = +7° ~ +9°

Face Milling

Shoulder Milling



Slot Milling

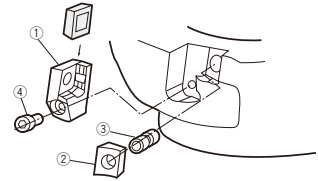
| Designation | APMX | DC | CICT | BD | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|-------------|
| THE4003RIA | 6 | 80 | 4 | 80 | 50 | 25.4 | 26 | 9.5 | 6 | 1.5 | S/WE*N42... |
| THE4004RIA | 6 | 100 | 5 | 99 | 63 | 31.75 | 32 | 12.7 | 8 | 2.1 | S/WE*N42... |
| THE4005RIA | 6 | 125 | 6 | 124 | 63 | 38.1 | 38 | 15.9 | 10 | 3.2 | S/WE*N42... |

Profile Milling

SPARE PARTS

| Designation | ① Locator | ② Wedge | ③ Wedge fixing screw | ④ Locator fixing screw | Wrench |
|-------------|-----------|---------|----------------------|------------------------|--------|
| THE4003RIA | LE413R | WP440R | FDS-8SS | CM4X0.7X14 | TP-4 |
| THE4004RIA | LE413R | WP440R | FDS-8S | CM4X0.7X14 | TP-4 |

Recommended clamping torque : 8 N·m



Chamfering, Counterbore

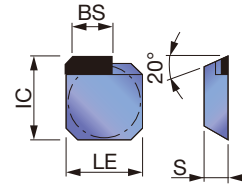
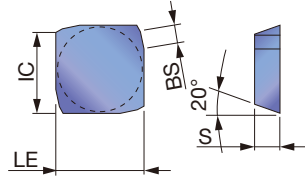
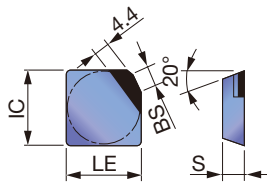
Finish Face Milling

INSERT

SECN42ZFR-DIA

SEEN/SECN 42Z

WECN42ZFR-DIA



Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

90°

Others

| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ● | | | | | |
| Stainless | | ● | | | | |
| Cast iron | | | ● | | | |
| Non-ferrous | | | | ● | | |
| Superalloys | | | | | ● | |
| Hard materials | | | | | | ● |

★ : First choice
☆ : Second choice

| Designation | APMX | Uncoated | | PCD | | LE | IC | S | BS |
|---------------|------|----------|-------|-----|--|------|-------|------|-----|
| | | TH10 | DX140 | | | | | | |
| SECN42ZFR-DIA | 3.5 | | ● | | | 12.7 | 12.7 | 3.18 | 2.5 |
| SECN42ZFR | 6 | ● | | | | 12.7 | 12.7 | 3.18 | 2.5 |
| SEEN42ZFR | 6 | ● | | | | 12.7 | 12.7 | 3.18 | 2.5 |
| WECN42ZFR-DIA | 0.5 | | ● | | | 12.4 | 12.93 | 3.18 | 6 |

T-DIA is a diamond-based ultra high pressure sintered body. Available in 1-corner type.

● : Line up

STANDARD CUTTING CONDITIONS

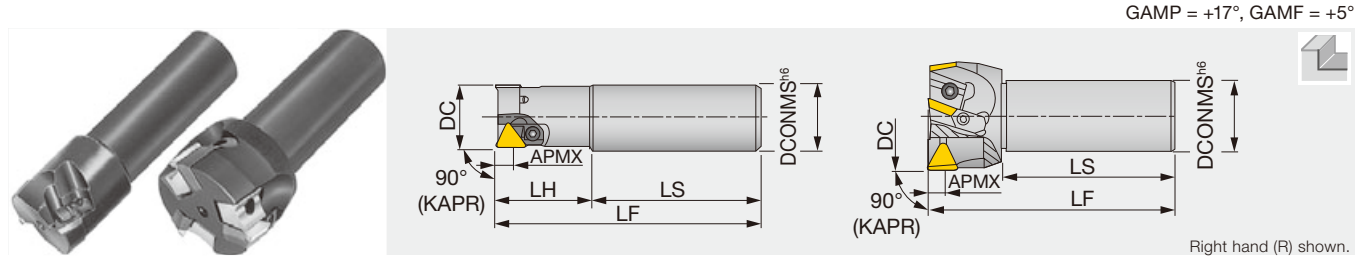
Please scan below.

e-catalog



ESE3000R

Square shoulder endmill, shank type, with wedge clamp system

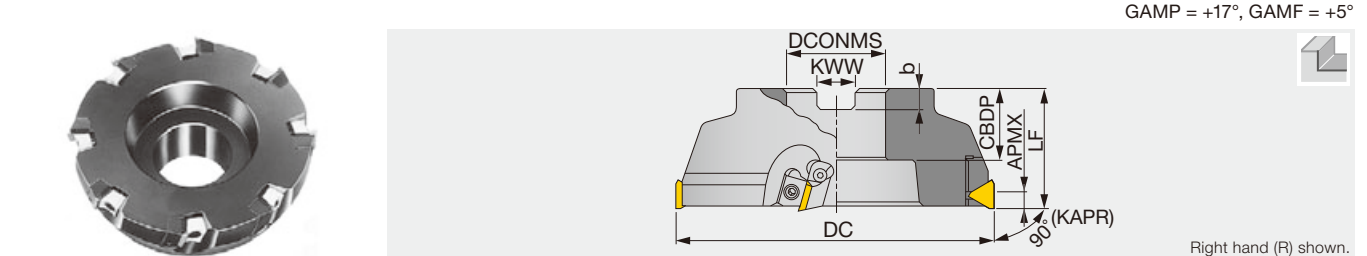


| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | Insert |
|-------------|------|----|------|--------|----|----|-----|--------------------|
| ESE3020R | 8 | 20 | 1 | 20 | 70 | 30 | 100 | TE*N32/TEKR1603... |
| ESE3025R | 8 | 25 | 1 | 25 | 80 | 35 | 115 | TE*N32/TEKR1603... |
| ESE3030R | 8 | 30 | 2 | 32 | 80 | 45 | 125 | TE*N32/TEKR1603... |
| ESE3035R | 8 | 35 | 2 | 32 | 80 | 45 | 125 | TE*N32/TEKR1603... |
| ESE3040R | 8 | 40 | 2 | 32 | 80 | 45 | 125 | TE*N32/TEKR1603... |
| ESE3050R | 8 | 50 | 3 | 32 | 80 | - | 115 | TE*N32/TEKR1603... |
| ESE3063R | 8 | 63 | 4 | 32 | 80 | - | 115 | TE*N32/TEKR1603... |

Note: The items do not have variable pitch.

TSE3000R

Square shoulder mill, with wedge clamp system



| Designation | APMX | DC | CICT | LF | DCONMS | CBDBP | KWW | b | WT(kg) | Insert |
|--------------|------|-----|------|----|--------|-------|------|-----|--------|--------------------|
| TSE3050R | 8 | 50 | 3 | 40 | 22 | 20 | 10 | 6 | 0.3 | TE*N32/TEKR1603... |
| TSE3050R-E | 8 | 50 | 3 | 40 | 22 | 20 | 10.4 | 6.3 | 0.3 | TE*N32/TEKR1603... |
| TSE3063R | 8 | 63 | 3 | 40 | 22 | 20 | 10 | 6 | 0.5 | TE*N32/TEKR1603... |
| TSE3063RE | 8 | 63 | 3 | 40 | 22 | 20 | 10.4 | 6.3 | 0.5 | TE*N32/TEKR1603... |
| TSE3003RIA | 8 | 80 | 4 | 50 | 25.4 | 26 | 9.5 | 6 | 1 | TE*N32/TEKR1603... |
| TSE3003RIAE | 8 | 80 | 4 | 50 | 27 | 26 | 12.4 | 7 | 1 | TE*N32/TEKR1603... |
| TSE3004RIA | 8 | 100 | 6 | 63 | 31.75 | 32 | 12.7 | 8 | 2 | TE*N32/TEKR1603... |
| TSE3004RIA-E | 8 | 100 | 6 | 63 | 32 | 32 | 14.4 | 8 | 2 | TE*N32/TEKR1603... |
| TSE3005RIA | 8 | 125 | 6 | 63 | 38.1 | 38 | 15.9 | 10 | 3.1 | TE*N32/TEKR1603... |
| TSE3006RIA | 8 | 160 | 8 | 63 | 50.8 | 38 | 19 | 11 | 5.2 | TE*N32/TEKR1603... |

TSE3050R/L and TSE3063R/L do not have variable pitch.

SPARE PARTS

| Designation | Clamp set | Locator | Wedge fixing screw | Shell locking bolt | Wedge1 | Wedge 2 | Wrench 1 | Wrench 2 |
|--|-----------|---------|--------------------|--------------------|--------|---------|----------|----------|
| TSE3050R..., 63R... ESE3020R - ESE3050R | CSL-4 | - | - | - | - | - | - | P-3 |
| TSE300*RIA (E/-E) | - | LE303R | FDS-8S | CM4X0.7X12 | WF330R | - | TP-4 | - |
| ESE3063R | - | LE302R | DS-8S | SHCM4-10 | - | WP302R | TP-4 | - |

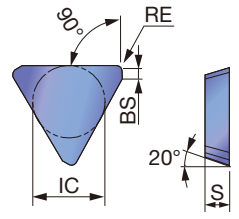
Recommended clamping torque : 8 N·m

Reference pages: Inserts → [H174](#)

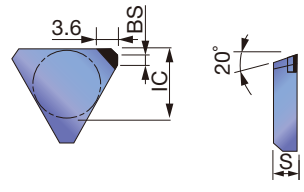
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

INSERT

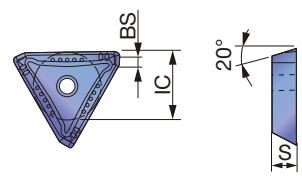
TECN/TEEN 32Z



TECN32ZFR-DIA



TEKR16-MS



| | | | | | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|---|---|
| P | Steel | ★ | | | ☆ | ☆ | | ☆ | ★ | | ☆ | ★ | ☆ | ☆ | | | | |
| M | Stainless | | ★ | ☆ | | | | | | ★ | | ☆ | | | | | | |
| K | Cast iron | ★ | | | | | ☆ | | | | | ★ | | | | | | |
| N | Non-ferrous | | | | | | | | | | | | | | | | ★ | ★ |
| S | Superalloys | ★ | ☆ | | | | | | | | | | | | | | | |
| H | Hard materials | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | | | | | Cermet | | Uncoated | | PCD | IC | S | BS | | | |
|-----------------|-----|------|--------|-------|-------|-------|-------|-------|-------|--------|-------|-------|--------|------|----------|------|-------|----|---|----|-------|------|------|
| | | | AH120 | AH130 | AH140 | AH330 | GH330 | T1115 | T3130 | AH3135 | T1215 | T3225 | NS740 | N308 | UX30 | TH10 | DX140 | | | | | | |
| TECN32ZFR | - | 8 | | | | | | | | | | | | | | | | ● | | | 9.525 | 3.18 | 1.37 |
| TECN32ZTR | 0.8 | 8 | | | | | | | | | | | | | ● | ● | | ● | | | 9.525 | 3.18 | 1 |
| TEEN32ZFR | - | 8 | | | | | | | | | | | | | | | | | ● | | 9.525 | 3.18 | 1.37 |
| TEEN32ZTR | 0.8 | 8 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | 9.525 | 3.18 | 1 |
| TECN32ZFR-DIA | - | 2.5 | | | | | | | | | | | | | | | | | ● | | 9.525 | 3.18 | 1.37 |
| TEKR1603PEPR-MS | - | 8 | | ● | | | | | | | | | | | | | | | | | 9.525 | 3.18 | 1.49 |


Note: T-DIA is a diamond-based ultra high pressure sintered body. Available in 1-corner type.

● : Line up
DX140: 1 piece per package

STANDARD CUTTING CONDITIONS


Please scan below.

e-catalog



ESE3000R

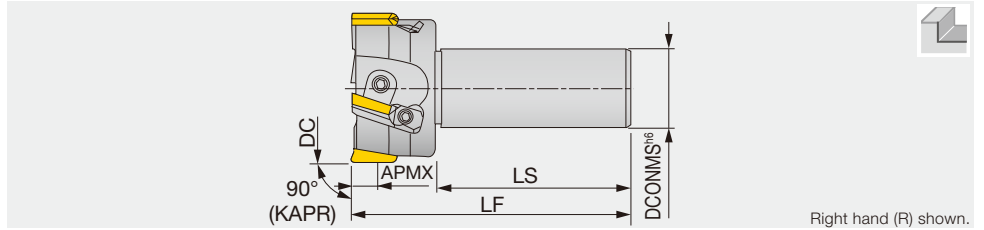
e-catalog



TSE3000R

ESE4000R

Square shoulder endmill, shank type, with wedge clamp system

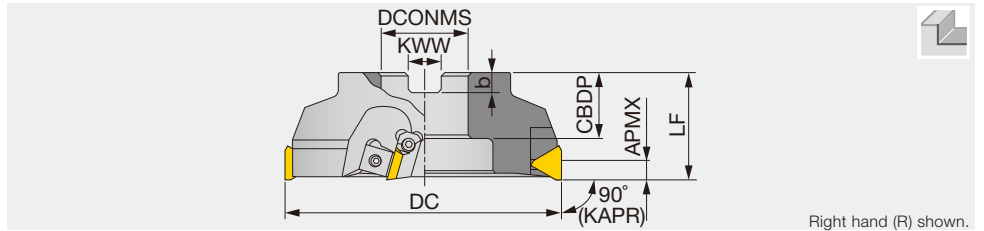


| Designation | APMX | DC | CICT | DCONMS | LS | LF | Insert |
|----------------|------|----|------|--------|----|-----|--------------------|
| ESE4050RA | 10 | 50 | 3 | 32 | 80 | 115 | TE*N43/TEKR2204... |
| ESE4063RA | 10 | 63 | 4 | 32 | 80 | 115 | TE*N43/TEKR2204... |
| ESE4003RIA-S32 | 10 | 80 | 4 | 32 | 80 | 120 | TE*N43/TEKR2204... |

ESE4050RA and ESE4063RA do not have variable pitch.

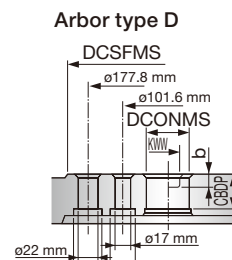
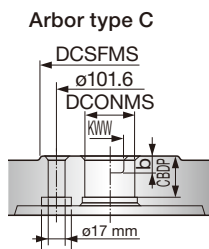
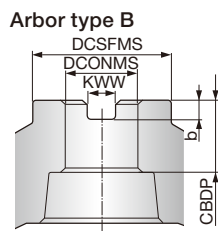
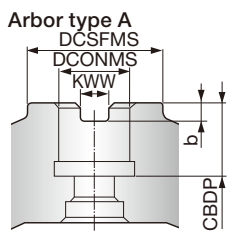
TSE4000RIA

Square shoulder mill, with wedge clamp system



| Designation | APMX | DC | CICT | LF | DCONMS | CBDP | KWW | b | WT(kg) | Arbor type |
|-------------|------|-----|------|----|--------|------|------|-----|--------|------------|
| TSE4003RIA | 10 | 80 | 4 | 50 | 25.4 | 22 | 9.5 | 60 | 1 | A |
| TSE4004RIA | 10 | 100 | 6 | 63 | 31.75 | 32 | 12.7 | 80 | 1.9 | A |
| TSE4005RIA | 10 | 125 | 6 | 63 | 38.1 | 38 | 15.9 | 100 | 2.9 | B |
| TSE4006RIA | 10 | 160 | 8 | 63 | 50.8 | 38 | 19 | 110 | 4.9 | B |
| TSE4008RIA | 10 | 200 | 10 | 63 | 47.625 | 38 | 25.4 | 140 | 7.4 | C |
| TSE4010RIA | 10 | 250 | 12 | 63 | 47.625 | 38 | 25.4 | 140 | 13.8 | C |
| TSE4012RIA | 10 | 315 | 14 | 63 | 47.625 | 38 | 25.4 | 140 | 22.1 | D |
| TSE4003RIAE | 10 | 80 | 4 | 50 | 27 | 26 | 12.4 | 70 | 1 | A |
| TSE4004RIAE | 10 | 100 | 6 | 63 | 32 | 32 | 14.4 | 80 | 1.9 | A |
| TSE4005RIAE | 10 | 125 | 6 | 63 | 40 | 32 | 16.4 | 90 | 2.9 | B |
| TSE4006RIAE | 10 | 160 | 8 | 63 | 40 | 29 | 16.4 | 90 | 4.9 | B |

Arbor type



SPARE PARTS

| Designation | Locator | Wedge fixing screw | Locator fixing screw | Shell locking bolt | Wedge | Wrench |
|--------------------------|---------|--------------------|----------------------|--------------------|--------|--------|
| ESE4050RA | LE402AR | DS-8S | - | SHCM4-10 | WT402R | TP-4 |
| ESE4063RA | LE402AR | DS-8 | - | SHCM4-10 | WT402R | TP-4 |
| ESE4003RIA-S32 | LE403R | FDS-8S | CM4X0.7X14 | - | WF330N | TP-4 |
| TSE4003RIA | LE403R | FDS-8SS | CM4X0.7X14 | CAP-CM12X1.75X30 | WF330N | TP-4 |
| TSE4004RIA | LE403R | FDS-8S | CM4X0.7X14 | CAP-CM16X2.0X40 | WF330N | TP-4 |
| TSE4005 - 12... | LE405R | FDS-8S | CM4X0.7X14 | - | WF500R | TP-4 |
| TSE4003RIAE, TSE4004RIAE | LE403R | FDS-8S | CM4X0.7X14 | - | WF330N | TP-4 |
| TSE4005RIAE, TSE4006RIAE | LE405R | FDS-8S | CM4X0.7X14 | - | WF500R | TP-4 |

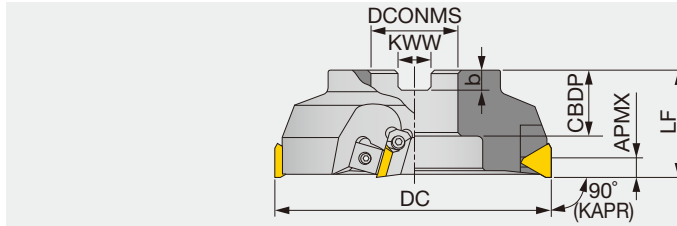
Recommended clamping torque : 8 N·m

Reference pages: Inserts → **H176**

TSP4000IA

Square shoulder mill, with wedge clamp system

GAMP = +5°, GAMF = 0°



Right hand (R) shown.

| Designation | APMX | DC | CICT | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|----|--------|------|------|----|--------|------------------|
| TSP4003RIA | 10 | 80 | 4 | 50 | 25.4 | 26 | 9.5 | 6 | 1.1 | TP*N43 / TP*R... |
| TSP4004RIA | 10 | 100 | 6 | 63 | 31.75 | 32 | 12.7 | 8 | 2 | TP*N43 / TP*R... |
| TSP4005RIA | 10 | 125 | 6 | 63 | 38.1 | 38 | 15.9 | 10 | 3.1 | TP*N43 / TP*R... |
| TSP4006RIA | 10 | 160 | 8 | 63 | 50.8 | 38 | 19 | 11 | 5.1 | TP*N43 / TP*R... |
| TSP4008RIA | 10 | 200 | 10 | 63 | 47.625 | 38 | 25.4 | 14 | 7.7 | TP*N43 / TP*R... |
| TSP4010RIA | 10 | 250 | 12 | 63 | 47.625 | 38 | 25.4 | 14 | 14.1 | TP*N43 / TP*R... |
| TSP4012RIA | 10 | 315 | 14 | 63 | 47.625 | 38 | 25.4 | 14 | 22.6 | TP*N43 / TP*R... |

SPARE PARTS

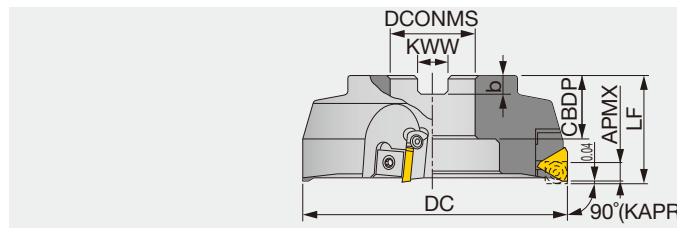
| Designation | Locator | Wedge fixing screw | Locator fixing screw | Shell locking bolt | Wedge | Wrench |
|-------------|---------|--------------------|----------------------|--------------------|--------|--------|
| TSP4003RIA | LP403R | FDS-8S | CM4X0.7X14 | CAP-CM12X1.75X30 | WF330N | TP-4 |
| TSP4004RIA | LP403R | FDS-8S | CM4X0.7X14 | CAP-CM16X2.0X40 | WF330N | TP-4 |
| TSP40**RIA | LP405R | FDS-8S | CM4X0.7X14 | - | WF500R | TP-4 |

Recommended clamping torque : 8 N·m

TFP4000IA

Square shoulder mill with finisher

GAMP = +5°, GAMF = 0°



Right hand (R) shown.

| Designation | APMX | DC | CICT | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|----|--------|------|------|----|--------|------------------|
| TFP4004RIA | 10 | 100 | 5 | 63 | 31.75 | 32 | 12.7 | 8 | 2 | TP*N43 / TP*R... |
| TFP4005RIA | 10 | 125 | 6 | 63 | 38.1 | 38 | 15.9 | 10 | 3.1 | TP*N43 / TP*R... |
| TFP4006RIA | 10 | 160 | 8 | 63 | 50.8 | 38 | 19 | 11 | 5.2 | TP*N43 / TP*R... |
| TFP4008RIA | 10 | 200 | 10 | 63 | 47.625 | 38 | 25.4 | 14 | 7.9 | TP*N43 / TP*R... |

A SPARE PARTS FOR FINISHING INSERT

| Designation | Clamping screw | Locator | Wedge fixing screw | Locator fixing screw1 | Locator fixing screw2 | Wedge | Wrench 1 | Wrench 2 |
|-------------|----------------|---------|--------------------|-----------------------|-----------------------|--------|----------|----------|
| TFP40... | CSTA-5S | LW400R | FDS-8S | CM4X0.7X14 | CM5X0.8X16 | FW-305 | T-15D | TP-4 |

Recommended clamping torque : 8 N·m

B SPARE PARTS FOR REGULAR INSERT

| Designation | Clamping screw | Wedge fixing screw | Locator fixing screw | Wedge | Wrench |
|-----------------|----------------|--------------------|----------------------|--------|--------|
| TFP4004RIA | LP403R | FDS-8S | CM4X0.7X14 | WF330N | TP-4 |
| TFP4005 - 08... | LP405R | FDS-8S | CM4X0.7X14 | WF500R | TP-4 |

Recommended clamping torque : 8 N·m

Reference pages: Inserts, → **H178**

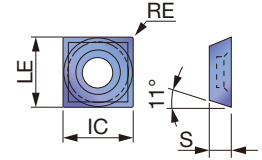
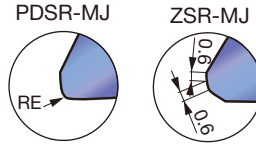
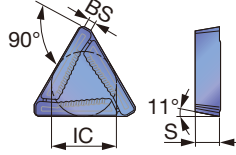
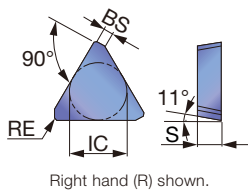


INSERT

TPCN/TPEN/TPKN 43Z

TPKR/TPMR-MJ

SPHA-FNW



Right hand (R) shown.

| | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|---|---|---|---|--|---|--|--|--|
| P Steel | ★ | | | ☆ | ★ | ★ | ☆ | ☆ | | | | | |
| M Stainless | | ★ | ★ | | | | | | | | | | |
| K Cast iron | ★ | | | | ★ | | | | | | | | |
| N Non-ferrous | | | | | | | | | | ★ | | | |
| S Superalloys | ★ | ☆ | | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | | | | Cermet | | Uncoated | | IC | LE | S | BS | | |
|-----------------|------|------|-----------|-------|-------|-------|-------|-------|--------|------|----------|------|----|----|------|------|------|-----|
| | | | AH120 | AH130 | AH140 | GH330 | T1115 | T3130 | NS740 | N308 | UX30 | TH10 | | | | | | |
| | | | TPCN43ZFR | C0.5 | 10 | | | | | | | | | | | | | ● |
| TPCN43ZTR | C0.5 | 10 | | | | | | | ● | ● | ● | | | | 12.7 | - | 4.76 | 2 |
| TPEN43ZTR | C0.5 | 10 | | | | | | | ● | | | | | | 12.7 | - | 4.76 | 2 |
| TPEN43ZTRCR | 1 | 10 | | | | | | | ● | | | | | | 12.7 | - | 4.76 | 2 |
| TPKN43ZFR | C0.5 | 10 | | | | | | | | | ● | | | | 12.7 | - | 4.76 | 2 |
| TPKN43ZTR | C0.5 | 10 | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | | 12.7 | - | 4.76 | 2 |
| TPKR43ZSR-MJ | - | 10 | | | | ● | ● | | | | | | | | 12.7 | - | 4.76 | 1.5 |
| TPMR2204PDSR-MJ | 0.8 | 10 | | | | ● | ● | | | | | | | | 12.7 | - | 4.76 | 1.2 |
| TPKN43ZFL | C0.5 | 10 | | | | | | | | | ● | | | | 12.7 | - | 4.76 | 2 |
| SPHA431FNW | 0.4 | - | | | | | | | ● | | ● | | | | 12.7 | 12.7 | 4.76 | - |

● : Line up



STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



TSP4000IA

e-catalog



TFP4000IA

7°-25°

41°-45°

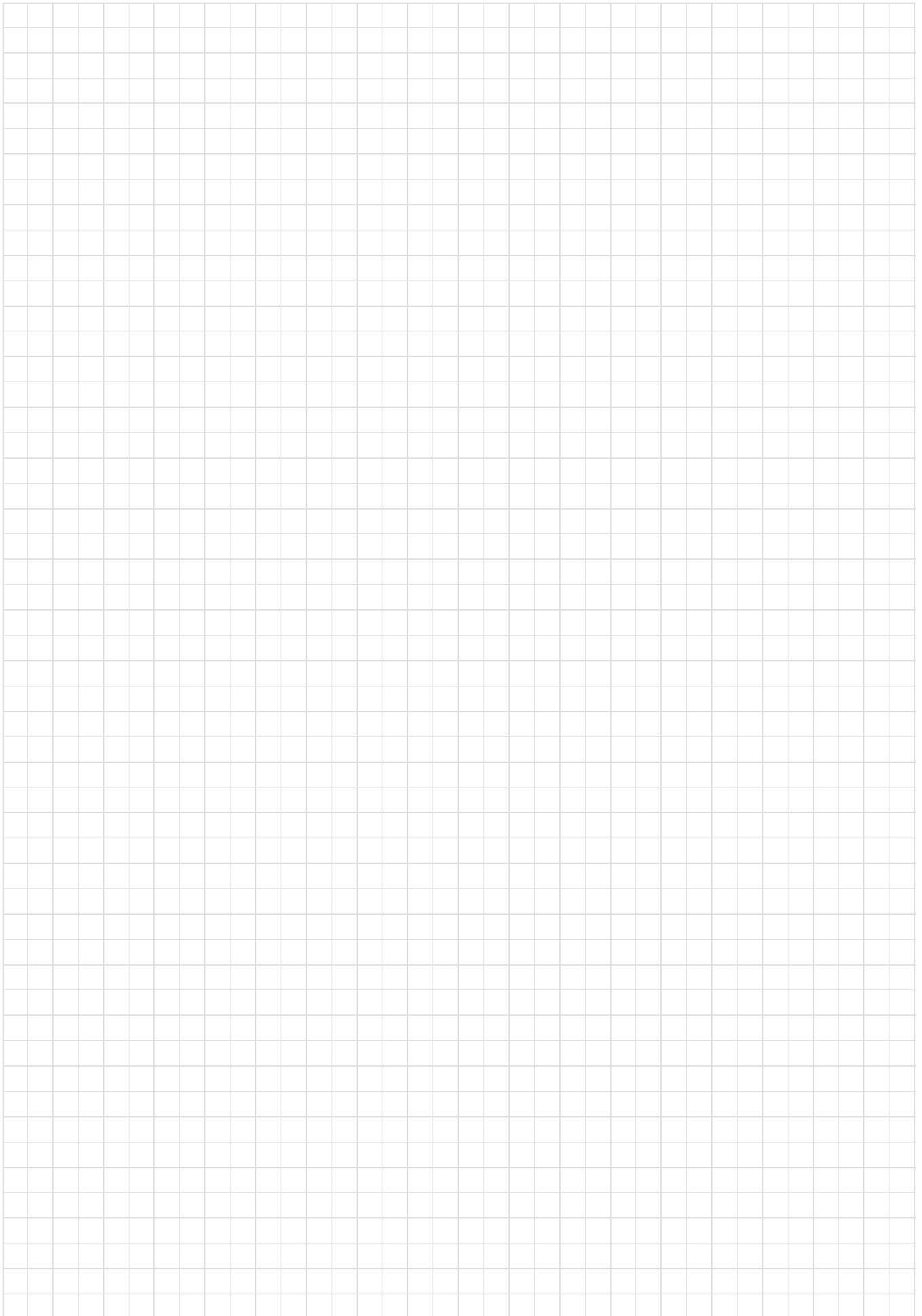
60°-70°

85-88°

90°

Others

MEMO



Grade

A

Insert

B

Ext. Toolholder

C

Int. Toolholder

D

Threading

E

Grooving

F

Miniature tool

G

Milling cutter

H

Endmill

I

Drilling tool

J

Tooling System

K

User's Guide

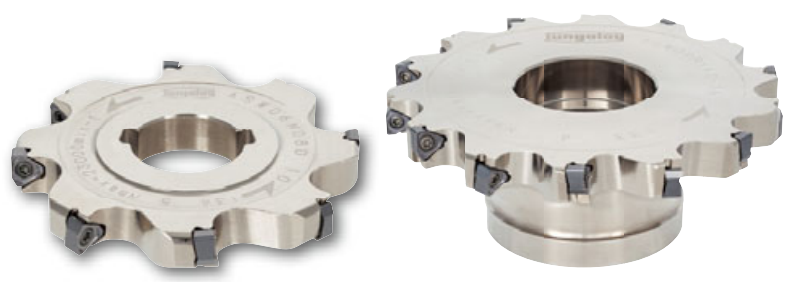
L

Index

M



TUNGUSLOT NIVERSAL

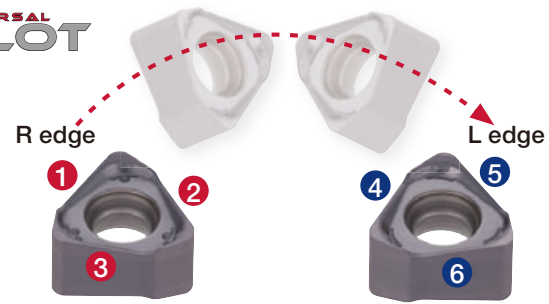


High economy by 6-corner insert with wiper
 Machining stability with the cutter design for optimum chip evacuation

High economy by 6-corner insert

6-corner insert provides economical advantage. Self-wiper edge delivers good surface quality.

TUNGUSLOT
 6 corners with wiper



ASW / TSW
 CW = 10, 12, 14, 16 mm

Excellent chip evacuation even in deep slot milling - optimum pocket design

TUNGUSLOT

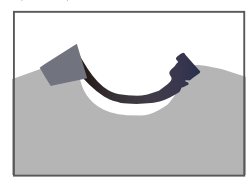
Competitor

OK



Optimum chipbreaker and big gullets create compact chip formation and smooth evacuation!

X



Unformed chip and narrow gullet cause chip packing.

TUNGUSLOT ASW / TSW type

P Steel S55C / C55 (200HB)
 Edge width: CW = 10 mm, Dry
 Corner radius: RE = 0.8 mm

Chips at ae = 30 mm depth

| Cutter | Depth of slot: ae (mm) | | |
|------------------|------------------------|----|----|
| | 10 | 20 | 30 |
| TUNGUSLOT | ○ | ○ | ○ |
| Competitor A | ○ | ○ | × |

TUNGUSLOT

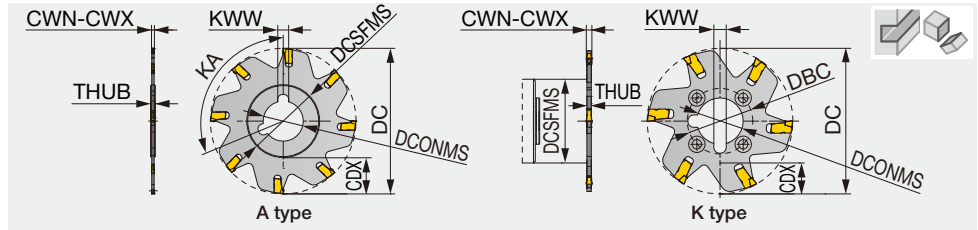
Competitor A



Chips are packed because of bad chip control and flow.

Packed chips

Reference pages: **H187 - H188**



| Designation | CW | CWN | CWX | DC | CICT | Seat size | CDX | DCONMS | THUB | DCSFMS | DBC | KA | KWW | SS | SS | Drive flange | Key | Insert |
|-------------------------------|-----|------|------|------|------|-----------|-------------------|--------|------|-------------------|-----|-------|------|--------------------|-----------|--------------|-----|-------------------|
| SSG01R063-E1.6 | 1.6 | 1.5 | 1.79 | 63 | 6 | 1 | 14 | 10 | 2.4 | 32 | 22 | - | 3 | SW25-32 | SW1.00-32 | - | K | SSM1*N/ SSS1*N |
| SSG02R063-E2 | 2.2 | 1.8 | 2.69 | 63 | 6 | 2 | 15 | 10 | 2.4 | 32 | 22 | - | 3 | SW25-32 | SW1.00-32 | - | K | SSM2*N/ SSS2*N |
| SSG03R063-E3 | 3.1 | 2.7 | 3.53 | 63 | 5 | 3 | 15 | 10 | 2.4 | 32 | 22 | - | 3 | SW25-32 | SW1.00-32 | - | K | SSM3*N/ SSS3*N |
| SSG04R063-E4 | 4.1 | 3.54 | 4.52 | 63 | 5 | 4 | 15 | 10 | 3.2 | 32 | 22 | - | 3 | SW25-32 | SW1.00-32 | - | K | SSM4*N/ SSS4*N |
| ASG01N076-1.6 | 1.6 | 1.5 | 1.79 | 76.2 | 8 | 1 | 14 | 25.4 | 2.4 | 39 | - | 112.5 | 6.35 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG02N076-2 | 2.2 | 1.8 | 2.69 | 76.2 | 8 | 2 | 17 | 25.4 | 2.4 | 39 | - | 112.5 | 6.35 | - | - | - | A | SSM2*N/ SSS2*N |
| ASG01N080-E1.6 | 1.6 | 1.5 | 1.79 | 80 | 8 | 1 | 16 | 22 | 2.4 | 39 | - | 112.5 | 6 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG02N080-E2 | 2.2 | 1.8 | 2.69 | 80 | 8 | 2 | 20 | 22 | 2.4 | 39 | - | 112.5 | 6 | - | - | - | A | SSM2*N/ SSS2*N |
| SSG03R080-3 | 3.1 | 2.7 | 3.53 | 80 | 6 | 3 | 16 | 25.4 | 2.4 | 46 | 36 | - | 6.35 | SW32- 25.4-46-J | SW1.25-46 | R1.00-46 | K | SSM3*N/ SSS3*N |
| SSG03R080-E3 | 3.1 | 2.7 | 3.53 | 80 | 6 | 3 | 19 ⁽²⁾ | 22 | 2.4 | 40 ⁽¹⁾ | 32 | - | 6 | SW32-40 | - | R 22-46 | K | SSM3*N/ SSS3*N |
| SSG04R080-4 | 4.1 | 3.54 | 4.52 | 80 | 6 | 4 | 16 | 25.4 | 3.2 | 46 | 36 | - | 6.35 | SW32- 25.4-46-J | SW1.25-46 | R1.00-46 | K | SSM4*N/ SSS4*N |
| SSG04R080-E4 | 4.1 | 3.54 | 4.52 | 80 | 6 | 4 | 19 ⁽²⁾ | 22 | 3.2 | 40 ⁽¹⁾ | 32 | - | 6 | SW32-40 | - | R 22-46 | K | SSM4*N/ SSS4*N |
| ASG01N100-1.6 | 1.6 | 1.5 | 1.79 | 100 | 10 | 1 | 30 | 25.4 | 2.4 | 39 | - | 90 | 6.35 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG01N100-E1.6 | 1.6 | 1.5 | 1.79 | 100 | 10 | 1 | 30 | 22 | 2.4 | 39 | - | 90 | 6 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG02N100-2 | 2.2 | 1.8 | 2.69 | 100 | 10 | 2 | 30 | 25.4 | 2.4 | 39 | - | 90 | 6.35 | - | - | - | A | SSM2*N/ SSS2*N |
| ASG02N100-E2 | 2.2 | 1.8 | 2.69 | 100 | 10 | 2 | 30 | 22 | 2.4 | 39 | - | 90 | 6 | - | - | - | A | SSM2*N/ SSS2*N |
| SSG03R100-3 | 3.1 | 2.7 | 3.53 | 100 | 6 | 3 | 26 | 25.4 | 2.4 | 46 | 36 | - | 6.35 | SW32- 25.4-46-J | SW1.25-46 | R1.00-46 | K | SSM3*N/ SSS3*N |
| SSG03R100-E3 | 3.1 | 2.7 | 3.53 | 100 | 6 | 3 | 29 ⁽³⁾ | 22 | 2.4 | 40 ⁽¹⁾ | 32 | - | 6 | SW32-40 | - | R 22-46 | K | SSM3*N/ SSS3*N |
| SSG04R100-4 | 4.1 | 3.54 | 4.52 | 100 | 6 | 4 | 26 | 25.4 | 3.2 | 46 | 36 | - | 6.35 | SW32- 25.4-46-J | SW1.25-46 | R1.00-46 | K | SSM4*N/ SSS4*N |
| SSG04R100-E4 | 4.1 | 3.54 | 4.52 | 100 | 6 | 4 | 29 ⁽³⁾ | 22 | 3.2 | 40 ⁽¹⁾ | 32 | - | 6 | SW32-40 | - | R 22-46 | K | SSM4*N/ SSS4*N |
| ASG01N125-1.6 ⁽⁴⁾ | 1.6 | 1.5 | 1.79 | 125 | 12 | 1 | 30 | 31.75 | 2.4 | 64 | - | 75 | 7.92 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG01N125-E1.6 ⁽⁴⁾ | 1.6 | 1.5 | 1.79 | 125 | 12 | 1 | 30 | 27 | 2.4 | 64 | - | 75 | 7 | - | - | - | A | SSM1*N/ SSS1*N |
| ASG02N125-2 ⁽⁴⁾ | 2.2 | 1.8 | 2.69 | 125 | 12 | 2 | 32 | 31.75 | 2.4 | 60 | - | 75 | 7.92 | - | - | - | A | SSM2*N/ SSS2*N |
| ASG02N125-E2 ⁽⁴⁾ | 2.2 | 1.8 | 2.69 | 125 | 12 | 2 | 32 | 27 | 2.4 | 60 | - | 75 | 7 | - | - | - | A | SSM2*N/ SSS2*N |
| SSG03R125-3 ⁽⁴⁾ | 3.1 | 2.7 | 3.53 | 125 | 8 | 3 | 34 | 31.75 | 2.4 | 55 | 45 | - | 7.92 | - | - | R1.25-55 | K | SSM3*N/ SSS3*N |
| SSG03R125-E3 ⁽⁴⁾ | 3.1 | 2.7 | 3.53 | 125 | 8 | 3 | 34 | 32 | 2.4 | 55 | 45 | - | 8 | S32-55 | - | R 32-55 | K | SSM3*N/ SSS3*N |
| SSG04R125-4 ⁽⁴⁾ | 4.1 | 3.54 | 4.52 | 125 | 8 | 4 | 34 | 31.75 | 3.2 | 55 | 45 | - | 7.92 | - | - | R1.25-55 | K | SSM4*N/ SSS4*N |

(1) When using a drive flange, DCSFMS = 46 mm
 (2) When using a drive flange, CDX = 16 mm
 (3) When using a drive flange, CDX = 26 mm
 (4) Cutters ø125 mm, only one keyway.

CW = When standard inserts are mounted.
 CWN, CWX = When special inserts are mounted.
 Since a single insert cuts the full groove width, use the insert whose width is equal to the groove width in the application.

Tolerance of slot width*

±0.1

*Just for reference

SPARE PARTS

| Designation | Grip | Extractor |
|--------------------------|--------|-----------|
| SSG01/02..., ASG01/02... | ESG0.5 | - |
| SSG03/04... | - | ESG 1 |

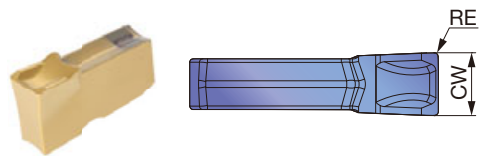
Reference pages: Inserts, Standard cutting conditions → **H182**



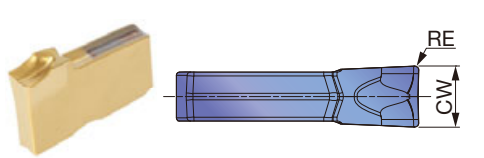


INSERT

SSM



SSS



| | | |
|-------------------------|---|--|
| P Steel | ★ | |
| M Stainless | ★ | |
| K Cast iron | ★ | |
| N Non-ferrous | | |
| S Superalloys | | |
| H Hard materials | | |

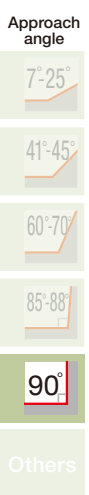
★ : First choice
☆ : Second choice

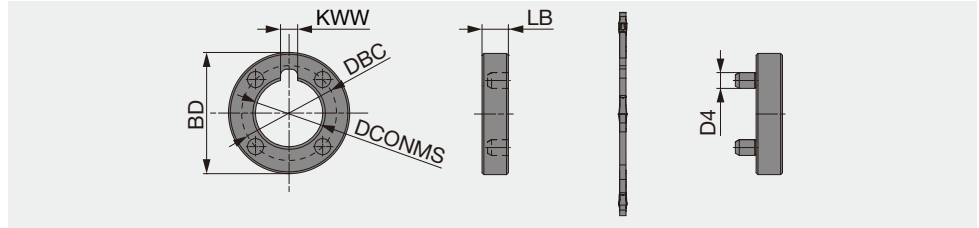
| Designation | RE | Coated | | CW±0.04 |
|-------------|------|--------|--|---------|
| | | GH130 | | |
| SSM22N | 0.2 | ● | | 2.2 |
| SSM31N | 0.2 | ● | | 3.1 |
| SSM41N | 0.25 | ● | | 4.1 |
| SSS16N | 0.16 | ● | | 1.6 |
| SSS22N | 0.2 | ● | | 2.2 |
| SSS31N | 0.2 | ● | | 3.1 |
| SSS41N | 0.25 | ● | | 4.1 |

● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness (HB) | Insert | Cutting speed Vc (m/min) | Chip thickness t (mm) |
|----------|--|---------------|--------|--------------------------|-----------------------|
| P | Low carbon steel SS400, S15C, etc. E275A, C15E4, etc. | - 200 | SSM... | 150 - 230 | 0.05 - 0.15 |
| | High carbon steel S45C, S55C, etc. E355D, C55, etc. | 200 - 300 | SSM... | 100 - 170 | 0.04 - 0.13 |
| | Alloy steels SCM440, SCr415, etc. 42CrMo4, 20Cr4, etc. | 150 - 300 | SSM... | 90 - 160 | 0.04 - 0.13 |
| | Tool steel SKD11, SKD61, etc. X153CrMoV12, X40CrMoV5-1, etc. | - 300 | SSM... | 70 - 120 | 0.04 - 0.13 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200 | SSS... | 90 - 200 | 0.04 - 0.13 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 | SSM... | 100 - 200 | 0.05 - 0.15 |
| | Ductile cast iron FCD400, etc. 400-15S, etc. | 150 - 250 | SSM... | 80 - 130 | 0.05 - 0.15 |

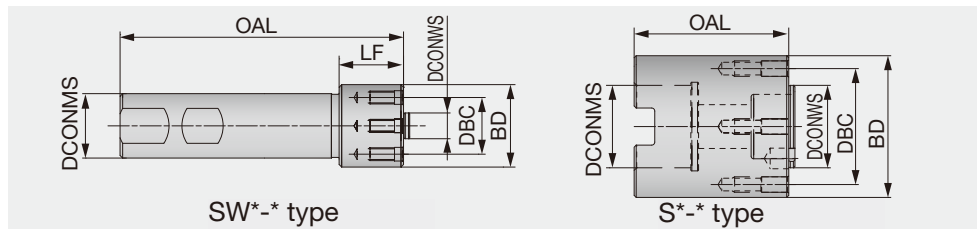




| Designation | DCONMS | BD | D4 | DBC | LB | KWW |
|-------------|--------|----|----|-----|----|------|
| R22-46 | 22 | 46 | 6 | 32 | 10 | 6 |
| R1.00-46 | 25.4 | 46 | 5 | 36 | 10 | 6.35 |
| R1.25-55 | 31.75 | 55 | 6 | 45 | 10 | 7.92 |
| R32-55 | 32 | 55 | 6 | 45 | 10 | 8 |

SW

Drive shank for side cutters



| Designation | DCONMS | DCONMS | DCONWS | BD | DBC | LF | OAL |
|----------------|--------|--------|--------|----|-----|------|-----|
| SW25-32 | 25 | - | 10 | 32 | 22 | 25 | 110 |
| SW1.00-32 | 25.4 | - | 10 | 32 | 22 | 25.4 | 110 |
| SW1.25-46 | 31.75 | - | 25.4 | 46 | 36 | 30 | 120 |
| SW32-40 | 32 | - | 22 | 40 | 32 | 30 | 120 |
| SW32-25.4-46-J | 32 | - | 25.4 | 46 | 36 | 30 | 120 |
| S32-55 | - | 32 | 32 | 55 | 45 | - | 60 |

SPARE PARTS



| Designation | Screw | Wrench | | |
|------------------------------------|-----------|-----------------|---------------------|-----------------|
| | | Mono block type | Torx bit (Optional) | Grip (Optional) |
| SW25-32, SW1.00-32 | SR 76-961 | SET T-15/5 | - | - |
| SW32-40, SW32-25.4-46-J, SW1.25-46 | SR 76-963 | SET T-15/5 | - | - |
| S32-55 | SR 76-943 | - | (BT20M) | (H-TB) |

Torx size: S32-55 = T20

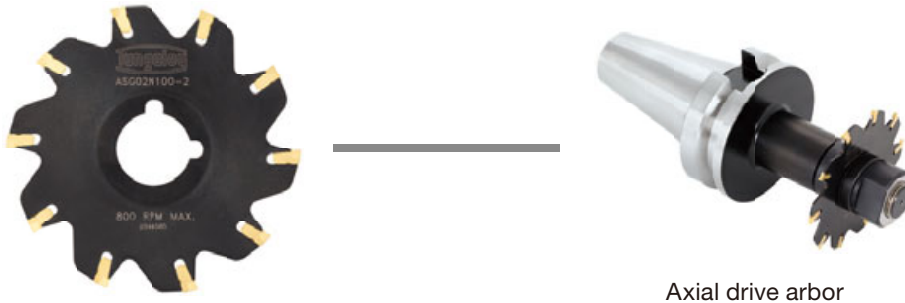


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
 - 7°-25°
 - 41°-45°
 - 60°-70°
 - 85°-88°
 - 90°
- Others

COMBINATION OF ARBORS / ATTACHMENTS

Cutter bodies : "A" type

A-type disk cutters are without clamping holes on the hub and can be mounted only by using axial drive arbors.



Axial drive arbor

Cutter bodies : "K" type

K-type disk cutters are with clamping holes on the hub and can be mounted by using intermediate shanks or shell adaptors, making it possible to use endmills / shell mill arbors.



Drive flange

Axial drive arbor

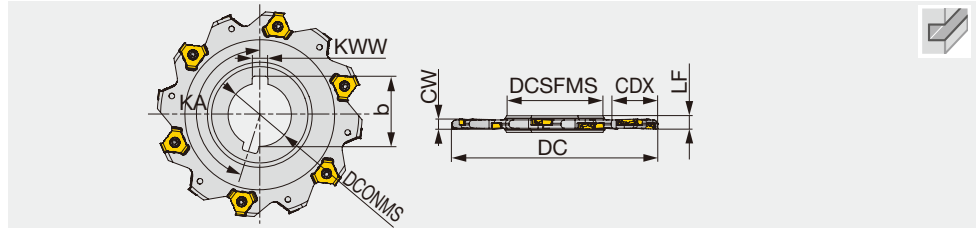
Shank adaptor

Shell adaptor

Shell mill / Endmill arbor

| Tool dia. | ø63 | ø80 | ø100 | ø125 |
|-----------------------|-----|-----|------|------|
| Drive flange | - | ✓ | ✓ | ✓ |
| Shank / Shell adaptor | ✓ | ✓ | ✓ | - |

Axial drive slot mill, for tangentially mounted inserts



| Designation | CW | DC | ZEFP/CICT | DCSFMS | DCONMS | LF | b | KWW | CDX | KA | Insert |
|--------------|----|-----|-----------|--------|--------|-----|------|------|------|--------|-------------|
| ASV02N080-4 | 4 | 80 | 5/10 | 41 | 25.4 | 6 | 28 | 6.35 | 15 | 162 | TVKX0202... |
| ASV02N080-E4 | 4 | 80 | 5/10 | 41 | 27 | 6 | 29.8 | 7 | 15 | 162 | TVKX0202... |
| ASV03N080-5 | 5 | 80 | 5/10 | 41 | 25.4 | 6.5 | 28 | 6.35 | 15 | 162 | TVKX03X3... |
| ASV03N080-E5 | 5 | 80 | 5/10 | 41 | 27 | 6.5 | 29.8 | 7 | 15 | 162 | TVKX03X3... |
| ASV04N080-6 | 6 | 80 | 4/8 | 41 | 25.4 | 8 | 28 | 6.35 | 17 | 157.5 | TVKX04H3... |
| ASV04N080-E6 | 6 | 80 | 4/8 | 41 | 27 | 8 | 29.8 | 7 | 17 | 157.5 | TVKX04H3... |
| ASV05N080-8 | 8 | 80 | 4/8 | 41 | 25.4 | 10 | 28 | 6.35 | 17 | 157.5 | TVKX0504... |
| ASV05N080-E8 | 8 | 80 | 4/8 | 41 | 27 | 10 | 29.8 | 7 | 17 | 157.5 | TVKX0504... |
| ASV02N100-4 | 4 | 100 | 6/12 | 48 | 31.75 | 6 | 35.2 | 7.92 | 20 | 165 | TVKX0202... |
| ASV02N100-E4 | 4 | 100 | 6/12 | 47 | 32 | 6 | 34.8 | 8 | 20 | 165 | TVKX0202... |
| ASV03N100-5 | 5 | 100 | 6/12 | 48 | 31.75 | 6.5 | 35.2 | 7.92 | 20 | 165 | TVKX03X3... |
| ASV03N100-E5 | 5 | 100 | 6/12 | 47 | 32 | 6.5 | 34.8 | 8 | 20 | 165 | TVKX03X3... |
| ASV04N100-6 | 6 | 100 | 5/10 | 48 | 31.75 | 8 | 35.2 | 7.92 | 23.5 | 162 | TVKX04H3... |
| ASV04N100-E6 | 6 | 100 | 5/10 | 47 | 32 | 8 | 34.8 | 8 | 23.5 | 162 | TVKX04H3... |
| ASV05N100-8 | 8 | 100 | 5/10 | 48 | 31.75 | 10 | 35.2 | 7.92 | 23.5 | 162 | TVKX0504... |
| ASV05N100-E8 | 8 | 100 | 5/10 | 47 | 32 | 10 | 34.8 | 8 | 23.5 | 162 | TVKX0504... |
| ASV02N125-4 | 4 | 125 | 8/16 | 58 | 38.1 | 6 | 42.3 | 9.52 | 30 | 168.75 | TVKX0202... |
| ASV02N125-E4 | 4 | 125 | 8/16 | 55 | 40 | 6 | 43.5 | 10 | 30 | 168.75 | TVKX0202... |
| ASV03N125-5 | 5 | 125 | 8/16 | 58 | 38.1 | 6.5 | 42.3 | 9.52 | 30 | 168.75 | TVKX03X3... |
| ASV03N125-E5 | 5 | 125 | 8/16 | 55 | 40 | 6.5 | 43.5 | 10 | 30 | 168.75 | TVKX03X3... |
| ASV04N125-6 | 6 | 125 | 6/12 | 58 | 38.1 | 8 | 42.3 | 9.52 | 31 | 165 | TVKX04H3... |
| ASV04N125-E6 | 6 | 125 | 6/12 | 55 | 40 | 8 | 43.5 | 10 | 32.5 | 165 | TVKX04H3... |
| ASV05N125-8 | 8 | 125 | 6/12 | 58 | 38.1 | 10 | 42.3 | 9.52 | 31 | 165 | TVKX0504... |
| ASV05N125-E8 | 8 | 125 | 6/12 | 55 | 40 | 10 | 43.5 | 10 | 32.5 | 165 | TVKX0504... |
| ASV02N160-4 | 4 | 160 | 10/20 | 58 | 38.1 | 6 | 42.3 | 9.52 | 45 | 171 | TVKX0202... |
| ASV02N160-E4 | 4 | 160 | 10/20 | 55 | 40 | 6 | 43.5 | 10 | 45 | 171 | TVKX0202... |
| ASV03N160-5 | 5 | 160 | 10/20 | 58 | 38.1 | 6.5 | 42.3 | 9.52 | 45 | 171 | TVKX03X3... |
| ASV03N160-E5 | 5 | 160 | 10/20 | 55 | 40 | 6.5 | 43.5 | 10 | 45 | 171 | TVKX03X3... |
| ASV04N160-6 | 6 | 160 | 8/16 | 58 | 38.1 | 8 | 42.3 | 9.52 | 48.5 | 168.75 | TVKX04H3... |
| ASV04N160-E6 | 6 | 160 | 8/16 | 55 | 40 | 8 | 43.5 | 10 | 50 | 168.75 | TVKX04H3... |
| ASV05N160-8 | 8 | 160 | 8/16 | 58 | 38.1 | 10 | 42.3 | 9.52 | 48.5 | 168.75 | TVKX0504... |
| ASV05N160-E8 | 8 | 160 | 8/16 | 55 | 40 | 10 | 43.5 | 10 | 50 | 168.75 | TVKX0504... |
| ASV04N200-6 | 6 | 200 | 10/20 | 69 | 50.8 | 8 | 55.8 | 12.7 | 63 | 171 | TVKX04H3... |
| ASV04N200-E6 | 6 | 200 | 10/20 | 69 | 50 | 8 | 53.5 | 12 | 63 | 171 | TVKX04H3... |
| ASV05N200-8 | 8 | 200 | 10/20 | 69 | 50.8 | 10 | 55.8 | 12.7 | 63 | 171 | TVKX0504... |
| ASV05N200-E8 | 8 | 200 | 10/20 | 69 | 50 | 10 | 53.5 | 12 | 63 | 171 | TVKX0504... |

SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Lubricant (Optional) | Torx bit (Optional) | Mono block type Torx bit |
|--------------|-----------------|-----------------|----------------------|---------------------|--------------------------|
| ASV02/03N... | SR114-018-L3.40 | - | (M-1000) | - | T-6D |
| ASV04N... | SR14-500-L5.1 | (H-TB2W) | (M-1000) | (BT15S) | - |
| ASV05N... | SR14-500-L7.0 | (H-TB2W) | (M-1000) | (BT15S) | - |

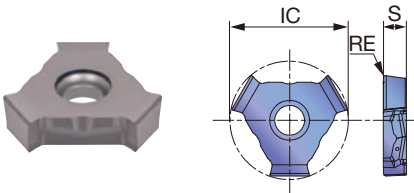
Recommended clamping torque (Torx size): SR114-018-L3.40 = 0.7 N·m
 SR14-500-L5.1, SR 14-500-L7.0 = 3.5 N·m (T15)





INSERT

TVKX-MJ

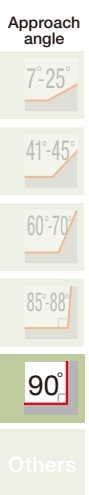


| | | | | |
|-------------------------|---|---|---|---|
| P Steel | ☆ | ★ | ★ | |
| M Stainless | | ★ | ☆ | ☆ |
| K Cast iron | ★ | | ☆ | ☆ |
| N Non-ferrous | | | | |
| S Superalloys | ★ | ☆ | ★ | ★ |
| H Hard materials | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | | S | IC |
|-----------------|-----|--------|-------|-------|-------|-----|------|
| | | AH120 | AH130 | AH725 | SH725 | | |
| TVKX020202TN-MJ | 0.2 | ● | | ● | | 2.4 | 9.4 |
| TVKX020202FN-MJ | 0.2 | | | | ● | 2.4 | 9.4 |
| TVKX020204TN-MJ | 0.4 | ● | | ● | | 2.4 | 9.4 |
| TVKX03X302TN-MJ | 0.2 | ● | | ● | | 3.2 | 9.4 |
| TVKX03X302FN-MJ | 0.2 | | | | ● | 3.2 | 9.4 |
| TVKX03X304TN-MJ | 0.4 | ● | | ● | | 3.2 | 9.4 |
| TVKX04H302FN-MJ | 0.2 | | | | ● | 3.5 | 16.9 |
| TVKX04H304TN-MJ | 0.4 | ● | ● | ● | | 3.5 | 16.9 |
| TVKX04H308TN-MJ | 0.8 | ● | ● | ● | | 3.5 | 16.9 |
| TVKX050402FN-MJ | 0.2 | | | | ● | 4.5 | 16.9 |
| TVKX050404TN-MJ | 0.4 | ● | ● | ● | | 4.5 | 16.9 |
| TVKX050408TN-MJ | 0.8 | ● | ● | ● | | 4.5 | 16.9 |

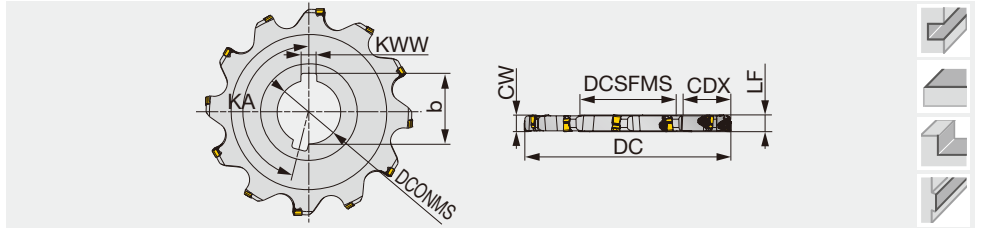
● : Line up



Others

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Priority | Grade | Cutting speed Vc (m/min) | Feed per edge line: fz (mm/t) | | | |
|---|---|---------------------|---------------------|----------|--------------------------|-------------------------------|-------------|--------------|-------------|
| | | | | | | ASV | | ASV | |
| | | | | | | ae / DC (mm) | | ae / DC (mm) | |
| | | | | | | 10% | 20% | 30% | ≤ 50% |
| P | Low carbon steels SS400, etc. E275A, etc. | - 200 HB | First choice | AH725 | 90 - 180 | 0.08 - 0.25 | 0.06 - 0.19 | 0.05 - 0.16 | 0.05 - 0.15 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.08 - 0.25 | 0.06 - 0.19 | 0.05 - 0.16 | 0.05 - 0.15 |
| | High carbon steels S45C, etc. C45, etc. | 200 - 300 HB | First choice | AH725 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 |
| | Alloy steels SCM440, etc. 42CrMo4, etc. | 150 - 300 HB | First choice | AH725 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 |
| Tool steels SKD61, etc. X40CrMoV5-1, etc. | - 300 HB | First choice | AH725 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 | |
| | | Fracture resistance | AH130 | 90 - 180 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 | |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | | AH130 | 90 - 200 | 0.07 - 0.22 | 0.05 - 0.16 | 0.04 - 0.14 | 0.04 - 0.13 |
| K | Grey cast irons FC250, etc. 250, etc. | 150 - 250 HB | | AH120 | 120 - 230 | 0.08 - 0.25 | 0.06 - 0.19 | 0.05 - 0.16 | 0.05 - 0.15 |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150 - 250 HB | | AH120 | 90 - 150 | 0.08 - 0.25 | 0.06 - 0.19 | 0.05 - 0.16 | 0.05 - 0.15 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH725 | 30 - 40 | 0.07 - 0.12 | 0.05 - 0.09 | 0.04 - 0.07 | 0.04 - 0.07 |
| | | | Fracture resistance | AH130 | 30 - 40 | 0.07 - 0.12 | 0.05 - 0.09 | 0.04 - 0.07 | 0.04 - 0.07 |
| | Nickel-based alloys Inconel 718, etc. | - 40 HRC | First choice | AH725 | 20 - 35 | 0.07 - 0.12 | 0.05 - 0.09 | 0.04 - 0.07 | 0.04 - 0.07 |
| | | | Fracture resistance | AH130 | 20 - 35 | 0.07 - 0.12 | 0.05 - 0.09 | 0.04 - 0.07 | 0.04 - 0.07 |



| Designation | CW | DC | ZEFP/CICT | DCSFMS | DCONMS | LF | b | KWW | CDX | KA | Insert |
|---------------|----|-----|-----------|--------|--------|----|------|------|------|--------|-------------|
| ASW06N080-10 | 10 | 80 | 4/8 | 41 | 25.4 | 10 | 28 | 6.35 | 18.5 | 157.5 | WNGU0603... |
| ASW06N080-E10 | 10 | 80 | 4/8 | 41 | 27 | 10 | 29.8 | 7 | 18.5 | 157.5 | WNGU0603... |
| ASW06N100-10 | 10 | 100 | 5/10 | 48 | 31.75 | 10 | 35.2 | 7.92 | 25 | 162 | WNGU0603... |
| ASW06N100-E10 | 10 | 100 | 5/10 | 47 | 32 | 10 | 34.8 | 8 | 25.5 | 162 | WNGU0603... |
| ASW07N100-12 | 12 | 100 | 5/10 | 48 | 31.75 | 12 | 35.2 | 7.92 | 25 | 162 | WNGU07T3... |
| ASW07N100-E12 | 12 | 100 | 5/10 | 47 | 32 | 12 | 34.8 | 8 | 25.5 | 162 | WNGU07T3... |
| ASW09N100-14 | 14 | 100 | 5/10 | 48 | 31.75 | 14 | 35.2 | 7.92 | 25 | 162 | WNGU0904... |
| ASW09N100-E14 | 14 | 100 | 5/10 | 47 | 32 | 14 | 34.8 | 8 | 25.5 | 162 | WNGU0904... |
| ASW07N125-12 | 12 | 125 | 6/12 | 58 | 38.1 | 12 | 42.3 | 9.52 | 32.5 | 165 | WNGU07T3... |
| ASW07N125-E12 | 12 | 125 | 6/12 | 55 | 40 | 12 | 43.5 | 10 | 34 | 165 | WNGU07T3... |
| ASW06N125-10 | 10 | 125 | 6/12 | 58 | 38.1 | 10 | 42.3 | 9.52 | 32.5 | 165 | WNGU0603... |
| ASW06N125-E10 | 10 | 125 | 6/12 | 55 | 40 | 10 | 43.5 | 10 | 34 | 165 | WNGU0603... |
| ASW06N160-10 | 10 | 160 | 7/14 | 58 | 38.1 | 10 | 42.3 | 9.52 | 50 | 167.14 | WNGU0603... |
| ASW06N160-E10 | 10 | 160 | 7/14 | 55 | 40 | 10 | 43.5 | 10 | 51.5 | 167.14 | WNGU0603... |
| ASW07N160-12 | 12 | 160 | 7/14 | 58 | 38.1 | 12 | 42.3 | 9.52 | 50 | 167.14 | WNGU07T3... |
| ASW07N160-E12 | 12 | 160 | 7/14 | 55 | 40 | 12 | 43.5 | 10 | 51.5 | 167.14 | WNGU07T3... |
| ASW09N160-14 | 14 | 160 | 7/14 | 58 | 38.1 | 14 | 42.3 | 9.52 | 50 | 167.14 | WNGU0904... |
| ASW09N160-E14 | 14 | 160 | 7/14 | 55 | 40 | 14 | 43.5 | 10 | 51.5 | 167.14 | WNGU0904... |
| ASW09N160-16 | 16 | 160 | 7/14 | 58 | 38.1 | 16 | 42.3 | 9.52 | 50 | 167.14 | WNGU0904... |
| ASW09N160-E16 | 16 | 160 | 7/14 | 55 | 40 | 16 | 43.5 | 10 | 51.5 | 167.14 | WNGU0904... |

SPARE PARTS

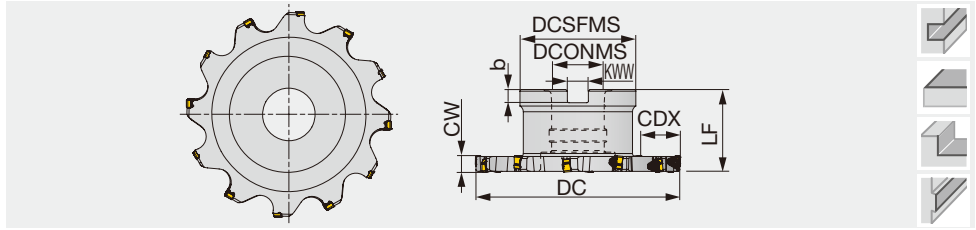
| Designation | Clamping screw1 | Clamping screw2 | Grip 1 (Optional) | Grip 2 | Lubricant (Optional) | Torx bit 1 | Torx bit 2 (Optional) | Wrench |
|-------------------|-----------------|-----------------|-------------------|--------|----------------------|-------------|-----------------------|--------|
| ASW06N... | - | CSPB-2.5 | - | - | (M-1000) | - | - | IP-8D |
| ASW07N100/125-... | - | CSPD-3 | - | SW6-SD | (M-1000) | BLD IP10/S7 | - | - |
| ASW07N160-... | - | CSPD-3 | - | - | (M-1000) | - | - | IP-10D |
| ASW09N100-... | CSPB-3.5 | - | (H-TB2W) | - | (M-1000) | - | (BLDIP15/S7) | - |
| ASW09N160-... | CSPB-3.5 | - | - | - | (M-1000) | - | - | IP-15D |

Recommended clamping torque (Torx size): CSPB-2.5 = 1.3 N·m, CSPB-3.5 = 3.5 N·m, CSPD-3 = 2.5 N·m (ASW09N100-... = 15IP)





Radial drive slot mill



| Designation | CW | DC | ZEPF/CICT | DCSFMS | DCONMS | LF | b | KWW | CDX | Insert |
|---------------|----|-----|-----------|--------|--------|----|----|------|------|-------------|
| TSW06R100-10 | 10 | 100 | 5/10 | 50 | 25.4 | 50 | 6 | 9.5 | 24 | WNGU0603... |
| TSW06R100-E10 | 10 | 100 | 5/10 | 58 | 27 | 50 | 7 | 12.4 | 20 | WNGU0603... |
| TSW07R100-12 | 12 | 100 | 5/10 | 50 | 25.4 | 50 | 6 | 9.5 | 24 | WNGU07T3... |
| TSW07R100-E12 | 12 | 100 | 5/10 | 58 | 27 | 50 | 7 | 12.4 | 20 | WNGU07T3... |
| TSW06R125-10 | 10 | 125 | 6/12 | 70 | 31.75 | 50 | 8 | 12.7 | 26.5 | WNGU0603... |
| TSW06R125-E10 | 10 | 125 | 6/12 | 66 | 32 | 50 | 8 | 14.4 | 28.5 | WNGU0603... |
| TSW07R125-12 | 12 | 125 | 6/12 | 70 | 31.75 | 50 | 8 | 12.7 | 26.5 | WNGU07T3... |
| TSW07R125-E12 | 12 | 125 | 6/12 | 66 | 32 | 50 | 8 | 14.4 | 28.5 | WNGU07T3... |
| TSW06R160-10 | 10 | 160 | 7/14 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | WNGU0603... |
| TSW06R160-E10 | 10 | 160 | 7/14 | 82 | 40 | 63 | 9 | 16.4 | 38 | WNGU0603... |
| TSW07R160-12 | 12 | 160 | 7/14 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | WNGU07T3... |
| TSW07R160-E12 | 12 | 160 | 7/14 | 82 | 40 | 63 | 9 | 16.4 | 38 | WNGU07T3... |
| TSW09R160-16 | 16 | 160 | 7/14 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | WNGU0904... |
| TSW09R160-E16 | 16 | 160 | 7/14 | 82 | 40 | 63 | 9 | 16.4 | 38 | WNGU0904... |

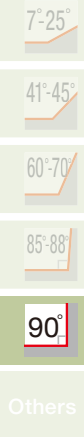
SPARE PARTS



| Designation | Clamping screw1 | Clamping screw2 | Grip | Lubricant (Optional) | Torx bit | Mono block type Torx bit |
|-------------------|-----------------|-----------------|--------|----------------------|-------------|--------------------------|
| TSW06R... | - | CSPB-2.5 | - | (M-1000) | - | IP-8D |
| TSW07R100/125-... | - | CSPD-3 | SW6-SD | (M-1000) | BLD IP10/S7 | - |
| TSW07R160-... | - | CSPD-3 | - | (M-1000) | - | IP-10D |
| TSW09R160-... | CSPB-3.5 | - | - | (M-1000) | - | IP-15D |

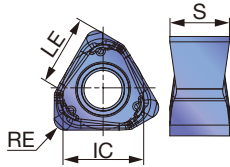
Recommended clamping torque: CSPB-2.5 = 1.3 N·m, CSPB-3.5 = 3.5 N·m, CSPD-3 = 2.5 N·m

Approach angle



INSERT

WNGU-MJ



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ☆ | | ★ | ★ | | |
| Stainless | | ★ | ☆ | ★ | | |
| Cast iron | ★ | | ☆ | | | |
| Non-ferrous | | | | | | |
| Superalloys | ★ | ☆ | ★ | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | | LE | IC | S |
|-----------------|-----|--------|-------|-------|--------|-----|-----|-----|
| | | AH120 | AH130 | AH725 | AH3135 | | | |
| WNGU060304TN-MJ | 0.4 | ● | | | ● | 5.6 | 6.1 | 4.4 |
| WNGU060308TN-MJ | 0.8 | ● | ● | ● | ● | 5.6 | 6.1 | 4.4 |
| WNGU060310TN-MJ | 1 | ● | | | ● | 5.6 | 6.1 | 4.4 |
| WNGU060316TN-MJ | 1.6 | ● | ● | ● | | 5.6 | 6.1 | 4.4 |
| WNGU060320TN-MJ | 2 | ● | | | ● | 5.6 | 6.1 | 4.4 |
| WNGU07T304TN-MJ | 0.4 | ● | | | ● | 6.8 | 7.4 | 5.5 |
| WNGU07T308TN-MJ | 0.8 | ● | ● | ● | | 6.8 | 7.4 | 5.5 |
| WNGU07T310TN-MJ | 1 | ● | | | ● | 6.8 | 7.4 | 5.5 |
| WNGU07T316TN-MJ | 1.6 | ● | ● | ● | | 6.8 | 7.4 | 5.5 |
| WNGU07T320TN-MJ | 2 | ● | | | ● | 6.8 | 7.4 | 5.5 |
| WNGU090404TN-MJ | 0.4 | ● | | | ● | 8.5 | 8.6 | 6.5 |
| WNGU090408TN-MJ | 0.8 | ● | ● | ● | | 8.5 | 8.6 | 6.5 |
| WNGU090410TN-MJ | 1 | ● | | | ● | 8.5 | 8.6 | 6.5 |
| WNGU090416TN-MJ | 1.6 | ● | ● | ● | | 8.5 | 8.6 | 6.5 |
| WNGU090420TN-MJ | 2 | ● | | | ● | 8.5 | 8.6 | 6.5 |

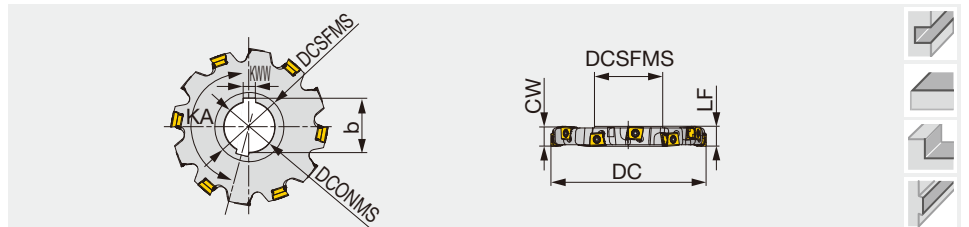
● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Priority | Grade | Cutting speed Vc (m/min) | Feed per edge line: fz (mm/t) | | | |
|----------|---|--------------|---------------------|-------|-----------------------------|-------------------------------|-------------|-------------|-------------|
| | | | | | | TSW / ASW | | | |
| | | | | | | ae / DC (mm) | | | |
| | | 10% | 20% | 30% | ≤ 50% | | | | |
| P | Low carbon steels SS400, etc. E275A, etc. | - 200 HB | First choice | AH725 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | High carbon steels S45C, etc. C45, etc. | 200 - 300 HB | First choice | AH725 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | Alloy steels SCM440, etc. 42CrMo4, etc. | 150 - 300 HB | First choice | AH725 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | Tool steels SKD61, etc. X40CrMoV5-1, etc. | - 300 HB | First choice | AH725 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | | | Fracture resistance | AH130 | 90 - 180 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | First choice | AH130 | 90 - 200 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| | | | Fracture resistance | AH130 | 90 - 200 | 0.12 - 0.33 | 0.09 - 0.25 | 0.07 - 0.21 | 0.07 - 0.2 |
| K | Grey cast irons FC250, etc. 250, etc. | 150 - 250 HB | - | AH120 | 120 - 230 | 0.12 - 0.42 | 0.09 - 0.31 | 0.07 - 0.27 | 0.07 - 0.25 |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150 - 250 HB | - | AH120 | 90 - 150 | 0.12 - 0.42 | 0.09 - 0.31 | 0.07 - 0.27 | 0.07 - 0.25 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH725 | 30 - 40 | 0.1 - 0.17 | 0.08 - 0.13 | 0.06 - 0.11 | 0.06 - 0.1 |
| | | | Fracture resistance | AH130 | 30 - 40 | 0.1 - 0.17 | 0.08 - 0.13 | 0.06 - 0.11 | 0.06 - 0.1 |
| | Nickel-based alloys Inconel 718, etc. | - 40 HRC | First choice | AH725 | 20 - 35 | 0.1 - 0.17 | 0.08 - 0.13 | 0.06 - 0.11 | 0.06 - 0.1 |
| | | | Fracture resistance | AH130 | 20 - 35 | 0.1 - 0.17 | 0.08 - 0.13 | 0.06 - 0.11 | 0.06 - 0.1 |

TEC TANGENTIAL ASN 10/12/15

Axial drive slot mill, for tangentially mounted inserts



| Designation | CW | DC | ZEP | CICT | DCSFMS | DCONMS | LF | b | KWW | CDX | KA | Insert |
|----------------------|----|-----|-----|------|--------|--------|----|------|------|------|--------|-------------------|
| ASN10R100M31.7-16-05 | 16 | 100 | 5 | 10 | 48 | 31.75 | 16 | 35.2 | 7.92 | 25 | 162 | LMEU1008**ZNEN-MJ |
| ASN10R100M32.0E16-05 | 16 | 100 | 5 | 10 | 47 | 32 | 16 | 34.8 | 8 | 25.5 | 162 | LMEU1008**ZNEN-MJ |
| ASN12R100M31.7-19-05 | 19 | 100 | 5 | 10 | 48 | 31.75 | 19 | 35.2 | 7.92 | 25 | 162 | LMEU1206**ZNEN-MJ |
| ASN12R100M32.0E19-05 | 19 | 100 | 5 | 10 | 47 | 32 | 19 | 34.8 | 8 | 25.5 | 162 | LMEU1208**ZNEN-MJ |
| ASN10R125M38.1-16-06 | 16 | 125 | 6 | 12 | 58 | 38.1 | 16 | 42.3 | 9.52 | 32.5 | 165 | LMEU1008**ZNEN-MJ |
| ASN10R125M40.0E16-06 | 16 | 125 | 6 | 12 | 55 | 40 | 16 | 43.5 | 10 | 34 | 165 | LMEU1008**ZNEN-MJ |
| ASN12R125M38.1-19-06 | 19 | 125 | 6 | 12 | 58 | 38.1 | 19 | 42.3 | 9.52 | 32.5 | 165 | LMEU1206**ZNEN-MJ |
| ASN12R125M40.0E19-06 | 19 | 125 | 6 | 12 | 55 | 40 | 19 | 43.5 | 10 | 34 | 165 | LMEU1208**ZNEN-MJ |
| ASN15R125M38.1-25-05 | 25 | 125 | 5 | 10 | 58 | 38.1 | 25 | 42.3 | 9.52 | 32.5 | 162 | LMEU1509**ZNEN-MJ |
| ASN15R125M40.0E25-05 | 25 | 125 | 5 | 10 | 55 | 40 | 25 | 43.5 | 10 | 34 | 165 | LMEU1509**ZNEN-MJ |
| ASN10R160M38.1-16-07 | 16 | 160 | 7 | 14 | 58 | 38.1 | 16 | 42.3 | 9.52 | 50 | 167.14 | LMEU1008**ZNEN-MJ |
| ASN10R160M40.0E16-07 | 16 | 160 | 7 | 14 | 55 | 40 | 16 | 43.5 | 10 | 51.5 | 167.14 | LMEU1008**ZNEN-MJ |
| ASN12R160M38.1-19-07 | 19 | 160 | 7 | 14 | 58 | 38.1 | 19 | 42.3 | 9.52 | 50 | 167.14 | LMEU1206**ZNEN-MJ |
| ASN12R160M40.0E19-07 | 19 | 160 | 7 | 14 | 55 | 40 | 19 | 43.5 | 10 | 51.5 | 167.14 | LMEU1208**ZNEN-MJ |
| ASN15R160M38.1-25-06 | 25 | 160 | 6 | 12 | 58 | 38.1 | 25 | 42.3 | 9.52 | 50 | 165 | LMEU1509**ZNEN-MJ |
| ASN15R160M40.0E25-06 | 25 | 160 | 6 | 12 | 55 | 40 | 25 | 43.5 | 10 | 51.5 | 167.14 | LMEU1509**ZNEN-MJ |
| ASN10R200M50.0E16-08 | 16 | 200 | 8 | 16 | 69 | 50 | 16 | 53.6 | 12 | 64.5 | 168.75 | LMEU1008**ZNEN-MJ |
| ASN12R200M50.0E19-08 | 19 | 200 | 8 | 16 | 69 | 50 | 19 | 53.6 | 12 | 64.5 | 168.75 | LMEU1208**ZNEN-MJ |
| ASN12R250M50.0E19-09 | 19 | 250 | 9 | 18 | 84 | 50 | 19 | 53.6 | 12 | 82 | 170 | LMEU1208**ZNEN-MJ |
| ASN15R200M50.0E25-07 | 25 | 200 | 7 | 14 | 69 | 50 | 25 | 53.6 | 12 | 64.5 | 168.75 | LMEU1509**ZNEN-MJ |
| ASN15R250M50.0E25-08 | 25 | 250 | 8 | 16 | 84 | 50 | 25 | 53.6 | 12 | 82 | 170 | LMEU1509**ZNEN-MJ |

SPARE PARTS

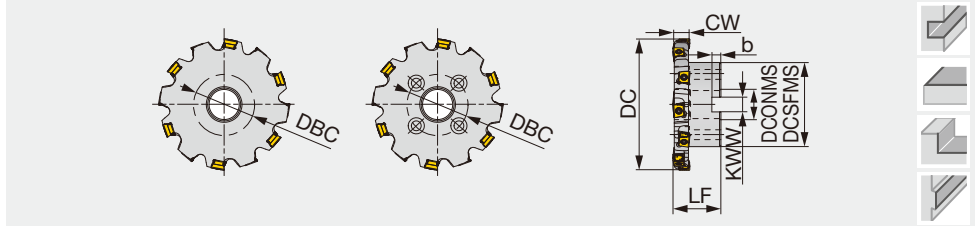
| Designation | Clamping screw | Grip (Optional) (H-TB) | Torx bit (Optional) (BT15S) |
|--------------|----------------|---------------------------|--------------------------------|
| ASN10/12R... | SM40-143-H0 | (H-TB) | (BT15S) |
| ASN15R... | CSTB-5L159 | (H-TB) | (BT20S) |

Reference pages: Inserts, Standard cutting conditions
→ **H191**

Recommended clamping torque (Torx size): SM40-143-H0 = 3.5 N·m (T15), CSTB-5L159 = 5 N·m (T20)



Radial drive slot mill, for tangentially mounted inserts



| Designation | CW | DC | ZEFP | CICT | DCSFMS | DCONMS | LF | b | KWW | CDX | DBC | Insert |
|----------------------|----|-----|------|------|--------|--------|----|----|------|------|-------|-------------------|
| TSN10R100M25.4-16-05 | 16 | 100 | 5 | 10 | 50 | 25.4 | 50 | 6 | 9.5 | 24 | - | LMEU1008**ZNEN-MJ |
| TSN10R100M27.0E16-05 | 16 | 100 | 5 | 10 | 58 | 27 | 50 | 7 | 12.4 | 20 | - | LMEU1008**ZNEN-MJ |
| TSN12R100M25.4-19-05 | 19 | 100 | 5 | 10 | 50 | 25.4 | 50 | 6 | 9.5 | 24 | - | LMEU1208**ZNEN-MJ |
| TSN12R100M27.0E19-05 | 19 | 100 | 5 | 10 | 58 | 27 | 50 | 7 | 12.4 | 20 | - | LMEU1208**ZNEN-MJ |
| TSN10R125M31.7-16-06 | 16 | 125 | 6 | 12 | 70 | 31.75 | 50 | 8 | 12.7 | 26.5 | - | LMEU1008**ZNEN-MJ |
| TSN10R125M32.0E16-06 | 16 | 125 | 6 | 12 | 66 | 32 | 50 | 8 | 14.4 | 28.5 | - | LMEU1008**ZNEN-MJ |
| TSN12R125M31.7-19-06 | 19 | 125 | 6 | 12 | 70 | 31.75 | 50 | 8 | 12.7 | 26.5 | - | LMEU1208**ZNEN-MJ |
| TSN12R125M32.0E19-06 | 19 | 125 | 6 | 12 | 66 | 32 | 50 | 8 | 14.4 | 28.5 | - | LMEU1208**ZNEN-MJ |
| TSN15R125M31.7-25-05 | 25 | 125 | 5 | 10 | 70 | 31.75 | 50 | 8 | 12.7 | 26.5 | - | LMEU1509**ZNEN-MJ |
| TSN15R125M32.0E25-05 | 25 | 125 | 5 | 10 | 66 | 32 | 50 | 8 | 14.4 | 28.5 | - | LMEU1509**ZNEN-MJ |
| TSN10R160M38.1-16-07 | 16 | 160 | 7 | 14 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | - | LMEU1008**ZNEN-MJ |
| TSN10R160M40.0E16-07 | 16 | 160 | 7 | 14 | 82 | 40 | 63 | 9 | 16.4 | 38 | - | LMEU1008**ZNEN-MJ |
| TSN12R160M38.1-19-07 | 19 | 160 | 7 | 14 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | - | LMEU1208**ZNEN-MJ |
| TSN12R160M40.0E19-07 | 19 | 160 | 7 | 14 | 82 | 40 | 63 | 9 | 16.4 | 38 | - | LMEU1208**ZNEN-MJ |
| TSN15R160M38.1-25-06 | 25 | 160 | 6 | 12 | 100 | 38.1 | 63 | 10 | 15.9 | 29 | - | LMEU1509**ZNEN-MJ |
| TSN15R160M40.0E25-06 | 25 | 160 | 6 | 12 | 82 | 40 | 63 | 9 | 16.4 | 38 | - | LMEU1509**ZNEN-MJ |
| TSN10R200M40.0E16-08 | 16 | 200 | 8 | 16 | 95 | 40 | 63 | 9 | 16.4 | 55 | 66.7 | LMEU1008**ZNEN-MJ |
| TSN10R200M47.6-16-08 | 16 | 200 | 8 | 16 | 135 | 47.625 | 63 | 14 | 25.4 | 31.5 | 101.6 | LMEU1008**ZNEN-MJ |
| TSN12R200M40.0E19-08 | 19 | 200 | 8 | 16 | 95 | 40 | 63 | 9 | 16.4 | 55 | 66.7 | LMEU1208**ZNEN-MJ |
| TSN12R200M47.6-19-08 | 19 | 200 | 8 | 16 | 135 | 47.625 | 63 | 14 | 25.4 | 31.5 | 101.6 | LMEU1208**ZNEN-MJ |
| TSN15R200M40.0E25-07 | 25 | 200 | 7 | 14 | 95 | 40 | 63 | 9 | 16.4 | 55 | 66.7 | LMEU1509**ZNEN-MJ |
| TSN15R200M47.6-25-07 | 25 | 200 | 7 | 14 | 135 | 47.625 | 63 | 14 | 25.4 | 31.5 | 101.6 | LMEU1509**ZNEN-MJ |
| TSN12R250M47.6-19-09 | 19 | 250 | 9 | 18 | 140 | 47.625 | 63 | 14 | 25.4 | 54 | 101.6 | LMEU1208**ZNEN-MJ |
| TSN12R250M60.0E19-09 | 19 | 250 | 9 | 18 | 135 | 60 | 63 | 14 | 25.7 | 60 | 101.6 | LMEU1208**ZNEN-MJ |
| TSN15R250M47.6-25-08 | 25 | 250 | 8 | 16 | 140 | 47.625 | 63 | 14 | 25.4 | 54 | 101.6 | LMEU1509**ZNEN-MJ |
| TSN15R250M60.0E25-08 | 25 | 250 | 8 | 16 | 135 | 60 | 63 | 14 | 25.7 | 60 | 101.6 | LMEU1509**ZNEN-MJ |

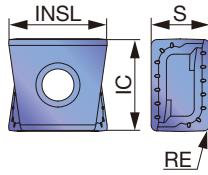
SPARE PARTS

| Designation | Clamping screw | Grip (Optional) | Torx bit (Optional) |
|--------------|----------------|-----------------|---------------------|
| TSN10/12R... | SM40-143-H0 | (H-TB) | (BT15S) |
| TSN15R... | CSTB-5L159 | (H-TB) | (BT20S) |

Recommended clamping torque (Torx size): SM40-143-H0 = 3.5 N·m (T15), CSTB-5L159 = 5 N·m (T20)

INSERT

LMEU-MJ



| | | | |
|-------------------------|---|---|---|
| P Steel | ☆ | ☆ | ★ |
| M Stainless | | ☆ | ★ |
| K Cast iron | ★ | ☆ | |
| N Non-ferrous | | | |
| S Superalloys | ★ | ★ | |
| H Hard materials | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | | INSL | IC | S |
|--------------------|-----|--------|-------|-------|--------|------|------|-----|
| | | AH120 | AH140 | AH725 | AH3135 | | | |
| LMEU100808ZNEN-MJ | 0.8 | ● | ● | ● | ● | 12.7 | 10.5 | 8 |
| LMEU100810ZNEN-MJ | 1 | ● | | | ● | 12.7 | 10.5 | 8 |
| LMEU100816ZNEN-MJ | 1.6 | ● | ● | ● | ● | 12.5 | 10.5 | 8 |
| LMEU100820ZNEN-MJ | 2 | ● | | | ● | 12.4 | 10.5 | 8 |
| LMEU100824ZNEN-MJ | 2.4 | ● | ● | ● | ● | 12.4 | 10.5 | 8 |
| LMEU100830ZNEN-MJ | 3 | ● | | | ● | 12.2 | 10.5 | 8 |
| LMEU100832ZNEN-MJ | 3.2 | ● | ● | ● | ● | 12.2 | 10.5 | 8 |
| LMEU120808ZNEN-MJ | 0.8 | ● | ● | ● | ● | 13.6 | 12.7 | 8 |
| LMEU120816ZNEN-MJ | 1.6 | ● | ● | ● | ● | 13.4 | 12.7 | 8 |
| LMEU120820ZNEN-MJ | 2 | ● | | | ● | 13.3 | 12.7 | 8 |
| LMEU120824ZNEN-MJ | 2.4 | ● | ● | ● | ● | 13.2 | 12.7 | 8 |
| LMEU120830ZNEN-MJ | 3 | ● | | | ● | 13.1 | 12.7 | 8 |
| LMEU120832ZNEN-MJ | 3.2 | ● | ● | ● | ● | 13.1 | 12.7 | 8 |
| LMEU150908ZNEN-MJ | 0.8 | ● | ● | ● | ● | 15.6 | 15 | 9.5 |
| LMEU150916ZNEN-MJ | 1.6 | ● | ● | ● | ● | 15.4 | 15 | 9.5 |
| LMEU150920ZNEN-MJ | 2 | ● | | | ● | 15.4 | 15 | 9.5 |
| LMEU150924ZNEN-MJ | 2.4 | ● | ● | ● | ● | 15.3 | 15 | 9.5 |
| LMEU150930ZNEN-MJ | 3 | ● | | | ● | 15.2 | 15 | 9.5 |
| LMEU150932ZNEN-MJ | 3.2 | ● | ● | ● | ● | 15.1 | 15 | 9.5 |
| LMEU150940ZNEN-MJ* | 4 | ● | | | ● | 14.9 | 15 | 9.5 |
| LMEU150950ZNEN-MJ* | 5 | ● | | | ● | 14.7 | 15 | 9.5 |

* Please note that LMEU150940 and LMEU150950 inserts are for special cutter bodies only and do not fit standard versions.

● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Priority | Grade | Cutting speed Vc (m/min) | Feed per edge line: fz (mm/t) | | | |
|---|---|---------------------|---------------------|----------|--------------------------|-------------------------------|-------------|-------------|-------------|
| | | | | | | TSN / ASN | | | |
| | | | | | | 10% | 20% | 30% | ≤ 50% |
| P | Low carbon steels SS400, etc. E275A, etc. | - 200 HB | First choice | AH3135 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| | | | Fracture resistance | AH725 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| | High carbon steels S45C, etc. C45, etc. | 200 - 300 HB | First choice | AH3135 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| | | | Fracture resistance | AH725 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| | Alloy steels SCM440, etc. 42CrMo4, etc. | 150 - 300 HB | First choice | AH3135 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| | | | Fracture resistance | AH725 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| Tool steels SKD61, etc. X40CrMoV5-1, etc. | - 300 HB | First choice | AH3135 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 | |
| | | Fracture resistance | AH725 | 90 - 180 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 | |
| M | Stainless steel SUS304, etc. X5CrNi18-9, etc. | - 200 HB | - | AH3135 | 90 - 200 | 0.22 - 0.42 | 0.16 - 0.31 | 0.14 - 0.27 | 0.13 - 0.25 |
| K | Grey cast irons FC250, etc. 250, etc. | 150 - 250 HB | - | AH120 | 120 - 230 | 0.22 - 0.5 | 0.16 - 0.38 | 0.14 - 0.32 | 0.13 - 0.3 |
| | Ductile cast irons FCD400, etc. 400-15S, etc. | 150 - 250 HB | - | AH120 | 90 - 150 | 0.22 - 0.33 | 0.16 - 0.25 | 0.14 - 0.21 | 0.13 - 0.2 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | First choice | AH725 | 30 - 40 | 0.12 - 0.22 | 0.09 - 0.16 | 0.07 - 0.14 | 0.07 - 0.13 |
| | Nickel-based alloys Inconel 718, etc. | - 40 HRC | First choice | AH725 | 20 - 35 | 0.12 - 0.22 | 0.09 - 0.16 | 0.07 - 0.14 | 0.07 - 0.13 |



ADD^{FORCE} BARREL



Barrel-shaped inserts for profile milling with productivity boost!

Large R cutting edge and multi-flute design for unparalleled productivity



Large R for small cusp height



Close pitch design

ADD^{FORCE} BARREL
DCX = 20 mm, PRFRAD = 30 mm



Large pitch

Cusp height

Ball endmill
DCX = 20 mm, R = 10 mm

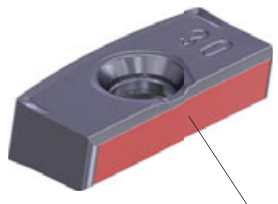


Small pitch

Cusp height

AddForceBarrel reduces the number of passes by 40% compared to ball endmill with 10 mm radius without compromising the surface quality (cusp height).

Excellent clamping reliability with dove-tail back support



Wide contact surface



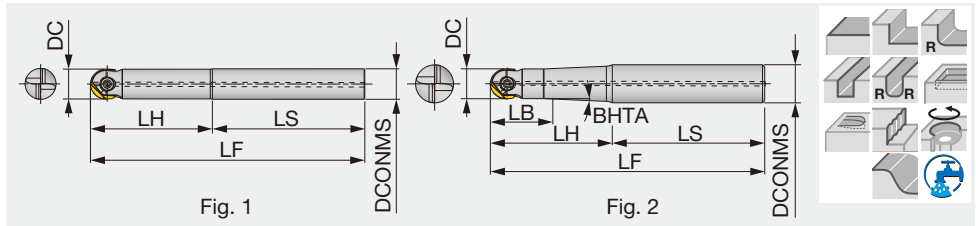
High clamping rigidity



Dove-tail clamping

Reference pages: **H198 - H199**

High precision finishing endmill, shank type, with screw clamp system



| Designation | DC | DCONMS | LS | LH | LF | LB | BHTA | Air hole | Fig. | Shank material | Insert |
|---------------|----|--------|-----|-----|-----|------|------|----------|------|----------------|-------------------------|
| EBFM08T12S100 | 8 | 12 | 80 | 20 | 100 | 10 | 9.5° | With | 2 | Steel | ZFBM080... |
| EBFM08S08C100 | 8 | 8 | 70 | 30 | 100 | - | - | Without | 1 | Carbide | ZFBM080... |
| EBFM08S08C140 | 8 | 8 | 75 | 65 | 140 | - | - | Without | 1 | Carbide | ZFBM080... |
| EBFM10T12S100 | 10 | 12 | 75 | 25 | 100 | 15 | 5° | With | 2 | Steel | ZFBM100... |
| EBFM10S10C140 | 10 | 10 | 65 | 75 | 140 | - | - | Without | 1 | Carbide | ZFBM100... |
| EBFM10S10C220 | 10 | 10 | 80 | 140 | 220 | - | - | Without | 1 | Carbide | ZFBM100... |
| EBFM12S12S110 | 12 | 12 | 80 | 30 | 110 | - | - | With | 1 | Steel | ZF*M120..., ZFCBM120... |
| EBFM12S12C160 | 12 | 12 | 70 | 90 | 160 | - | - | Without | 1 | Carbide | ZF*M120..., ZFCBM120... |
| EBFM12S12C220 | 12 | 12 | 70 | 150 | 220 | - | - | Without | 1 | Carbide | ZF*M120..., ZFCBM120... |
| EBFM16T20S130 | 16 | 20 | 80 | 50 | 130 | 15.5 | 1.5° | With | 2 | Steel | ZF*M160..., ZFCBM160... |
| EBFM16S16C160 | 16 | 16 | 80 | 80 | 160 | - | - | Without | 1 | Carbide | ZF*M160..., ZFCBM160... |
| EBFM16S16C220 | 16 | 16 | 70 | 150 | 220 | - | - | Without | 1 | Carbide | ZF*M160..., ZFCBM160... |
| EBFM20T25S180 | 20 | 25 | 100 | 80 | 180 | 24 | 2.5° | With | 2 | Steel | ZF*M200..., ZFCBM200... |
| EBFM20S20C220 | 20 | 20 | 100 | 120 | 220 | - | - | Without | 1 | Carbide | ZF*M200..., ZFCBM200... |
| EBFM20S20C300 | 20 | 20 | 80 | 220 | 300 | - | - | Without | 1 | Carbide | ZF*M200..., ZFCBM200... |
| EBFM25T32S200 | 25 | 32 | 100 | 100 | 200 | 32 | 1.5° | With | 2 | Steel | ZFBM250..., ZFCBM250... |
| EBFM25S25C220 | 25 | 25 | 100 | 120 | 220 | - | - | Without | 1 | Carbide | ZFBM250..., ZFCBM250... |
| EBFM25S25C300 | 25 | 25 | 80 | 220 | 300 | - | - | Without | 1 | Carbide | ZFBM250..., ZFCBM250... |
| EBFM30T32S220 | 30 | 32 | 120 | 100 | 220 | 35 | 0.5° | With | 2 | Steel | ZFBM300..., ZFCBM300... |
| EBFM30S32C250 | 30 | 32 | 100 | 150 | 250 | - | - | Without | 1 | Carbide | ZFBM300..., ZFCBM300... |
| EBFM30S32C350 | 30 | 32 | 100 | 250 | 350 | - | - | Without | 1 | Carbide | ZFBM300..., ZFCBM300... |
| EBFM32S32S250 | 32 | 32 | 150 | 100 | 250 | - | - | With | 1 | Steel | ZFBM320... |
| EBFM32S32C300 | 32 | 32 | 80 | 220 | 300 | - | - | Without | 1 | Carbide | ZFBM320... |

SPARE PARTS



| Designation | Clamping screw | Torx bit | Grip | Wrench |
|-------------|----------------|-------------|----------|--------|
| EBFM08... | TS 25F080A | - | - | T-8D |
| EBFM10... | TS 30F100A | - | - | T-10D |
| EBFM12... | TS 40F120A | - | - | T-15D |
| EBFM16... | TS 50F160A | (BT20S) | (H-TB2W) | - |
| EBFM20... | TS 60F200A | (BLDT25/M7) | (H-TB2W) | - |
| EBFM25... | TS 70F250A | (BLDT25/M7) | (H-TB2W) | - |
| EBFM30... | TS 80F300A | - | - | T-T30 |
| EBFM32... | TS 80F300A | - | - | T-T30 |

Recommended clamping torque: TS 25F080A = 1.3 N-m, TS 30F100A = 2.5 N-m, TS 40F120A = 3.5 N-m, TS 50F160A = 5 N-m, TS 60F200A, TS 70F250A = 7 N-m, TS 80F300A = 10 N-m





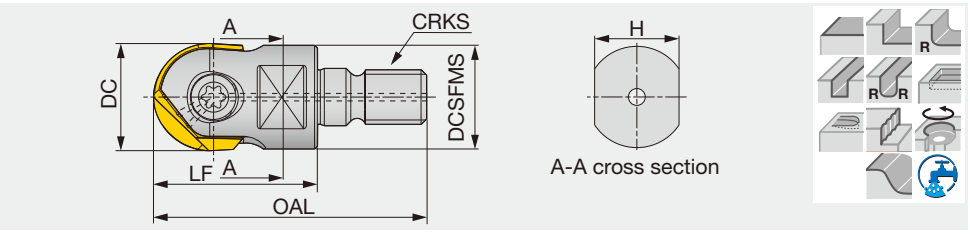
BALLFINISH HBFM

High precision finishing endmill, modular type (TungFlex), with screw clamp system



Approach angle

- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others



| Designation | DC | OAL | LF | H | DCSFMS | CRKS | Air hole | Insert |
|-------------|----|------|----|----|--------|------|----------|-------------------------|
| HBFM10M06 | 10 | 34.5 | 20 | 7 | 9.7 | M6 | With | ZFBM100... |
| HBFM12M06 | 12 | 37.5 | 23 | 7 | 11.5 | M6 | With | ZF*M120..., ZFCBM120... |
| HBFM12M08 | 12 | 40 | 23 | 10 | 13 | M8 | With | ZF*M120..., ZFCBM120... |
| HBFM16M08 | 16 | 47 | 30 | 10 | 13 | M8 | With | ZF*M160..., ZFCBM160... |
| HBFM20M10 | 20 | 49 | 30 | 15 | 19 | M10 | With | ZF*M200..., ZFCBM200... |
| HBFM25M12 | 25 | 57 | 35 | 17 | 24 | M12 | With | ZFBM250..., ZFCBM250... |
| HBFM30M16 | 30 | 66 | 43 | 22 | 29 | M16 | With | ZFBM300..., ZFCBM300... |
| HBFM32M16 | 32 | 66 | 43 | 22 | 29.5 | M16 | With | ZFBM320... |

SPARE PARTS



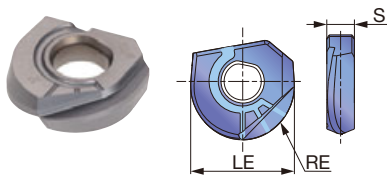
| Designation | Clamping screw | Torx bit | Grip | Wrench |
|----------------------|----------------|-----------|--------|--------|
| HBFM10... | TS 30F100A | - | - | T-10D |
| HBFM12... | TS 40F120A | - | - | T-15D |
| HBFM16... | TS 50F160A | BT20S | H-TB2W | - |
| HBFM20... | TS 60F200A | BLDT25/M7 | H-TB2W | - |
| HBFM25... | TS 70F250A | BLDT25/M7 | H-TB2W | - |
| HBFM30..., HBFM32... | TS 80F300A | - | - | T-T30 |

Recommended clamping torque :
 TS 25F080A = 1.3 N-m, TS 30F100A = 2.5 N-m,
 TS 40F120A = 3.5 N-m, TS 50F160A = 5 N-m,
 TS 60F200A, TS 70F250A = 7 N-m, TS 80F300A = 10 N-m

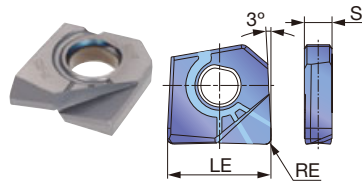
Reference pages: TungFlex → **H036 - H037**

INSERT

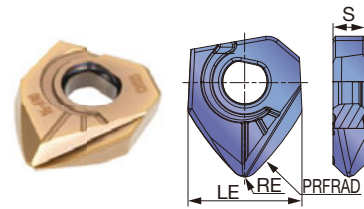
ZFBM-MJ



ZFRM-MJ



ZFCBM-MM



| | | | | |
|---|----------------|---|---|---|
| P | Steel | ★ | ☆ | ★ |
| M | Stainless | ★ | | ☆ |
| K | Cast iron | ★ | ★ | ☆ |
| N | Non-ferrous | ☆ | | ☆ |
| S | Superalloys | ★ | | ★ |
| H | Hard materials | ★ | ★ | ☆ |

★ : First choice
☆ : Second choice

| Designation | PRFRAD | RE | Coated | | | LE | S |
|-----------------|--------|------|--------|-------|-------|----|-----|
| | | | CH315 | AH710 | AH725 | | |
| ZFBM080R00-MJ | - | 4 | ● | ● | | 8 | 2.4 |
| ZFBM100R00-MJ | - | 5 | ● | ● | | 10 | 2.9 |
| ZFBM120R00-MJ | - | 6 | ● | ● | | 12 | 3.4 |
| ZFBM160R00-MJ | - | 8 | ● | ● | | 16 | 4.4 |
| ZFBM200R00-MJ | - | 10 | ● | ● | | 20 | 5.4 |
| ZFBM250R00-MJ | - | 12.5 | ● | ● | | 25 | 6.4 |
| ZFBM300R00-MJ | - | 15 | ● | ● | | 30 | 7.4 |
| ZFBM320R00-MJ | - | 16 | ● | ● | | 32 | 7.4 |
| ZFRM120R05-MJ | - | 0.5 | ● | ● | | 12 | 3.4 |
| ZFRM120R10-MJ | - | 1 | ● | ● | | 12 | 3.4 |
| ZFRM160R05-MJ | - | 0.5 | ● | ● | | 16 | 4.4 |
| ZFRM160R10-MJ | - | 1 | ● | ● | | 16 | 4.4 |
| ZFRM160R15-MJ | - | 1.5 | ● | ● | | 16 | 4.4 |
| ZFRM200R10-MJ | - | 1 | ● | ● | | 20 | 5.4 |
| ZFRM200R15-MJ | - | 1.5 | ● | ● | | 20 | 5.4 |
| ZFCBM120R300-MM | 30 | 1.5 | ● | | | 12 | 3.4 |
| ZFCBM160R400-MM | 40 | 2 | ● | | | 16 | 4.4 |
| ZFCBM200R500-MM | 50 | 2.5 | ● | | | 20 | 5.4 |
| ZFCBM250R625-MM | 62.5 | 3 | ● | | | 25 | 6.4 |
| ZFCBM300R750-MM | 75 | 3.5 | ● | | | 30 | 7.4 |

With ZFCBM insert, the functional length (LF) of the EBFM and HBFM cutters becomes longer for the amount as indicated below: ● : Line up

For E/HBFM12, +2.6 mm; E/HBFM16, +4 mm; E/HBFM20, +4.4 mm; E/HBFM25, +5.8 mm; and E/HBFM30, +5.9 mm.

ZFBM080/100/120/160... : 5 piece per package, ZFBM200/250/300/320... : 1 piece per package

ZFRM120/160... : 5 piece per package, ZFRM200... : 1 piece per package

STANDARD CUTTING CONDITIONS

ZF*M-MJ



| ISO | Workpiece materials | Hardness | Priority | Grades | Max. depth of cut (mm) | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | | | | |
|----------|--|--------------|---------------------|--------|------------------------|--------------------------|---------------------------|------|------|------|------|------|------|------|
| | | | | | | | D8 | D10 | D12 | D16 | D20 | D25 | D30 | D32 |
| P | Low carbon steel, alloy steel | 85 - 180 HB | First choice | AH725 | ≤ 0.04D | 180 - 260 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.35 | 0.35 |
| | | 85 - 180 HB | Wear resistance | AH710 | ≤ 0.04D | 180 - 260 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.35 | 0.35 |
| | High carbon steel, alloy steel | 180 - 280 HB | First choice | AH725 | ≤ 0.03D | 150 - 230 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.35 | 0.35 |
| | | 180 - 280 HB | Wear resistance | AH710 | ≤ 0.03D | 180 - 230 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.35 | 0.35 |
| | Prehardened steel Die & mold tool steel | 40 - 48 HRC | First choice | AH710 | ≤ 0.03D | 180 - 300 | 0.15 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.3 |
| | | 40 - 48 HRC | Fracture resistance | AH725 | ≤ 0.03D | 180 - 300 | 0.15 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.3 |
| M | Stainless steel | 135 - 200 HB | First choice | AH725 | ≤ 0.03D | 100 - 250 | 0.1 | 0.15 | 0.2 | 0.2 | 0.25 | 0.25 | 0.3 | 0.3 |
| K | Cast iron | 150 - 240 HB | First choice | AH710 | ≤ 0.04D | 90 - 350 | 0.2 | 0.2 | 0.25 | 0.3 | 0.3 | 0.35 | 0.4 | 0.4 |
| | | 150 - 240 HB | Fracture resistance | AH725 | ≤ 0.04D | 90 - 350 | 0.2 | 0.2 | 0.25 | 0.3 | 0.3 | 0.35 | 0.4 | 0.4 |
| N | Aluminium | - | First choice | AH725 | ≤ 0.03D | 200 - 400 | 0.25 | 0.25 | 0.35 | 0.35 | 0.35 | 0.4 | 0.4 | 0.45 |
| S | Titanium alloy | - 40 HRC | First choice | AH725 | ≤ 0.03D | 30 - 80 | 0.08 | 0.08 | 0.1 | 0.12 | 0.15 | 0.18 | 0.2 | 0.2 |
| | Heat-resistance alloys | - 40 HRC | First choice | AH725 | ≤ 0.03D | 20 - 60 | 0.08 | 0.08 | 0.1 | 0.12 | 0.15 | 0.18 | 0.2 | 0.2 |
| H | High hardened steel | 48 - 65 HRC | First choice | AH710 | ≤ 0.02D | 50 - 180 | 0.08 | 0.08 | 0.1 | 0.13 | 0.15 | 0.2 | 0.2 | 0.25 |

- Remove excessive chip accumulation with an air blast.
- For the operation with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (fz) should be set to the lower recommended value shown in the above table.
- Cutting conditions maybe limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

How to clamp the insert

1. Clear chips and dust from the pocket.
2. Place the insert in the pocket. The insert can be placed only in one direction.
3. Tighten the screw while pressing the insert into the pocket.

How to check the run-out

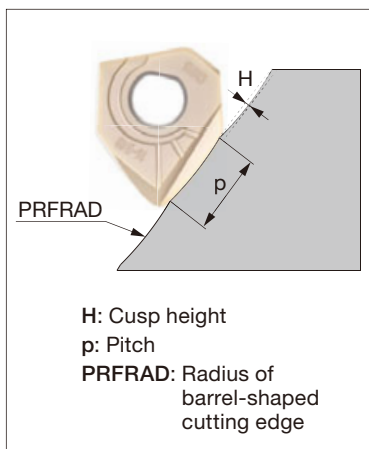
1. Clamp the insert on the shank.
 2. Clamp the shank on a high-precision arbor.
 3. Measure the run-out on tool presetter or by dial gauge.
- Notes:
1. Due to the helical cutting edge, it is important that the run-out is inspected with the insert clamped on the shank.
 2. Do not use micrometer or caliper to inspect the insert diameter as inaccurate dimensions may be provided.

STANDARD CUTTING CONDITIONS

ZFCBM-MM

| ISO | Workpiece materials | Hardness | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Width of cut ae (mm) |
|----------|---|-------------|-----------------------------|-----------------------------|-------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40HRC | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| M | Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Precipitation hardening stainless steel SUS630, etc. X5CrNiCuNb16-4, etc. | - 45HRC | 100 - 300 | 0.05 - 0.25 | < 0.2 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 45HRC | 40 - 120 | 0.05 - 0.2 | < 0.2 |
| | Superalloys Inconel718, etc. | - 45HRC | 20 - 80 | 0.05 - 0.2 | < 0.2 |
| H | Hardened steel SKD61, etc. X40CrMoV5-1, etc. | 40 - 55HRC | 50 - 300 | 0.05 - 0.2 | < 0.2 |

■ Cusp height and pitch



To obtain the pitch (p) from the given cusp height (H)

| PRFRAD (mm) | H (mm) | | | | | | | |
|---------------------------|--------|-------|-------|-------|-------|------|-------|------|
| | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 | 0.015 | 0.02 |
| 30 (ZFCBM120R300...) | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 | 1.9 | 2.19 |
| 40 (ZFCBM160R400...) | 0.57 | 0.8 | 0.98 | 1.13 | 1.26 | 1.79 | 2.19 | 2.53 |
| 50 (ZFCBM200R500...) | 0.63 | 0.89 | 1.1 | 1.26 | 1.41 | 2 | 2.45 | 2.83 |
| 62.5 (ZFCBM250R625...) | 0.71 | 1 | 1.22 | 1.41 | 1.58 | 2.24 | 2.74 | 3.16 |
| 75 (ZFCBM300R750...) | 0.77 | 1.1 | 1.34 | 1.55 | 1.73 | 2.45 | 3 | 3.46 |

$$p = \sqrt{8 \times H \times \text{PRFRAD}}$$

(mm)

To obtain the cusp height (H) from the given pitch (p)

| PRFRAD (mm) | p (mm) | | | | | | |
|---------------------------|---------|-------|-------|-------|-------|-------|-------|
| | 0.5 | 0.75 | 1 | 1.25 | 1.5 | 1.75 | 2 |
| 30 (ZFCBM120R300...) | 0.001 | 0.002 | 0.004 | 0.007 | 0.009 | 0.013 | 0.017 |
| 40 (ZFCBM160R400...) | 0.001 | 0.002 | 0.003 | 0.005 | 0.007 | 0.01 | 0.013 |
| 50 (ZFCBM200R500...) | 0.001 | 0.001 | 0.003 | 0.004 | 0.006 | 0.008 | 0.01 |
| 62.5 (ZFCBM250R625...) | 0.001 | 0.001 | 0.002 | 0.003 | 0.005 | 0.006 | 0.008 |
| 75 (ZFCBM300R750...) | < 0.001 | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.007 |

$$H = \frac{p^2}{8 \times \text{PRFRAD}}$$

(mm)



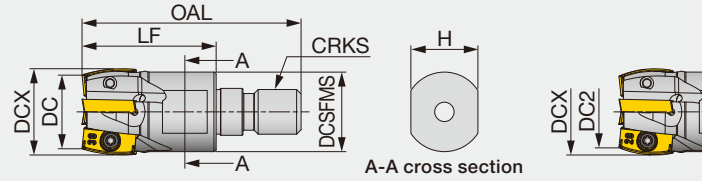
Profiling endmill, modular type (TungFlex)

GAMP = +7.1° ~ +9.2°, GAMF = -20.8° ~ -17.9°



with ZNHU1003R30-MM

with ZNHU1003R20-MM



| Designation | DCX | CICT | DC | DC2 | OAL | LF | DCSFMS | CRKS | H | WT(kg) | Air hole | Insert |
|------------------|-----|------|------|------|-----|----|--------|------|----|--------|----------|-------------|
| HFZN10M016M08R03 | 16 | 3 | 13 | 12.5 | 42 | 25 | 14.5 | M8 | 10 | 0.02 | With | ZNHU1003... |
| HFZN10M020M10R04 | 20 | 4 | 17 | 16.5 | 49 | 30 | 17.8 | M10 | 15 | 0.05 | With | ZNHU1003... |
| HFZN10M025M12R05 | 25 | 5 | 22 | 21.5 | 57 | 35 | 23 | M12 | 17 | 0.1 | With | ZNHU1003... |
| HFZN10M035M16R07 | 35 | 7 | 31.9 | 31.4 | 63 | 40 | 28.8 | M16 | 22 | 0.22 | With | ZNHU1003... |
| HFZN10M040M16R08 | 40 | 8 | 36.9 | 36.4 | 63 | 40 | 28.8 | M16 | 22 | 0.25 | With | ZNHU1003... |

SPARE PARTS

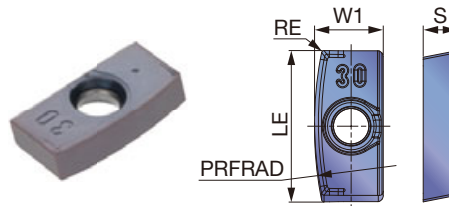
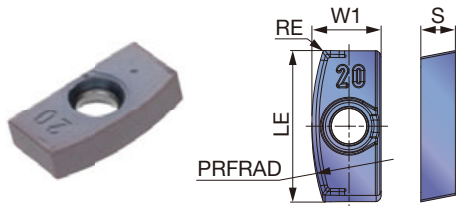
| Designation | Clamping screw | Wrench |
|-------------|---------------------|--------|
| HFZN10... | SR M2.5X0.45-L6 IP7 | IP-7D |

Recommended clamping torque: 1 N·m

INSERTS

ZNHU1003R20-MM

ZNHU1003R30-MM



| Material | Steel | Stainless | Cast iron | Non-ferrous | Superalloy | Hard materials |
|----------|-------|-----------|-----------|-------------|------------|----------------|
| ★ | ★ | ★ | ★ | ★ | ★ | ☆ |

★ : First choice
☆ : Second choice

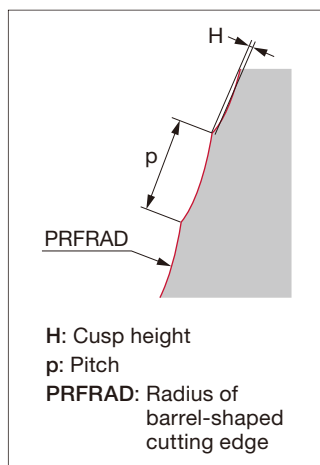
| Designation | PRFRAD | RE | Coated | | | | | | | LE | W1 | S | |
|----------------|--------|-----|--------|--|--|--|--|--|--|----|------|------|-----|
| | | | AH9130 | | | | | | | | | | |
| ZNHU1003R20-MM | 20 | 0.2 | ● | | | | | | | | 11.5 | 5.61 | 2.8 |
| ZNHU1003R30-MM | 30 | 0.2 | ● | | | | | | | | 11.5 | 5.56 | 2.8 |

● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Width of cut ae (mm) |
|----------|---|--------------|-----------------------------|-----------------------------|-------------------------|
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200 HB | 100 - 600 | 0.05 - 0.3 | < 0.4 |
| | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| M | Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 100 - 500 | 0.05 - 0.3 | < 0.3 |
| | Precipitation hardening stainless steel SUS630, etc. X5CrNiCuNb16-4, etc. | - 45 HRC | 100 - 300 | 0.05 - 0.25 | < 0.2 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| | Ductile cast iron FCD400, etc. 400-15, 600-3, etc. | 150 - 250 HB | 100 - 600 | 0.05 - 0.3 | < 0.3 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 45 HRC | 40 - 120 | 0.05 - 0.2 | < 0.2 |
| | Superalloys Inconel718, etc. | - 45 HRC | 20 - 80 | 0.05 - 0.2 | < 0.2 |
| H | Hardened steel SKD61, etc. X40CrMoV5-1, etc. | 40 - 55 HRC | 50 - 300 | 0.05 - 0.2 | < 0.2 |

■ Cusp height and pitch



To obtain the pitch (p) from the given cusp height (H)

| H (mm) \ PRFRAD (mm) | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 | 0.015 | 0.02 |
|------------------------|-------|-------|-------|-------|-------|------|-------|------|
| 20 (ZNHU1003R20...) | 0.4 | 0.57 | 0.69 | 0.8 | 0.89 | 1.26 | 1.55 | 1.79 |
| 30 (ZNHU1003R30...) | 0.49 | 0.69 | 0.85 | 0.98 | 1.1 | 1.55 | 1.9 | 2.19 |

$$p = \sqrt{8 \times H \times \text{PRFRAD}}$$

(mm)

To obtain the cusp height (H) from the given pitch (p)

| p (mm) \ PRFRAD (mm) | 0.5 | 0.75 | 1 | 1.25 | 1.5 | 1.75 | 2 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| 20 (ZNHU1003R20...) | 0.002 | 0.004 | 0.006 | 0.01 | 0.014 | 0.019 | 0.025 |
| 30 (ZNHU1003R30...) | 0.001 | 0.002 | 0.004 | 0.007 | 0.009 | 0.013 | 0.017 |

$$H = \frac{p^2}{8 \times \text{PRFRAD}}$$

(mm)



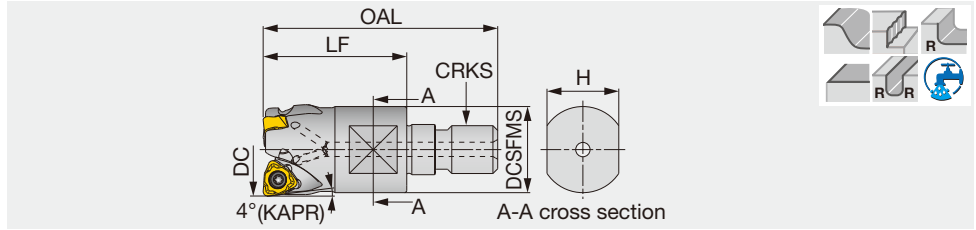


DOMMILL

HFWX04-M

Small-radius finishing endmill, modular type (TungFlex)

GAMP = 0°, GAMF = -14°



| Designation | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|----|------|-----|----|----|--------|------|--------|----------|-----------|
| HFWX04M016M08R02 | 16 | 2 | 42 | 25 | 10 | 13 | M8 | 0.03 | With | WXHU04... |
| HFWX04M020M10R03 | 20 | 3 | 49 | 30 | 15 | 18 | M10 | 0.05 | With | WXHU04... |
| HFWX04M025M12R04 | 25 | 4 | 52 | 30 | 17 | 21 | M12 | 0.09 | With | WXHU04... |

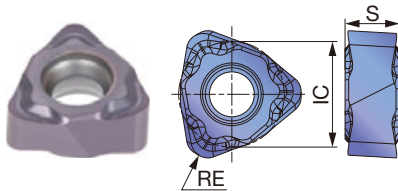
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------|----------------|----------------------|--------|
| HFWX04M... | SR34-514 | (M-1000) | T-7F |

Recommended clamping torque: 0.9 N·m

INSERT

WXHU-MJ



| Designation | RE | APMX | Coated | | IC | S |
|----------------|-----|------|--------|--|------|------|
| | | | AH110 | | | |
| WXHU040305R-MJ | 0.5 | 0.5 | ● | | 6.35 | 3.18 |
| WXHU040310R-MJ | 1 | 1 | ● | | 6.35 | 3.18 |

* For plunging, the maximum cutting width is 2 mm.

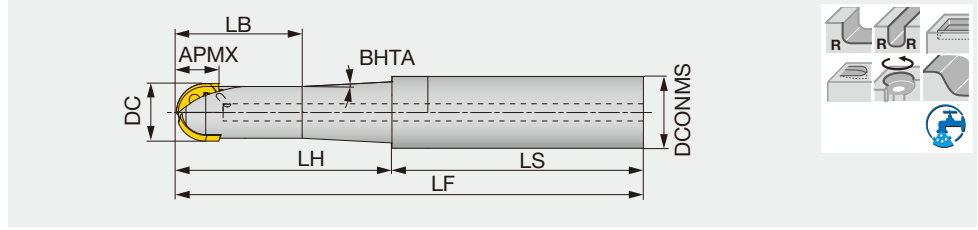
●: Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|---|----------------------------------|-------|--------------------------|--------------------------|
| P | High carbon steel S45C, S55C, etc. C45, C55, etc. Alloy steel SCM440, etc. 42CrMo4, SCr145, etc. | 200 - 300 HB | AH110 | 100 - 300 | 0.1 - 0.3 |
| | Prehardened steel NAK80, PX5, etc. | 150 - 300 HB | AH110 | 100 - 300 | 0.1 - 0.3 |
| | | 30 - 40 HRC | AH110 | 100 - 300 | 0.05 - 0.3 |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | AH110 | 80 - 130 | 0.1 - 0.3 |
| | | SKD11, etc. X153CrMoV12, etc. | AH110 | 50 - 100 | 0.05 - 0.15 |

Reference pages: TungFlex → **H036 - H037**

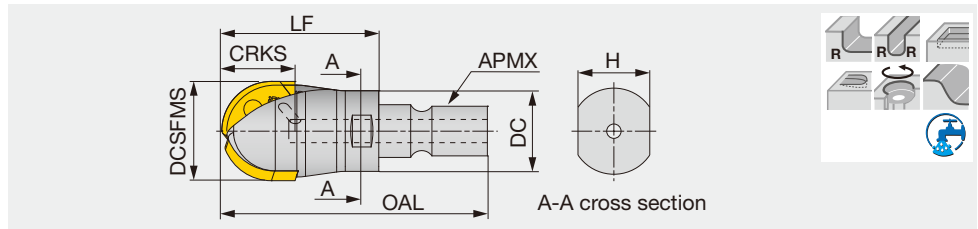
Ball nose endmill for semi-roughing, shank type, with screw clamp system



| Designation | APMX | DC | CICT | DCONMS | LS | LF | LH | LB | BHTA | WT(kg) | Air hole | Insert |
|---------------|------|----|------|--------|-----|-----|-----|----|------|--------|----------|------------|
| EBRM16T20S130 | 11.8 | 16 | 2 | 20 | 70 | 130 | 60 | 35 | 3 | 0.235 | With | ZRBM160... |
| EBRM16T20S200 | 11.8 | 16 | 2 | 20 | 140 | 200 | 60 | 35 | 3 | 0.395 | With | ZRBM160... |
| EBRM20T25S160 | 13.6 | 20 | 2 | 25 | 85 | 160 | 75 | 45 | 3 | 0.455 | With | ZRBM200... |
| EBRM20T25S220 | 13.6 | 20 | 2 | 25 | 135 | 220 | 85 | 60 | 5 | 0.655 | With | ZRBM200... |
| EBRM25T32S200 | 17.7 | 25 | 2 | 32 | 115 | 200 | 85 | 55 | 6 | 0.965 | With | ZRBM250... |
| EBRM25T32S300 | 17.7 | 25 | 2 | 32 | 180 | 300 | 120 | 70 | 4 | 1.505 | With | ZRBM250... |

HBRM...

Ball nose endmill for semi-roughing, modular type (TungFlex), with screw clamp system



| Designation | APMX | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|-------------|------|----|------|------|----|----|--------|------|--------|----------|------------|
| HBRM16M08 | 11.8 | 16 | 2 | 42.5 | 25 | 10 | 13 | M8 | 0.025 | With | ZRBM160... |
| HBRM20M10 | 13.6 | 20 | 2 | 50 | 30 | 15 | 18 | M10 | 0.05 | With | ZRBM200... |
| HBRM25M12 | 17.7 | 25 | 2 | 57 | 35 | 17 | 21 | M12 | 0.08 | With | ZRBM250... |

SPARE PARTS



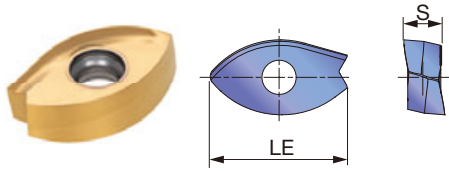
| Designation | Clamping screw | Wrench |
|----------------------|----------------|--------|
| EBRM16..., HBRM16... | TS25064I | T-8D |
| EBRM20..., HBRM20... | TS30085I/HG | T-9D |
| EBRM25..., HBRM25... | TS35085I/HG | T-15D |

Recommended clamping torque: TS25064I = 1.3 N·m, TS30085I/HG = 2.3 N·m, TS35085I/HG = 3.5 N·m

High Feed Milling
 Face Milling
 Shoulder Milling
 Slot Milling
 Profile Milling
 Chamfering, Counterbore
 Finish Face Milling

INSERT

ZRBM...



| | | | | | | | | | | | | |
|-------------------------|---|--|--|--|--|--|--|--|--|--|--|--|
| P Steel | ★ | | | | | | | | | | | |
| M Stainless | ☆ | | | | | | | | | | | |
| K Cast iron | ☆ | | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | |
| S Superalloys | ☆ | | | | | | | | | | | |
| H Hard materials | ☆ | | | | | | | | | | | |

★ : First choice
 ☆ : Second choice

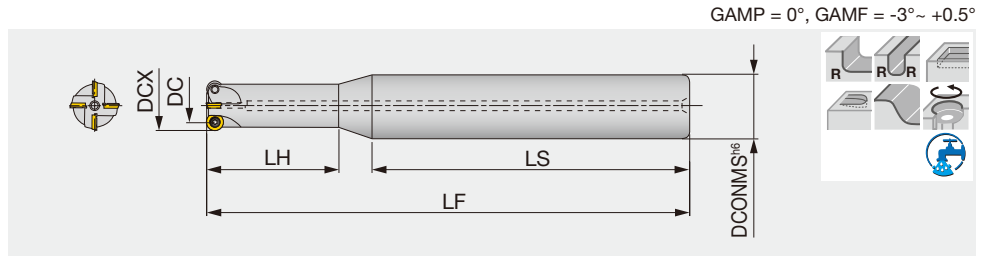
| Designation | RE | Coated | | | | | | | | | | LE | S | |
|-------------|------|--------|--|--|--|--|--|--|--|--|--|----|------|-----|
| | | APH730 | | | | | | | | | | | | |
| ZRBM160-MM | 8 | ● | | | | | | | | | | | 12.4 | 3.7 |
| ZRBM200-MM | 10 | ● | | | | | | | | | | | 14.9 | 4.8 |
| ZRBM250-MM | 12.5 | ● | | | | | | | | | | | 18.9 | 5.9 |

● : Line up
 5 piece per package

STANDARD CUTTING CONDITIONS

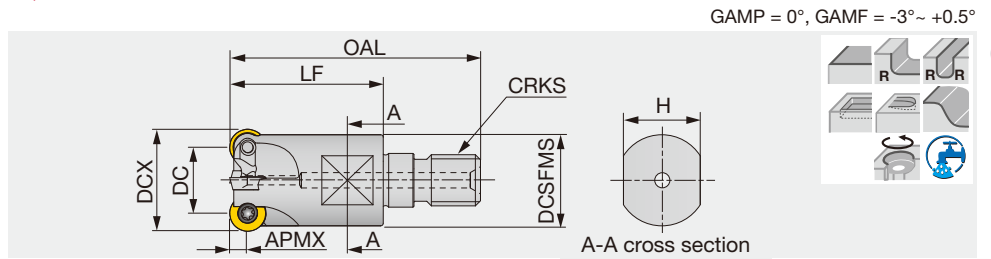
| ISO | Workpiece materials | Hardness | Selection criteria | Recommended grade | Chip-breaker | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---|-------------|--------------------|-------------------|--------------|--------------------------|--------------------------|
| P | Low carbon steel S15C, etc. C15, etc. | - 300HB | First choice | APH730 | MM | 150 - 350 | 0.08 - 0.6 |
| | High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300HB | First choice | APH730 | MM | 120 - 320 | 0.05 - 0.5 |
| | Prehardened steels NAK80, PX5 etc. | 30 - 40HRC | First choice | APH730 | MM | 100 - 200 | 0.05 - 0.5 |
| M | Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - 200HB | First choice | APH730 | MM | 100 - 280 | 0.05 - 0.6 |
| | Martensitic stainless steel SUS420J1, etc. X20Cr13, etc. | - 200HB | First choice | APH730 | MM | 100 - 300 | 0.05 - 0.6 |
| K | Gray cast irons FC250, etc. 250, etc. | 150 - 250HB | First choice | APH730 | MM | 120 - 380 | 0.08 - 0.6 |
| | Ductile cast iron FCD600, etc. 600-3, etc. | 150 - 250HB | First choice | APH730 | MM | 100 - 280 | 0.08 - 0.6 |
| S | Titanium alloy Ti-6Al-4V, etc. | - 40HRC | First choice | APH730 | MM | 20 - 80 | 0.05 - 0.6 |
| | Heat-resistance alloys Inconel718, etc. | - 40HRC | First choice | APH730 | MM | 20 - 60 | 0.05 - 0.4 |
| H | Hardened steel SKD61, etc. X40CrMoV51, etc. | 40 - 50HRC | First choice | APH730 | MM | 40 - 80 | 0.05 - 0.2 |
| | Hardened steel SKD11, etc. X153CrMoV12, etc. | 50 - 60HRC | First choice | APH730 | MM | 30 - 60 | 0.04 - 0.14 |

The above cutting parameters are for reference. Adjustments may be required depending on applications, machine powers and rigidity, and/or workpiece fixture/clamping methods.



| Designation | APMX | DC | CICT | DCX | DCONMS | LS | LH | LF | Air hole | Insert |
|-------------|------|----|------|-----|--------|-----|----|-----|----------|-----------|
| EWD05010R | 2.5 | 5 | 2 | 10 | 20 | 80 | 20 | 130 | With | RDMW05... |
| EWD05012R | 2.5 | 7 | 3 | 12 | 20 | 80 | 20 | 130 | With | RDMW05... |
| EWD07015R | 3.5 | 8 | 3 | 15 | 20 | 100 | 40 | 150 | With | RDMW07... |
| EWD05015R | 2.5 | 10 | 4 | 15 | 20 | 100 | 40 | 150 | With | RDMW05... |
| EWD10020R | 5.0 | 10 | 2 | 20 | 25 | 120 | 40 | 170 | With | RDMW10... |
| EWD07020R | 3.5 | 13 | 4 | 20 | 25 | 120 | 40 | 170 | With | RDMW07... |
| EWD05020R | 2.5 | 15 | 5 | 20 | 25 | 120 | 40 | 170 | With | RDMW05... |
| EWD10025R | 5.0 | 15 | 3 | 25 | 32 | 125 | 45 | 195 | With | RDMW10... |
| EWD07025R | 3.5 | 18 | 5 | 25 | 32 | 125 | 45 | 195 | With | RDMW07... |

HWD07-M



| Designation | APMX | DC | CICT | DCX | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole |
|------------------|------|----|------|-----|-----|----|----|--------|------|--------|----------|
| HWD07R015MM08-03 | 3.5 | 8 | 3 | 15 | 42 | 25 | 10 | 12.8 | M8 | 0.03 | With |
| HWD07R020MM10-04 | 3.5 | 13 | 4 | 20 | 49 | 30 | 15 | 17.8 | M10 | 0.06 | With |
| HWD07R025MM12-05 | 3.5 | 18 | 5 | 25 | 57 | 35 | 17 | 20.8 | M12 | 0.1 | With |
| HWD07R030MM16-05 | 3.5 | 23 | 5 | 30 | 63 | 40 | 22 | 28.8 | M16 | 0.2 | With |

SPARE PARTS



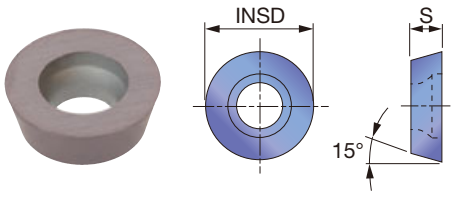
| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|------------------------|----------------|----------------------|--------|
| EWD050**R | CSTD-1.8 | (M-1000) | T-6D |
| EWD070**R, HWD07**M... | CSTB-2.5S | (M-1000) | T-8D |
| EWD100**R | CSTB-3.5H | (M-1000) | T-15D |

Recommended clamping torque: CSTD-1.8 = 0.7 N·m, CSTB-2.5S = 1.3 N·m, CSTB-3.5H = 3.5 N·m



INSERT

RDMW05/07/10



| | | | | | | | | | | |
|---|----------------|---|--|--|--|--|--|--|--|--|
| P | Steel | ★ | | | | | | | | |
| M | Stainless | | | | | | | | | |
| K | Cast iron | ★ | | | | | | | | |
| N | Non-ferrous | | | | | | | | | |
| S | Superalloys | ★ | | | | | | | | |
| H | Hard materials | | | | | | | | | |

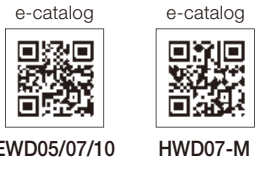
★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | INSD | S |
|-------------|------|--------|--|------|------|
| | | AH120 | | | |
| RDMW0501M0 | 2.5 | ● | | 5 | 1.4 |
| RDMW0702M0 | 3.5 | ● | | 7 | 2.38 |
| RDMW1003M0 | 5.0 | ● | | 10 | 3.18 |

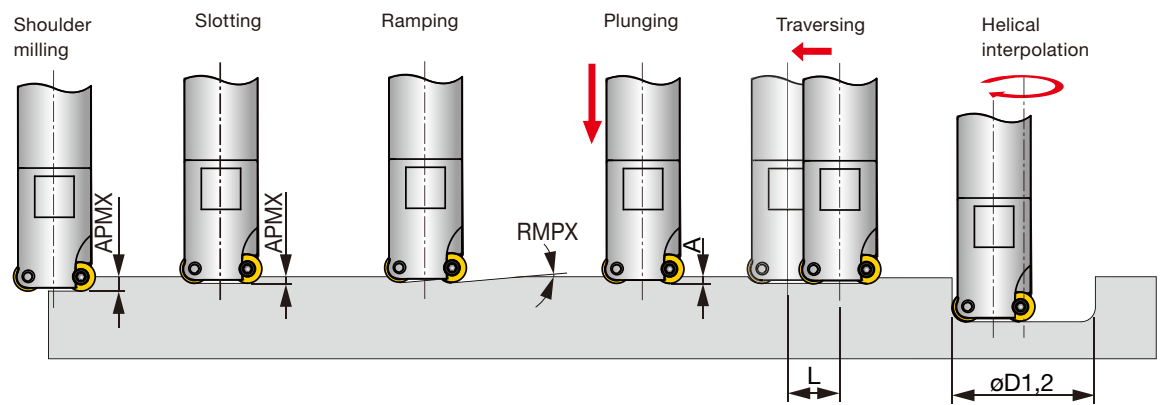
● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.



APPLICATION RANGE

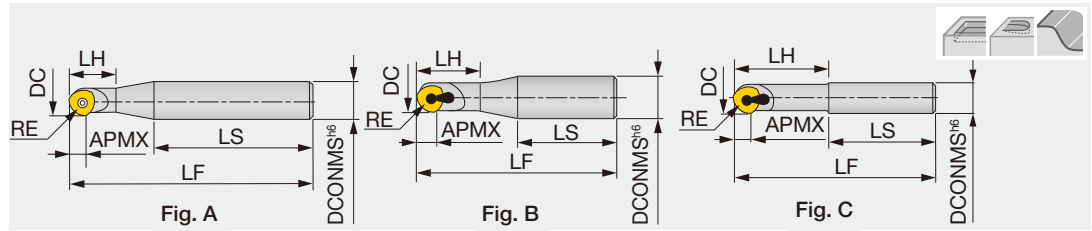


| Designation | Tool-ø | Max. depth of cut | Max. ramping | Max. plunging depth | Machining length for removing uncut portion | Max. machining | *Max. machining |
|------------------|--------|-------------------|--------------|---------------------|---|----------------|-----------------|
| | DCX | APMX | RMPX | A | L | øD1 | øD2 |
| HWD07R015MM08-03 | 15 | 3.5 | 25° | 2 | øDc - 6 | 23 | 28 |
| HWD07R020MM10-04 | 20 | 3.5 | 11° | 2 | øDc - 6 | 33 | 38 |
| HWD07R025MM12-05 | 25 | 3.5 | 7° | 2 | øDc - 6 | 43 | 48 |
| HWD07R030MM16-05 | 30 | 3.5 | 5.5° | 2 | øDc - 6 | 53 | 58 |

*For flat bottom hole

TBN1000

Ball nose endmill for semi-finishing



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | RE | Insert | Fig. |
|-------------|------|----|------|--------|-----|----|-----|------|-------------|------|
| TBN1100S | 5 | 10 | 1 | 16 | 60 | 15 | 90 | 5 | ZNCA1002FN2 | A |
| TBN1120S | 6 | 12 | 1 | 16 | 70 | 20 | 110 | 6 | ZNCA1203FN | A |
| TBN1160S | 8 | 16 | 1 | 20 | 85 | 25 | 130 | 8 | ZNCA1603FN | A |
| TBN1200S | 10 | 20 | 1 | 25 | 100 | 35 | 160 | 10 | ZN**2004... | A |
| TBN1250S | 12.5 | 25 | 1 | 32 | 100 | 45 | 175 | 12.5 | ZN**2505... | B |
| TBN1300S | 15 | 30 | 1 | 32 | 100 | 90 | 190 | 15 | ZN**3005... | C |

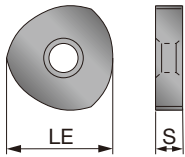
SPARE PARTS

| Designation | Clamping screw | Clamp | Adjusting screw | Wewnch |
|-----------------|----------------|-------|-----------------|--------|
| TBN1100S | CSTB-2.5B | - | - | T-8D |
| TBN1120S | CSTB-3S | - | - | T-9D |
| TBN1160S | CSTB-4S | - | - | T-15D |
| TBN1200S | CSTA-5SS | - | - | T-15D |
| TBN1250S, 1300S | CSTA-5S | CP536 | DS-6T | T-15D |

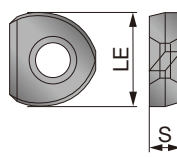
Recommended clamping torque: CSTB-2.5B = 1.3 N·m, CSTB-3S = 2.3 N·m, CSTB-4S/CSTA-5S/CSTA-5SS = 3.5 N·m

INSERT

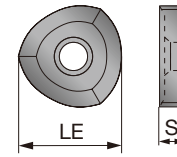
ZNCA-FN



ZNCA-FN2



ZNMM-EN



| Material | Steel | Stainless | Cast iron | Non-ferrous | Superalloys | Hard materials |
|----------|-------|-----------|-----------|-------------|-------------|----------------|
| ZNCA-FN | ★ | | | | | |
| ZNCA-FN2 | | | ★ | | | |
| ZNMM-EN | | | | | | |

★ : First choice
☆ : Second choice

| Designation | Uncoated | | LE | S |
|-------------|----------|------|--------|-----|
| | UX30 | TH10 | | |
| ZNCA1002FN2 | ● | ● | 7.958 | 2.5 |
| ZNCA1203FN | ● | ● | 9.735 | 3 |
| ZNCA1603FN | ● | ● | 12.772 | 3.5 |
| ZNCA2004FN | ● | ● | 15.862 | 4 |
| ZNCA2505FN | ● | ● | 19.826 | 5 |
| ZNCA3005FN | ● | ● | 23.618 | 5 |
| ZNMM2004EN | ● | | 15.862 | 4 |
| ZNMM2505EN | ● | | 19.826 | 5 |
| ZNMM3005EN | ● | | 23.618 | 5.5 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

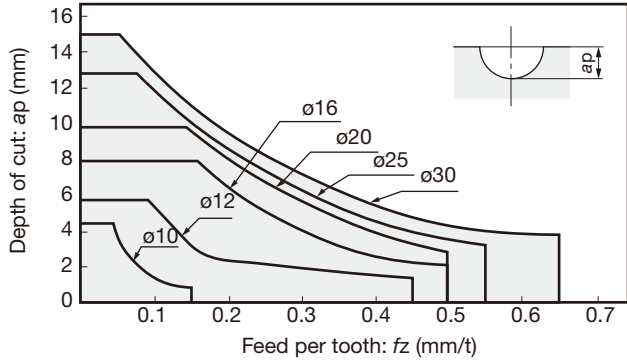
e-catalog



TBN1000



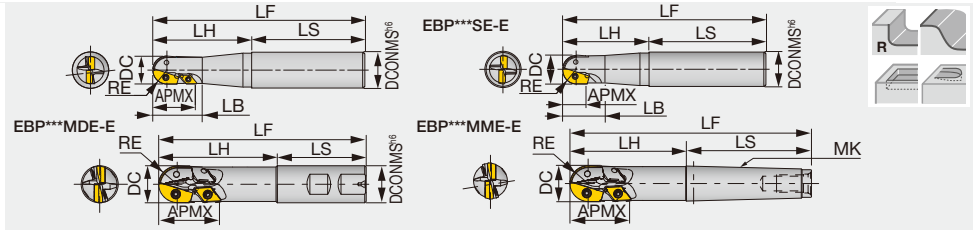
GUIDELINES FOR SELECTING DEPTH OF CUT AND FEED



Workpiece material: Carbon steel (S55C, C55)
 Insert grade: UX30
 Machine power: ø16 - ø16: 7.5 kW
 ø20 - ø30: 22.5 kW
 No. of revolutions: ø10 - ø16: 2000 min⁻¹
 ø20 - ø30: 1500 min⁻¹

EBP

Ball nose endmill for semi-finishing



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | LB | RE | MK | Insert 1 | Insert 2 |
|-------------|------|----|-------|--------|-----|-----|-----|----|------|-----|-------------|--------------|
| EBP020SD-E | 16 | 20 | 2 | 20 | 56 | 60 | 116 | - | 10 | - | ZPET2004-MJ | - |
| EBP020SS | 16 | 20 | 2 | 25 | 80 | 60 | 140 | 30 | 10 | - | ZPET2004-MJ | - |
| EBP020MDE-E | 29.5 | 20 | 2 (4) | 20 | 56 | 70 | 126 | - | 10 | - | ZPET2004-MJ | DCMW070204TN |
| EBP020MME-E | 29.5 | 20 | 2 (4) | - | 69 | 70 | 139 | - | 10 | MK2 | ZPET2004-MJ | DCMW070204TN |
| EBP020MSE | 29.5 | 20 | 2 (4) | 25 | 80 | 70 | 150 | 35 | 10 | - | ZPET2004-MJ | DCMW070204TN |
| EBP020LSE | 29.5 | 20 | 2 (4) | 25 | 180 | 70 | 250 | 35 | 10 | - | ZPET2004-MJ | DCMW070204TN |
| EBP025SD-E | 21 | 25 | 2 | 25 | 60 | 70 | 130 | - | 12.5 | - | ZPET2505-MJ | - |
| EBP025SS | 21 | 25 | 2 | 32 | 80 | 70 | 150 | 35 | 12.5 | - | ZPET2505-MJ | - |
| EBP025MDE-E | 41 | 25 | 2 (4) | 25 | 60 | 80 | 140 | - | 12.5 | - | ZPET2505-MJ | DCMW11T304TN |
| EBP025MME-E | 41 | 25 | 2 (4) | - | 86 | - | 166 | - | 12.5 | MK3 | ZPET2505-MJ | DCMW11T304TN |
| EBP025MSE | 41 | 25 | 2 (4) | 32 | 100 | 80 | 180 | 50 | 12.5 | - | ZPET2505-MJ | DCMW11T304TN |
| EBP025LSE | 41 | 25 | 2 (4) | 32 | 220 | 80 | 300 | 50 | 12.5 | - | ZPET2505-MJ | DCMW11T304TN |
| EBP030SS | 24 | 30 | 2 | 32 | 80 | 80 | 160 | 40 | 15 | - | ZPET3006-MJ | - |
| EBP030MSE | 45 | 30 | 2 (4) | 32 | 100 | 100 | 200 | 55 | 15 | - | ZPET3006-MJ | DCMW11T304TN |
| EBP030LSE | 45 | 30 | 2 (4) | 32 | 250 | 100 | 350 | 55 | 15 | - | ZPET3006-MJ | DCMW11T304TN |
| EBP032SD-E | 25 | 32 | 2 | 32 | 60 | - | 140 | - | 16 | - | ZPET3206-MJ | - |
| EBP032MDE-E | 46 | 32 | 2 (4) | 32 | 60 | 100 | 160 | - | 16 | - | ZPET3206-MJ | DCMW11T304TN |
| EBP032MME-E | 46 | 32 | 2 (4) | - | 109 | 100 | 209 | - | 16 | MK4 | ZPET3206-MJ | DCMW11T304TN |

SPARE PARTS

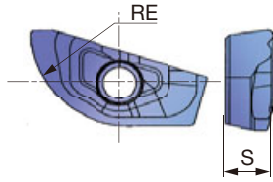
| Designation | Clamping screw for Insert 1 | Clamping screw for Insert 2 | Lubricant (Optional) | Wewnch 1 for Insert 1 | Wewnch 2 for Insert 2 |
|--------------------------------|-----------------------------|-----------------------------|----------------------|-----------------------|-----------------------|
| EBP020SS/SD-E | CSTD-3T | - | (M-1000) | T-10D | - |
| EBP025SS/SD-E, EBP025*SE/M*E-E | CSTB-4S | - | (M-1000) | T-15D | - |
| EBP030SS/032SD-E | CSTB-5S | - | (M-1000) | T-20D | - |
| EBP020*SE/M*E-E | CSTB-2.5S | CSTD-3T | (M-1000) | T-10D | T-8D |
| EBP030*SE/032M*E-E | CSTB-4S | CSTB-5S | (M-1000) | T-15D | T-20D |

Recommended clamping torque :
 CSTB-2.5S = 1.3 N·m, CSTD-3T = 2.5 N·m,
 CSTB-4S = 3.5 N·m, CSTB-5S = 5 N·m

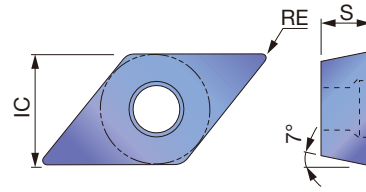
Reference pages: Inserts → **H207**

INSERT

ZPET-MJ (For R edge)



DCMW-TN (For P edge)



| | | | | | | | | | | |
|---|----------------|---|---|--|--|--|--|--|--|--|
| P | Steel | ☆ | ★ | | | | | | | |
| M | Stainless | | | | | | | | | |
| K | Cast iron | ★ | | | | | | | | |
| N | Non-ferrous | | | | | | | | | |
| S | Superalloys | | | | | | | | | |
| H | Hard materials | ☆ | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | | | | | | IC | S |
|--------------|------|--------|-------|--|--|--|--|--|--|-----|------|
| | | AH120 | AH330 | | | | | | | | |
| ZPET2004-MJ | 10 | ● | ● | | | | | | | - | 4.5 |
| ZPET2505-MJ | 12.5 | ● | ● | | | | | | | - | 5.63 |
| ZPET3006-MJ | 15 | ● | ● | | | | | | | - | 6.75 |
| DCMW070204TN | 0.4 | ● | ● | | | | | | | 6.4 | 2.4 |
| DCMW11T304TN | 0.4 | ● | ● | | | | | | | 9.5 | 4 |

● : Line up
ZPET30... : 5 piece per package

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



Machining types

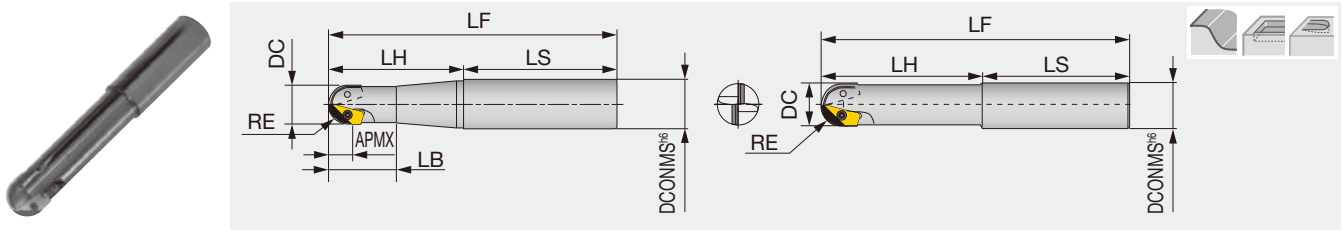
| (1) Grooving | (2) Shouldering at shallow depth of cut | (3) Shouldering at deep depth of cut |
|--------------|---|--------------------------------------|
| | | |

Grade A
Insert B
Ext. Toolholder C
Int. Toolholder D
Threading E
Grooving F
Miniature tool G
Milling cutter H
Endmill I
Drilling tool J
Tooling System K
User's Guide L
Index M



EBB

Ball nose endmill for semi-finishing, for CBN inserts



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | LB | RE | Insert |
|-------------|------|----|------|--------|-----|-----|-----|----|------|--------------|
| EBB020MS | 12 | 20 | 2 | 25 | 80 | 70 | 150 | 35 | 10 | ZPCW2003-QBN |
| EBB025MS | 15.5 | 25 | 2 | 32 | 100 | 80 | 180 | 50 | 12.5 | ZPCW25H3-QBN |
| EBB030MS | 18 | 30 | 2 | 32 | 100 | 100 | 200 | - | 15 | ZPCW30T3-QBN |
| EBB040MS | 23 | 40 | 2 | 42 | 100 | 150 | 250 | - | 20 | ZPCW4004-QBN |
| EBB050MS | 28 | 50 | 2 | 50 | 100 | 150 | 250 | - | 25 | ZPCW5004-QBN |

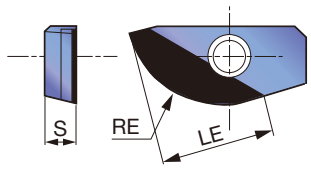
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench | Clamp set |
|--------------------|----------------|----------------------|--------|-----------|
| EBB020MS | CSTB-3S | (M-1000) | T-9D | - |
| EBB025MS | CSTB-3.5 | (M-1000) | T-15D | - |
| EBB030MS | CSTB-4S | (M-1000) | T-15D | - |
| EBB040MS, EBB050MS | CSTB-5 | (M-1000) | T-20D | CSP22 |

Recommended clamping torque: CSTB-3S = 2.3 N·m, CSTB-3.5/CSTB-4S = 3.5 N·m, CSTB-5 = 5 N·m

INSERT

ZPCW-QBN



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ● | | | | | |
| Stainless | | ● | | | | |
| Cast iron | | | ★ | | | |
| Non-ferrous | | | | ● | | |
| Superalloys | | | | | ● | |
| Hard materials | | | | | | ● |

★ : First choice
☆ : Second choice

| Designation | RE | CBN | | | | | | | | | | S | LE | |
|--------------|------|-------|--|--|--|--|--|--|--|--|--|---|------|------|
| | | BX480 | | | | | | | | | | | | |
| ZPCW2003-QBN | 10 | ● | | | | | | | | | | | 3.18 | 12 |
| ZPCW25H3-QBN | 12.5 | ● | | | | | | | | | | | 3.5 | 15.5 |
| ZPCW30T3-QBN | 15 | ● | | | | | | | | | | | 3.97 | 18 |
| ZPCW4004-QBN | 20 | ● | | | | | | | | | | | 4.76 | 23 |
| ZPCW5004-QBN | 25 | ● | | | | | | | | | | | 4.76 | 28 |

● : Line up
BX480 : 1 piece per package

STANDARD CUTTING CONDITIONS

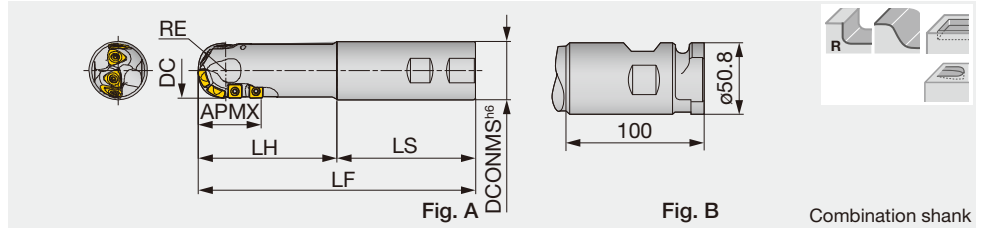
Please scan below.



EBB

EBD

Ball nose endmill for roughing



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | RE | Fig. | Insert R | Insert P |
|-------------|------|----|-------|--------|-----|-----|-----|----|------|-------------|---------------|
| EBD040SSE | 45 | 40 | 4 (7) | 42 | 100 | 100 | 200 | 20 | A | ZDMT4005-MJ | SCMT09T308-23 |
| EBD040MSE | 45 | 40 | 4 (7) | 42 | 100 | 150 | 250 | 20 | A | ZDMT4005-MJ | SCMT09T308-23 |
| EBD050SSE | 59 | 50 | 4 (7) | 42 | 100 | 100 | 200 | 25 | A | ZDMT5006-MJ | SCMT120408-23 |
| EBD050MSE | 59 | 50 | 4 (7) | 42 | 100 | 150 | 250 | 25 | A | ZDMT5006-MJ | SCMT120408-23 |
| EBD050SCE | 59 | 50 | 4 (7) | 50.8 | 100 | 100 | 200 | 25 | B | ZDMT5006-MJ | SCMT120408-23 |
| EBD050MCE | 59 | 50 | 4 (7) | 50.8 | 100 | 150 | 250 | 25 | B | ZDMT5006-MJ | SCMT120408-23 |

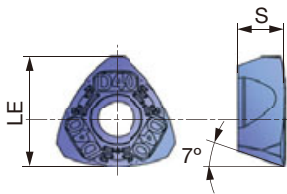
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------|----------------|----------------------|--------|
| EBD040*SE | CSTB-4M | (M-1000) | T-15T |
| EBD050**E | CSTB-5 | (M-1000) | T-20T |

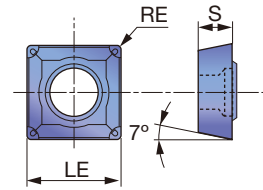
Recommended clamping torque : CSTB-4M = 3.5 N·m, CSTB-5 = 5 N·m

INSERT

ZDMT-MJ (For R edge)



SCMT-23 (For P edge)



| | | | |
|---|----------------|---|--|
| P | Steel | ☆ | |
| M | Stainless | | |
| K | Cast iron | ★ | |
| N | Non-ferrous | | |
| S | Superalloys | | |
| H | Hard materials | ☆ | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | LE | S |
|---------------|-----|--------|--|-------|------|
| | | AH120 | | | |
| ZDMT4005-MJ | - | ● | | 13 | 5.5 |
| ZDMT5006-MJ | - | ● | | 16.2 | 6.5 |
| SCMT09T308-23 | 0.8 | ● | | 9.525 | 3.97 |
| SCMT120408-23 | 0.8 | ● | | 12.7 | 4.76 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EBD



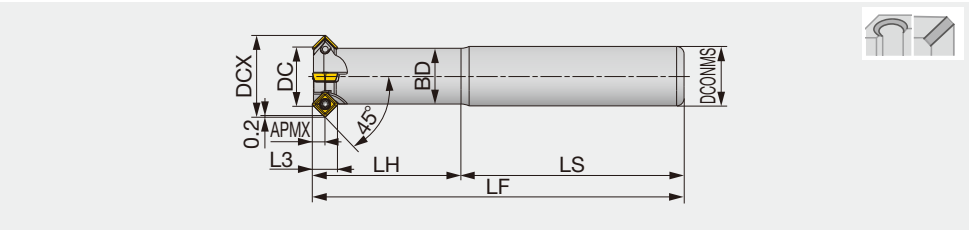
TUNGQUAD

EASD05

Chamfering endmill



GAMP = +5°, GAMF = -7° ~ +12°



| Designation | DCX | CICT | DC* | BD | APMX | DCONMS | LH | L3 | LS | LF | Air hole | Insert |
|--------------------|-----|------|------|-----|------|--------|----|-----|----|-----|----------|-------------|
| EASD05M006C12.0R01 | 12 | 1 | 5.7 | 7.5 | 3 | 12 | 40 | 6.8 | 60 | 100 | Without | SD*T0502... |
| EASD05M008C12.0R02 | 14 | 2 | 7.8 | 9.1 | 3 | 12 | 40 | 6.8 | 60 | 100 | Without | SD*T0502... |
| EASD05M016C16.0R04 | 22 | 4 | 15.7 | 15 | 3 | 16 | 40 | 6.8 | 60 | 100 | Without | SD*T0502... |

The minimum chamfering diameter (DC) measures up to the point where the insert's nose radius ends. This will offset the total tool length by shortening 0.3 mm.

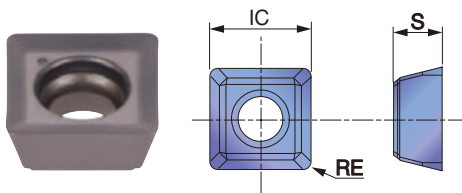
SPARE PARTS

| Designation | Clamping screw | Wrench |
|-------------|----------------|--------|
| EASD05... | CSPB-2L043 | IP-6DB |

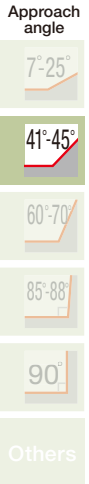
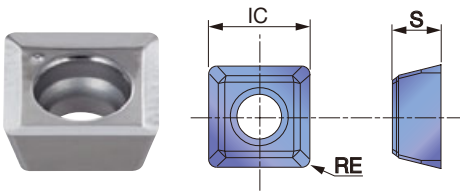
Recommended clamping torque: 0.7 N·m

INSERT

SDMT05-MJ



SDHT05-AJ



| | P | M | K | N | S | H |
|----------------|---|-----|---|---|---|---|
| Steel | ★ | | | | | |
| Stainless | | ★ ☆ | | | | |
| Cast iron | | | ★ | | | |
| Non-ferrous | | | | ★ | | |
| Superalloys | | | | | ★ | |
| Hard materials | | | | | | ★ |

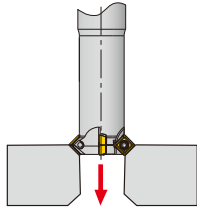
★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | Uncoated | | S | IC |
|-----------------|-----|------|--------|-------|----------|--|------|------|
| | | | AH140 | AH725 | TH10 | | | |
| SDMT050204PN-MJ | 0.4 | 4 | ● | ● | | | 2.38 | 5.09 |
| SDHT050204FN-AJ | 0.4 | 4 | | | ● | | 2.39 | 5.09 |

● : Line up

CUTTING PERFORMANCE

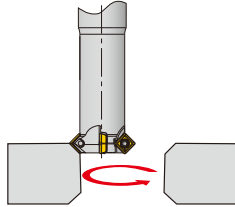
Chamfering & countersinking



■ **C2.5 (45° x 2.5 mm)**
Workpiece material: S55C / C55

| Designation | Cutting speed Vc (m/min) | Feed rate fz (mm/z) |
|---------------------------|-----------------------------|------------------------|
| EASD05M006C12.0R01 | 80 - 120 | 0.03 - 0.08 |
| EASD05M008C12.0R02 | 80 - 120 | 0.03 - 0.08 |
| EASD05M016C16.0R04 (*z=2) | 80 - 120 | 0.03 - 0.08 |

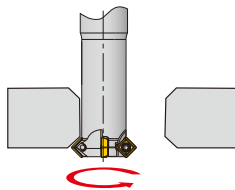
Interpolated chamfering



■ **C2.5 (45° x 2.5 mm)**
Workpiece material: S55C / C55

| Designation | Cutting speed Vc (m/min) | Feed rate fz (mm/z) |
|--------------------|-----------------------------|------------------------|
| EASD05M006C12.0R01 | 80 - 120 | 0.08 - 0.12 |
| EASD05M008C12.0R02 | 80 - 120 | 0.08 - 0.12 |
| EASD05M016C16.0R04 | 80 - 120 | 0.08 - 0.12 |

Back chamfering



■ **C1.0 (45° x 1.0 mm)**
Workpiece material: S55C / C55

| Designation | Cutting speed Vc (m/min) | Feed rate fz (mm/z) |
|--------------------|-----------------------------|------------------------|
| EASD05M006C12.0R01 | 80 - 120 | 0.08 - 0.12 |
| EASD05M008C12.0R02 | 80 - 120 | 0.08 - 0.12 |
| EASD05M016C16.0R04 | 80 - 120 | 0.08 - 0.12 |

STANDARD CUTTING CONDITIONS

■ Interpolated or back chamfering type

| ISO | Workpiece material | Brinell hardness (HB) | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|--|--------------------------|-------|-----------------------------|-----------------------------|
| P | Low carbon steels S15C, etc. C15E4, etc. | - 200 | AH725 | 230 ~ 320 | 0.04 ~ 0.1 |
| | High carbon steels S45C, etc. C45, etc. | 200 - 300 | AH725 | 150 ~ 230 | 0.04 ~ 0.1 |
| | Alloyed steels SCM440, etc. 42CrMo4, etc. | 150 - 300 | AH725 | 150 ~ 230 | 0.04 ~ 0.1 |
| | Tool steels SKD11, etc. X153CrMoV12, etc. | - 300 | AH725 | 110 ~ 130 | 0.03 ~ 0.09 |
| M | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - | AH140 | 100 ~ 200 | 0.03 ~ 0.09 |
| K | Grey cast irons FC250, etc. 250, etc. | 150 - 250 | AH725 | 150 ~ 250 | 0.05 ~ 0.12 |
| | Ductile cast irons FCD450, etc. 450-10S, etc. | 150 - 250 | AH725 | 100 ~ 180 | 0.05 ~ 0.12 |
| N | Aluminium alloys Si < 13% | - | TH10 | 350 ~ 500 | 0.05 ~ 0.15 |
| | Copper alloys | - | TH10 | 100 ~ 200 | 0.05 ~ 0.15 |

STANDARD CUTTING CONDITIONS

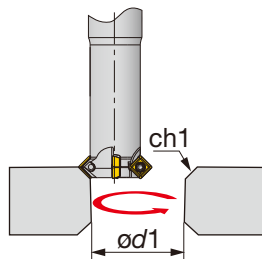
Front chamfering type

| ISO | Workpiece material | Brinell hardness (HB) | Grade | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|-----------------------|-------|--------------------------|--------------------------|
| P | Low carbon steels S15C, etc. C15E4, etc. | - 200 | AH725 | 160 ~ 220 | 0.04 ~ 0.1 |
| | High carbon steels S45C, etc. C45, etc. | 200 - 300 | AH725 | 110 ~ 160 | 0.04 ~ 0.1 |
| | Alloyed steels SCM440, etc. 42CrMo4, etc. | 150 - 300 | AH725 | 110 ~ 160 | 0.04 ~ 0.1 |
| M | Tool steels SKD11, etc. X153CrMoV12, etc. | - 300 | AH725 | 80 ~ 90 | 0.03 ~ 0.09 |
| K | Stainless steels SUS304, etc. X5CrNi18-9, etc. | - | AH140 | 70 ~ 140 | 0.03 ~ 0.09 |
| K | Grey cast irons FC250, etc. 250, etc. | 150 - 250 | AH725 | 110 ~ 180 | 0.05 ~ 0.12 |
| | Ductile cast irons FCD450, etc. 450-10S, etc. | 150 - 250 | AH725 | 70 ~ 130 | 0.05 ~ 0.12 |
| N | Aluminium alloys Si < 13% | - | TH10 | 250 ~ 350 | 0.05 ~ 0.15 |
| | Copper alloys | - | TH10 | 70 ~ 140 | 0.05 ~ 0.15 |

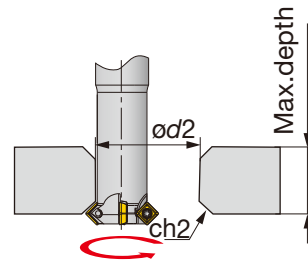
* When chamfering over C1.0 (45° x 1.0 mm), decrease the cutting parameters to 70% of the above parameters.

APPLICATION RANGE

Front chamfering



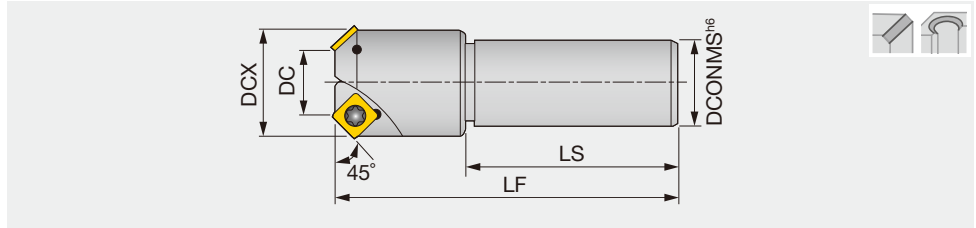
Back chamfering



| Designation | Minimum hole diameter to be chamfered (mm) | | Maximum chamfer dimension (at 45°) (mm) | | Maximum reachable hole distance when back chamfering (mm) |
|--------------------|--|------------------|---|-----------|---|
| | Front-chamfer ød1 | Back-chamfer ød2 | Front ch1 | Back ch2 | Max. depth |
| EASD05M006C12.0R01 | 5.7 | 12.5 | 2.9 x 2.9 | 2 x 2 | 18.2 |
| EASD05M008C12.0R02 | 7.8 | 14.5 | 2.9 x 2.9 | 1.5 x 1.5 | 33.2 |
| EASD05M016C16.0R04 | 15.8 | 22.5 | 2.9 x 2.9 | 2.8 x 2.8 | 43.2 |

ECP4400R

Chamfering endmill, screw clamp system, for square inserts



| Designation | DC | CICT | DCX | DCONMS | LF | LS | Insert |
|-------------|----|------|------|--------|-----|----|-----------|
| ECP440AR | 10 | 1 | 27.5 | 32 | 130 | 80 | SPMA422*N |
| ECP4423R | 23 | 2 | 40.3 | 32 | 130 | 80 | SPMA422*N |
| ECP4436R | 36 | 3 | 53.3 | 32 | 130 | 80 | SPMA422*N |

SPARE PARTS

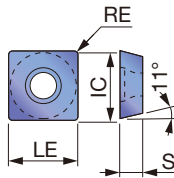


| Designation | Clamping screw | Wrench |
|-------------|----------------|--------|
| ECP44... | CSTA-4 | T-15D |

Recommended clamping torque: 3.5 N·m

INSERT

SPMA42



| | | | | | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| P Steel | ★ | ☆ | ☆ | | | | | | | | | | | | | | | | |
| M Stainless | | | | | | | | | | | | | | | | | | | |
| K Cast iron | | | | ★ | | | | | | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | | | | | | | | |
| S Superalloys | | | | | | | | | | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Cermet | | Uncoated | | LE | IC | S |
|-------------|-----|--------|------|----------|------|------|------|------|
| | | NS740 | N308 | UX30 | TH10 | | | |
| SPMA422TN | 0.8 | ● | ● | ● | | 12.7 | 12.7 | 3.18 |
| SPMA422FN | 0.8 | | | ● | | 12.7 | 12.7 | 3.18 |

● : Line up

STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



ECP4400R

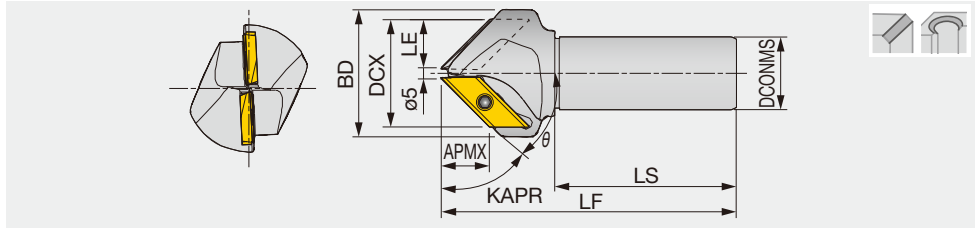
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M



ECC31

Chamfering endmill, screw clamp system, for large parallelogram inserts



| Designation | DCX | CICT | θ | KAPR | BD | LE | APMX | DCONMS | LS | LF | Insert |
|--------------|-----|------|-----|------|----|------|------|--------|----|-------|-------------|
| ECC31005R-30 | 34 | 1 | 30° | 60° | 40 | 14.5 | 25.5 | 32 | 80 | 130.2 | XCET3104... |
| ECC31005R-45 | 46 | 2 | 45° | 45° | 56 | 20.5 | 20.5 | 32 | 80 | 130.1 | XCET3104... |
| ECC31005R-60 | 55 | 2 | 60° | 30° | 72 | 25.5 | 14.5 | 32 | 80 | 130.1 | XCET3104... |

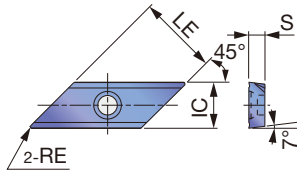
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Wrench |
|-------------|----------------|----------------------|--------|
| ECC31... | CSTB-5S | (M-1000) | T-20D |

* Recommended clamping torque: CSTB-5S=5

INSERT

XCET31



| | P | M | K | N | S | H |
|----------------|-----|-----|-----|-----|-----|-----|
| Steel | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |
| Stainless | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |
| Cast iron | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |
| Non-ferrous | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |
| Superalloys | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |
| Hard materials | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ | ★☆☆ |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | | Cermet | | Un-coated | | LE | IC | S |
|--------------|-----|--------|-------|-------|-------|--------|------|-----------|----|------|-----|---|
| | | AH3135 | AH330 | AH120 | NS740 | TH10 | UX30 | | | | | |
| XCET310404ER | 0.4 | ● | ● | ● | ● | ● | ● | ● | 22 | 12.7 | 4.5 | |

●: Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness (HB) | Grade | No. of revolutions: n (min-1) | Feed per tooth: fz (mm/t) |
|-----|---|---------------|--------|-------------------------------|---------------------------|
| P | Carbon steels, Alloy steels S55C, C55, etc. SCM440, 42CrMo4, etc. | < 300 | NS740 | 1000 - 3000 - 7000 | 0.1 - 0.25 |
| | Die steels SKD61, etc. X40CrMoV5-1, etc. | < 300 | UX30 | 700 - 2000 - 4900 | 0.1 - 0.25 |
| M | Stainless steels SUS304, etc. X5CrNi18-10, etc. | < 250 | AH3135 | 1000 - 3000 - 7000 | 0.1 - 0.25 |
| K | Cast irons FC250, etc. 250, etc. | 150 - 250 | AH330 | 1000 - 3000 - 7000 | 0.1 - 0.25 |

Notes:

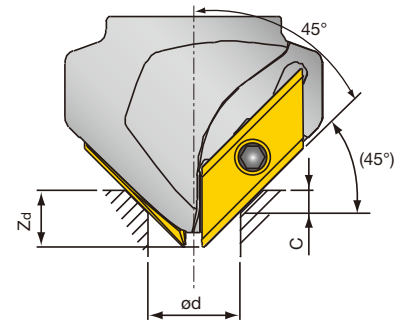
- When the hole diameter to be chamfered is small or the cutting edges near the front end of tool are used, use at higher side of the revolution range shown in the Table.
In contrast, when the hole diameter to be chamfered is large or the cutting edges far from the tool's front end are used, use the lower side of the revolution range shown in the Table.

- When chamfering a small diameter hole (smaller than ø10 mm) in a plungemilling mode, peck-feeding should not be used.
- When the hole diameter to be chamfered is smaller than ø10 mm or the cutting edges near the tool's front end are used, the feed should be set within 0.15 mm/t.

Guidelines for programming

Z-axis plunging depth Z_d (mm) in 45° chamfering of hole

| Hole dia. ød (mm) | Size of chamfering C (mm) | | | | | | |
|----------------------|---------------------------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 3 | 4 | 5 |
| 5 | 0.7 | 1.2 | 1.7 | 2.2 | 3.2 | - | - |
| 6 | 1.2 | 1.7 | 2.2 | 2.7 | 3.7 | - | - |
| 6.8 | 1.6 | 2.1 | 2.6 | 3.1 | 4.1 | - | - |
| 8 | 2.2 | 2.7 | 3.2 | 3.7 | 4.7 | - | - |
| 8.5 | 2.4 | 2.9 | 3.4 | 3.9 | 4.9 | - | - |
| 10 | 3.2 | 3.7 | 4.2 | 4.7 | 5.7 | 6.7 | 7.7 |
| 10.2 | 3.3 | 3.8 | 4.3 | 4.8 | 5.8 | 6.8 | 7.8 |
| 12 | 4.2 | 4.7 | 5.2 | 5.7 | 6.7 | 7.7 | 8.7 |
| 14 | 5.2 | 5.7 | 6.2 | 6.7 | 7.7 | 8.7 | 9.7 |
| 16 | 6.2 | 6.7 | 7.2 | 7.7 | 8.7 | 9.7 | 10.7 |
| 17.5 | 6.9 | 7.4 | 7.9 | 8.4 | 9.4 | 10.4 | 11.4 |
| 20 | 8.2 | 8.7 | 9.2 | 9.7 | 10.7 | 11.7 | 12.7 |
| 21 | 8.7 | 9.2 | 9.7 | 10.2 | 11.2 | 12.2 | 13.2 |
| 24 | 10.2 | 10.7 | 11.2 | 11.7 | 12.7 | 13.7 | 14.7 |
| 30 | 13.2 | 13.7 | 14.2 | 14.7 | 15.7 | 16.7 | 17.7 |
| 33 | 14.7 | 15.2 | 15.7 | 16.2 | 17.2 | 18.2 | 19.2 |
| 36 | 16.2 | 16.7 | 17.2 | 17.7 | 18.7 | 19.7 | - |
| 42 | 19.2 | 19.7 | 20.2 | - | - | - | - |

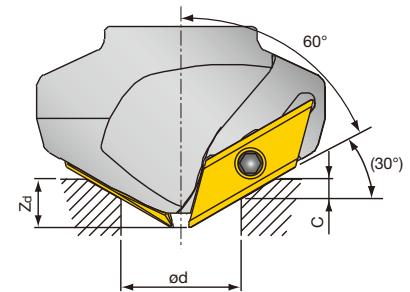


Tool: ECC31005R-45

Note: When the hole depth is smaller than the Z-axis plunging depth (Z_d), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

Z-axis plunging depth Z_d (mm) in 30° chamfering of hole

| Hole dia. ød (mm) | Size of chamfering C (mm) | | | | | | |
|----------------------|---------------------------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 |
| 5 | 0.6 | 1.1 | 1.6 | 2.1 | - | - | - |
| 6 | 0.9 | 1.4 | 1.9 | 2.4 | - | - | - |
| 6.8 | 1.1 | 1.6 | 2.1 | 2.6 | - | - | - |
| 8 | 1.4 | 1.9 | 2.4 | 2.9 | - | - | - |
| 8.5 | 1.6 | 2.1 | 2.6 | 3.1 | - | - | - |
| 10 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 |
| 10.2 | 2.1 | 2.6 | 3.1 | 3.6 | 4.1 | 4.6 | 5.1 |
| 12 | 2.6 | 3.1 | 3.6 | 4.1 | 4.6 | 5.1 | 5.6 |
| 16 | 3.7 | 4.2 | 4.7 | 5.2 | 5.7 | 6.2 | 6.7 |
| 17.5 | 4.2 | 4.7 | 5.2 | 5.7 | 6.2 | 6.7 | 7.2 |
| 20 | 4.9 | 5.4 | 5.9 | 6.4 | 6.9 | 7.4 | 7.9 |
| 21 | 5.2 | 5.7 | 6.2 | 6.7 | 7.2 | 7.7 | 8.2 |
| 24 | 6.1 | 6.6 | 7.1 | 7.6 | 8.1 | 8.6 | 9.1 |
| 30 | 7.8 | 8.3 | 8.8 | 9.3 | 9.8 | 10.3 | 10.8 |
| 33 | 8.7 | 9.2 | 9.7 | 10.2 | 10.7 | 11.2 | 11.7 |
| 36 | 9.5 | 10 | 10.5 | 11 | 11.5 | 12 | 12.5 |
| 38 | 10.1 | 10.6 | 11.1 | 11.6 | 12.1 | 12.6 | 13.1 |
| 42 | 11.2 | 11.7 | 12.2 | 12.7 | 13.2 | 13.7 | 14.2 |
| 46 | 12.4 | 12.9 | 13.4 | 13.9 | 14.4 | - | - |
| 48 | 13 | 13.5 | 14 | 14.5 | - | - | - |
| 52 | 14.1 | - | - | - | - | - | - |

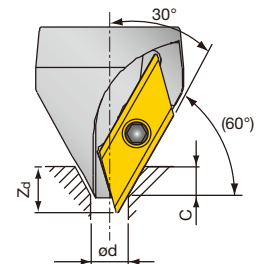


Tool: ECC31005R-60

Note: When the hole depth is smaller than the Z-axis plunging depth (Z_d), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

Z-axis plunging depth Z_d (mm) in 60° chamfering of hole

| Hole dia. ød (mm) | Size of chamfering C (mm) | | | | | | | |
|----------------------|---------------------------|------|------|------|------|------|------|------|
| | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 |
| 5 | 0.8 | 1.3 | 1.8 | 2.3 | 2.8 | - | - | - |
| 6 | 1.7 | 2.2 | 2.7 | 3.2 | 3.7 | - | - | - |
| 6.8 | 2.4 | 2.9 | 3.4 | 3.9 | 4.4 | - | - | - |
| 8 | 3.4 | 3.9 | 4.4 | 4.9 | 5.4 | - | - | - |
| 8.5 | 3.8 | 4.3 | 4.8 | 5.3 | 5.8 | - | - | - |
| 10 | 5.1 | 5.6 | 6.1 | 6.6 | 7.1 | 7.6 | 8.1 | 8.6 |
| 10.2 | 5.3 | 5.8 | 6.3 | 6.8 | 7.3 | 7.8 | 8.3 | 8.8 |
| 12 | 6.9 | 7.4 | 7.9 | 8.4 | 8.9 | 9.4 | 9.9 | 10.4 |
| 16 | 10.3 | 10.8 | 11.3 | 11.8 | 12.3 | 12.8 | 13.3 | 13.8 |
| 17.5 | 11.6 | 12.1 | 12.6 | 13.1 | 13.6 | 14.1 | 14.6 | 15.1 |
| 20 | 13.7 | 14.2 | 14.7 | 15.2 | 15.7 | 16.2 | 16.7 | 17.2 |
| 21 | 14.6 | 15.1 | 15.6 | 16.1 | 16.6 | 17.1 | 17.6 | 18.1 |
| 24 | 17.2 | 17.7 | 18.2 | 18.7 | 19.2 | 19.7 | 20.2 | 20.7 |
| 30 | 22.4 | 22.9 | 23.4 | 23.9 | 24.4 | 24.9 | 25.4 | - |
| 33 | 24.9 | 25.4 | - | - | - | - | - | - |



Tool: ECC31005R-30

Note: When the hole depth is smaller than the Z-axis plunging depth (Z_d), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.



High Feed Milling

TCB

Counterboring endmill, monoblock type



Face Milling



Shoulder Milling



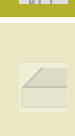
Slot Milling



Profile Milling



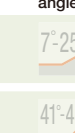
Chamfering, Counterbore



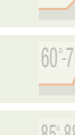
Finish Face Milling



Approach angle



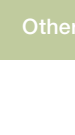
7°-25°



41°-45°



60°-70°



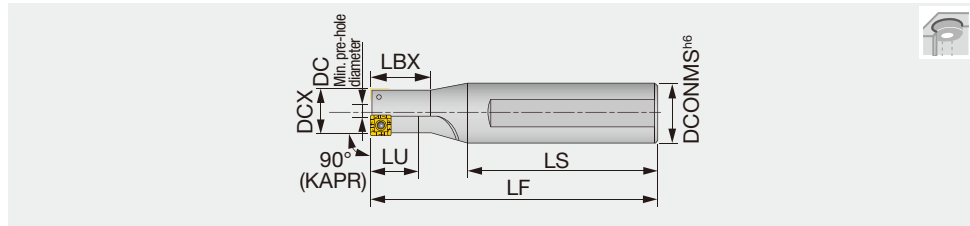
85°-88°



90°



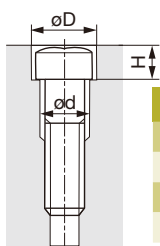
Others



| Designation | DCX | CICT | DC | LU | LBX | LF | LS | DCONMS | Insert |
|-------------|------|------|------|----|------|-----|----|--------|------------|
| TCB100F16 | 10 | 1 | 2.8 | 13 | 17 | 86 | 60 | 16 | SPMP771... |
| TCB110F16 | 11 | 1 | 2.8 | 14 | 18.7 | 87 | 60 | 16 | SPMP771... |
| TCB120F20 | 12 | 1 | 3.6 | 15 | 20.5 | 89 | 60 | 20 | SPMP771... |
| TCB130F20 | 13 | 2 | 4.5 | 16 | 22.2 | 91 | 60 | 20 | SPMP771... |
| TCB-140 | 14 | 1 | 4 | 11 | 18 | 117 | 80 | 25 | SPMP831... |
| TCB140F25 | 14 | 2 | 5.5 | 18 | 24 | 113 | 80 | 25 | SPMP771... |
| TCB150F25 | 15 | 2 | 6.5 | 19 | 25.7 | 114 | 80 | 25 | SPMP771... |
| TCB160F25 | 16 | 2 | 7.5 | 20 | 27.5 | 116 | 80 | 25 | SPMP771... |
| TCB170F25 | 17 | 2 | 6.6 | 13 | 21 | 114 | 80 | 25 | SPMP831... |
| TCB175F25 | 17.5 | 2 | 7.1 | 14 | 22 | 115 | 80 | 25 | SPMP831... |
| TCB180F25 | 18 | 2 | 7.5 | 15 | 23 | 116 | 80 | 25 | SPMP831... |
| TCB190F25 | 19 | 2 | 8.5 | 15 | 24 | 118 | 80 | 25 | SPMP831... |
| TCB-200 | 20 | 2 | 8.2 | 16 | 25 | 120 | 80 | 25 | SPMP042... |
| TCB200F25 | 20 | 2 | 8.2 | 16 | 25 | 120 | 80 | 25 | SPMP042... |
| TCB210F25 | 21 | 2 | 9 | 17 | 26 | 122 | 80 | 25 | SPMP042... |
| TCB220F25 | 22 | 2 | 10 | 18 | 28 | 124 | 80 | 25 | SPMP042... |
| TCB-230 | 23 | 2 | 11 | 19 | 29 | 126 | 80 | 25 | SPMP042... |
| TCB230F25 | 23 | 2 | 11 | 19 | 29 | 126 | 80 | 25 | SPMP042... |
| TCB240F25 | 24 | 2 | 12 | 20 | - | 128 | 80 | 25 | SPMP042... |
| TCB250F25 | 25 | 2 | 13 | 25 | - | 130 | 80 | 25 | SPMP042... |
| TCB-260 | 26 | 2 | 14 | 21 | 33 | 132 | 80 | 32 | SPMP042... |
| TCB-290 | 29 | 2 | 14 | 23 | 36 | 138 | 80 | 32 | SPMM322... |
| TCB-320 | 32 | 2 | 16.9 | 40 | - | 144 | 80 | 32 | SPMM322... |
| TCB-350 | 35 | 2 | 14 | 43 | - | 150 | 80 | 32 | SPMM432... |
| TCB-390 | 39 | 2 | 17.9 | 48 | - | 158 | 80 | 32 | SPMM432... |
| TCB-430 | 43 | 2 | 21.7 | 53 | - | 171 | 85 | 42 | SPMM432... |

| Tool diameter tolerance | Applicable tolerance range of hole diameter |
|-------------------------|---|
| +0.2 / 0 | +0.3 / 0 |

Countersink dimensions of bolt hole



| Thread size | M6 | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 | M27 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| øD (mm) | 11 | 14 | 17.5 | 20 | 23 | 26 | 29 | 32 | 35 | 39 | 43 |
| H (mm) | 6.5 | 8.6 | 10.8 | 13 | 15.2 | 17.5 | 19.5 | 21.5 | 23.5 | 25.5 | 29 |
| ød (mm) | 6 | 9 | 11 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 30 |
| Applicable tool | TCB110 | TCB140 | TCB175 | TCB200 | TCB230 | TCB260 | TCB290 | TCB320 | TCB350 | TCB390 | TCB430 |

SPARE PARTS



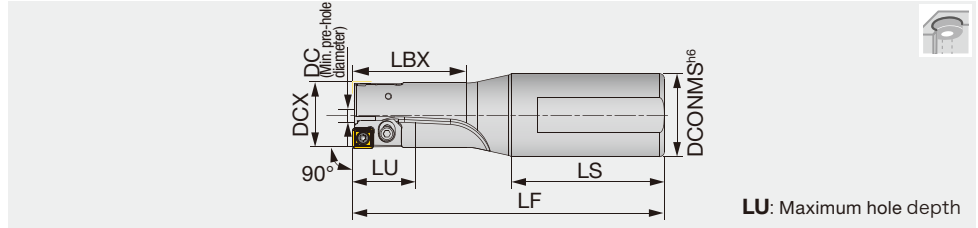
| Designation | Clamping screw | Wrench |
|-----------------------|----------------|--------|
| TCB100... - TCB160... | CSTB-2L040 | T-6D |
| TCB-140... | CSTB-2.2S | T-7D |
| TCB170... - TCB190... | CSTB-2.2 | T-7D |
| TCB200... - TCB260... | CSTA-NO3 | T-9D |
| TCB-290 - TCB-320 | CSTA-NO5 | T-9D |
| TCB-350 - TCB-430 | CSTA-4 | T-15D |

Recommended clamping torque: CSTB-2L040 = 0.7 N·m, CSTB-2.2S / CSTB-2.2 = 1 N·m, CSTA-NO3 / CSTA-NO5 = 2.3 N·m, CSTA-4 = 3.5 N·m

Reference pages: Inserts → [H219](#), Standard cutting conditions → [H219 - H220](#)

TCB

Counterboring endmill, cartridge type

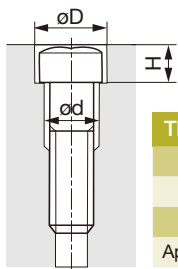


| Body Designation | DCX | DCONMS | DC | LU | LS | LBX | LF | WT(kg) | Cartridge set Designation | Shim plate Designation | Shim plate Thickness | Insert |
|------------------|-----|--------|------|----|----|-----|-----|--------|---------------------------|------------------------|----------------------|------------|
| TCB260-290F32 | 26 | 32 | 13.2 | 40 | 59 | 43 | 120 | 0.6 | TCB04CA-26-29 | - | - | SPMP042... |
| TCB260-290F32 | 27 | 32 | 14.2 | 40 | 59 | 43 | 120 | 0.6 | TCB04CA-26-29 | AP16050 | 0.5 | SPMP042... |
| TCB260-290F32 | 28 | 32 | 15.2 | 40 | 59 | 43 | 120 | 0.6 | TCB04CA-26-29 | AP16100 | 1 | SPMP042... |
| TCB260-290F32 | 29 | 32 | 16.2 | 40 | 59 | 43 | 120 | 0.6 | TCB04CA-26-29 | AP16150 | 1.5 | SPMP042... |
| TCB300-340F32 | 30 | 32 | 14.2 | 45 | 59 | 55 | 130 | 0.6 | TCB32CA-30-39 | - | - | SPMM322... |
| TCB300-340F32 | 31 | 32 | 15.2 | 45 | 59 | 55 | 130 | 0.6 | TCB32CA-30-39 | AP16050 | 0.5 | SPMM322... |
| TCB300-340F32 | 32 | 32 | 16.2 | 45 | 59 | 55 | 130 | 0.6 | TCB32CA-30-39 | AP16100 | 1 | SPMM322... |
| TCB300-340F32 | 33 | 32 | 17.2 | 45 | 59 | 55 | 130 | 0.6 | TCB32CA-30-39 | AP16150 | 1.5 | SPMM322... |
| TCB300-340F32 | 34 | 32 | 18.2 | 45 | 59 | 55 | 130 | 0.6 | TCB32CA-30-39 | AP16200 | 2 | SPMM322... |
| TCB350-390F32 | 35 | 32 | 19 | 50 | 59 | 70 | 140 | 0.7 | TCB32CA-30-39 | - | - | SPMM322... |
| TCB350-390F32 | 36 | 32 | 20 | 50 | 59 | 70 | 140 | 0.7 | TCB32CA-30-39 | AP16050 | 0.5 | SPMM322... |
| TCB350-390F32 | 37 | 32 | 21 | 50 | 59 | 70 | 140 | 0.7 | TCB32CA-30-39 | AP16100 | 1 | SPMM322... |
| TCB350-390F32 | 38 | 32 | 22 | 50 | 59 | 70 | 140 | 0.7 | TCB32CA-30-39 | AP16150 | 1.5 | SPMM322... |
| TCB350-390F32 | 39 | 32 | 23 | 50 | 59 | 70 | 140 | 0.7 | TCB32CA-30-39 | AP16200 | 2 | SPMM322... |
| TCB400-440F32 | 40 | 32 | 18 | 55 | 59 | 80 | 150 | 1 | TCB43CA-40-59 | - | - | SPMM432... |
| TCB400-440F32 | 41 | 32 | 19 | 55 | 59 | 80 | 150 | 1 | TCB43CA-40-59 | AP21050 | 0.5 | SPMM432... |
| TCB400-440F32 | 42 | 32 | 20 | 55 | 59 | 80 | 150 | 1 | TCB43CA-40-59 | AP21100 | 1 | SPMM432... |
| TCB400-440F32 | 43 | 32 | 21 | 55 | 59 | 80 | 150 | 1 | TCB43CA-40-59 | AP21150 | 1.5 | SPMM432... |
| TCB400-440F32 | 44 | 32 | 22 | 55 | 59 | 80 | 150 | 1 | TCB43CA-40-59 | AP21200 | 2 | SPMM432... |
| TCB450-490F32 | 45 | 32 | 23 | 65 | 59 | 90 | 160 | 1.2 | TCB43CA-40-59 | - | - | SPMM432... |
| TCB450-490F32 | 46 | 32 | 24 | 65 | 59 | 90 | 160 | 1.2 | TCB43CA-40-59 | AP21050 | 0.5 | SPMM432... |
| TCB450-490F32 | 47 | 32 | 25 | 65 | 59 | 90 | 160 | 1.2 | TCB43CA-40-59 | AP21100 | 1 | SPMM432... |
| TCB450-490F32 | 48 | 32 | 26 | 65 | 59 | 90 | 160 | 1.2 | TCB43CA-40-59 | AP21150 | 1.5 | SPMM432... |
| TCB450-490F32 | 49 | 32 | 27 | 65 | 59 | 90 | 160 | 1.2 | TCB43CA-40-59 | AP21200 | 2 | SPMM432... |
| TCB500-540F32 | 50 | 32 | 28 | 70 | 59 | 97 | 165 | 1.5 | TCB43CA-40-59 | - | - | SPMM432... |
| TCB500-540F32 | 51 | 32 | 29 | 70 | 59 | 97 | 165 | 1.5 | TCB43CA-40-59 | AP21050 | 0.5 | SPMM432... |
| TCB500-540F32 | 52 | 32 | 30 | 70 | 59 | 97 | 165 | 1.5 | TCB43CA-40-59 | AP21100 | 1 | SPMM432... |
| TCB500-540F32 | 53 | 32 | 31 | 70 | 59 | 97 | 165 | 1.5 | TCB43CA-40-59 | AP21150 | 1.5 | SPMM432... |
| TCB500-540F32 | 54 | 32 | 32 | 70 | 59 | 97 | 165 | 1.5 | TCB43CA-40-59 | AP21200 | 2 | SPMM432... |
| TCB550-590F32 | 55 | 32 | 33 | 75 | 59 | 105 | 175 | 1.9 | TCB43CA-40-59 | - | - | SPMM432... |
| TCB550-590F32 | 56 | 32 | 34 | 75 | 59 | 105 | 175 | 1.9 | TCB43CA-40-59 | AP21050 | 0.5 | SPMM432... |
| TCB550-590F32 | 57 | 32 | 35 | 75 | 59 | 105 | 175 | 1.9 | TCB43CA-40-59 | AP21100 | 1 | SPMM432... |
| TCB550-590F32 | 58 | 32 | 36 | 75 | 59 | 105 | 175 | 1.9 | TCB43CA-40-59 | AP21150 | 1.5 | SPMM432... |
| TCB550-590F32 | 59 | 32 | 37 | 75 | 59 | 105 | 175 | 1.9 | TCB43CA-40-59 | AP21200 | 2 | SPMM432... |

The cartridge sets and shim plates are included.

| | |
|-------------------------|---|
| Tool diameter tolerance | Applicable tolerance range of hole diameter |
| +0.2 / 0 | +0.3 / 0 |

Countersink dimensions of bolt hole



| Thread size | M16 | M18 | M20 | M22 | M24 | M27 | M30 | M33 | M36 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| øD (mm) | 26 | 29 | 32 | 35 | 39 | 43 | 48 | 54 | 58 |
| H (mm) | 17.5 | 19.5 | 21.5 | 23.5 | 25.5 | 29 | 32 | 35 | 38 |
| ød (mm) | 18 | 20 | 22 | 24 | 26 | 30 | 33 | 36 | 39 |
| Applicable tool | TCB260 | TCB290 | TCB320 | TCB350 | TCB390 | TCB430 | TCB480 | TCB540 | TCB580 |

Reference pages: Inserts → [H219](#), Standard cutting conditions → [H219 - H220](#)





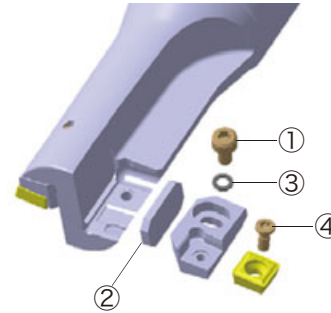
Body SPARE PARTS

| Designation | ① Cartridge screw | ② Shim plate | ② Shim plate | ② Shim plate | ② Shim plate | Wrench for cartridge | ③ Washer |
|---------------|-------------------|--------------|--------------|--------------|--------------|----------------------|-----------|
| TCB260-290F32 | CM3×0.5×6 | AP16050 | AP16100 | AP16150 | | P-2.5 | 3.2X6X0.5 |
| TCB300-340F32 | CM3×0.5×6 | AP16050 | AP16100 | AP16150 | AP16200 | P-2.5 | 3.2X6X0.5 |
| TCB350-390F32 | CM3×0.5×6 | AP16050 | AP16100 | AP16150 | AP16200 | P-2.5 | 3.2X6X0.5 |
| TCB400-440F32 | CM4×0.7×10 | AP21050 | AP21100 | AP21150 | AP21200 | P-3 | 4.3X8X0.5 |
| TCB450-490F32 | CM4×0.7×10 | AP21050 | AP21100 | AP21150 | AP21200 | P-3 | 4.3X8X0.5 |
| TCB500-540F32 | CM4×0.7×10 | AP21050 | AP21100 | AP21150 | AP21200 | P-3 | 4.3X8X0.5 |
| TCB550-590F32 | CM4×0.7×10 | AP21050 | AP21100 | AP21150 | AP21200 | P-3 | 4.3X8X0.5 |

Cartridge set SPARE PARTS

| Designation | ④ Insert screw | Wrench |
|---------------|----------------|--------|
| TCB04CA-26-29 | CSTA-NO3 | T-9D |
| TCB32CA-30-39 | CSTA-NO5 | T-9D |
| TCB32CA-30-39 | CSTA-NO5 | T-9D |
| TCB43CA-40-59 | CSTA-4 | T-15D |
| TCB43CA-40-59 | CSTA-4 | T-15D |
| TCB43CA-40-59 | CSTA-4 | T-15D |
| TCB43CA-40-59 | CSTA-4 | T-15D |

Recommended clamping torque: CSTA-NO3 / CSTA-NO5 = 2.3 N·m, CSTA-4 = 3.5 N·m



Fine adjustment shim plates (sold separately)

SPARE PARTS

| Designation | Thickness |
|-------------|-----------|
| AP16005 | 0.05 |
| AP16020 | 0.2 |
| AP21005 | 0.05 |
| AP21020 | 0.2 |

Cautions in preparing the cartridge type cutter

- Firmly press the cartridge in the arrowed direction while tightening the screw to install the cartridge on the cutter body. (Fig.1)
- Ensure that the shim plates thickness are always the same on both sides to equalize the tool diameter. (Fig.2)
- Ensure to locate the shim plate fit within the cartridge pocket. (Fig.2)
- Use thin shim plates (not included) for fine diameter adjustments in $\phi 0.1$ mm increments.
- When using multiple shim plates in one pocket for a diameter adjustment, always use the thinnest shim plates at the bottom to prevent them from dislocating during machining. (Fig.3)
- Ensure that the top shim is always in contact with the rim of the cartridge pocket to prevent it from dislocation during machining. (Fig.4)



Fig.1



Fig.2

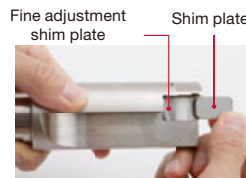


Fig.3



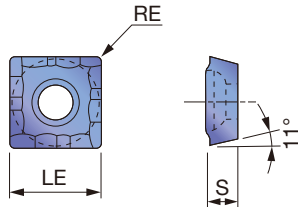
Fig.4

CUSTOM-BUILT TOOL SERVICE

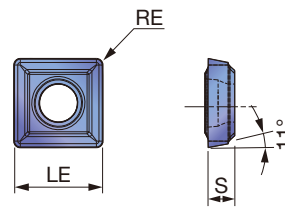
Tungaloy also designs and fabricates semi-standard or tailor-made tools with the TCB inserts according to the desired tool specifications. Contact your Tungaloy representative for further details.

INSERT

SPMP/SPMM



SPMP/SPMM-CG



| | | | | |
|----------|----------------|---|---|---|
| P | Steel | ☆ | ★ | ★ |
| M | Stainless | ☆ | ★ | ★ |
| K | Cast iron | ☆ | ★ | ★ |
| N | Non-ferrous | ☆ | ☆ | ☆ |
| S | Superalloys | ☆ | ☆ | ☆ |
| H | Hard materials | ☆ | ☆ | ☆ |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | LE | S |
|--------------|-----|--------|--------|--------|------|------|
| | | T313W | AH6030 | AH6225 | | |
| SPMP771-CG | 0.4 | ▲ | ● | | 5.4 | 1.61 |
| SPMP831-CG | 0.4 | ▲ | ● | | 6.35 | 2.38 |
| SPMP831DS | 0.4 | ● | | | 6.35 | 2.38 |
| SPMP832-CG | 0.8 | | ● | | 6.35 | 2.38 |
| SPMP041ER-CG | 0.4 | | ● | | 7.94 | 3.18 |
| SPMP042ER-CG | 0.8 | ▲ | ● | | 7.94 | 3.18 |
| SPMP042ERD | 0.8 | ● | | | 7.94 | 3.18 |
| SPMM321ER-CG | 0.4 | | ● | | 9.53 | 3.18 |
| SPMM322ER-CG | 0.8 | ▲ | ● | | 9.53 | 3.18 |
| SPMM322ERD | 0.8 | ● | | | 9.53 | 3.18 |
| SPMM431ER-CG | 0.4 | | ● | | 12.7 | 4.76 |
| SPMM432ER-CG | 0.8 | ▲ | ● | | 12.7 | 4.76 |
| SPMM432ERD | 0.8 | ● | | | 12.7 | 4.76 |

● : Line up
▲ : To be discontinued

STANDARD CUTTING CONDITIONS

Counterboring

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed : f (mm/rev) | |
|----------|--------------------|--------------|-----------------------------|-------------------|------------------|
| | | | | ø10 - 12 (z = 1) | ø13 - 59 (z = 2) |
| P | Carbon steel | - 300 HB | 80 - 200 | 0.03 - 0.08 | 0.1 - 0.3 |
| M | Stainless steel | - 200 HB | 80 - 150 | 0.03 - 0.05 | 0.06 - 0.15 |
| K | Grey cast iron | 150 - 250 HB | 80 - 200 | 0.05 - 0.1 | 0.1 - 0.4 |
| N | Non-ferrous | - | 100 - 300 | 0.05 - 0.2 | 0.1 - 0.4 |
| S | Superalloys | - 40 HRC | 50 - 80 | 0.03 - 0.05 | 0.06 - 0.15 |
| H | Hard materials | - 50 HRC | 50 - 80 | 0.03 - 0.05 | 0.06 - 0.15 |

Milling

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|--------------------|--------------|-----------------------------|-----------------------------|
| P | Carbon steel | - 300 HB | 80 - 200 | 0.05 - 0.15 |
| M | Stainless steel | - 200 HB | 80 - 150 | 0.05 - 0.1 |
| K | Grey cast iron | 150 - 250 HB | 80 - 200 | 0.05 - 0.2 |
| N | Non-ferrous | - | 100 - 300 | 0.1 - 0.2 |
| S | Superalloys | - 40 HRC | 50 - 80 | 0.05 - 0.08 |
| H | Hard materials | - 50 HRC | 50 - 80 | 0.05 - 0.08 |

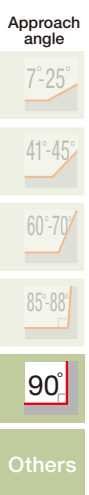
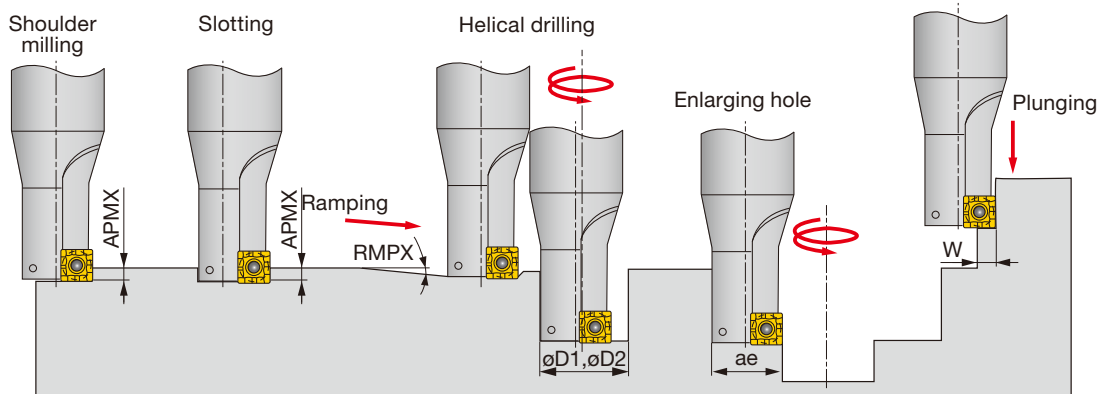




Internal boring (With one cutting edge)

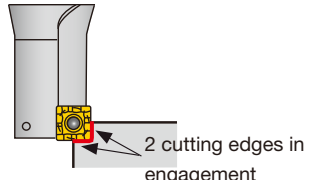
| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Depth of cut ap (mm) | Feed : f (mm/rev) |
|----------|--------------------|--------------|--------------------------|----------------------|-------------------|
| P | Carbon steel | - 300 HB | 80 - 200 | 0.5 - | 0.05 - 0.15 |
| M | Stainless steel | - 200 HB | 80 - 150 | 0.5 - | 0.05 - 0.1 |
| K | Grey cast iron | 150 - 250 HB | 80 - 200 | 0.5 - | 0.05 - 0.2 |
| N | Non-ferrous | - | 100 - 300 | 0.5 - | 0.1 - 0.2 |
| S | Superalloys | - 40 HRC | 50 - 80 | 0.5 - | 0.05 - 0.08 |
| H | Hard materials | - 50 HRC | 50 - 80 | 0.5 - | 0.05 - 0.08 |

APPLICATION



| Designation | Tool dia. DCX | Max. depth of cut APMX | Max. ramping angle RMPX | Max. cutting width in plunging W | Min. machinable hole dia. øD1 | Max. machinable hole dia. øD2 | Max. cutting width in enlarging hole ae |
|-------------|---------------|------------------------|-------------------------|----------------------------------|-------------------------------|-------------------------------|---|
| TCB100F16 | 10 | 4 | - | 4 | - | - | - |
| TCB110F16 | 11 | 4 | 2.1° | 4 | 12 | 20 | 10 |
| TCB120F20 | 12 | 4 | 2.1° | 4 | 14 | 22 | 11 |
| TCB130F20 | 13 | 4 | 2.1° | 4 | 17 | 24 | 12 |
| TCB-140 | 14 | 5 | 3° | 5 | 20 | 25 | 13 |
| TCB140F25 | 14 | 4 | 1.9° | 4 | 19 | 26 | 13 |
| TCB150F25 | 15 | 4 | 1.6° | 4 | 21 | 28 | 14 |
| TCB160F25 | 16 | 4 | 1.3° | 4 | 23 | 30 | 15 |
| TCB170F25 | 17 | 5 | 2.5° | 5 | 25 | 32 | 16 |
| TCB175F25 | 17.5 | 5 | 2.2° | 5 | 25.5 | 33 | 16.5 |
| TCB180F25 | 18 | 5 | 2° | 5 | 26 | 34 | 17 |
| TCB190F25 | 19 | 5 | 1.5° | 5 | 27 | 36 | 18 |
| TCB200F25 | 20 | 6 | 3° | 6 | 29 | 38 | 19 |
| TCB210F25 | 21 | 6 | 2.5° | 6 | 30 | 40 | 20 |
| TCB220F25 | 22 | 6 | 2° | 6 | 31 | 42 | 21 |
| TCB230F25 | 23 | 6 | 1.6° | 6 | 32 | 44 | 22 |
| TCB240F25 | 24 | 6 | 1.3° | 6 | 33 | 46 | 23 |
| TCB250F25 | 25 | 6 | 1.1° | 6 | 34 | 48 | 24.5 |
| TCB-260 | 26 | 6 | 1° | 6 | 35 | 50 | 25 |
| TCB-290 | 29 | 8 | 3° | 8 | 37 | 56 | 28 |
| TCB-320 | 32 | 8 | 2.5° | 8 | 40 | 62 | 31 |
| TCB-350 | 35 | 10 | 2.5° | 10 | 45 | 68 | 34 |
| TCB-390 | 39 | 10 | 2° | 10 | 49 | 76 | 38 |
| TCB-430 | 43 | 10 | 1.5° | 10 | 53 | 84 | 42 |

The insert can be used for a maximum 2 indexings. (full 4 indexing for a plunging application.)

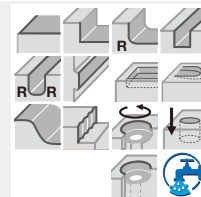
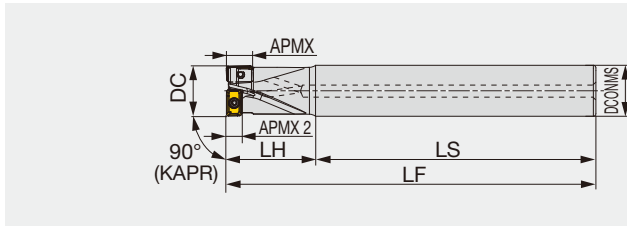


Cautions in shouldering operation

The cutter is design so that the insert provides 1° taper relief on the periphery. The wall, therefore, will be 89° when milled.

Multi-function endmill, shank type, with center cutting edge

GAMP: Center insert $-2.6^{\circ} \sim -4.4^{\circ}$, Peripheral insert $+6.1^{\circ} \sim +7.1^{\circ}$
GAMF: Center insert $+0.2^{\circ} \sim +1.3^{\circ}$, Peripheral insert $-15.7^{\circ} \sim -15^{\circ}$

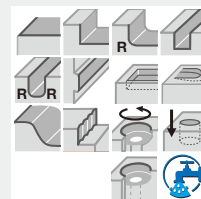
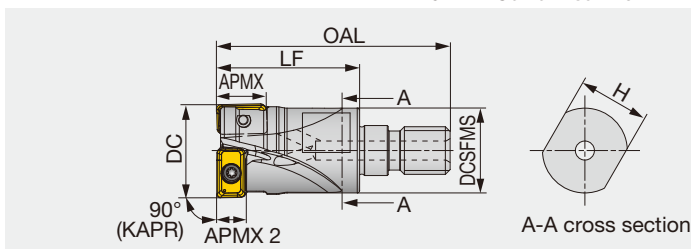


| Designation | APMX | APMX 2 | DC | CICT | DCONMS | LS | LH | LF | WT(kg) | Air hole | Insert |
|---------------------|------|--------|----|------|--------|-----|----|-----|--------|----------|-----------|
| EVLX08M016C16.0R02 | 7 | 4 | 16 | 2 | 16 | 100 | 30 | 130 | 0.18 | With | LXMU08... |
| EVLX08M016C16.0R02L | 7 | 4 | 16 | 2 | 16 | 130 | 50 | 180 | 0.25 | With | LXMU08... |
| EVLX08M017C16.0R02L | 7 | 4 | 17 | 2 | 16 | 155 | 25 | 180 | 0.26 | With | LXMU08... |
| EVLX10M020C20.0R02 | 9 | 4 | 20 | 2 | 20 | 110 | 35 | 145 | 0.31 | With | LXMU10... |
| EVLX10M020C20.0R02L | 9 | 4 | 20 | 2 | 20 | 130 | 60 | 190 | 0.41 | With | LXMU10... |
| EVLX10M021C20.0R02L | 9 | 4 | 21 | 2 | 20 | 160 | 30 | 190 | 0.42 | With | LXMU10... |
| EVLX12M025C25.0R02 | 11 | 6 | 25 | 2 | 25 | 105 | 45 | 150 | 0.51 | With | LXMU12... |
| EVLX12M025C25.0R02L | 11 | 6 | 25 | 2 | 25 | 150 | 75 | 225 | 0.77 | With | LXMU12... |
| EVLX12M026C25.0R02L | 11 | 6 | 26 | 2 | 25 | 190 | 35 | 225 | 0.8 | With | LXMU12... |

HVLX08/10/12-M

Multi-function endmill, modular type (TungFlex), with center cutting edge

GAMP: Center insert $-2.6^{\circ} \sim -4.4^{\circ}$, Peripheral insert $+6.1^{\circ} \sim +7.1^{\circ}$
GAMF: Center insert $+0.2^{\circ} \sim +1.3^{\circ}$, Peripheral insert $-15.7^{\circ} \sim -15^{\circ}$



| Designation | APMX | APMX 2 | DC | CICT | OAL | LF | H | DCSFMS | CRKS | WT(kg) | Air hole | Insert |
|------------------|------|--------|----|------|-----|----|----|--------|------|--------|----------|-----------|
| HVLX08M016M08R02 | 7 | 4 | 16 | 2 | 42 | 25 | 10 | 14.5 | M8 | 0.03 | With | LXMU08... |
| HVLX08M017M08R02 | 7 | 4 | 17 | 2 | 42 | 25 | 10 | 14.5 | M8 | 0.04 | With | LXMU08... |
| HVLX10M020M10R02 | 9 | 4 | 20 | 2 | 49 | 30 | 15 | 17.8 | M10 | 0.05 | With | LXMU10... |
| HVLX10M021M10R02 | 9 | 4 | 21 | 2 | 49 | 30 | 15 | 17.8 | M10 | 0.06 | With | LXMU10... |
| HVLX12M025M12R02 | 11 | 6 | 25 | 2 | 57 | 35 | 17 | 23 | M12 | 0.1 | With | LXMU12... |
| HVLX12M026M12R02 | 11 | 6 | 26 | 2 | 57 | 35 | 17 | 23 | M12 | 0.1 | With | LXMU12... |

SPARE PARTS



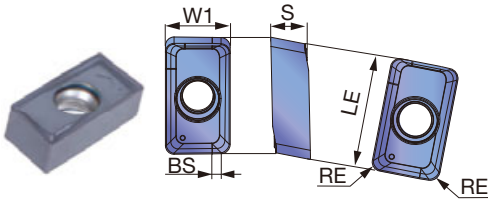
| Designation | Clamping screw | Wrench |
|-------------|---------------------|--------|
| E/HVLX08... | CSPB-2.2 | IP-7D |
| E/HVLX10... | SR M2.5X0.45-L6 IP7 | IP-7D |
| E/HVLX12... | TS30100I/HG-P | IP-9D |

Recommended clamping torque: CSPB-2.2, SR M2.5X0.45-L6 IP7 = 1 N·m, TS30100I/HG-P = 2 N·m



INSERT

LXMU-MM



| | | | | | | | | | |
|----------|----------------|---|---|---|--|--|--|--|--|
| P | Steel | ★ | ☆ | | | | | | |
| M | Stainless | ★ | | | | | | | |
| K | Cast iron | | ☆ | ★ | | | | | |
| N | Non-ferrous | | | | | | | | |
| S | Superalloys | ☆ | | ★ | | | | | |
| H | Hard materials | | | ★ | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Coated | | | LE | W1 | S | BS |
|------------------|-----|------|--------|-------|--------|------|-----|-----|-----|
| | | | AH3225 | AH120 | AH8015 | | | | |
| LXMU080304PER-MM | 0.4 | 7 | ● | ● | ● | 7.7 | 5 | 2.8 | 0.8 |
| LXMU10T304PER-MM | 0.4 | 9 | ● | ● | | 10 | 6 | 3.2 | 1.2 |
| LXMU10T308PER-MM | 0.8 | 9 | ● | ● | ● | 10 | 6 | 3.2 | 0.8 |
| LXMU120404PER-MM | 0.4 | 11 | ● | ● | | 12.2 | 7.1 | 4.2 | 1.2 |
| LXMU120408PER-MM | 0.8 | 11 | ● | ● | ● | 12.2 | 7.1 | 4.2 | 0.8 |

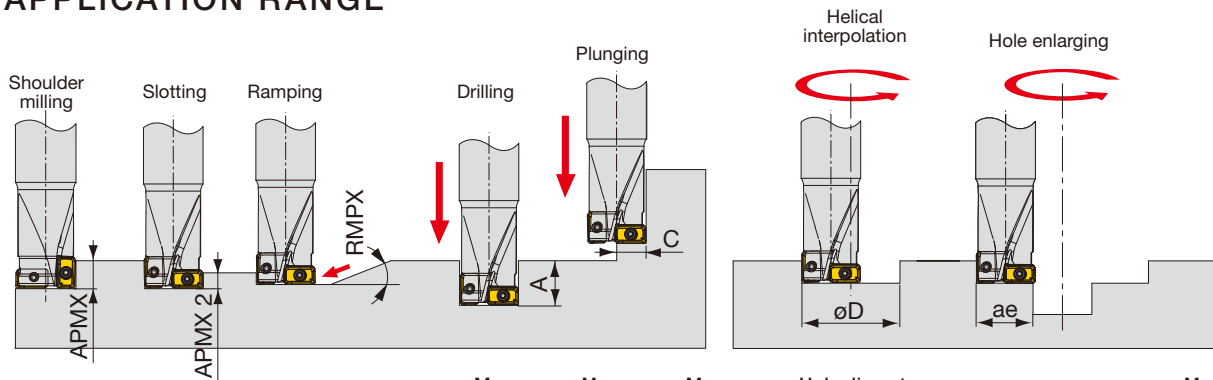
● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece materials | Hardness | Grades | Cutting speed Vc (m/min) | Drilling (ZEFP = 1)* Feed per revolution f (mm/rev) | Shouldering / Helical interpolation* | |
|----------|--|----------------------------------|---------------|-----------------------------|---|---|-------------|
| | | | | | | Feed per tooth fz (mm/t) | |
| | | | | | | 08 | 10 / 12 |
| P | Low carbon steel S15C, SS400, etc. C15E4, E275A, etc. | - 200 HB | AH3225 | 100 - 300 | 0.03 - 0.08 | 0.05 - 0.25 | 0.05 - 0.3 |
| | Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | - 300 HB | AH3225 | 100 - 250 | 0.03 - 0.08 | 0.05 - 0.25 | 0.05 - 0.3 |
| | Prehardened steel NAK80, PX5, etc. | 30 - 40 HRC | AH3225 | 100 - 200 | 0.03 - 0.06 | 0.05 - 0.2 | 0.05 - 0.25 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | - | AH3225 | 80 - 180 | 0.03 - 0.08 | 0.05 - 0.2 | 0.05 - 0.22 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | AH120, AH8015 | 100 - 300 | 0.03 - 0.1 | 0.05 - 0.25 | 0.05 - 0.3 |
| | Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc. | 150 - 250 HB | AH120, AH8015 | 100 - 250 | 0.03 - 0.08 | 0.05 - 0.2 | 0.05 - 0.25 |
| S | Titanium alloys Ti-6Al-4V, etc. | - | AH3225 | 20 - 60 | 0.03 - 0.06 | 0.04 - 0.15 | 0.04 - 0.15 |
| | Superalloys Inconel 718, etc. | - | AH8015 | 20 - 40 | 0.03 - 0.06 | 0.04 - 0.15 | 0.04 - 0.15 |
| H | Hardened steel | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50 HRC | AH8015 | 50 - 150 | 0.03 - 0.05 | 0.04 - 0.15 |
| | | SKD11, etc. X153CrMoV12, etc. | 50 - 60 HRC | AH8015 | 40 - 70 | 0.03 - 0.05 | 0.04 - 0.15 |

*In the following cases, feed as if the cutter has a single effective cutting edge (ZEFP = 1):
 - Hole making
 - Helical interpolating for holes with a hole diameter (øD) ≤ 1.25x the tool diameter (DC)
 - The axial D.O.C. exceeds APMX2 (See next page for APMX2)

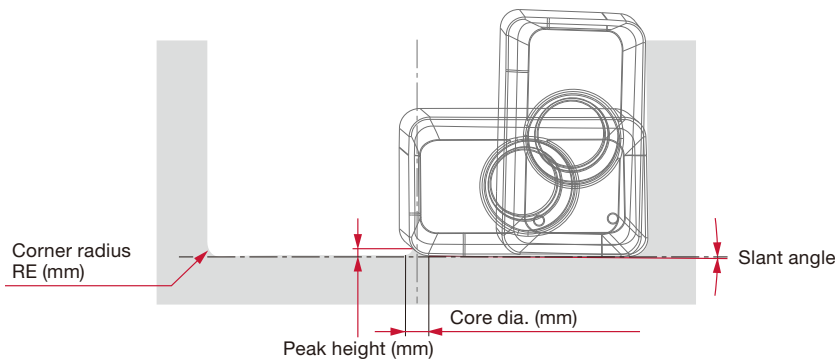
APPLICATION RANGE



| Designation | DC | Max. depth of cut | | Max. drilling depth* | Max. cutting width in plunging | Max. ramping angle | Hole diameters (w/ flat bottom) machinable | | Hole diameters machinable | | Max. cutting width engagement |
|-----------------|----|-------------------|--------|----------------------|--------------------------------|--------------------|--|-------|---------------------------|----------------|-------------------------------|
| | | APMX | APMX 2 | | | | A | C | RMPX | ϕD_{min} | |
| E/HVLX08M016... | 16 | 7 | 4 | 12 | 8 | 90° | 17 | 30.75 | 16 | 31.75 | 14 |
| E/HVLX08M017... | 17 | 7 | 4 | 12 | 8.5 | 90° | 19 | 32.75 | 17 | 33.75 | 15 |
| E/HVLX10M020... | 20 | 9 | 4 | 15 | 10 | 90° | 22 | 37.95 | 20 | 39.15 | 18 |
| E/HVLX10M021... | 21 | 9 | 4 | 15 | 10.5 | 90° | 23.35 | 39.95 | 21 | 40.95 | 19 |
| E/HVLX12M025... | 25 | 11 | 6 | 18.5 | 12.5 | 90° | 26.65 | 47.85 | 25 | 48.95 | 23 |
| E/HVLX12M026... | 26 | 11 | 6 | 18.5 | 13 | 90° | 28.65 | 49.85 | 26 | 50.95 | 24 |

*Use pecking or dwelling method when drilling holes deeper than 5 mm.

HOLE BOTTOM PROFILE AFTER DRILLING



| DC | D16 | | D17 | | D20 | | D21 | | D25 | | D26 | |
|------------------|--|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
| Insert | LXMU08... | | LXMU10... | | LXMU10... | | LXMU10... | | LXMU12... | | LXMU12... | |
| RE (mm) | 0.4 | | 0.4 | | 0.8 | | 0.4 | | 0.8 | | 0.4 | |
| Peak height (mm) | 0.43 | 0.86 | 0.1 | 0.24 | 0.86 | 0.86 | 0.45 | 0.45 | 0.86 | 0.86 | 0.86 | 0.86 |
| Core dia. (mm) | 0.9 | 1.9 | 0.21 | 1.02 | 1.22 | 2.02 | 0.7 | 1.37 | 1.59 | 2.36 | 2.36 | 2.36 |
| Slant angle | Conical shape with $\approx 0.3^\circ$ slant angle | | | | | | | | | | | |

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

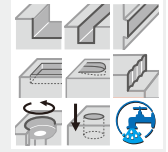
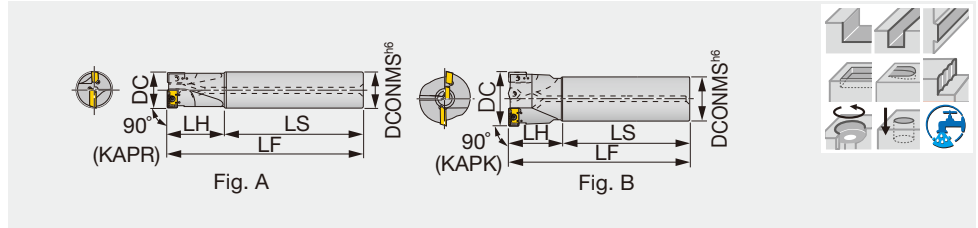
Index



EVX

Multi purpose endmill, shank type, with center cutting edge

Standard type GAMP = +2°~ +5°, GAMF = -10°~ -3.5°
Long type GAMP = +5°, GAMF = -4°~ -2°



| Designation | APMX | DC | CICT | DCONMS | LS | LH | LF | Coolant hole | Fig. | Insert |
|-------------|------|----|------|--------|-----|-----|-----|--------------|------|-------------------|
| EVX08016RSA | 7 | 16 | 2 | 16 | 90 | 30 | 120 | With | A | XXMU08... |
| EVX08016RS | 7 | 16 | 2 | 16 | 90 | 30 | 120 | Without | A | XXMU08... |
| EVX08016RLA | 7 | 16 | 2 | 16 | 135 | 40 | 175 | With | A | XXMU08... |
| EVX08016RL | 7 | 16 | 2 | 16 | 135 | 40 | 175 | Without | A | XXMU08... |
| EVX10020RSA | 9 | 20 | 2 | 20 | 90 | 30 | 120 | With | A | XXMU10... |
| EVX10020RS | 9 | 20 | 2 | 20 | 90 | 30 | 120 | Without | A | XXMU10... |
| EVX10020RLA | 9 | 20 | 2 | 20 | 135 | 50 | 185 | With | A | XXMU10... |
| EVX10020RL | 9 | 20 | 2 | 20 | 135 | 50 | 185 | Without | A | XXMU10... |
| EVX12025RSA | 11.5 | 25 | 2 | 25 | 100 | 40 | 140 | With | A | XXMU12... |
| EVX12025RS | 11.5 | 25 | 2 | 25 | 100 | 40 | 140 | Without | A | XXMU12... |
| EVX12025RLA | 11.5 | 25 | 2 | 25 | 150 | 70 | 220 | With | A | XXMU12... |
| EVX12025RL | 11.5 | 25 | 2 | 25 | 150 | 70 | 220 | Without | A | XXMU12... |
| EVX16032RSA | 15 | 32 | 2 | 32 | 110 | 50 | 160 | With | A | XXMU16... |
| EVX16032RS | 15 | 32 | 2 | 32 | 110 | 50 | 160 | Without | A | XXMU16... |
| EVX16032RLA | 15 | 32 | 2 | 32 | 175 | 80 | 255 | With | A | XXMU16... |
| EVX16032RL | 15 | 32 | 2 | 32 | 175 | 80 | 255 | Without | A | XXMU16... |
| EVX12040RSA | 11.5 | 40 | 2 | 42 | 120 | 60 | 180 | With | B | XXMU12, WCMT05... |
| EVX12040RS | 11.5 | 40 | 2 | 42 | 120 | 60 | 180 | Without | B | XXMU12, WCMT05... |
| EVX12040RLA | 11.5 | 40 | 2 | 42 | 210 | 100 | 310 | With | B | XXMU12, WCMT05... |
| EVX12040RL | 11.5 | 40 | 2 | 42 | 210 | 100 | 310 | Without | B | XXMU12, WCMT05... |
| EVX16050RSA | 15 | 50 | 2 | 42 | 160 | 50 | 210 | With | B | XXMU16, WCMT06... |
| EVX16050RS | 15 | 50 | 2 | 42 | 160 | 50 | 210 | Without | B | XXMU16, WCMT06... |
| EVX16050RLA | 15 | 50 | 2 | 42 | 310 | 50 | 360 | With | B | XXMU16, WCMT06... |
| EVX16050RL | 15 | 50 | 2 | 42 | 310 | 50 | 360 | Without | B | XXMU16, WCMT06... |
| EVX16063RSA | 15 | 63 | 2 | 42 | 190 | 50 | 240 | With | B | XXMU16, WCMT06... |
| EVX16063RS | 15 | 63 | 2 | 42 | 190 | 50 | 240 | Without | B | XXMU16, WCMT06... |
| EVX16063RLA | 15 | 63 | 2 | 42 | 310 | 50 | 360 | With | B | XXMU16, WCMT06... |
| EVX16063RL | 15 | 63 | 2 | 42 | 310 | 50 | 360 | Without | B | XXMU16, WCMT06... |

SPARE PARTS



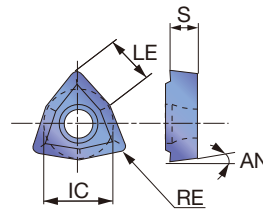
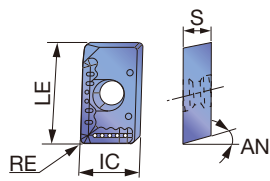
| Designation | Clamping screw 1 | Clamping screw 2 | Lubricant (Optional) | Wrench 1 | Wrench 2 |
|------------------|------------------|------------------|----------------------|----------|----------|
| EVX08016R... | - | CSPB-2.2 | (M-1000) | IP-7D | - |
| EVX10020R... | - | CSPB-2.5 | (M-1000) | IP-8D | - |
| EVX12025R... | - | CSPD-3 | (M-1000) | IP-10D | - |
| EVX16032R... | CSPB-3.5 | - | (M-1000) | IP-15D | - |
| EVX12040R... | - | CSPD-3 | (M-1000) | IP-10D | - |
| EVX16050, 63R... | CSPB-3.5 | CSTB-3.5D | (M-1000) | IP-15D | T-9D |

Recommended clamping torque: CSPB-2.2 = 1 N·m, CSPB-2.5 = 1.3 N·m, CSPB-3.5 = 3.5 N·m, CSPD-3 = 2.5 N·m, CSTB-3.5D = 2.3 N·m

INSERT

XXMU-MJ

WCMT-D4



| | | | | | | | |
|---|----------------|---|---|---|--|--|--|
| P | Steel | ★ | ★ | | | | |
| M | Stainless | ★ | | ★ | | | |
| K | Cast iron | | ★ | | | | |
| N | Non-ferrous | | | | | | |
| S | Superalloys | | | | | | |
| H | Hard materials | ★ | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | | LE | IC | S | AN |
|-----------------|-----|--------|-------|-------|------|-------|------|-----|
| | | AH3135 | AH120 | AH140 | | | | |
| XXMU08T204PR-MJ | 0.4 | ● | ● | ● | 8.2 | 5.6 | 2.78 | 10° |
| XXMU10H308PR-MJ | 0.8 | ● | ● | ● | 10.6 | 6.8 | 3.5 | 11° |
| XXMU12X408PR-MJ | 0.8 | ● | ● | ● | 13.2 | 7.9 | 4.2 | 11° |
| XXMU16X508PR-MJ | 0.8 | ● | ● | ● | 16.8 | 11.1 | 5 | 11° |
| WCMT050308-D4 | 0.8 | | ● | ● | 5.4 | 7.94 | 3.18 | 7° |
| WCMT06T308-D4 | 0.8 | | ● | ● | 6.5 | 9.525 | 3.97 | 7° |

● : Line up

STANDARD CUTTING CONDITIONS

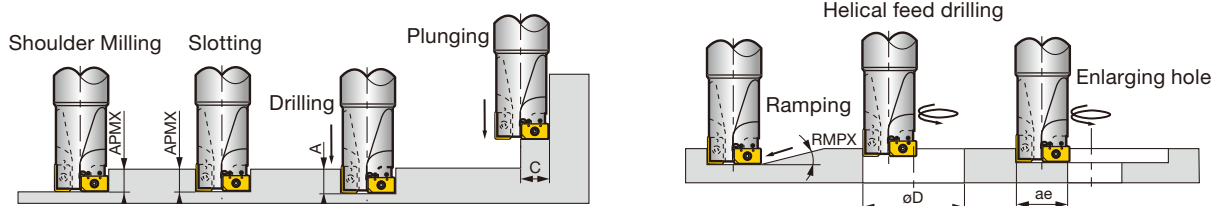
Please scan below.

e-catalog



EVX

APPLICATION RANGE



| Designation | Tool dia. DC | Max. depth of cut APMX | Max. drilling depth A | Max. cutting width in plunging C | Max. ramping angle RMPX | Min. machining hole dia. øDmin | Max. machining hole dia. øDmax | Max. cutting width in enlarging hole ae |
|------------------|-----------------|---------------------------|--------------------------|-------------------------------------|----------------------------|-----------------------------------|-----------------------------------|--|
| EVX08016R... | 16 | 7 | 8 | 8 | 3° | 19.2 | 30 | 14 |
| EVX10020R... | 20 | 9 | 10 | 10 | 3° | 24 | 38 | 18 |
| EVX12025R... | 25 | 11.5 | 12.5 | 12.5 | 3° | 30 | 48 | 23 |
| EVX16032R... | 32 | 15 | 16 | 16 | 3° | 38.4 | 62 | 30 |
| EVX12040RS/L (A) | 40 | 11.5 | 20 | 20 | 3° | 48 | 78 | 38 |
| EVX16050RS/L (A) | 50 | 15 | 25 | 25 | 3° | 60 | 98 | 48 |
| EVX16063RS/L (A) | 63 | 15 | 31.5 | 31.5 | 3° | 75.6 | 124 | 61 |

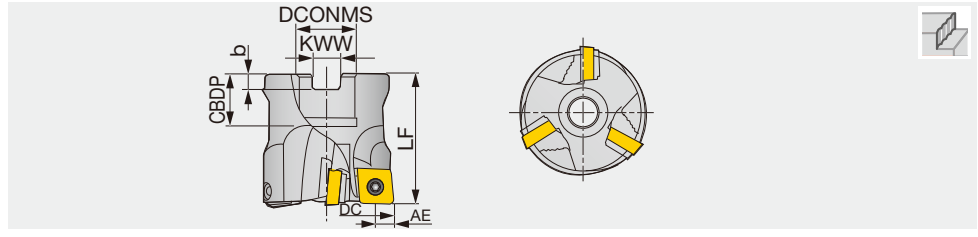


Z-FEEDMILL

TZP12

Plunge mill for roughing, with screw clamp system

GAMP = +26°, GAMF = -2°



| Designation | DC | CICT | DCONMS | CBDP | LF | b | KWW | WT(kg) | Insert |
|-------------|----|------|--------|------|----|-----|------|--------|-----------------|
| TZP12050R | 50 | 3 | 22 | 20 | 50 | 6 | 10 | 0.38 | APMT120416PR-MJ |
| TZP12050R-E | 50 | 3 | 22 | 20 | 50 | 6.3 | 10.4 | 0.38 | APMT120416PR-MJ |
| TZP12063R | 63 | 3 | 22 | 20 | 50 | 6 | 10 | 0.72 | APMT120416PR-MJ |
| TZP12063R-E | 63 | 3 | 22 | 20 | 50 | 6.3 | 10.4 | 0.72 | APMT120416PR-MJ |
| TZP12080R | 80 | 4 | 31.75 | 32 | 63 | 8 | 12.7 | 1.51 | APMT120416PR-MJ |

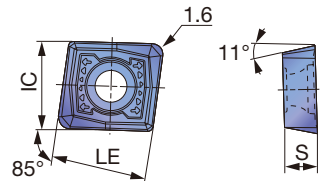
SPARE PARTS

| Designation | Clamping screw | Lubricant (Optional) | Shim screw | Shim | Wewnch1 | Wewnch2 |
|-------------|----------------|----------------------|------------|---------|---------|---------|
| TZP12 | CSTB-3.5T | (M-1000) | DTS5-3.5SS | ZSA1102 | T-20D | P-3.5 |

Recommended clamping torque: 5 N·m

INSERT

APMT120416-MJ



| | P | M | K | N | S | H |
|----------------|---|---|---|---|---|---|
| Steel | ☆ | ★ | | | | |
| Stainless | | | | | | |
| Cast iron | | | ★ | | | |
| Non-ferrous | | | | | | |
| Superalloys | | | | | | |
| Hard materials | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | AE | Coated | | IC | LE | S |
|-----------------|-----|----|--------|-------|------|------|------|
| | | | AH120 | T3130 | | | |
| APMT120416PR-MJ | 1.6 | 10 | ● | ● | 12.7 | 13.5 | 4.76 |

●: Line up

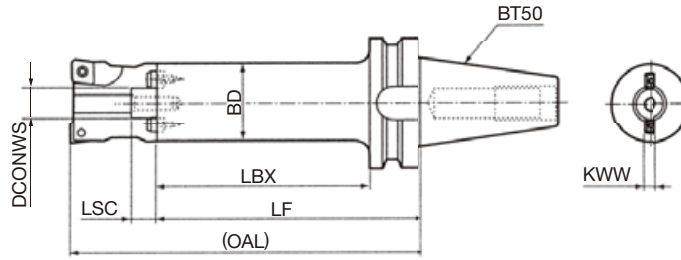
STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



TZP12



| Designation | Dimension (mm) | | | | | | | WT (kg) | Applicable mill |
|----------------------|----------------|-----|-------|----|--------|-----|------|---------|-----------------|
| | LF | LBX | (OAL) | BD | DCONWS | LSC | KWW | | |
| BT50-FMC22-343-47 | 343 | 305 | 393 | 47 | 22 | 18 | 10 | 7.9 | TZP12050R... |
| BT50-FMC22-293-47 | 293 | 255 | 343 | 47 | 22 | 18 | 10 | 7.2 | TZP12050R... |
| BT50-FMC22-243-47 | 243 | 205 | 293 | 47 | 22 | 18 | 10 | 6.5 | TZP12050R... |
| BT50-FMC22-433-59 | 433 | 395 | 483 | 59 | 22 | 18 | 10 | 12.2 | TZP12063R... |
| BT50-FMC22-373-59 | 373 | 335 | 423 | 59 | 22 | 18 | 10 | 10.9 | TZP12063R... |
| BT50-FMC22-308-59 | 308 | 270 | 358 | 59 | 22 | 18 | 10 | 9.5 | TZP12063R... |
| BT50-FMA31.75-455-76 | 455 | 417 | 518 | 76 | 31.75 | 30 | 12.7 | 18.6 | TZP12080R... |
| BT50-FMA31.75-375-76 | 375 | 337 | 438 | 76 | 31.75 | 30 | 12.7 | 15.8 | TZP12080R... |
| BT50-FMA31.75-295-76 | 295 | 257 | 358 | 76 | 31.75 | 30 | 12.7 | 12.9 | TZP12080R... |

Note: (GL) is a length with TZP12 cutter mounted.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

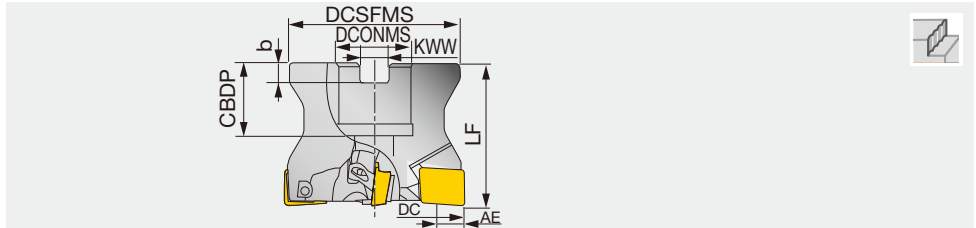


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- Others

TZP19

Plunge mill for roughing, with wedge clamp system

GAMP = +16°, GAMF = -2°



| Designation | DC | CICT | DCSFMS | DCONMS | CBDP | LF | b | KWW | WT(kg) | Insert |
|-------------|-----|------|--------|--------|------|----|----|------|--------|-----------------|
| TZP19080R | 80 | 4 | 76 | 31.75 | 32 | 63 | 8 | 12.7 | 1.32 | APMR190616PR-MJ |
| TZP19100R | 100 | 5 | 96 | 31.75 | 32 | 63 | 8 | 12.7 | 2.41 | APMR190616PR-MJ |
| TZP19125R | 125 | 6 | 98 | 38.1 | 38 | 63 | 10 | 15.9 | 3.17 | APMR190616PR-MJ |

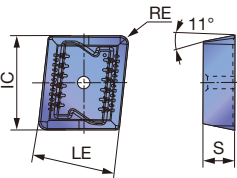
SPARE PARTS

| Designation | Clamping screw | Adjusting screw | Shim | Wedge | Wewnch1 | Wewnch 2 |
|-------------|----------------|-----------------|---------|--------|---------|----------|
| TZP19 | CSTA-4 | FDS-8ST | ZSA1502 | WPP16R | T-15D | T-27T |

Recommended clamping torque: 3.5 N·m

INSERT

APMR190616-MJ



| | | | | | | | | | |
|---|----------------|---|---|--|--|--|--|--|--|
| P | Steel | ☆ | ★ | | | | | | |
| M | Stainless | | | | | | | | |
| K | Cast iron | ★ | | | | | | | |
| N | Non-ferrous | | | | | | | | |
| S | Superalloys | | | | | | | | |
| H | Hard materials | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | AE | Coated | | IC | LE | S |
|-----------------|-----|----|--------|-------|-------|--------|------|
| | | | AH120 | T3130 | | | |
| APMR190616PR-MJ | 1.6 | 17 | ● | ● | 19.05 | 15.875 | 6.35 |

●: Line up

STANDARD CUTTING CONDITIONS

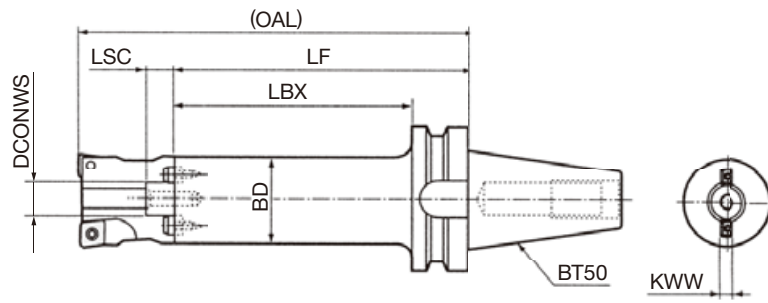
Please scan below.

e-catalog



TZP19

ARBOR



| Designation | Dimension (mm) | | | | | | | WT (kg) | Applicable mill |
|----------------------|----------------|-----|-------|----|--------|-----|------|---------|-----------------|
| | LF | LBX | (OAL) | BD | DCONWS | LSC | KWW | | |
| BT50-FMA31.75-455-76 | 455 | 417 | 518 | 76 | 31.75 | 30 | 12.7 | 18.6 | TZP19080R |
| BT50-FMA31.75-375-76 | 375 | 337 | 438 | 76 | 31.75 | 30 | 12.7 | 15.8 | TZP19080R |
| BT50-FMA31.75-295-76 | 295 | 257 | 358 | 76 | 31.75 | 30 | 12.7 | 12.9 | TZP19080R |
| BT50-FMA31.75-375-96 | 375 | 337 | 438 | 96 | 31.75 | 30 | 12.7 | 23 | TZP19100R |
| BT50-FMA38.1-375-98 | 375 | 337 | 438 | 98 | 38.1 | 34 | 15.9 | 23.8 | TZP19125R |

Note: (GL) is a length with TZP19 cutter mounted.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

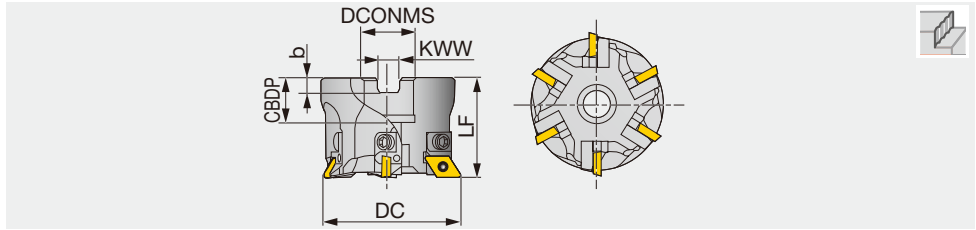




TZF11

High precision plunge mill

GAMP = 0°, GAMF = -6° ~ 0°



| Designation | CICT | DC | DCONMS | CBDF | LF | b | KWW | WT(kg) | Insert |
|-------------|------|----|--------|------|----|-----|------|--------|-------------|
| TZF11050R | 4 | 50 | 22 | 20 | 45 | 6 | 10 | 0.38 | DPCW11T3ZFR |
| TZF11050R-E | 4 | 50 | 22 | 20 | 45 | 6.3 | 10.4 | 0.38 | DPCW11T3ZFR |
| TZF11063R | 6 | 63 | 22 | 20 | 45 | 6 | 10 | 0.72 | DPCW11T3ZFR |
| TZF11063R-E | 6 | 63 | 22 | 20 | 45 | 6.3 | 10.4 | 0.72 | DPCW11T3ZFR |
| TZF11080R | 7 | 80 | 31.75 | 32 | 63 | 8 | 12.7 | 1.51 | DPCW11T3ZFR |

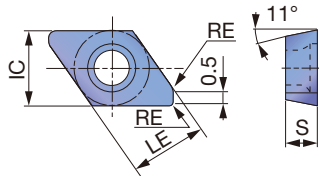
SPARE PARTS

| Designation | Clamping screw | Cartridge | Lubricant (Optional) | Cartridge fixing screw | Cartridge fixing screw | Shell locking bolt | Wewnch | Wewnch 1 | Wewnch 2 |
|-----------------------|----------------|--------------|----------------------|------------------------|------------------------|--------------------|--------|----------|----------|
| TZF11050R* | CSTB-4S | SDUPR09CZ-11 | (M-1000) | CM4X0.7X12 | SSHM3-10 | FSHM10-40 | T-15D | P-1.5 | P-3 |
| TZF11063R*, TZF11080R | CSTB-4S | SDUPR09CZ-11 | (M-1000) | CM4X0.7X12 | SSHM3-10 | - | T-15D | P-1.5 | P-3 |

Recommended clamping torque: 3.5 N·m

INSERT

DPCW11T3 (High precision ground insert for plunging)



| | | | | | | | | | |
|---|----------------|---|---|---|--|--|--|--|--|
| P | Steel | ☆ | ☆ | ★ | | | | | |
| M | Stainless | | | | | | | | |
| K | Cast iron | ★ | ☆ | | | | | | |
| N | Non-ferrous | | | | | | | | |
| S | Superalloys | | | | | | | | |
| H | Hard materials | ☆ | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | Coated | | Cermet | LE | IC | S |
|-------------|----|--------|-------|--------|-------|-------|------|
| | | AH120 | AH740 | NS740 | | | |
| DPCW11T3ZFR | 1 | ● | ● | ● | 9.525 | 9.525 | 3.97 |

● : Line up

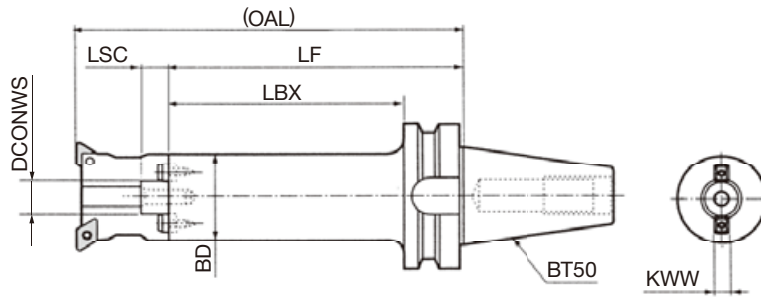
STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



ARBOR



| Designation | Dimension (mm) | | | | | | | WT (kg) | Applicable mill |
|----------------------|----------------|-----|--------|----|--------|-----|------|---------|-----------------|
| | LF | LBX | (OAL)* | BD | DCONWS | LSC | KWW | | |
| BT50-FMC22-343-47 | 343 | 305 | 388 | 47 | 22 | 18 | 10 | 7.9 | TZF11050R... |
| BT50-FMC22-293-47 | 293 | 255 | 338 | 47 | 22 | 18 | 10 | 7.2 | TZF11050R... |
| BT50-FMC22-243-47 | 243 | 205 | 288 | 47 | 22 | 18 | 10 | 6.5 | TZF11050R... |
| BT50-FMC22-433-59 | 433 | 395 | 478 | 59 | 22 | 18 | 10 | 12.2 | TZF11063R... |
| BT50-FMC22-373-59 | 373 | 335 | 418 | 59 | 22 | 18 | 10 | 10.9 | TZF11063R... |
| BT50-FMC22-308-59 | 308 | 270 | 353 | 59 | 22 | 18 | 10 | 9.5 | TZF11063R... |
| BT50-FMA31.75-455-76 | 455 | 417 | 518 | 76 | 31.75 | 30 | 12.7 | 18.6 | TZF11080R... |
| BT50-FMA31.75-375-76 | 375 | 337 | 438 | 76 | 31.75 | 30 | 12.7 | 15.8 | TZF11080R... |
| BT50-FMA31.75-295-76 | 295 | 257 | 358 | 76 | 31.75 | 30 | 12.7 | 12.9 | TZF11080R... |

Note: (OAL) is a length with TZF11 cutter mounted.

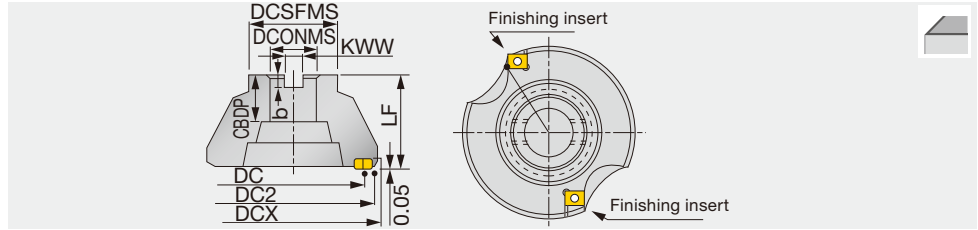
| | |
|-----------------|---|
| Grade | A |
| Insert | B |
| Ext. Toolholder | C |
| Int. Toolholder | D |
| Threading | E |
| Grooving | F |
| Miniature tool | G |
| Milling cutter | H |
| Endmill | I |
| Drilling tool | J |
| Tooling System | K |
| User's Guide | L |
| Index | M |

- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

NMS09

High precision finishing face mill

GAMP = 10°, GAMF = -30°

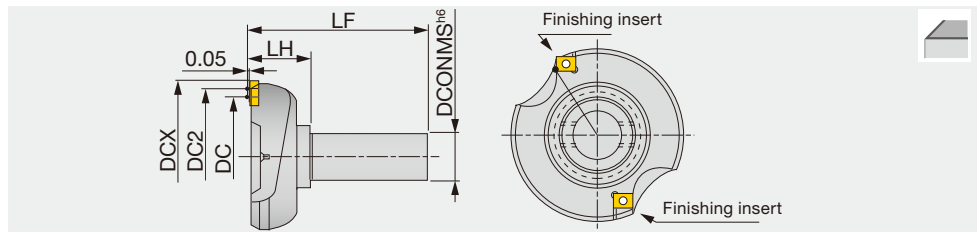


| Designation | APMX | DC | CICT | DC2 | DCX | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|-------|----|--------|------|------|----|--------|-------------|
| NMS09080R | 0.2 | 80 | 2 | 92 | 100.7 | 50 | 25.4 | 26 | 9.5 | 6 | 1.49 | LNCQ0906... |
| NMS09100R | 0.2 | 100 | 2 | 112 | 120.7 | 50 | 31.75 | 32 | 12.7 | 8 | 2.1 | LNCQ0906... |
| NMS09125R | 0.2 | 125 | 2 | 137 | 145.7 | 63 | 38.1 | 38 | 15.9 | 10 | 4.07 | LNCQ0906... |
| NMS09160R | 0.2 | 160 | 2 | 172 | 180.7 | 63 | 50.8 | 38 | 19 | 11 | 6.15 | LNCQ0906... |
| NMS09200R | 0.2 | 200 | 2 | 212 | 220.7 | 63 | 47.625 | 38 | 25.4 | 14 | 9.67 | LNCQ0906... |

EMS09

High precision finishing endmill, shank type

GAMP = +10°, GAMF = -30°



| Designation | APMX | DC | CICT | DC2 | DCX | DCONMS | LH | LF | Insert |
|-------------|------|----|------|-----|-------|--------|----|-----|-------------|
| EMS09080R | 0.2 | 80 | 2 | 92 | 100.7 | 32 | 40 | 120 | LNCQ0906... |

SPARE PARTS

| Designation | Clamping screw | Wedge |
|---------------------|----------------|-------|
| NMS09..., EMS09080R | CSTB-4 | T-15D |

Recommended clamping torque: 3.5 N·m

INSERT

LNCQ0906N-100(50)L

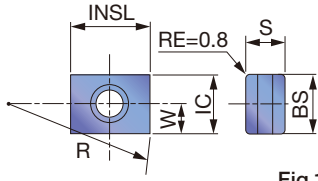


Fig.1

LNCQ0906-50S

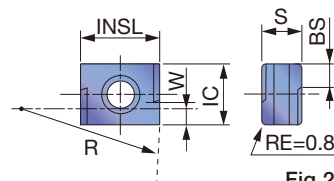


Fig.2

| | | | | | | | | | | | | |
|-------------------------|---|---|---|--|--|--|--|--|--|--|--|--|
| P Steel | ☆ | | ★ | | | | | | | | | |
| M Stainless | ★ | | ★ | | | | | | | | | |
| K Cast iron | ★ | ★ | | | | | | | | | | |
| N Non-ferrous | | | | | | | | | | | | |
| S Superalloys | | | | | | | | | | | | |
| H Hard materials | | | | | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | APMX | Coated | | Cermet | | IC | INSL | S | R | W | BS | Fig. |
|----------------|------|--------|-------|--------|--|-------|------|------|-----|-------|-----|------|
| | | AH120 | GH110 | NS740 | | | | | | | | |
| LNCQ0906N-100L | 0.2 | ● | ● | ● | | 9.525 | 12.7 | 6.35 | 100 | 4.763 | 7.9 | 1 |
| LNCQ0906N-50L | 0.2 | ● | ● | ● | | 9.525 | 12.7 | 6.35 | 50 | 4.763 | 7.9 | 1 |
| LNCQ0906R-50S | 0.2 | ● | ● | ● | | 9.525 | 12.7 | 6.35 | 50 | 2.3 | 4 | 2 |

●: Line up

STANDARD CUTTING CONDITIONS

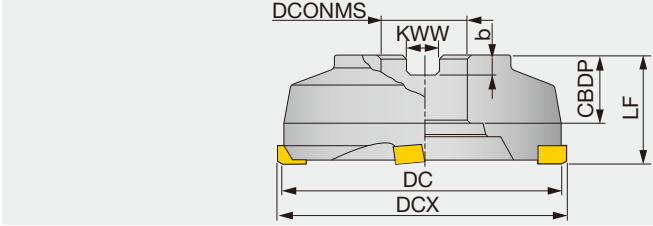
| ISO | Workpiece material | Hardness (HB) | Grade | Cutting speed Vc (m/min) | LNCQ0906N-100(50)L | | LNCQ0906R-50S | |
|----------|---|--|----------------|--------------------------|------------------------|---------------------------|------------------------|---------------------------|
| | | | | | Depth of cut APMX (mm) | Feed per tooth f (mm/rev) | Depth of cut APMX (mm) | Feed per tooth f (mm/rev) |
| P | Mild steels SS400, etc. E275A, etc. | < 180 | NS740 | 200 - 300 | < 0.2 | 2 - 6 | ≤ 0.2 | 1 - 2.5 |
| | Carbon steels S55C, etc. C55, etc. | < 300 | NS740 | 150 - 250 | | | | |
| | Alloy steels SCM440, etc. 42CrMo4, etc. | < 300 | NS740 | 120 - 200 | | | | |
| | Die steels SKD61, etc. X40CrMoV5-1, etc. | < 300 | NS740 | 100 - 150 | | | | |
| M | Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | < 250 | AH120 NS740 | 150 - 220 | < 0.2 | 2 - 6 | ≤ 0.2 | 1 - 2.5 |
| | K | Cast irons FC250, etc. 250, etc. | 150 - 250 | GH110 AH120 | 120 - 200 | < 0.2 | 2 - 6 | ≤ 0.2 |



MS

High precision finishing face mill

GAMP = -5°, GAMF = -30°



Right hand (R) shown.

| Designation | APMX | DC | CICT | DCX | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|-----|----|--------|------|------|----|--------|-----------|
| MS04R/L | 0.1 | 100 | 2 | 105 | 55 | 31.75 | 32 | 12.7 | 8 | 3 | SN**56... |
| MS05R/L | 0.1 | 125 | 2 | 130 | 60 | 38.1 | 38 | 15.9 | 10 | 4 | SN**56... |
| MS06R/L | 0.1 | 150 | 4 | 155 | 60 | 50.8 | 38 | 19 | 11 | 5 | SN**56... |
| MS08R/L | 0.1 | 200 | 4 | 205 | 60 | 47.625 | 38 | 25.4 | 14 | 8.5 | SN**56... |
| MS10R/L | 0.1 | 250 | 4 | 255 | 60 | 47.625 | 38 | 25.4 | 14 | 14 | SN**56... |
| MS12R/L | 0.1 | 300 | 4 | 305 | 60 | 47.625 | 38 | 25.4 | 14 | 23 | SN**56... |

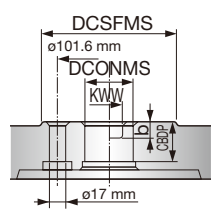
SPARE PARTS

| Designation | Clamping screw | Locator | Pin | Locator fixing screw | Washer | Protector | Wrench |
|-------------------|----------------|----------|------|----------------------|--------|-----------|--------|
| MS04R/L | CST-5 | - | SP-8 | - | - | PMS4R/L | T-25D |
| MS05R/L, MS06R/L | CST-5 | - | SP-8 | - | - | PMS5R/L | T-25D |
| MS08R/L - MS12R/L | CST-5 | LMS56R/L | SP-8 | CM6x25, CM6x16 | VA6 | PMS5R/L | T-25D |

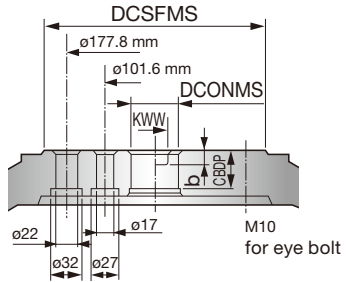
Recommended clamping torque: 3.5 N·m

Arbor type

MS08, 10R/L

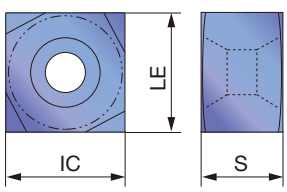


MS12R/L



INSERT

SNA A56FTR



| | | | |
|---|----------------|---|--|
| P | Steel | ★ | |
| M | Stainless | | |
| K | Cast iron | | |
| N | Non-ferrous | | |
| S | Superalloys | | |
| H | Hard materials | ☆ | |

★ : First choice
☆ : Second choice

| Designation | APMX | Cermets | | | LE | IC | S |
|-------------|------|---------|--|--|------|--------|------|
| | | X407 | | | | | |
| SNA A56FTR | 0.1 | ● | | | 7.85 | 15.875 | 9.52 |

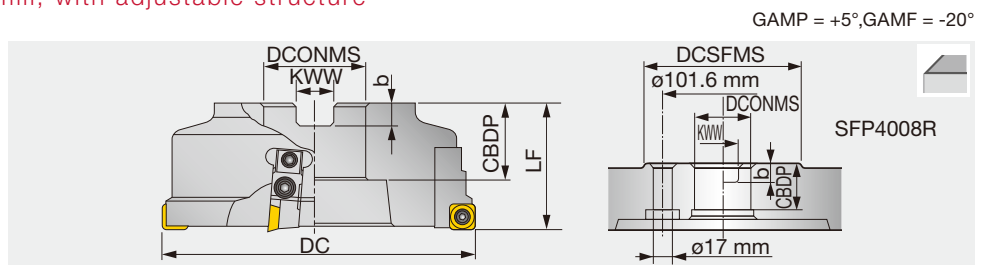
● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Grade | Cutting speed V_c (m/min) | Feed per tooth f_z (mm/t) | Depth of cut APMX (mm) |
|----------|--------------------|-------------|-------|--------------------------------|--------------------------------|---------------------------|
| P | Mild steels | < 180 HB | X407 | 260 - 300 | ≤ 6 | ≤ 0.1 |
| | Carbon steels | < 300 HB | X407 | 120 - 180 | ≤ 6 | ≤ 0.1 |
| | Alloy steels | < 300 HB | X407 | 120 - 180 | ≤ 6 | ≤ 0.1 |
| | Die steels | < 30 HRC | X407 | 120 - 180 | ≤ 6 | ≤ 0.1 |
| H | Carbon steel | 40 - 50 HRC | X407 | 150 - 200 | ≤ 3 | ≤ 0.05 |

SFP4000R

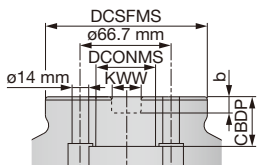
High precision finishing face mill, with adjustable structure



| Designation | APMX | DC | CICT | LF | DCONMS | CBDP | KWW | b | WT(kg) | Insert |
|-------------|------|-----|------|----|--------|------|------|----|--------|------------|
| SFP4004R | 0.1 | 100 | 2 | 63 | 31.75 | 32 | 12.7 | 8 | 2.3 | SPHA435FNW |
| SFP4005R | 0.1 | 125 | 2 | 63 | 38.1 | 38 | 15.9 | 10 | 3.5 | SPHA435FNW |
| SFP4006R | 0.1 | 160 | 4 | 63 | 50.8 | 38 | 19 | 11 | 5.8 | SPHA435FNW |
| SFP4008R | 0.1 | 200 | 4 | 63 | 47.625 | 38 | 25.4 | 14 | 9 | SPHA435FNW |
| SFP4004R-E | 0.1 | 100 | 2 | 63 | 32 | 32 | 14.4 | 8 | 2.3 | SPHA435FNW |
| SFP4005R-E | 0.1 | 125 | 2 | 63 | 40 | 32 | 16.4 | 9 | 3.5 | SPHA435FNW |
| SFP4006R-E | 0.1 | 160 | 4 | 63 | 40 | 29 | 16.4 | 9 | 5.8 | SPHA435FNW |

Arbor type

SFP4006R-E

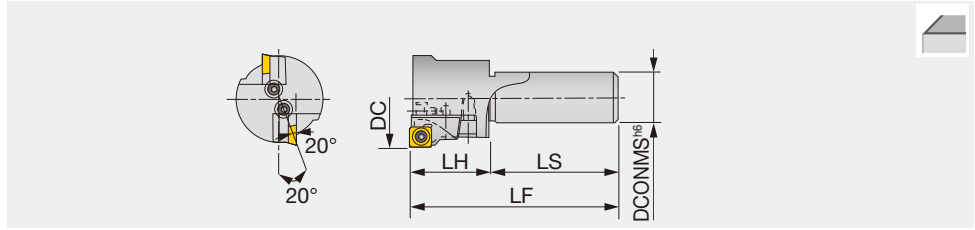


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

EFP4000R

High precision finishing endmill, shank type, with adjustable structure

GAMP = +5°, GAMF = -20°



| Designation | APMX | DC | CICT | DCONMS | LS | LF | LH | Insert |
|-------------|------|----|------|--------|----|-----|----|------------|
| EFP4050R | 0.1 | 50 | 1 | 32 | 80 | 120 | 40 | SPHA435FNW |
| EFP4063R | 0.1 | 63 | 2 | 32 | 80 | 130 | 50 | SPHA435FNW |

Note: EFP4050R does not have the adjustable structure.

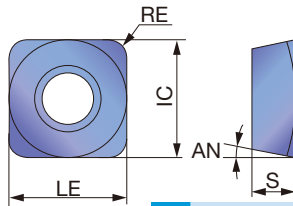
SPARE PARTS

| Designation | Clamping screw | Locator | Adjusting screw | Locator fixing screw1 | Locator fixing screw2 | Wedge | Wrench | Washer1 | Washer2 | Wrench |
|--------------------|----------------|---------|-----------------|-----------------------|-----------------------|--------|--------|---------|---------|--------|
| EFP4050R | CSTA-5S | LW402R | - | CM5X0.8X16 | - | - | T-15D | - | - | - |
| SFP40..., EFP4063R | CSTA-5S | LW400R | FDS-8S | CM5X0.8X16 | CM5X0.8X18 | FW-305 | T-15D | 5S | L5 | P-4 |

Recommended clamping torque: 3.5 N·m

INSERT

SPHA435



| | | | | | | | | | |
|---|----------------|---|---|--|--|--|--|--|--|
| P | Steel | ★ | | | | | | | |
| M | Stainless | ★ | | | | | | | |
| K | Cast iron | | ★ | | | | | | |
| N | Non-ferrous | | ★ | | | | | | |
| S | Superalloys | | | | | | | | |
| H | Hard materials | | | | | | | | |

★ : First choice
☆ : Second choice

| Designation | RE | APMX | Cermets | | | | | | | | | |
|-------------|----|------|---------|------|----------|--|--|--|------|------|------|-----|
| | | | N308 | TH10 | Uncoated | | | | | | | |
| SPHA435FNW | 2 | 0.1 | ● | ● | | | | | IC | LE | S | AN |
| | | | | | | | | | 12.7 | 12.7 | 4.76 | 11° |

● : Line up

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness (HB) | Grade | Cutting speed Vc (m/min) | Feed per revolution: f (mm/rev) | | Depth of cut APMX (mm) |
|-----|--------------------|---------------|-------|--------------------------|---------------------------------|-----|------------------------|
| | | | | | SFP | EFP | |
| P | Mild steels | < 180 | N308 | 180 - 250 | ≤ 6 | ≤ 4 | ≤ 0.1 |
| | Carbon steels | < 300 | N308 | 150 - 200 | ≤ 6 | ≤ 4 | ≤ 0.1 |
| | Alloy steels | < 300 | N308 | 150 - 200 | ≤ 6 | ≤ 4 | ≤ 0.1 |
| M | Stainless steels | < 250 | N308 | 160 - 200 | ≤ 4 | ≤ 3 | ≤ 0.1 |
| K | Cast irons | 150 - 250 | TH10 | 100 - 150 | ≤ 5 | ≤ 3 | ≤ 0.2 |
| N | Non-ferrous metals | - | TH10 | 200 - 500 | ≤ 6 | ≤ 4 | ≤ 0.1 |

Under the above conditions, attainable surface roughness is 3 to 4 μm RzJIS for steel and 6 to 12 μm RzJIS for cast iron.

Endmill



EndMill - Content structure

- Products are listed by application.
- Endmills in the catalog are our standard items.

How to use the page

Method 1.

Select the tool type at the index on the right page, choose the application (1), cutting edge shape (2), and the number of cutting edges (3), and check the designation you need (6) in the dimension table (5).

| Designation | AH715 | AH725 | NOF | FHA | DC | DCSfMS | APMX | RE | CRKS | LF | Wrench |
|--------------------|-------|-------|-----|---------|----|--------|------|-----|------|------|----------|
| VEH08L05.0P0504505 | ● | ● | 4 | 41°-45° | 8 | 7.7 | 5 | 0.5 | 505 | 10 | KEYV-505 |
| VEH08L05.0P1004505 | ● | ● | 4 | 41°-45° | 8 | 7.7 | 5 | 1 | 505 | 10 | KEYV-505 |
| VEH10L07.0P1004505 | ● | ● | 4 | 41°-45° | 10 | 9.7 | 7 | 1 | 505 | 12.8 | KEYV-505 |
| VEH10L07.0P2004506 | ● | ● | 4 | 41°-45° | 10 | 9.7 | 7 | 0.5 | 506 | 13 | KEYV-506 |
| VEH10L07.0P3004506 | ● | ● | 4 | 41°-45° | 10 | 9.7 | 7 | 1 | 506 | 13 | KEYV-506 |
| VEH12L09.0P1004505 | ● | ● | 4 | 41°-45° | 12 | 9.3 | 9 | 1 | 505 | 14.3 | KEYV-505 |
| VEH12L09.0P2004508 | ● | ● | 4 | 41°-45° | 12 | 11.7 | 9 | 0.5 | 508 | 16.5 | KEYV-508 |
| VEH12L09.0P3004508 | ● | ● | 4 | 41°-45° | 12 | 11.7 | 9 | 1 | 508 | 16.5 | KEYV-508 |
| VEH16L12.0P1004508 | ● | ● | 4 | 41°-45° | 16 | 11.7 | 12 | 1 | 508 | 20 | KEYV-508 |
| VEH16L12.0P2004510 | ● | ● | 4 | 41°-45° | 16 | 15.3 | 12 | 0.5 | 510 | 20.5 | KEYV-510 |
| VEH16L12.0P3004510 | ● | ● | 4 | 41°-45° | 16 | 15.3 | 12 | 1 | 510 | 20.5 | KEYV-510 |
| VEH20L15.0P2004512 | ● | ● | 4 | 41°-45° | 20 | 18.3 | 15 | 0.5 | 512 | 25.5 | KEYV-512 |
| VEH20L15.0P3004512 | ● | ● | 4 | 41°-45° | 20 | 18.3 | 15 | 1 | 512 | 25.5 | KEYV-512 |

Method 2.

Select the tool series name on I004 – I005 and check the details on the product page.

Method 3.

Select the application and the cutting edge shape from Quick Guide on I006-I015 and I060 - I061, and see the details on each page.

| Edge shape | Name of the series | Designation | Appearance | Application | Tool diameter | No. of cutting edges |
|------------------|--------------------|-------------|------------|-------------|---------------|----------------------|
| Square | TEC**H8M**CF-E | | | ✓ | ø6 - ø20 | 4 |
| | TEC**EAL**CF | | | ✓ | ø1 - ø25 | 4 |
| | TEC**E8L**CF | | | ✓ | ø6 - ø20 | 5 |
| | TEC**H7-CF | | | ✓ | ø6 - ø20 | 7 |
| | TEC**H7-CF | | | ✓ | ø6 - ø20 | 6-20 |
| | TECK**H4M**CF-R | | | ✓ | ø4 - ø20 | 4 |
| | TECK**H7/9M**CF-R | | | ✓ | ø6 - ø20 | 7,9 |
| | TEC**H4M**CF-R | | | ✓ | ø6 - ø25 | 4 |
| | TEC**H4X**CF-R | | | ✓ | ø6 - ø20 | 4 |
| | TECA**H3**CF-R | | | ✓ | ø1 - ø25 | 3 |
| Shoulder milling | TECA**H4**CF-R | | | ✓ | ø6 - ø16 | 4 |
| | TECA**H3**CF-R**C | | | ✓ | ø6 - ø25 | 3 |
| | TEPS**E44**CF | | | ✓ | ø6 - ø25 | 4 |
| | TEPS**B44 | | | ✓ | ø4 - ø25 | 4 |
| | TECR**B**S | | | ✓ | ø5 - ø20 | 4, 5, 7 |
| | TECR**B**M | | | ✓ | ø5 - ø20 | 4, 5, 7 |
| | TECR**B**MF | | | ✓ | ø6 - ø25 | 4, 6 |
| | TECR**B**L | | | ✓ | ø6 - ø20 | 4, 5, 7 |

Icon

| Edge shape | No. of cutting edges | Head geometry | Application |
|------------|----------------------|---------------|--------------------------------|
| Square | 2 | Square | Shoulder milling |
| Ball nose | 3 | Ball nose | Deep shoulder milling |
| High feed | 4 | Radius | Shoulder milling (with radius) |
| | 5 | Chamfering | Face milling |
| | 6 or more | Slotting | Slotting |
| | | Threading | Slotting (with radius) |
| | | | Side slotting |
| | | | Side milling |
| | | | Pocketing |
| | | | Ramping |
| | | | Profiling |
| | | | Plunging |
| | | | Hole enlarging |
| | | | Holmaking |
| | | | Counterboring |
| | | | Hole chamfering |
| | | | Chamfering |
| | | | Cutting-off |

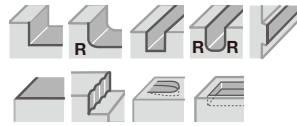
Main products

Solid Endmill



SOLIDMEISTER

Solid endmill for a wide variety of applications
ø0.4 mm - ø25 mm



I006 -

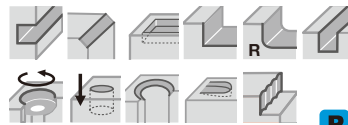
P M K N S H

Exchangeable Head Endmill



TUNGMEISTER

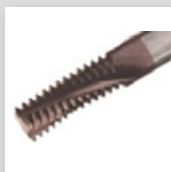
Endmills with exchangeable heads
for reduced tool change time
ø5 mm - ø32 mm



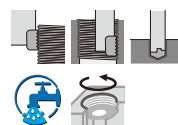
I060 -

P M K N S H

Threading Endmill



THREADMILLING



I106

P M K N S H



SOLIDTHREAD

Solid threading tool series for machining small diameters, such as M1x0.25 and 0-80UNF.

I107 -



TUNGMEISTER

Head-changeable milling tool for less down-time than solid tapping tools.

I060 -



Indexable thread milling cutter

Many different types of inserts for various threading diameters and pitches, leading to the tool integration and reduced tool cost.

I124 -

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M

SOLIDMEISTER



Powerful endmill with excellent performance

VARIABLEMEISTER

High resistance to chatter leading to highly efficient machining

- Suitable for machining large cutting depth and width where chattering is likely to occur.
- Capability of machining with long overhang allows the operations on various parts of workpieces.

Stable, long tool life

- Impacts on cutting edges are softened due to reduced vibration, resulting in longer, stable tool life.
- The combination of PVD coated grade with high wear resistance and robust substance.



High resistance to chatter
= Machining large cutting width
= Machining large cutting depth
/ long overhang



FINISHMEISTER

Tool integration / Shortened tool change time

- Cutting depth at the level of roughing endmills is possible, and a single tool can handle semi-finishing to finishing with the conditions appropriately adjusted.
- A single tool completes the operation which used to require two tools, roughing and square endmills, shortening tool change time.

Hard to chatter, excellent chip control

- Variable pitch design increases the resistance to chatter, delivering high efficiency in machining with long overhang and at high cutting speed.
- Serrated cutting edges produce small chips and provide stable machining even in slotting.



Roughing and finishing with one tool
+ Variable pitch design



SHREDMEISTER

Significantly reduced time for roughing

- Long cutting edge and the capability of machining large depth of cut lead to highly efficient roughing.
- Unique serrated cutting edges produce small chips and provide high efficiency and stability in deep slotting.

Excellent sharpness and stable machining with long tool life

- Chamfer on corner tips that are easy to break is reinforced, providing stable machining even under high cutting conditions.
- The combination of PVD coated grade with high wear resistance and robust substance allows the design with high helix angle, providing excellent sharpness and long tool life.



Effective cutting edge length
= Tool diameter x 2



Grades

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M

AH725

- High thermal and chemical stability.
- High hardness 3500 HV makes higher speeds, machining of harder materials, and dry machining possible. The TiAlN coating can be applied at 800° C.
- Recommended for hardened steel, high-temperature and steel alloys.
- Improves and expedites finishing on dies and molds.
- Longer tool life in high speed machining.

AH750 / AH710

- Excellent for machining hard steel up to 70 HRC and high temperature alloys.
- The small grain size improves cutting edge strength and tends to chip less.

KS15F








- Suited for aluminum alloys and non-ferrous metals.
- Excellent edge sharpness for super mirror surface finish quality.

FX510



- Suitable for nickel-based heat-resistnt superalloys.
- SiAlON ceramic grade enables high speed milling.
- Also good for cast iron and specialty graphite materials.

Grade priorities for solid carbide endmills

In most cases the best performance can be attained without using coolant for specific grades. However, it should be noted that if for any reason coolant must be used, it could possibly affect tool life and sometimes cause insert failure, due to thermal shock.

| |  ISO P |  ISO M |  ISO K |  ISO N |  ISO S |  ISO H |
|---|--|--|--|--|--|--|
| Material Groups | Steel | Stainless | Cast Iron | Non-ferrous | Superalloys | Hard Materials |
|  | Harder ↑ AH750 | Harder ↑ AH725 | Harder ↑ AH750 | Harder ↑ AH725 | Harder ↑ AH750 | Harder ↑ AH750 |
| | AH725 | AH725 | AH725 | AH725 | AH725 | AH725 |
| | Tougher ↓ | Tougher ↓ | Tougher ↓ | Tougher ↓ KS15F | Tougher ↓ KS15F | Tougher ↓ |






Quick Guide **SOLIDMEISTER**

| Edge shape | Name of the series | Designation | Appearance | Application | | | Tool diameter | No. of cutting edges | |
|---|------------------------|---|---|---|----------------|----------|---------------|----------------------|---|
| | | | | Finishing | Medium cutting | Roughing | | | |
|  Square | VARIABLEMEISTER | TEC**H4S/M**CF-E |  | | ✓ | ✓ | ø6 - ø20 | 4 | |
| | | TEC**E4L**CF |  | | ✓ | ✓ | ø1 - ø25 | 4 | |
| | | TEC**E5L**CF |  | | ✓ | ✓ | ø6 - ø20 | 5 | |
| | | TEC**H7-CF |  | ✓ | | | ø6 - ø20 | 7 | |
| | | TEC**H**CF |  | ✓ | | | ø6 - ø20 | 6 - 20 | |
| | | TECK**H4M**CF-R |  | | ✓ | ✓ | ø4 - ø20 | 4 | |
| | | TECK**H7/9M**CF-R |  | | ✓ | ✓ | ø6 - ø20 | 7, 9 | |
| | | TEC**H4M**CF-R |  | | ✓ | ✓ | ø6 - ø25 | 4 | |
| | | TEC**H4X**CF-R |  | | ✓ | ✓ | ø6 - ø20 | 4 | |
| | | TECA**H3**CF-R |  | | ✓ | ✓ | ø1 - ø25 | 3 | |
| | | TECA**H4**CF-R |  | | ✓ | ✓ | ø6 - ø16 | 4 | |
| | | TECA**H3**CF-R**C |  | | ✓ | | ø6 - ø25 | 3 | |
| | | FINISHMEISTER | TEFS**E44**CF |  | | ✓ | ✓ | ø6 - ø25 | 4 |
| | TEFS**B44 | |  | | ✓ | ✓ | ø4 - ø25 | 4 | |
| | SHREDMEISTER | TECR**B*S |  | | | ✓ | ø5 - ø20 | 4, 5, 7 | |
| TECR**B*M | |  | | | ✓ | ø5 - ø20 | 4, 5, 7 | | |
| TECR**B*MF | |  | | | ✓ | ø6 - ø25 | 4, 6 | | |
| TECR**B*L | |  | | | ✓ | ø6 - ø20 | 4, 5, 7 | | |

★ : First choice ☆ : Second choice

| | ap | Corner geometry | Helix angle | Pitch | Workpiece material | | | | | | Remarks | Page |
|----------|--------------------------------|-----------------|-------------|-------|--------------------|---|---|---|---|--------------------------------------|----------------|------|
| | | | | | P | M | K | N | S | H | | |
| 1D, 2D | Chamfered/R | Variable | Variable | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I016 | |
| 2D | Chamfered/ Sharp edge | 38 | Variable | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I017 | |
| 2.5D | Chamfered | 38 | Variable | ★ | ★ | ★ | ☆ | ★ | ☆ | | I017 | |
| 2D - 6D | Chamfered/ R/ Sharp edge | Variable | Variable | ★ | ★ | ★ | ☆ | ☆ | ★ | | I018 | |
| 2D | Chamfered | Variable | Variable | ★ | ★ | ☆ | ☆ | ☆ | ☆ | | I019 | |
| 2D | R | Variable | Variable | ★ | ★ | ☆ | ☆ | ★ | ☆ | | I019 | |
| 2D | R | Variable | Variable | ★ | ★ | ☆ | ☆ | ★ | ☆ | | I020 | |
| 2D | R | Variable | Variable | ★ | ★ | ☆ | ☆ | ★ | ★ | | I020 | |
| 2D | R | Variable | Variable | ★ | ★ | ☆ | ☆ | ★ | ☆ | | I021 | |
| 1.5D, 2D | R | Variable | Variable | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I022 - I023 | |
| 1.5D, 2D | R | Variable | Variable | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I024 | |
| 2D | R | Variable | Variable | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I024 | |
| 2D | Chamfered | 38 | Variable | ★ | ☆ | ★ | ☆ | ☆ | ☆ | Rough/Finish combination geometry | I026 | |
| 2D | Chamfered | 45 | Regular | ★ | ★ | ☆ | ☆ | ★ | ☆ | Rough/Finish combination geometry | I027 | |
| 1D | Chamfered | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | I027 | |
| 2D | Chamfered/R | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | I028 | |
| 2D | Chamfered | 45 | Regular | ★ | ☆ | ☆ | ☆ | ★ | ★ | Serrated cutting edge | I028 | |
| 2D | Chamfered | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | I029 | |

Quick Guide **SOLIDMEISTER**

| Edge shape | Name of the series | Designation | Appearance | Application | | | Tool diameter | No. of cutting edges | |
|---|-----------------------|---|--|-------------|----------------|----------|---------------|----------------------|--|
| | | | | Finishing | Medium cutting | Roughing | | | |
|  Square | SHREDMEISTER | TECR**B*X |  | | | ✓ | ø8 - ø16 | 4, 5 | |
| | | TERF**A/E3,4 |  | | | ✓ | ø4 - ø20 | 3, 4 | |
| | | TECR**T4M |  | | | ✓ | ø6 - ø20 | 4 | |
| | | TECP**E*3/4L |  | | | ✓ | ø5 - ø20 | 3, 4 | |
| | | TEAP**H3**CFR**C |  | | | ✓ | ø10 - ø20 | 3 | |
| | | TERC**E3 |  | | | ✓ | ø6 - ø25 | 3 | |
| | | TECR**B3**R |  | | | ✓ | ø6 - ø20 | 3 | |
| | TEC**B4/6L |  | | ✓ | | | ø6 - ø20 | 4, 6 | |
| | TEC**B4/6X |  | | ✓ | | | ø10 - ø20 | 4, 6 | |
| | TECC**A/B2 |  | | ✓ | ✓ | ✓ | ø2 - ø20 | 2 | |
| | TECS/TECCS**E3 |  | | ✓ | ✓ | ✓ | ø2 - ø16 | 3 | |
| | TECC**E3 |  | | ✓ | ✓ | ✓ | ø4 - ø20 | 3 | |
| | TEC**B3 |  | | | ✓ | ✓ | ø6 - ø18 | 3 | |
| | TECC**A/B4 |  | | ✓ | ✓ | ✓ | ø2 - ø20 | 4 | |
| | TEC**B4 |  | | ✓ | ✓ | | ø2 - ø20 | 4 | |
| | TEC**B4**R |  | | ✓ | ✓ | | ø6 - ø20 | 4 | |
| | TEC**A2 |  | | | ✓ | | ø0.4 - ø3 | 2 | |
| | TEC**A4 |  | | | ✓ | | ø4 - ø20 | 4 | |

★ : First choice ☆ : Second choice

| | ap | Corner geometry | Helix angle | Pitch | Workpiece material | | | | | | Remarks | Page |
|--|------------|-----------------|-------------|----------|--------------------|---|---|---|---|---|-----------------------|----------------|
| | | | | | P | M | K | N | S | H | | |
| | 1.5D | Chamfered | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | 1029 |
| | 2D | Chamfered | 30/38 | Regular | ★ | ★ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | 1029 |
| | 2D | Chamfered | 20 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | 1030 |
| | 2D | Chamfered | 38 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | 1030 |
| | 1.5D, 2D | R | Variable | Variable | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | Notched cutting edge | 1031 |
| | 2D | Chamfered | 38 | Regular | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | Serrated cutting edge | 1031 |
| | 1D | R | 45 | Regular | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | Serrated cutting edge | 1032 |
| | 3D, 4D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1034 |
| | 4D, 5D, 6D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1034 |
| | 2D, 3D | Chamfered | 30/45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1035 |
| | 1D | Chamfered | 38 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1035 |
| | 2D, 3D | Chamfered | 38 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1036 |
| | 2D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1036 |
| | 2D | Chamfered | 30/45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1036 |
| | 2D, 3D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1037 |
| | 2D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1037 |
| | 1.5D | Sharp edge | 30 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | | 1038 - 1039 |
| | 2D | Sharp edge | 30 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | | 1039 |

Quick Guide **SOLIDMEISTER**

| Edge shape | Name of the series | Designation | Appearance | Application | | | Tool diameter | No. of cutting edges | |
|---|--------------------|-------------------|---|-------------|----------------|----------|---------------|----------------------|--|
| | | | | Finishing | Medium cutting | Roughing | | | |
|  Square | SOLIDMEISTER | TECH**B6 |  | | ✓ | | ø6 - ø20 | 6 | |
| | | TEC**B6 |  | | ✓ | | ø6 - ø25 | 6 | |
| | | TEC**D6 |  | ✓ | | | ø6 - ø20 | 6 | |
| | | TECA**B2 |  | ✓ | | | ø4 - ø20 | 2 | |
| | | TECA**B3 |  | | ✓ | ✓ | ø4 - ø20 | 3 | |
| | | TECA**F2 |  | ✓ | | | ø4 - ø25 | 2 | |
| | ECONOMIST | TEC**A2**E |  | | ✓ | | ø1 - ø20 | 2 | |
| | | TEC**A/E3**E |  | | ✓ | | ø2 - ø16 | 3 | |
| | | TEC**B3**W |  | | ✓ | | ø2 - ø20 | 3 | |
| | | TEC**A4**E |  | | ✓ | | ø2 - ø20 | 4 | |
|  Ball | VARIABLEMEISTER | TEB**E4L**CF |  | | ✓ | ✓ | ø3 - ø16 | 4 | |
| | SHREDMEISTER | TEBRF**T3/4 |  | | | ✓ | ø6 - ø20 | 3, 4 | |
| | SOLIDMEISTER | TEB**A2-**C**M |  | ✓ | ✓ | | ø0.4 - ø3 | 2 | |
| | | TEB**A2-**C**H |  | ✓ | ✓ | | ø1 - ø20 | 2 | |
| | | TEB**A2-**C**M... |  | ✓ | ✓ | | ø3 - ø16 | 2 | |

★ : First choice ☆ : Second choice

| | ap | Corner geometry | Helix angle | Pitch | Workpiece material | | | | | | Remarks | Page |
|--|-----------------------------|-----------------|-------------|----------|--------------------|---|---|---|---|---|-----------------------|---------------|
| | | | | | P | M | K | N | S | H | | |
| | 2D | Sharp edge | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | | I040 |
| | 4D | Sharp edge | 45 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | | I040 |
| | 2D | Sharp edge | 50 | Regular | ★ | ☆ | ★ | ☆ | ☆ | ★ | | I041 |
| | 2D, 3D | Sharp edge | 45 | Regular | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I041 |
| | 2D | R | 45 | Regular | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I042 |
| | 2D | Sharp edge | 55 | Regular | ☆ | ☆ | ☆ | ★ | ☆ | ☆ | | I042 |
| | 1D, 1.5D, 2D, 3D, 4D | Sharp edge | 30 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I043 |
| | 1D, 1.5D, 2D, 3D, 4D | Sharp edge | 30/38 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I044 |
| | 1D | Sharp edge | 45 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I045 |
| | 2D, 3D, 4D, 5D, 6D, 8D, 10D | Sharp edge | 30 | Regular | ★ | ★ | ★ | ☆ | ☆ | ☆ | | I045- I046 |
| | 2D | R1.5 - R8 | 38 | Variable | ★ | ★ | ☆ | ☆ | ★ | ★ | | I048 |
| | 2D | R3 - R10 | 20 | Regular | ★ | ★ | ★ | ☆ | ☆ | ★ | Serrated cutting edge | I048 |
| | 1.5D | R0.2 - R1.5 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I049 |
| | 1D | R0.5 - R10 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I050 |
| | 2D | R1.5 - R8 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I050 |

Quick Guide **SOLIDMEISTER**

| Edge shape | Name of the series | Designation | Appearance | Application | | | Tool diameter | No. of cutting edges | |
|--|---------------------|---|---|-------------|----------------|----------|---------------|----------------------|--|
| | | | | Finishing | Medium cutting | Roughing | | | |
|  Ball | SOLIDMEISTER | TEB**A2**/**/**C**M... |  | ✓ | ✓ | | ø1 - ø10 | 2 | |
| | | TEB**A2**-**C**-... |  | ✓ | ✓ | | ø3 - ø20 | 2 | |
| | | TEB**A3 |  | ✓ | ✓ | | ø3 - ø12 | 3 | |
| | | TEB**A4 |  | ✓ | ✓ | | ø3 - ø20 | 4 | |
| | TEB**A2**E |  | ✓ | ✓ | | ø2 - ø20 | 2 | | |
|  High feed | FEEDMEISTER | TEFF**N4 |  | | | ✓ | ø6 - ø20 | 4 | |
| | | TCFF**A3 |  | | | ✓ | ø4 - ø20 | 3 | |
| Toroidal | SOLIDMEISTER | TETR**A2**R |  | | | ✓ | ø2 - ø6 | 2 | |

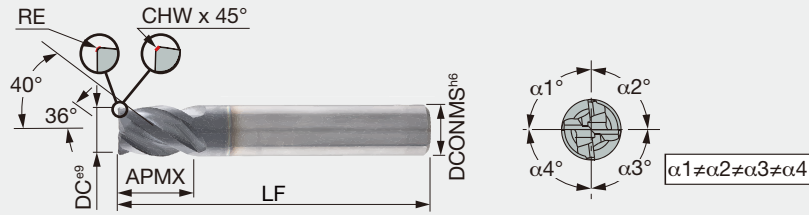
★ : First choice ☆ : Second choice

| | ap | Corner geometry | Helix angle | Pitch | Workpiece material | | | | | | Remarks | Page |
|--|------------------|-----------------|-------------|---------|--------------------|---|---|---|---|---|---------------------------------------|------|
| | | | | | P | M | K | N | S | H | | |
| | 2D | R0.5 - R5 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | Tapered ball nose | I051 |
| | 1D, 1.5D | R1.5 - R10 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I051 |
| | 1D, 1.5D | R1.5 - R6 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I051 |
| | 1D, 1.5D | R1.5 - R10 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I052 |
| | 1D, 1.5D, 2D, 3D | R1 - R10 | 30 | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I052 |
| | 0.05D | R | - | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | For high feed milling | I055 |
| | 0.04D-0.05D | R | - | Regular | | | ☆ | ☆ | ★ | | For high feed milling (ceramic grade) | I055 |
| | 0.5D, 1D | R | - | Regular | ★ | ★ | ☆ | ☆ | ★ | ★ | | I056 |

VARIABLE MEISTER

TEC**H4S**CF-E

4 flute chatter dampening endmill, variable helix and variable pitch, short type

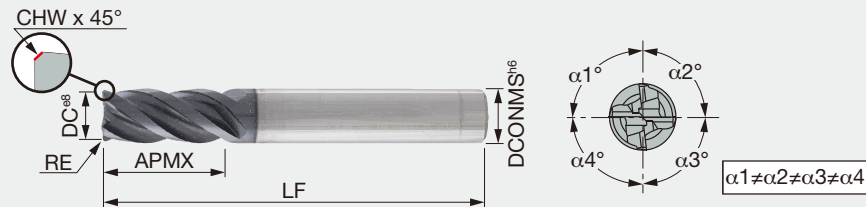


| Designation | AH725 | DC | DCONMS | NOF | CHW | RE | APMX | LF | Shank |
|--------------------------|-------|----|--------|-----|------|-----|------|----|-------------|
| TEC060H4S-06C06CF-E50 | ● | 6 | 6 | 4 | 0.25 | - | 6 | 50 | Cylindrical |
| TEC060H4S-06C06CF-R02E50 | ● | 6 | 6 | 4 | - | 0.2 | 6 | 50 | Cylindrical |
| TEC060H4S-06W06CF-E50 | ● | 6 | 6 | 4 | 0.25 | - | 6 | 50 | Weldon |
| TEC080H4S-08C08CF-E63 | ● | 8 | 8 | 4 | 0.3 | - | 8 | 63 | Cylindrical |
| TEC080H4S-08C08CF-R04E63 | ● | 8 | 8 | 4 | - | 0.4 | 8 | 63 | Cylindrical |
| TEC080H4S-08W08CF-E63 | ● | 8 | 8 | 4 | 0.3 | - | 8 | 63 | Weldon |
| TEC100H4S-10C10CF-E66 | ● | 10 | 10 | 4 | 0.4 | - | 10 | 66 | Cylindrical |
| TEC100H4S-10C10CFR.5E66 | ● | 10 | 10 | 4 | - | 0.5 | 10 | 66 | Cylindrical |
| TEC100H4S-10W10CF-E66 | ● | 10 | 10 | 4 | 0.4 | - | 10 | 66 | Weldon |
| TEC120H4S-12C12CF-E73 | ● | 12 | 12 | 4 | 0.5 | - | 12 | 73 | Cylindrical |
| TEC120H4S-12C12CF-R06E73 | ● | 12 | 12 | 4 | - | 0.6 | 12 | 73 | Cylindrical |
| TEC120H4S-12W12CF-E73 | ● | 12 | 12 | 4 | 0.5 | - | 12 | 73 | Weldon |
| TEC160H4S-16C16CF-E82 | ● | 16 | 16 | 4 | 0.6 | - | 16 | 82 | Cylindrical |
| TEC160H4S-16W16CF-E82 | ● | 16 | 16 | 4 | 0.6 | - | 16 | 82 | Weldon |
| TEC200H4S-20C20CF-E92 | ● | 20 | 20 | 4 | 0.6 | - | 20 | 92 | Cylindrical |
| TEC200H4S-20W20CF-E92 | ● | 20 | 20 | 4 | 0.6 | - | 20 | 92 | Weldon |

● : Line up

TEC**H4M**CF-E

4 flute chatter dampening endmill, variable helix and variable pitch



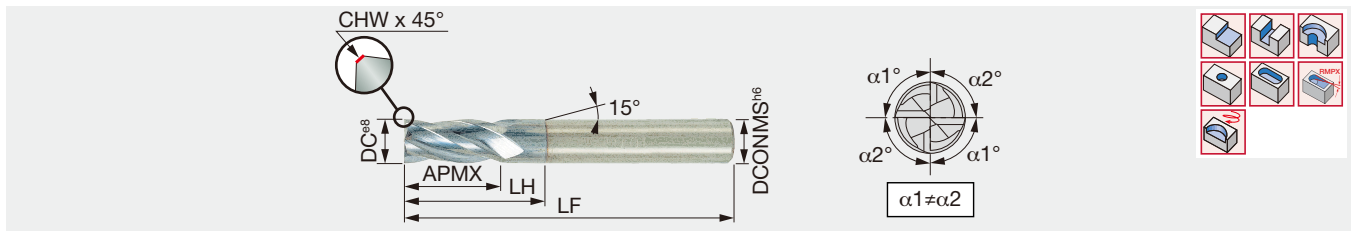
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|------------------------|-------|----|--------|-----|------|------|-----|-------------|
| TEC060H4M-12C06CF-E57 | ● | 6 | 6 | 4 | 0.25 | 12 | 57 | Cylindrical |
| TEC060H4M-12W06CF-E57 | ● | 6 | 6 | 4 | 0.25 | 12 | 57 | Weldon |
| TEC080H4M-16C08CF-E63 | ● | 8 | 8 | 4 | 0.3 | 16 | 63 | Cylindrical |
| TEC080H4M-16W08CF-E63 | ● | 8 | 8 | 4 | 0.3 | 16 | 63 | Weldon |
| TEC100H4M-20C10CF-E72 | ● | 10 | 10 | 4 | 0.4 | 20 | 72 | Cylindrical |
| TEC100H4M-20W10CF-E72 | ● | 10 | 10 | 4 | 0.4 | 20 | 72 | Weldon |
| TEC120H4M-24C12CF-E83 | ● | 12 | 12 | 4 | 0.5 | 24 | 83 | Cylindrical |
| TEC120H4M-24W12CF-E83 | ● | 12 | 12 | 4 | 0.5 | 24 | 83 | Weldon |
| TEC160H4M-32C16CF-E92 | ● | 16 | 16 | 4 | 0.6 | 32 | 92 | Cylindrical |
| TEC160H4M-32W16CF-E92 | ● | 16 | 16 | 4 | 0.6 | 32 | 92 | Weldon |
| TEC200H4M-40C20CF-E104 | ● | 20 | 20 | 4 | 0.6 | 40 | 104 | Cylindrical |
| TEC200H4M-40W20CF-E104 | ● | 20 | 20 | 4 | 0.6 | 40 | 104 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → [I025](#)

TEC**E4L**CF

4 flute chatter dampening endmill, 38° helix angle, variable pitch, short type

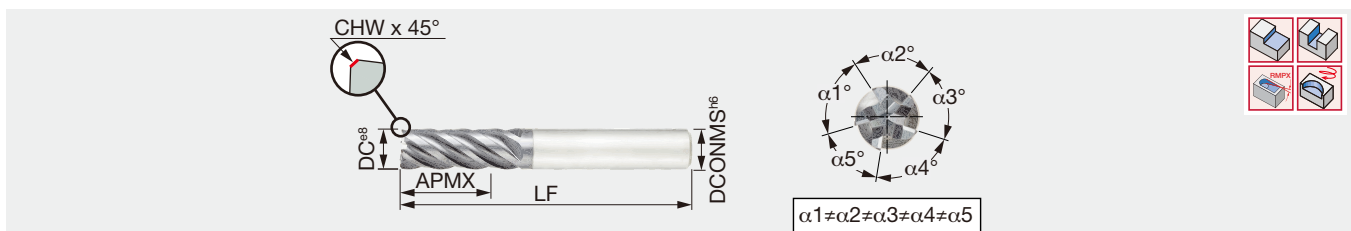


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|--------------------------|-------|----|--------|-----|------|------|-----|-----|-------------|
| TEC010E4L-2/04C04CF50 | ● | 1 | 4 | 4 | 0.04 | 2.2 | 4 | 50 | Cylindrical |
| TEC020E4L-4/06C04CF50 | ● | 2 | 4 | 4 | 0.08 | 4.3 | 6.1 | 50 | Cylindrical |
| TEC030E4L-8/11C06CF-57 | ● | 3 | 6 | 4 | 0.1 | 8 | 11 | 57 | Cylindrical |
| TEC040E4L-10/14C06CF-57 | ● | 4 | 6 | 4 | 0.15 | 10 | 14 | 57 | Cylindrical |
| TEC050E4L-12/17C06CF-57 | ● | 5 | 6 | 4 | 0.18 | 12 | 17 | 57 | Cylindrical |
| TEC060E4L-14/20C06CF-57 | ● | 6 | 6 | 4 | 0.25 | 14 | 20 | 57 | Cylindrical |
| TEC080E4L-18/26C08CFS63 | ● | 8 | 8 | 4 | - | 18 | 26 | 63 | Cylindrical |
| TEC080E4L-18/26C08CF-63 | ● | 8 | 8 | 4 | 0.3 | 18 | 26 | 63 | Cylindrical |
| TEC080E4L-18/26W08CF63 | ● | 8 | 8 | 4 | 0.3 | 18 | 26 | 63 | Weldon |
| TEC100E4L-22/32C10CFS72 | ● | 10 | 10 | 4 | - | 22 | 32 | 72 | Cylindrical |
| TEC100E4L-22/32C10CF-72 | ● | 10 | 10 | 4 | 0.4 | 22 | 32 | 72 | Cylindrical |
| TEC100E4L-22/32W10CF72 | ● | 10 | 10 | 4 | 0.4 | 22 | 32 | 72 | Weldon |
| TEC120E4L-26/38C12CFS83 | ● | 12 | 12 | 4 | - | 26 | 38 | 83 | Cylindrical |
| TEC120E4L-26/38C12CF-83 | ● | 12 | 12 | 4 | 0.5 | 26 | 38 | 83 | Cylindrical |
| TEC120E4L-26/38W12CF83 | ● | 12 | 12 | 4 | 0.5 | 26 | 38 | 83 | Weldon |
| TEC160E4L-34/50C16CF-100 | ● | 16 | 16 | 4 | 0.6 | 34 | 50 | 100 | Cylindrical |
| TEC160E4L-34/50W16CF-100 | ● | 16 | 16 | 4 | 0.6 | 34 | 50 | 100 | Weldon |
| TEC200E4L-42/60C20CF-110 | ● | 20 | 20 | 4 | 0.6 | 42 | 60 | 110 | Cylindrical |
| TEC200E4L-42/60W20CF-110 | ● | 20 | 20 | 4 | 0.6 | 42 | 60 | 110 | Weldon |
| TEC250E4L-50/65C25CF-121 | ● | 25 | 25 | 4 | 0.6 | 50 | 65 | 121 | Cylindrical |
| TEC250E4L-50/65W25CF121 | ● | 25 | 25 | 4 | 0.6 | 50 | 65 | 121 | Weldon |

● : Line up

TEC**E5L**CF

5 flute chatter dampening endmill, 38° helix angle, variable pitch

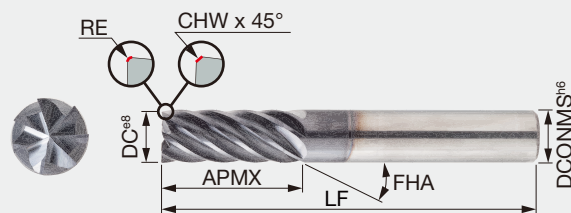


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|-----------------------|-------|----|--------|-----|------|------|-----|-------------|
| TEC060E5L-15C06CF-57 | ● | 6 | 6 | 5 | 0.2 | 15 | 57 | Cylindrical |
| TEC080E5L-20C08CF-63 | ● | 8 | 8 | 5 | 0.25 | 20 | 63 | Cylindrical |
| TEC100E5L-25C10CF-72 | ● | 10 | 10 | 5 | 0.3 | 25 | 72 | Cylindrical |
| TEC120E5L-30C12CF-83 | ● | 12 | 12 | 5 | 0.4 | 30 | 83 | Cylindrical |
| TEC160E5L-40C16CF-100 | ● | 16 | 16 | 5 | 0.5 | 40 | 100 | Cylindrical |
| TEC200E5L-50C20CF-125 | ● | 20 | 20 | 5 | 0.5 | 50 | 125 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I025](#)

7 flute chatter dampening endmill, variable helix and variable pitch, for high speed finishing



| Designation | AH710 | DC | DCONMS | NOF | RE | CHW | APMX | FHA | LF | Shank |
|--------------------------|-------|----|--------|-----|-----|-----|------|-----|-----|-------------|
| TEC060H7-12C06CF-M57 | ● | 6 | 6 | 7 | - | - | 12 | 37° | 57 | Cylindrical |
| TEC060H7-12C06CF-R02M57 | ● | 6 | 6 | 7 | 0.2 | - | 12 | 37° | 57 | Cylindrical |
| TEC060H7-18C06CF-M65 | ● | 6 | 6 | 7 | - | 0.2 | 18 | 37° | 65 | Cylindrical |
| TEC060H7-24C06CF-70 | ● | 6 | 6 | 7 | - | 0.2 | 24 | 37° | 70 | Cylindrical |
| TEC060H7-36C06CF-90 | ● | 6 | 6 | 7 | - | 0.2 | 36 | 37° | 90 | Cylindrical |
| TEC080H7-16C08CF-M63 | ● | 8 | 8 | 7 | - | - | 16 | 37° | 63 | Cylindrical |
| TEC080H7-16C08CF-R04M63 | ● | 8 | 8 | 7 | 0.4 | - | 16 | 37° | 63 | Cylindrical |
| TEC080H7-24C08CF-M90 | ● | 8 | 8 | 7 | - | 0.2 | 24 | 37° | 90 | Cylindrical |
| TEC080H7-32C08CF-90 | ● | 8 | 8 | 7 | - | 0.2 | 32 | 37° | 90 | Cylindrical |
| TEC080H7-48C08CF-110 | ● | 8 | 8 | 7 | - | 0.2 | 48 | 37° | 110 | Cylindrical |
| TEC100H7-20C10CF-M72 | ● | 10 | 10 | 7 | - | - | 20 | 37° | 72 | Cylindrical |
| TEC100H7-20C10CF-R05M72 | ● | 10 | 10 | 7 | 0.5 | - | 20 | 37° | 72 | Cylindrical |
| TEC100H7-20W10CF-M72 | ● | 10 | 10 | 7 | - | - | 20 | 37° | 72 | Weldon |
| TEC100H7-30C10CF-M85 | ● | 10 | 10 | 7 | - | 0.3 | 30 | 37° | 85 | Cylindrical |
| TEC100H7-40C10CF-100 | ● | 10 | 10 | 7 | - | 0.3 | 40 | 37° | 100 | Cylindrical |
| TEC100H7-60C10CF-130 | ● | 10 | 10 | 7 | - | 0.3 | 60 | 37° | 130 | Cylindrical |
| TEC120H7-24C12CF-M83 | ● | 12 | 12 | 7 | - | - | 24 | 37° | 83 | Cylindrical |
| TEC120H7-24C12CF-R06M83 | ● | 12 | 12 | 7 | 0.6 | - | 24 | 37° | 83 | Cylindrical |
| TEC120H7-24W12CF-M83 | ● | 12 | 12 | 7 | - | - | 24 | 37° | 83 | Weldon |
| TEC120H7-36C12CF-M95 | ● | 12 | 12 | 7 | - | 0.3 | 36 | 37° | 95 | Cylindrical |
| TEC120H7-48C12CF-110 | ● | 12 | 12 | 7 | - | 0.3 | 48 | 37° | 110 | Cylindrical |
| TEC120H7-72C12CF-140 | ● | 12 | 12 | 7 | - | 0.3 | 72 | 37° | 140 | Cylindrical |
| TEC160H7-32C16CF-M92 | ● | 16 | 16 | 7 | - | - | 32 | 37° | 92 | Cylindrical |
| TEC160H7-32C16CF-R08M92 | ● | 16 | 16 | 7 | 0.8 | - | 32 | 37° | 92 | Cylindrical |
| TEC160H7-32W16CF-M92 | ● | 16 | 16 | 7 | - | - | 32 | 37° | 92 | Weldon |
| TEC160H7-48C12CF-M110 | ● | 16 | 16 | 7 | - | 0.3 | 48 | 37° | 110 | Cylindrical |
| TEC160H7-64C16CF-131 | ● | 16 | 16 | 7 | - | 0.3 | 64 | 37° | 131 | Cylindrical |
| TEC160H7-96C16CF-175 | ● | 16 | 16 | 7 | - | 0.3 | 96 | 37° | 175 | Cylindrical |
| TEC200H7-40C20CF-M104 | ● | 20 | 20 | 7 | - | - | 40 | 37° | 104 | Cylindrical |
| TEC200H7-40C20CF-R10M104 | ● | 20 | 20 | 7 | 1 | - | 40 | 37° | 104 | Cylindrical |
| TEC200H7-40W20CF-M104 | ● | 20 | 20 | 7 | - | - | 40 | 37° | 104 | Weldon |
| TEC200H7-60C20CF-M140 | ● | 20 | 20 | 7 | - | 0.4 | 60 | 37° | 140 | Cylindrical |
| TEC200H7-80C20CF-140 | ● | 20 | 20 | 7 | - | 0.4 | 80 | 37° | 140 | Cylindrical |

● : Line up

P

M

K

N

S

H

Reference pages: Standard cutting conditions → I025

TEC**H**CF

6 - 20 flute chatter dampening endmill, variable helix and variable pitch, for high speed finishing

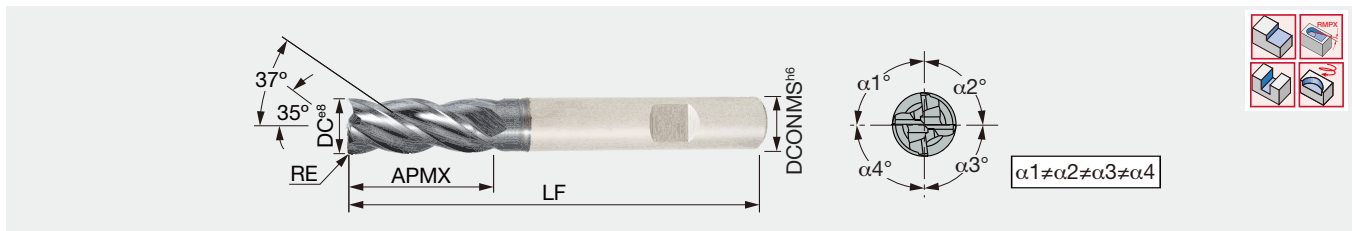


| Designation | AH710 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|-----------------------|-------|----|--------|-----|-----|------|-----|-------------|
| TEC060H6-12C06CF-H57 | ● | 6 | 6 | 6 | 0.2 | 12 | 57 | Cylindrical |
| TEC080H8-16C08CF-H63 | ● | 8 | 8 | 8 | 0.2 | 16 | 63 | Cylindrical |
| TEC100H10-20C10CF-H72 | ● | 10 | 10 | 10 | 0.3 | 20 | 72 | Cylindrical |
| TEC120H12-24C12CF-H83 | ● | 12 | 12 | 12 | 0.3 | 24 | 83 | Cylindrical |
| TEC160H16-32C16CF-H92 | ● | 16 | 16 | 16 | 0.3 | 32 | 92 | Cylindrical |
| TEC200H20-40C20CFH104 | ● | 20 | 20 | 20 | 0.4 | 40 | 104 | Cylindrical |

● : Line up

TECK**H4M**CF-R

4 flute chatter dampening endmill, variable helix and variable pitch, for titanium machining



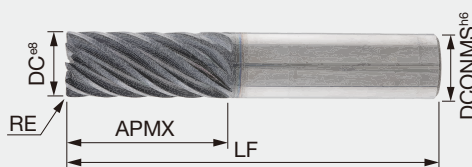
| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | RMPX | LF | Shank |
|------------------------|-------|----|--------|-----|-----|------|------|-----|-------------|
| TECK040H4M-08C06CF-R02 | ● | 4 | 6 | 4 | 0.2 | 8 | 5° | 57 | Cylindrical |
| TECK050H4M-10C06CF-R02 | ● | 5 | 6 | 4 | 0.2 | 10 | 5° | 57 | Cylindrical |
| TECK060H4M-12C06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 57 | Cylindrical |
| TECK060H4M-12W06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 57 | Weldon |
| TECK080H4M-16C08CF-R04 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 63 | Cylindrical |
| TECK080H4M-16W08CF-R04 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 63 | Weldon |
| TECK100H4M-20C10CF-R05 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 72 | Cylindrical |
| TECK100H4M-20W10CF-R05 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 72 | Weldon |
| TECK120H4M-24C12CF-R06 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 83 | Cylindrical |
| TECK120H4M-24W12CF-R06 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 83 | Weldon |
| TECK160H4M-32C16CF-R08 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 92 | Cylindrical |
| TECK160H4M-32W16CF-R08 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 92 | Weldon |
| TECK200H4M-40C20CF-R10 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 104 | Cylindrical |
| TECK200H4M-40W20CF-R10 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 104 | Weldon |

● : Line up

VARIABLE MEISTER

TECK**H7/9M**CF-R

7 - 9 flute chatter dampening endmill, variable helix and variable pitch, for titanium machining

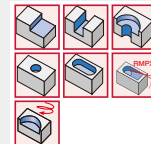
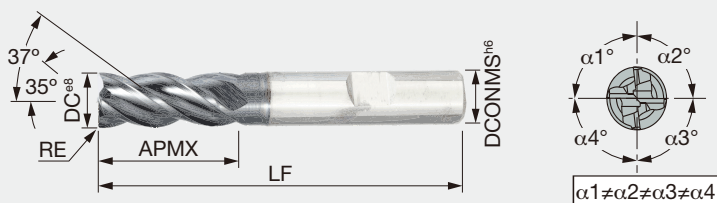


| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | RMPX | LF | Shank |
|---------------------------|-------|----|--------|-----|-----|------|------|-----|-------------|
| TECK060H7-13C06CF-R02T57 | ● | 6 | 6 | 7 | 0.2 | 13 | 5° | 57 | Cylindrical |
| TECK060H7-13W06CF-R02T57 | ● | 6 | 6 | 7 | 0.2 | 13 | 5° | 57 | Weldon |
| TECK080H7-19C08CF-R04T63 | ● | 8 | 8 | 7 | 0.4 | 19 | 5° | 63 | Cylindrical |
| TECK080H7-19W08CF-R04T63 | ● | 8 | 8 | 7 | 0.4 | 19 | 5° | 63 | Weldon |
| TECK100H7-22C10CF-R05T72 | ● | 10 | 10 | 7 | 0.5 | 22 | 5° | 72 | Cylindrical |
| TECK100H7-22W10CF-R05T72 | ● | 10 | 10 | 7 | 0.5 | 22 | 5° | 72 | Weldon |
| TECK120H7-26C12CF-R06T83 | ● | 12 | 12 | 7 | 0.6 | 26 | 5° | 83 | Cylindrical |
| TECK120H7-26W12CF-R06T83 | ● | 12 | 12 | 7 | 0.6 | 26 | 5° | 83 | Weldon |
| TECK160H9-32C16CF-R08T92 | ● | 16 | 16 | 9 | 0.8 | 32 | 5° | 92 | Cylindrical |
| TECK160H9-32W16CF-R08T92 | ● | 16 | 16 | 9 | 0.8 | 32 | 5° | 92 | Weldon |
| TECK200H9-38C20CF-R10T104 | ● | 20 | 20 | 9 | 1 | 38 | 5° | 104 | Cylindrical |
| TECK200H9-38W20CF-R10T104 | ● | 20 | 20 | 9 | 1 | 38 | 5° | 104 | Weldon |

● : Line up

TEC**H4M**CF-R

4 flute chatter dampening endmill, variable helix and variable pitch



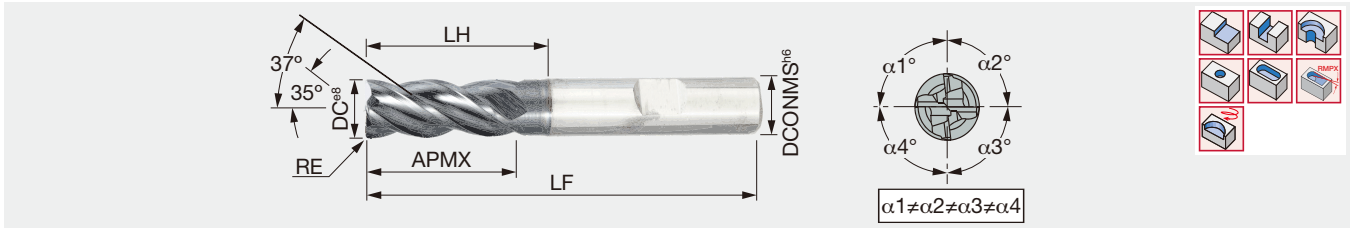
| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | RMPX | LF | Shank |
|---------------------------|-------|----|--------|-----|-----|------|------|-----|-------------|
| TEC060H4M-12C06CF-R02-57 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 57 | Cylindrical |
| TEC060H4M-12W06CF-R02-57 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 57 | Weldon |
| TEC080H4M-16C08CF-R04-63 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 63 | Cylindrical |
| TEC080H4M-16W08CF-R04-63 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 63 | Weldon |
| TEC100H4M-20C10CF-R05-72 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 72 | Cylindrical |
| TEC100H4M-20W10CF-R05-72 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 72 | Weldon |
| TEC120H4M-24C12CF-R06-83 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 83 | Cylindrical |
| TEC120H4M-24W12CF-R06-83 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 83 | Weldon |
| TEC140H4M-28C14CFR0.7-83 | ● | 14 | 14 | 4 | 0.7 | 28 | 5° | 83 | Cylindrical |
| TEC140H4M-28W14CFR0.7-83 | ● | 14 | 14 | 4 | 0.7 | 28 | 5° | 83 | Weldon |
| TEC160H4M-32C16CF-R08-92 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 92 | Cylindrical |
| TEC160H4M-32W16CF-R08-92 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 92 | Weldon |
| TEC200H4M-40C20CF-R10-104 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 104 | Cylindrical |
| TEC200H4M-40W20CF-R10-104 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 104 | Weldon |
| TEC250H4M-50C25CF-R12-121 | ● | 25 | 25 | 4 | 1.2 | 50 | 5° | 121 | Cylindrical |
| TEC250H4M-50W25CF-R12-121 | ● | 25 | 25 | 4 | 1.2 | 50 | 5° | 121 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → **I025**

TEC**H4X**CF-R

4 flute chatter dampening endmill, variable helix and variable pitch, extra long neck type

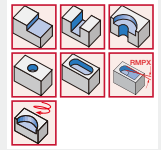
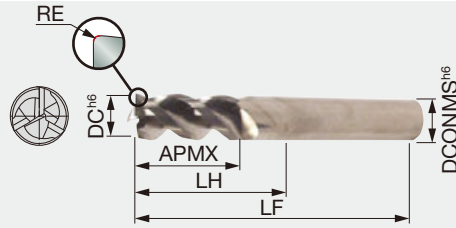


| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | RMPX | LH | LF | Shank |
|--------------------------|-------|----|--------|-----|-----|------|------|----|-----|-------------|
| TEC060H4X-12/25C06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 25 | 61 | Cylindrical |
| TEC060H4X-12/25W06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 12 | 5° | 25 | 61 | Weldon |
| TEC080H4X-16/32C08CF-R04 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 32 | 68 | Cylindrical |
| TEC080H4X-16/32W08CF-R04 | ● | 8 | 8 | 4 | 0.4 | 16 | 5° | 32 | 68 | Weldon |
| TEC100H4X-20/40C10CF-R05 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 40 | 80 | Cylindrical |
| TEC100H4X-20/40W10CF-R05 | ● | 10 | 10 | 4 | 0.5 | 20 | 5° | 40 | 80 | Weldon |
| TEC120H4X-24/50C12CF-R06 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 50 | 95 | Cylindrical |
| TEC120H4X-24/50W12CF-R06 | ● | 12 | 12 | 4 | 0.6 | 24 | 5° | 50 | 95 | Weldon |
| TEC160H4X-32/64C16CF-R08 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 64 | 115 | Cylindrical |
| TEC160H4X-32/64W16CF-R08 | ● | 16 | 16 | 4 | 0.8 | 32 | 5° | 64 | 115 | Weldon |
| TEC200H4X-40/75C20CF-R10 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 75 | 125 | Cylindrical |
| TEC200H4X-40/75W20CF-R10 | ● | 20 | 20 | 4 | 1 | 40 | 5° | 75 | 125 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → [I025](#)

3 flute endmill, 39°-41° variable helix and variable pitch, center cutting edge, for aluminium machining



| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LH | LF | Shank |
|--------------------------|-------|-----|--------|-----|------|------|----|-----|-------------|
| TECA010H3-04C06CF-R.05 | ● | 1 | 6 | 3 | 0.05 | 4 | 6 | 57 | Cylindrical |
| TECA015H3-04/06C06CF-R01 | ● | 1.5 | 6 | 3 | 0.1 | 4 | 6 | 57 | Cylindrical |
| TECA020H3-05/08C06CF-R01 | ● | 2 | 6 | 3 | 0.1 | 5 | 8 | 57 | Cylindrical |
| TECA025H3-05/08C06CF-R01 | ● | 2.5 | 6 | 3 | 0.1 | 5 | 8 | 57 | Cylindrical |
| TECA030H3-07/12C06CF-R01 | ● | 3 | 6 | 3 | 0.1 | 7 | 12 | 57 | Cylindrical |
| TECA040H3-10/16C06CF-R02 | ● | 4 | 6 | 3 | 0.2 | 10 | 16 | 57 | Cylindrical |
| TECA050H3-12/20C06CF-R02 | ● | 5 | 6 | 3 | 0.2 | 12 | 20 | 57 | Cylindrical |
| TECA060H3-09/18C06CF-R02 | ● | 6 | 6 | 3 | 0.2 | 9 | 18 | 57 | Cylindrical |
| TECA060H3-09/18C06CF-R04 | ● | 6 | 6 | 3 | 0.4 | 9 | 18 | 57 | Cylindrical |
| TECA060H3-09/18C06CF-R08 | ● | 6 | 6 | 3 | 0.8 | 9 | 18 | 57 | Cylindrical |
| TECA060H3-09/30C06CF-R02 | ● | 6 | 6 | 3 | 0.2 | 9 | 30 | 65 | Cylindrical |
| TECA060H3-09/30C06CF-R04 | ● | 6 | 6 | 3 | 0.4 | 9 | 30 | 65 | Cylindrical |
| TECA060H3-09/30C06CF-R08 | ● | 6 | 6 | 3 | 0.8 | 9 | 30 | 65 | Cylindrical |
| TECA060H3-14/24C06CF-R02 | ● | 6 | 6 | 3 | 0.2 | 14 | 24 | 60 | Cylindrical |
| TECA080H3-12/24C08CF-R02 | ● | 8 | 8 | 3 | 0.2 | 12 | 24 | 63 | Cylindrical |
| TECA080H3-12/24C08CF-R04 | ● | 8 | 8 | 3 | 0.4 | 12 | 24 | 63 | Cylindrical |
| TECA080H3-12/24C08CF-R08 | ● | 8 | 8 | 3 | 0.8 | 12 | 24 | 63 | Cylindrical |
| TECA080H3-12/24C08CF-R30 | ● | 8 | 8 | 3 | 3 | 12 | 24 | 63 | Cylindrical |
| TECA080H3-12/40C08CF-R02 | ● | 8 | 8 | 3 | 0.2 | 12 | 40 | 79 | Cylindrical |
| TECA080H3-12/40C08CF-R04 | ● | 8 | 8 | 3 | 0.4 | 12 | 40 | 79 | Cylindrical |
| TECA080H3-12/40C08CF-R08 | ● | 8 | 8 | 3 | 0.8 | 12 | 40 | 79 | Cylindrical |
| TECA080H3-18/32C08CF-R02 | ● | 8 | 8 | 3 | 0.2 | 18 | 32 | 68 | Cylindrical |
| TECA100H3-15/30C10CF-R02 | ● | 10 | 10 | 3 | 0.2 | 15 | 30 | 72 | Cylindrical |
| TECA100H3-15/30C10CF-R04 | ● | 10 | 10 | 3 | 0.4 | 15 | 30 | 72 | Cylindrical |
| TECA100H3-15/30C10CF-R08 | ● | 10 | 10 | 3 | 0.8 | 15 | 30 | 72 | Cylindrical |
| TECA100H3-15/30C10CF-R16 | ● | 10 | 10 | 3 | 1.6 | 15 | 30 | 72 | Cylindrical |
| TECA100H3-15/30C10CF-R30 | ● | 10 | 10 | 3 | 3 | 15 | 30 | 72 | Cylindrical |
| TECA100H3-15/50C10CF-R02 | ● | 10 | 10 | 3 | 0.2 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-15/50C10CF-R04 | ● | 10 | 10 | 3 | 0.4 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-15/50C10CF-R08 | ● | 10 | 10 | 3 | 0.8 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-15/50C10CF-R16 | ● | 10 | 10 | 3 | 1.6 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-15/50C10CF-R20 | ● | 10 | 10 | 3 | 2 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-15/50C10CF-R30 | ● | 10 | 10 | 3 | 3 | 15 | 50 | 92 | Cylindrical |
| TECA100H3-22/40C10CF-R02 | ● | 10 | 10 | 3 | 0.2 | 22 | 40 | 80 | Cylindrical |
| TECA100H3-22/40C10CF-R30 | ● | 10 | 10 | 3 | 3 | 22 | 40 | 80 | Cylindrical |
| TECA120H3-18/36C12CF-R02 | ● | 12 | 12 | 3 | 0.2 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/36C12CF-R04 | ● | 12 | 12 | 3 | 0.4 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/36C12CF-R08 | ● | 12 | 12 | 3 | 0.8 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/36C12CF-R16 | ● | 12 | 12 | 3 | 1.6 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/36C12CF-R20 | ● | 12 | 12 | 3 | 2 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/36C12CF-R25 | ● | 12 | 12 | 3 | 2.5 | 18 | 36 | 83 | Cylindrical |
| TECA120H3-18/60C12CF-R02 | ● | 12 | 12 | 3 | 0.2 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R04 | ● | 12 | 12 | 3 | 0.4 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R08 | ● | 12 | 12 | 3 | 0.8 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R16 | ● | 12 | 12 | 3 | 1.6 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R20 | ● | 12 | 12 | 3 | 2 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R25 | ● | 12 | 12 | 3 | 2.5 | 18 | 60 | 100 | Cylindrical |
| TECA120H3-18/60C12CF-R30 | ● | 12 | 12 | 3 | 3 | 18 | 60 | 100 | Cylindrical |
| TECA160H3-24/48C16CF-R02 | ● | 16 | 16 | 3 | 0.2 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R04 | ● | 16 | 16 | 3 | 0.4 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R08 | ● | 16 | 16 | 3 | 0.8 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R16 | ● | 16 | 16 | 3 | 1.6 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R20 | ● | 16 | 16 | 3 | 2 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R25 | ● | 16 | 16 | 3 | 2.5 | 24 | 48 | 92 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I025](#)

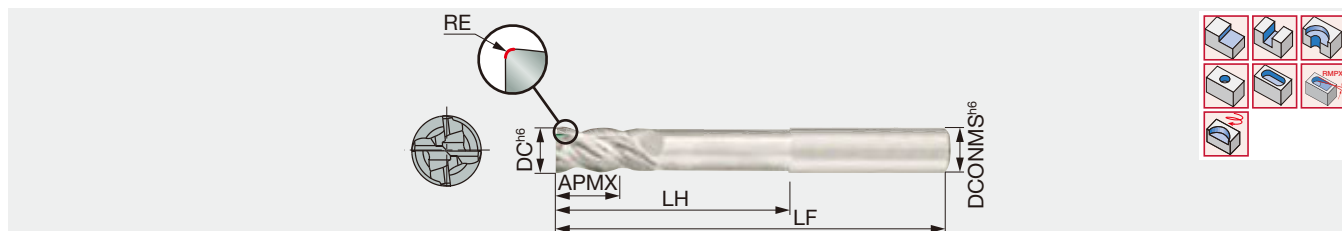
| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LH | LF | Shank |
|---------------------------|-------|----|--------|-----|-----|------|-----|-----|-------------|
| TECA160H3-24/48C16CF-R30 | ● | 16 | 16 | 3 | 3 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R32 | ● | 16 | 16 | 3 | 3.2 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R40 | ● | 16 | 16 | 3 | 4 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/48C16CF-R50 | ● | 16 | 16 | 3 | 5 | 24 | 48 | 92 | Cylindrical |
| TECA160H3-24/80C16CF-R02 | ● | 16 | 16 | 3 | 0.2 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R04 | ● | 16 | 16 | 3 | 0.4 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R08 | ● | 16 | 16 | 3 | 0.8 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R16 | ● | 16 | 16 | 3 | 1.6 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R20 | ● | 16 | 16 | 3 | 2 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R25 | ● | 16 | 16 | 3 | 2.5 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R30 | ● | 16 | 16 | 3 | 3 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R32 | ● | 16 | 16 | 3 | 3.2 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R40 | ● | 16 | 16 | 3 | 4 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-24/80C16CF-R50 | ● | 16 | 16 | 3 | 5 | 24 | 80 | 128 | Cylindrical |
| TECA160H3-34/64C16CF-R02 | ● | 16 | 16 | 3 | 0.2 | 34 | 64 | 115 | Cylindrical |
| TECA200H3-30/100C20CF-R02 | ● | 20 | 20 | 3 | 0.2 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/100C20CF-R04 | ● | 20 | 20 | 3 | 0.4 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/100C20CF-R08 | ● | 20 | 20 | 3 | 0.8 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/100C20CF-R32 | ● | 20 | 20 | 3 | 3.2 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/100C20CF-R40 | ● | 20 | 20 | 3 | 4 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/100C20CF-R50 | ● | 20 | 20 | 3 | 5 | 30 | 100 | 150 | Cylindrical |
| TECA200H3-30/60C20CF-R02 | ● | 20 | 20 | 3 | 0.2 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R04 | ● | 20 | 20 | 3 | 0.4 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R08 | ● | 20 | 20 | 3 | 0.8 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R16 | ● | 20 | 20 | 3 | 1.6 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R20 | ● | 20 | 20 | 3 | 2 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R32 | ● | 20 | 20 | 3 | 3.2 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R40 | ● | 20 | 20 | 3 | 4 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-30/60C20CF-R50 | ● | 20 | 20 | 3 | 5 | 30 | 60 | 110 | Cylindrical |
| TECA200H3-42/80C20CF-R02 | ● | 20 | 20 | 3 | 0.2 | 42 | 80 | 130 | Cylindrical |
| TECA250H3-38/125C25CF-R02 | ● | 25 | 25 | 3 | 0.2 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/125C25CF-R08 | ● | 25 | 25 | 3 | 0.8 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/125C25CF-R16 | ● | 25 | 25 | 3 | 1.6 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/125C25CF-R20 | ● | 25 | 25 | 3 | 2 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/125C25CF-R40 | ● | 25 | 25 | 3 | 4 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/125C25CF-R50 | ● | 25 | 25 | 3 | 5 | 38 | 125 | 185 | Cylindrical |
| TECA250H3-38/75C25CF-R02 | ● | 25 | 25 | 3 | 0.2 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-38/75C25CF-R04 | ● | 25 | 25 | 3 | 0.4 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-38/75C25CF-R16 | ● | 25 | 25 | 3 | 1.6 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-38/75C25CF-R20 | ● | 25 | 25 | 3 | 2 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-38/75C25CF-R32 | ● | 25 | 25 | 3 | 3.2 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-38/75C25CF-R50 | ● | 25 | 25 | 3 | 5 | 38 | 75 | 130 | Cylindrical |
| TECA250H3-52/100C25CF-R02 | ● | 25 | 25 | 3 | 0.2 | 52 | 100 | 156 | Cylindrical |

● : Line up

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



4 flute endmill, variable helix and variable pitch, relieved neck type, for aluminium machining (1.5xD, 2xD)

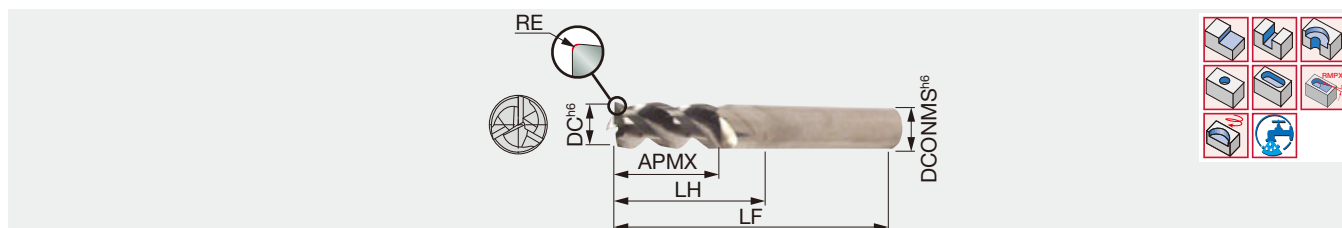


| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LH | LF | Shank |
|--------------------------|-------|----|--------|-----|-----|------|----|-----|-------------|
| TECA060H4-09/30C06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 9 | 30 | 65 | Cylindrical |
| TECA060H4-12/18C06CF-R02 | ● | 6 | 6 | 4 | 0.2 | 12 | 18 | 57 | Cylindrical |
| TECA080H4-12/40C08CF-R02 | ● | 8 | 8 | 4 | 0.2 | 12 | 40 | 79 | Cylindrical |
| TECA080H4-16/24C08CF-R02 | ● | 8 | 8 | 4 | 0.2 | 16 | 24 | 63 | Cylindrical |
| TECA100H4-15/50C10CF-R02 | ● | 10 | 10 | 4 | 0.2 | 15 | 50 | 92 | Cylindrical |
| TECA100H4-20/30C10CF-R02 | ● | 10 | 10 | 4 | 0.2 | 20 | 30 | 72 | Cylindrical |
| TECA120H4-18/60C12CF-R02 | ● | 12 | 12 | 4 | 0.2 | 18 | 60 | 100 | Cylindrical |
| TECA120H4-24/36C12CF-R02 | ● | 12 | 12 | 4 | 0.2 | 24 | 36 | 83 | Cylindrical |
| TECA160H4-24/80C16CF-R02 | ● | 16 | 16 | 4 | 0.2 | 24 | 80 | 128 | Cylindrical |
| TECA160H4-32/48C16CF-R02 | ● | 16 | 16 | 4 | 0.2 | 32 | 48 | 100 | Cylindrical |

● : Line up

TECAH3**CF-R**C**

3 flute endmill, variable helix and variable pitch, center cutting edge, for aluminium machining



| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LH | LF | Coolant hole | Shank |
|---------------------------|-------|----|--------|-----|-----|------|----|-----|--------------|-------------|
| TECA060H3-12/18C06CF-R02C | ● | 6 | 6 | 3 | 0.2 | 12 | 18 | 57 | With | Cylindrical |
| TECA060H3-12/30C06CF-R02C | ● | 6 | 6 | 3 | 0.2 | 12 | 30 | 65 | With | Cylindrical |
| TECA080H3-16/24C08CF-R02C | ● | 8 | 8 | 3 | 0.2 | 16 | 24 | 63 | With | Cylindrical |
| TECA080H3-16/40C08CF-R02C | ● | 8 | 8 | 3 | 0.2 | 16 | 40 | 79 | With | Cylindrical |
| TECA100H3-20/30C10CF-R02C | ● | 10 | 10 | 3 | 0.2 | 20 | 30 | 72 | With | Cylindrical |
| TECA100H3-20/50C10CF-R02C | ● | 10 | 10 | 3 | 0.2 | 20 | 50 | 100 | With | Cylindrical |
| TECA120H3-24/36C12CF-R02C | ● | 12 | 12 | 3 | 0.2 | 24 | 36 | 83 | With | Cylindrical |
| TECA120H3-24/60C12CF-R02C | ● | 12 | 12 | 3 | 0.2 | 24 | 60 | 100 | With | Cylindrical |
| TECA160H3-32/48C16CF-R02C | ● | 16 | 16 | 3 | 0.2 | 32 | 48 | 92 | With | Cylindrical |
| TECA160H3-32/80C16CF-R02C | ● | 16 | 16 | 3 | 0.2 | 32 | 80 | 128 | With | Cylindrical |
| TECA250H3-50/75C25CF-R02C | ● | 25 | 25 | 3 | 0.2 | 50 | 75 | 130 | With | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I025**

STANDARD CUTTING CONDITIONS

Slotting / Roughing ($a_e = 0.4 \times D$ or over)

| ISO | Workpiece material | Hardness | V_c (m/min) | f_z (mm/t) | | | a_p (Slotting) |
|----------|--------------------|--------------|---------------|-------------------|---------------------|---------------------|---------------------|
| | | | | $\phi 6 - \phi 8$ | $\phi 10 - \phi 12$ | $\phi 16 - \phi 20$ | |
| P | Carbon steel | - 300 HB | 140 - 180 | 0.03 - 0.045 | 0.035 - 0.055 | 0.05 - 0.07 | 2xD |
| | Alloy steel | - 300 HB | 70 - 150 | 0.025 - 0.04 | 0.035 - 0.055 | 0.05 - 0.07 | 2xD |
| M | Stainless steel | - 200 HB | 60 - 100 | 0.025 - 0.045 | 0.035 - 0.05 | 0.04 - 0.065 | 1xD |
| K | Cast iron | 150 - 200 HB | 80 - 180 | 0.025 - 0.05 | 0.035 - 0.065 | 0.05 - 0.075 | 2xD |
| N | Aluminium alloy | - | 300 - 750 | 0.025 - 0.05 | 0.035 - 0.065 | 0.035 - 0.09 | 2xD |
| S | Titanium alloy | - 40 HRC | 20 - 50 | 0.025 - 0.04 | 0.03 - 0.05 | 0.035 - 0.085 | 1xD |
| H | Hardened steel | - 60 HRC | 20 - 30 | 0.01 - 0.02 | 0.02 - 0.04 | 0.03 - 0.06 | 0.5xD |

Semi-finishing / Shouldering ($a_e = 0.1 \sim 0.4 \times D$)

| ISO | Workpiece material | Hardness | V_c (m/min) | f_z (mm/t) | | | a_p |
|----------|--------------------|--------------|---------------|-------------------|---------------------|---------------------|-------|
| | | | | $\phi 6 - \phi 8$ | $\phi 10 - \phi 12$ | $\phi 16 - \phi 20$ | |
| P | Carbon steel | - 300 HB | 150 - 220 | 0.035 - 0.075 | 0.075 - 0.09 | 0.085 - 0.1 | 2xD |
| | Alloy steel | - 300 HB | 70 - 160 | 0.025 - 0.065 | 0.05 - 0.09 | 0.055 - 0.09 | 2xD |
| M | Stainless steel | - 200 HB | 80 - 130 | 0.03 - 0.05 | 0.04 - 0.06 | 0.05 - 0.065 | 2xD |
| K | Cast iron | 150 - 250 HB | 130 - 220 | 0.035 - 0.065 | 0.05 - 0.075 | 0.075 - 0.09 | 2xD |
| N | Aluminium alloy | - | 350 - 850 | 0.05 - 0.075 | 0.075 - 0.1 | 0.1 - 0.125 | 2xD |
| S | Titanium alloy | - 40 HRC | 40 - 60 | 0.035 - 0.05 | 0.04 - 0.065 | 0.06 - 0.1 | 2xD |
| H | Hardened steel | - 60 HRC | 30 - 70 | 0.015 - 0.045 | 0.03 - 0.05 | 0.05 - 0.075 | 2xD |

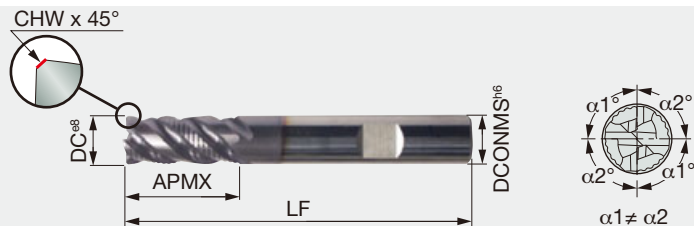
Finishing (feed rate depending on required accuracy) / High feed machining at low depth of cut ($a_e = 0.05 \sim 0.1 \times D$)

| ISO | Workpiece material | Hardness | V_c (m/min) | f_z (mm/t) | | | a_p |
|----------|--------------------|--------------|---------------|-------------------|---------------------|---------------------|------------|
| | | | | $\phi 6 - \phi 8$ | $\phi 10 - \phi 12$ | $\phi 16 - \phi 20$ | |
| P | Carbon steel | - 300 HB | 170 - 280 | 0.06 - 0.09 | 0.085 - 0.1 | 0.1 - 0.125 | a_{pmax} |
| | Alloy steel | - 300 HB | 110 - 220 | 0.06 - 0.09 | 0.085 - 0.1 | 0.1 - 0.125 | a_{pmax} |
| M | Stainless steel | - 200 HB | 100 - 160 | 0.035 - 0.055 | 0.05 - 0.065 | 0.055 - 0.075 | a_{pmax} |
| K | Cast iron | 150 - 250 HB | 180 - 280 | 0.04 - 0.075 | 0.075 - 0.08 | 0.08 - 0.1 | a_{pmax} |
| N | Aluminium alloy | - | 350 - 900 | 0.055 - 0.09 | 0.085 - 0.125 | 0.125 - 0.18 | a_{pmax} |
| S | Titanium alloy | - 40 HRC | 50 - 70 | 0.04 - 0.065 | 0.05 - 0.075 | 0.075 - 0.11 | a_{pmax} |
| H | Hardened steel | - 60 HRC | 40 - 80 | 0.025 - 0.05 | 0.04 - 0.065 | 0.06 - 0.08 | a_{pmax} |

- When the depth of cut (a_e) is closer to the upper limit, please start with a lower limit value of cutting speed (V_c).
- Please set the cutting speed and the feed rate lower for the items with long slot according to how chattering occurs.
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed and feed at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed and feed by 20 to 40%.



4 flute endmill, 38° helix angle, variable pitch, roughing and finishing combination type



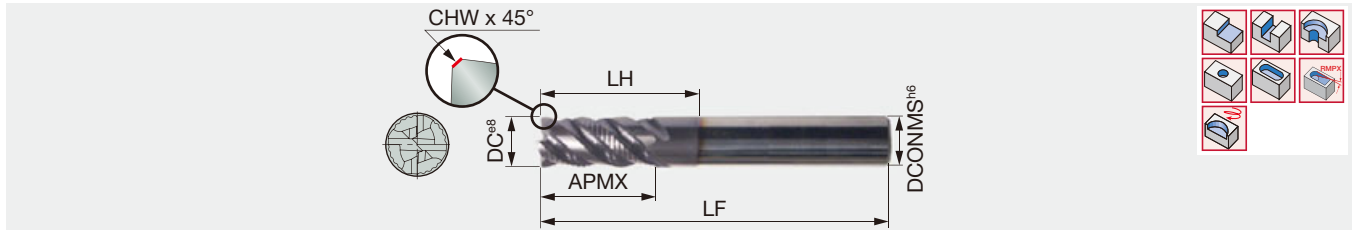
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|------------------------|-------|----|--------|-----|------|------|-----|-------------|
| TEFS060E44-14C06CF57 | ● | 6 | 6 | 4 | 0.25 | 14 | 57 | Cylindrical |
| TEFS060E44-14W06CF-57 | ● | 6 | 6 | 4 | 0.25 | 14 | 57 | Weldon |
| TEFS080E44-18C08CF63 | ● | 8 | 8 | 4 | 0.3 | 18 | 63 | Cylindrical |
| TEFS080E44-18W08CF-63 | ● | 8 | 8 | 4 | 0.3 | 18 | 63 | Weldon |
| TEFS100E44-22C10CF72 | ● | 10 | 10 | 4 | 0.4 | 22 | 72 | Cylindrical |
| TEFS100E44-22W10CF-72 | ● | 10 | 10 | 4 | 0.4 | 22 | 72 | Weldon |
| TEFS120E44-26C12CF83 | ● | 12 | 12 | 4 | 0.5 | 26 | 83 | Cylindrical |
| TEFS120E44-26W12CF-83 | ● | 12 | 12 | 4 | 0.5 | 26 | 83 | Weldon |
| TEFS140E44-30C14CF83 | ● | 14 | 14 | 4 | 0.5 | 30 | 83 | Cylindrical |
| TEFS140E44-30W14CF-83 | ● | 14 | 14 | 4 | 0.5 | 30 | 83 | Weldon |
| TEFS160E44-34C16CF92 | ● | 16 | 16 | 4 | 0.6 | 34 | 92 | Cylindrical |
| TEFS160E44-34W16CF-92 | ● | 16 | 16 | 4 | 0.6 | 34 | 92 | Weldon |
| TEFS200E44-42C20CF104 | ● | 20 | 20 | 4 | 0.6 | 42 | 104 | Cylindrical |
| TEFS200E44-42W20CF-104 | ● | 20 | 20 | 4 | 0.6 | 42 | 104 | Weldon |
| TEFS250E44-52C25CF121 | ● | 25 | 25 | 4 | 0.6 | 52 | 121 | Cylindrical |
| TEFS250E44-52W25CF-121 | ● | 25 | 25 | 4 | 0.6 | 52 | 121 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → **I033**

TEFS**B44

4 flute endmill, 45° helix angle, roughing and finishing combination type



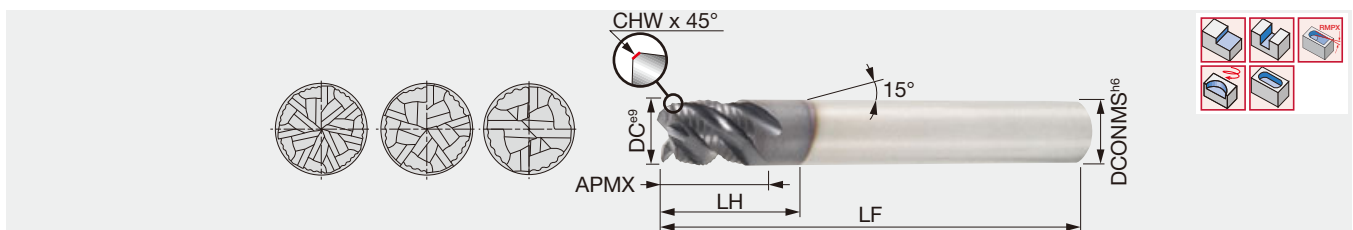
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|-------------------------|-------|----|--------|-----|------|------|----|-----|-------------|
| TEFS040B44-10C06-57 | ● | 4 | 6 | 4 | 0.12 | 10 | - | 57 | Cylindrical |
| TEFS050B44-12C06-57 | ● | 5 | 6 | 4 | 0.18 | 12 | - | 57 | Cylindrical |
| TEFS060B44-14/20C06-57 | ● | 6 | 6 | 4 | 0.25 | 14 | 20 | 57 | Cylindrical |
| TEFS060B44-14/20W06-57 | ● | 6 | 6 | 4 | 0.25 | 14 | 20 | 57 | Weldon |
| TEFS060B44-14C06-57 | ● | 6 | 6 | 4 | 0.25 | 14 | - | 57 | Cylindrical |
| TEFS060B44-14W06-57 | ● | 6 | 6 | 4 | 0.25 | 14 | - | 57 | Weldon |
| TEFS080B44-18/26C08-63 | ● | 8 | 8 | 4 | 0.3 | 18 | 26 | 63 | Cylindrical |
| TEFS080B44-18/26W08-63 | ● | 8 | 8 | 4 | 0.3 | 18 | 26 | 63 | Weldon |
| TEFS080B44-18C08-63 | ● | 8 | 8 | 4 | 0.3 | 18 | - | 63 | Cylindrical |
| TEFS080B44-18W08-63 | ● | 8 | 8 | 4 | 0.3 | 18 | - | 63 | Weldon |
| TEFS100B44-22/32C10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | 32 | 72 | Cylindrical |
| TEFS100B44-22/32W10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | 32 | 72 | Weldon |
| TEFS100B44-22C10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | - | 72 | Cylindrical |
| TEFS100B44-22W10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | - | 72 | Weldon |
| TEFS120B44-26/38C12-83 | ● | 12 | 12 | 4 | 0.4 | 26 | 38 | 83 | Cylindrical |
| TEFS120B44-26/38W12-83 | ● | 12 | 12 | 4 | 0.4 | 26 | 38 | 83 | Weldon |
| TEFS120B44-26C12-83 | ● | 12 | 12 | 4 | 0.4 | 26 | - | 83 | Cylindrical |
| TEFS120B44-26W12-83 | ● | 12 | 12 | 4 | 0.4 | 26 | - | 83 | Weldon |
| TEFS140B44-30C14-83 | ● | 14 | 14 | 4 | 0.4 | 30 | - | 83 | Cylindrical |
| TEFS140B44-30W14-83 | ● | 14 | 14 | 4 | 0.4 | 30 | - | 83 | Weldon |
| TEFS160B44-34/50C16-100 | ● | 16 | 16 | 4 | 0.6 | 34 | 50 | 100 | Cylindrical |
| TEFS160B44-34/50W16-100 | ● | 16 | 16 | 4 | 0.6 | 34 | 50 | 100 | Weldon |
| TEFS160B44-34C16-92 | ● | 16 | 16 | 4 | 0.6 | 34 | - | 92 | Cylindrical |
| TEFS160B44-34W16-92 | ● | 16 | 16 | 4 | 0.6 | 34 | - | 92 | Weldon |
| TEFS200B44-42/62C20-125 | ● | 20 | 20 | 4 | 0.6 | 42 | 62 | 125 | Cylindrical |
| TEFS200B44-42/62W20-125 | ● | 20 | 20 | 4 | 0.6 | 42 | 62 | 125 | Weldon |
| TEFS200B44-42C20-104 | ● | 20 | 20 | 4 | 0.6 | 42 | - | 104 | Cylindrical |
| TEFS200B44-42W20-104 | ● | 20 | 20 | 4 | 0.6 | 42 | - | 104 | Weldon |
| TEFS250B44-52C25-121 | ● | 25 | 25 | 4 | 0.6 | 52 | - | 121 | Cylindrical |
| TEFS250B44-52W25-121 | ● | 25 | 25 | 4 | 0.6 | 52 | - | 121 | Weldon |

● : Line up

SHREDMEISTER

TECR**B*S

4-7 flute roughing endmill, 45° helix angle, short type



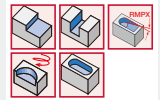
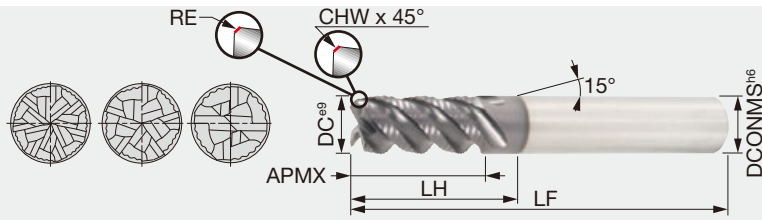
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|----------------------|-------|----|--------|-----|------|------|----|-----|--------|
| TECR050B4S-05W06-57 | ● | 5 | 6 | 4 | 0.2 | 5 | 10 | 57 | Weldon |
| TECR060B4S-06W06-57 | ● | 6 | 6 | 4 | 0.25 | 6 | - | 57 | Weldon |
| TECR080B4S-08W08-63 | ● | 8 | 8 | 4 | 0.25 | 8 | - | 63 | Weldon |
| TECR100B4S-10W10-72 | ● | 10 | 10 | 4 | 0.3 | 10 | - | 72 | Weldon |
| TECR120B4S-12W12-83 | ● | 12 | 12 | 4 | 0.35 | 12 | - | 83 | Weldon |
| TECR160B5S-16W16-92 | ● | 16 | 16 | 5 | 0.4 | 16 | - | 92 | Weldon |
| TECR200B7S-20W20-104 | ● | 20 | 20 | 7 | 0.4 | 20 | - | 104 | Weldon |


● : Line up

Reference pages: Standard cutting conditions → I033



4 - 7 flute roughing endmill, 45° helix angle



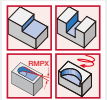
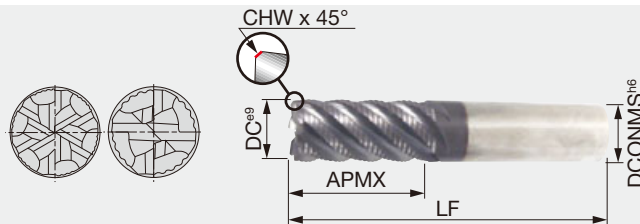
| Designation | AH725 | DC | DCONMS | NOF | CHW | RE | APMX | LH | LF |  | Shank |
|------------------------|-------|----|--------|-----|------|-----|------|----|-----|---|-------------|
| TECR050B4M-10C06-57 | ● | 5 | 6 | 4 | 0.2 | - | 10 | 15 | 57 | ✓ | Cylindrical |
| TECR050B4M-10W06-57 | ● | 5 | 6 | 4 | 0.2 | - | 10 | 15 | 57 | ✓ | Weldon |
| TECR060B4M-12C06-57 | ● | 6 | 6 | 4 | 0.25 | - | 12 | - | 57 | ✓ | Cylindrical |
| TECR060B4M-12W06-57 | ● | 6 | 6 | 4 | 0.25 | - | 12 | - | 57 | ✓ | Weldon |
| TECR080B4M-16C08-63 | ● | 8 | 8 | 4 | 0.25 | - | 16 | - | 63 | ✓ | Cylindrical |
| TECR080B4M-16W08-63 | ● | 8 | 8 | 4 | 0.25 | - | 16 | - | 63 | ✓ | Weldon |
| TECR100B4M-20C10-72 | ● | 10 | 10 | 4 | 0.3 | - | 20 | - | 72 | ✓ | Cylindrical |
| TECR100B4M-20C10-72R10 | ● | 10 | 10 | 4 | - | 1 | 20 | - | 72 | ✓ | Cylindrical |
| TECR100B4M-20W10-72 | ● | 10 | 10 | 4 | 0.3 | - | 20 | - | 72 | ✓ | Weldon |
| TECR120B4M-24C12-83 | ● | 12 | 12 | 4 | 0.35 | - | 24 | - | 83 | ✓ | Cylindrical |
| TECR120B4M-24C12-83R12 | ● | 12 | 12 | 4 | - | 1.2 | 24 | - | 83 | ✓ | Cylindrical |
| TECR120B4M-24W12-83 | ● | 12 | 12 | 4 | 0.35 | - | 24 | - | 83 | ✓ | Weldon |
| TECR120B4M-24W12-83R12 | ● | 12 | 12 | 4 | - | 1.2 | 24 | - | 83 | ✓ | Weldon |
| TECR160B5M-32C16-92 | ● | 16 | 16 | 5 | 0.4 | - | 32 | - | 92 | | Cylindrical |
| TECR160B5M-32C16-92R16 | ● | 16 | 16 | 5 | - | 1.6 | 32 | - | 92 | | Cylindrical |
| TECR160B5M-32W16-92 | ● | 16 | 16 | 5 | 0.4 | - | 32 | - | 92 | | Weldon |
| TECR160B5M-32W16-92R16 | ● | 16 | 16 | 5 | - | 1.6 | 32 | - | 92 | | Weldon |
| TECR200B7M-40C20-104 | ● | 20 | 20 | 7 | 0.4 | - | 40 | - | 104 | | Cylindrical |
| TECR200B7M-40W20-104 | ● | 20 | 20 | 7 | 0.4 | - | 40 | - | 104 | | Weldon |

● : Line up

2

TECR**B*MF

4 - 6 flute roughing endmill, 45° helix angle



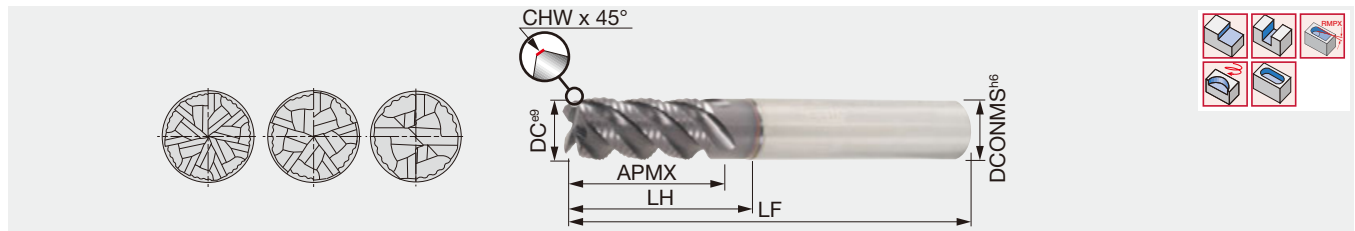
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|-----------------------|-------|----|--------|-----|------|------|-----|--------|
| TECR060B4MF-14W06-57 | ● | 6 | 6 | 4 | 0.25 | 14 | 57 | Weldon |
| TECR080B4MF-18W08-63 | ● | 8 | 8 | 4 | 0.3 | 18 | 63 | Weldon |
| TECR100B4MF-22W10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | 72 | Weldon |
| TECR120B4MF-26W12-83 | ● | 12 | 12 | 4 | 0.4 | 26 | 83 | Weldon |
| TECR140B4MF-30W14-83 | ● | 14 | 14 | 4 | 0.4 | 30 | 83 | Weldon |
| TECR160B6MF-34W16-92 | ● | 16 | 16 | 6 | 0.5 | 34 | 92 | Weldon |
| TECR200B6MF-42W20-104 | ● | 20 | 20 | 6 | 0.7 | 42 | 104 | Weldon |
| TECR250B6MF-52W25-121 | ● | 25 | 25 | 6 | 0.9 | 52 | 121 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → I033

TECR**B*L

4 - 7 flute roughing endmill, 45° helix angle, long neck type (3xD)

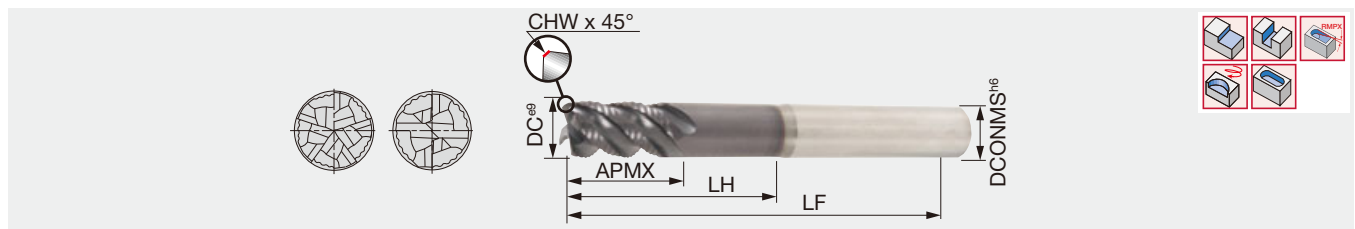


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | | Shank |
|-------------------------|-------|----|--------|-----|------|------|----|-----|---|--------|
| TECR060B4L-12/18W06-57 | ● | 6 | 6 | 4 | 0.25 | 12 | 18 | 57 | ✓ | Weldon |
| TECR080B4L-16/24W08-63 | ● | 8 | 8 | 4 | 0.25 | 16 | 24 | 63 | ✓ | Weldon |
| TECR100B4L-20/30W10-72 | ● | 10 | 10 | 4 | 0.3 | 20 | 30 | 72 | ✓ | Weldon |
| TECR120B4L-24/36W12-83 | ● | 12 | 12 | 4 | 0.35 | 24 | 36 | 83 | ✓ | Weldon |
| TECR160B5L-32/48W16-100 | ● | 16 | 16 | 5 | 0.4 | 32 | 48 | 100 | | Weldon |
| TECR200B7L-40/60W20-110 | ● | 20 | 20 | 7 | 0.4 | 40 | 60 | 110 | | Weldon |

● : Line up

TECR**B*X

4 - 5 flute roughing endmill, 45° helix angle, long neck type (4xD)

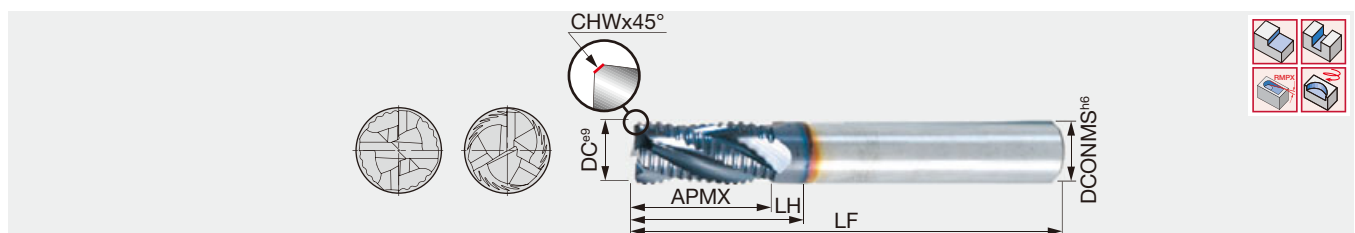


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | | Shank |
|-------------------------|-------|----|--------|-----|------|------|----|-----|---|--------|
| TECR080B4X-12/32W08-68 | ● | 8 | 8 | 4 | 0.25 | 12 | 32 | 68 | ✓ | Weldon |
| TECR100B4X-15/40W10-80 | ● | 10 | 10 | 4 | 0.3 | 15 | 40 | 80 | ✓ | Weldon |
| TECR120B4X-18/48W12-100 | ● | 12 | 12 | 4 | 0.35 | 18 | 48 | 100 | ✓ | Weldon |
| TECR160B5X-24/64W16-115 | ● | 16 | 16 | 5 | 0.4 | 24 | 64 | 115 | | Weldon |

● : Line up

TERF**A/E

3 - 4 flute roughing endmill, 30° or 38 helix angle, for alloy steel and stainless steel

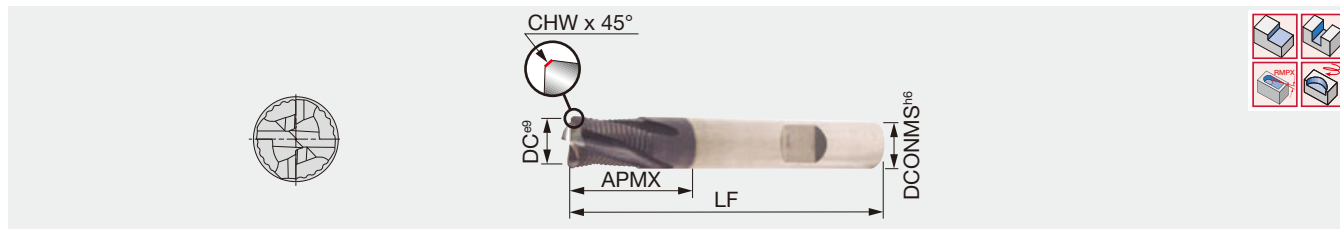


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | FHA | Shank |
|---------------------|-------|----|--------|-----|------|------|----|-----|-----|-------------|
| TERF040E3-08C06-57 | ● | 4 | 6 | 3 | 0.25 | 8 | 13 | 57 | 38° | Cylindrical |
| TERF050E3-10C06-57 | ● | 5 | 6 | 3 | 0.3 | 10 | 17 | 57 | 38° | Cylindrical |
| TERF060E3-13C06-57 | ● | 6 | 6 | 3 | 0.3 | 13 | 21 | 57 | 38° | Cylindrical |
| TERF070E3-20C08-63 | ● | 7 | 8 | 3 | 0.3 | 20 | 26 | 63 | 38° | Cylindrical |
| TERF080E3-20C08-63 | ● | 8 | 8 | 3 | 0.3 | 20 | 28 | 63 | 38° | Cylindrical |
| TERF090A4-22C10-72 | ● | 9 | 10 | 4 | 0.3 | 22 | 30 | 72 | 30° | Cylindrical |
| TERF100A4-22C10-72 | ● | 10 | 10 | 4 | 0.3 | 22 | 30 | 72 | 30° | Cylindrical |
| TERF110A4-25C12-83 | ● | 11 | 12 | 4 | 0.3 | 25 | 32 | 83 | 30° | Cylindrical |
| TERF120A4-25C12-83 | ● | 12 | 12 | 4 | 0.4 | 25 | 37 | 83 | 30° | Cylindrical |
| TERF140A4-25C14-83 | ● | 14 | 14 | 4 | 0.5 | 25 | 37 | 83 | 30° | Cylindrical |
| TERF160A4-32C16-92 | ● | 16 | 16 | 4 | 0.5 | 32 | 44 | 92 | 30° | Cylindrical |
| TERF180A4-32C18-92 | ● | 18 | 18 | 4 | 0.5 | 32 | 44 | 92 | 30° | Cylindrical |
| TERF200A4-38C20-104 | ● | 20 | 20 | 4 | 0.6 | 38 | 55 | 104 | 30° | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → I033

4 flute roughing endmill, 20° helix angle

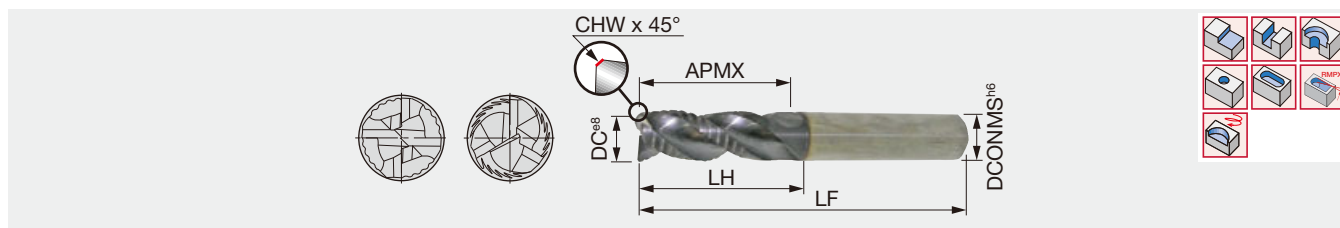


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | Shank |
|----------------------|-------|----|--------|-----|-----|------|-----|--------|
| TECR060T4M-10W06-57 | ● | 6 | 6 | 4 | 0.3 | 10 | 57 | Weldon |
| TECR080T4M-16W08-63 | ● | 8 | 8 | 4 | 0.4 | 16 | 63 | Weldon |
| TECR100T4M-20W10-72 | ● | 10 | 10 | 4 | 0.4 | 20 | 72 | Weldon |
| TECR120T4M-24W12-83 | ● | 12 | 12 | 4 | 0.4 | 24 | 83 | Weldon |
| TECR160T4M-32W16-92 | ● | 16 | 16 | 4 | 0.5 | 32 | 92 | Weldon |
| TECR200T4M-40W20-104 | ● | 20 | 20 | 4 | 0.5 | 40 | 104 | Weldon |

● : Line up

TECPE*L**

3 flute roughing endmill, 38° helix angle



| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|-------------------------|-------|----|--------|-----|-----|------|----|-----|--------|
| TECP050E3L-12/17W06S57 | ● | 5 | 6 | 3 | 0.3 | 12 | 17 | 57 | Weldon |
| TECP060E3L-14/20W06S57 | ● | 6 | 6 | 3 | 0.4 | 14 | 20 | 57 | Weldon |
| TECP080E3L-18/26W08S63 | ● | 8 | 8 | 3 | 0.4 | 18 | 26 | 63 | Weldon |
| TECP100E3L-22/32W10S72 | ● | 10 | 10 | 3 | 0.4 | 22 | 32 | 72 | Weldon |
| TECP120E3L-26/38W12S83 | ● | 12 | 12 | 3 | 0.4 | 26 | 38 | 83 | Weldon |
| TECP140E3L-30/44W14S100 | ● | 14 | 14 | 3 | 0.6 | 30 | 44 | 100 | Weldon |
| TECP160E3L-34/50W16S100 | ● | 16 | 16 | 3 | 0.5 | 34 | 50 | 100 | Weldon |
| TECP200E3L-42/62W20S125 | ● | 20 | 20 | 3 | 0.5 | 42 | 62 | 125 | Weldon |

4 flute roughing endmill, 38° helix angle

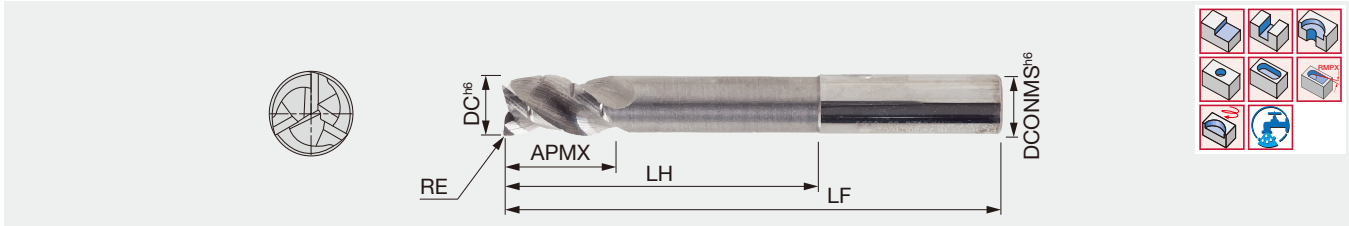
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|-------------------------|-------|----|--------|-----|-----|------|----|-----|--------|
| TECP050E4L-12/17W06S57 | ● | 5 | 6 | 4 | 0.3 | 12 | 17 | 57 | Weldon |
| TECP060E4L-14/20W06S57 | ● | 6 | 6 | 4 | 0.4 | 14 | 20 | 57 | Weldon |
| TECP080E4L-18/26W08S63 | ● | 8 | 8 | 4 | 0.4 | 18 | 26 | 63 | Weldon |
| TECP100E4L-22/32W10S72 | ● | 10 | 10 | 4 | 0.4 | 22 | 32 | 72 | Weldon |
| TECP120E4L-26/38W12S83 | ● | 12 | 12 | 4 | 0.4 | 26 | 38 | 83 | Weldon |
| TECP140E4L-30/44W14S100 | ● | 14 | 14 | 4 | 0.6 | 30 | 44 | 100 | Weldon |
| TECP160E4L-34/50W16S100 | ● | 16 | 16 | 4 | 0.5 | 34 | 50 | 100 | Weldon |
| TECP200E4L-42/62W20S125 | ● | 20 | 20 | 4 | 0.5 | 42 | 62 | 125 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → **I033**

TEAP**H3**CFR**C

3 flute endmill, variable helix and variable pitch with chip splitter, relieved neck type, for aluminium machining

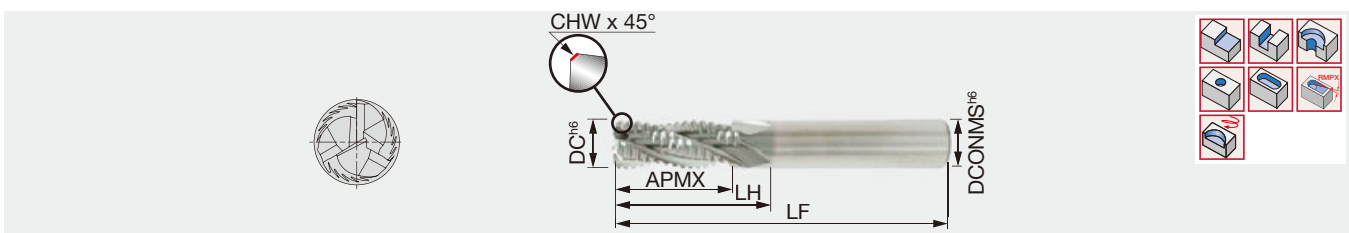


| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LH | LF | Coolant hole | Shank |
|---------------------------|-------|----|--------|-----|-----|------|-----|-----|--------------|-------------|
| TEAP100H3-15/50C10CFR02C | ● | 10 | 10 | 3 | 0.2 | 15 | 50 | 92 | With | Cylindrical |
| TEAP100H3-22/40C10CFR02C | ● | 10 | 10 | 3 | 0.2 | 22 | 40 | 80 | With | Cylindrical |
| TEAP120H3-18/60C12CFR02C | ● | 12 | 12 | 3 | 0.2 | 18 | 60 | 100 | With | Cylindrical |
| TEAP120H3-26/48C12CFR02C | ● | 12 | 12 | 3 | 0.2 | 26 | 48 | 93 | With | Cylindrical |
| TEAP160H3-24/80C16CFR02C | ● | 16 | 16 | 3 | 0.2 | 24 | 80 | 128 | With | Cylindrical |
| TEAP160H3-34/64C16CFR02C | ● | 16 | 16 | 3 | 0.2 | 34 | 64 | 115 | With | Cylindrical |
| TEAP200H3-42/80C20CFR02C | ● | 20 | 20 | 3 | 0.2 | 42 | 80 | 130 | With | Cylindrical |
| TEAP200H3-30/100C20CFR02C | ● | 20 | 20 | 3 | 0.2 | 30 | 100 | 150 | With | Cylindrical |

● : Line up

TERC**E3

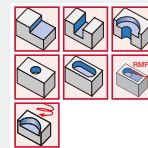
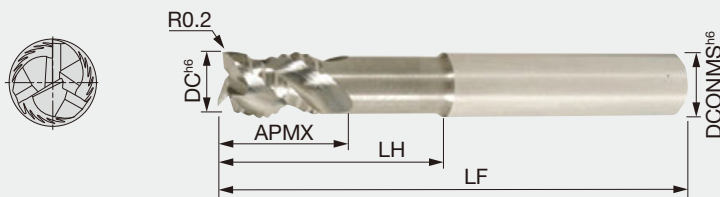
3 flute roughing endmill, 38° helix angle, for aluminium alloy and non-ferrous metal



| Designation | KS15F | DC | DCONMS | NOF | CHW | APMX | LH | LF | Shank |
|---------------------|-------|----|--------|-----|-----|------|----|-----|-------------|
| TERC060E3-13C06-57 | ● | 6 | 6 | 3 | 0.5 | 13 | 21 | 57 | Cylindrical |
| TERC080E3-20C08-63 | ● | 8 | 8 | 3 | 0.5 | 20 | 28 | 63 | Cylindrical |
| TERC100E3-22C10-72 | ● | 10 | 10 | 3 | 0.6 | 22 | 30 | 72 | Cylindrical |
| TERC120E3-25C12-83 | ● | 12 | 12 | 3 | 0.6 | 25 | 37 | 83 | Cylindrical |
| TERC140E3-25C14-83 | ● | 14 | 14 | 3 | 0.6 | 25 | 37 | 83 | Cylindrical |
| TERC160E3-32C16-92 | ● | 16 | 16 | 3 | 0.6 | 32 | 44 | 92 | Cylindrical |
| TERC200E3-38C20-104 | ● | 20 | 20 | 3 | 0.7 | 38 | 55 | 104 | Cylindrical |
| TERC250E3-45C25-121 | ● | 25 | 25 | 3 | 0.7 | 45 | 64 | 121 | Cylindrical |

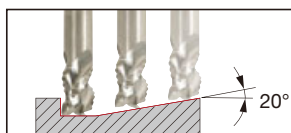
● : Line up

3 flute roughing endmill, 45° helix angle, relieved neck type, for aluminium machining



| Designation | KS15F | DC | DCONMS | NOF | APMX | LH | LF | Shank |
|---------------------------|-------|----|--------|-----|------|----|-----|-------------|
| TECR060B3-09/21C06R02A57 | ● | 6 | 6 | 3 | 9 | 21 | 57 | Cylindrical |
| TECR060B3-09/21W06R02A57 | ● | 6 | 6 | 3 | 9 | 21 | 57 | Weldon |
| TECR060B3-09/30C06R02A65 | ● | 6 | 6 | 3 | 9 | 30 | 65 | Cylindrical |
| TECR060B3-09/30W06R02A65 | ● | 6 | 6 | 3 | 9 | 30 | 65 | Weldon |
| TECR080B3-12/27C08R02A63 | ● | 8 | 8 | 3 | 12 | 27 | 63 | Cylindrical |
| TECR080B3-12/27W08R02A63 | ● | 8 | 8 | 3 | 12 | 27 | 63 | Weldon |
| TECR080B3-12/40C08R02A78 | ● | 8 | 8 | 3 | 12 | 40 | 78 | Cylindrical |
| TECR080B3-12/40W08R02A78 | ● | 8 | 8 | 3 | 12 | 40 | 78 | Weldon |
| TECR100B3-12/31C10R02A72 | ● | 10 | 10 | 3 | 12 | 31 | 72 | Cylindrical |
| TECR100B3-12/31W10R02A72 | ● | 10 | 10 | 3 | 12 | 31 | 72 | Weldon |
| TECR100B3-12/50C10R02A100 | ● | 10 | 10 | 3 | 12 | 50 | 100 | Cylindrical |
| TECR100B3-12/50W10R02A100 | ● | 10 | 10 | 3 | 12 | 50 | 100 | Weldon |
| TECR120B3-12/37C12R02A83 | ● | 12 | 12 | 3 | 12 | 37 | 83 | Cylindrical |
| TECR120B3-12/37W12R02A83 | ● | 12 | 12 | 3 | 12 | 37 | 83 | Weldon |
| TECR120B3-14/55C12R02A100 | ● | 12 | 12 | 3 | 14 | 55 | 100 | Cylindrical |
| TECR120B3-14/55W12R02A100 | ● | 12 | 12 | 3 | 14 | 55 | 100 | Weldon |
| TECR160B3-14/43C16R02A92 | ● | 16 | 16 | 3 | 14 | 43 | 92 | Cylindrical |
| TECR160B3-14/43W16R02A92 | ● | 16 | 16 | 3 | 14 | 43 | 92 | Weldon |
| TECR160B3-18/80C16R02A150 | ● | 16 | 16 | 3 | 18 | 80 | 150 | Cylindrical |
| TECR160B3-18/80W16R02A150 | ● | 16 | 16 | 3 | 18 | 80 | 150 | Weldon |
| TECR200B3-17/53C20R02A104 | ● | 20 | 20 | 3 | 17 | 53 | 104 | Cylindrical |
| TECR200B3-17/53W20R02A104 | ● | 20 | 20 | 3 | 17 | 53 | 104 | Weldon |
| TECR200B3-22/80C20R02A150 | ● | 20 | 20 | 3 | 22 | 80 | 150 | Cylindrical |
| TECR200B3-22/80W20R02A150 | ● | 20 | 20 | 3 | 22 | 80 | 150 | Weldon |

● : Line up



Rampdown angle

2

3

4

5

6

P

M

K

N

S

H

Reference pages: Standard cutting conditions → **I033**

STANDARD CUTTING CONDITIONS

Slotting / Roughing ($a_e = 0.4 \times D$ or over)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap (Slotting) |
|----------|--------------------|--------------|------------|---------------|--------------|---------------|---------------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 140 - 180 | 0.035 - 0.055 | 0.045 - 0.07 | 0.06 - 0.0825 | 2xD |
| | Alloy steel | - 300 HB | 70 - 150 | 0.03 - 0.045 | 0.045 - 0.07 | 0.06 - 0.0825 | 2xD |
| M | Stainless steel | - 200 HB | 60 - 100 | 0.03 - 0.055 | 0.045 - 0.06 | 0.05 - 0.0675 | 1xD |
| K | Cast iron | 150 - 200 HB | 80 - 180 | 0.03 - 0.06 | 0.045 - 0.08 | 0.06 - 0.09 | 2xD |
| N | Aluminium alloy | - | 300 - 750 | 0.03 - 0.06 | 0.045 - 0.08 | 0.04 - 0.105 | 2xD |
| S | Titanium alloy | - 40 HRC | 20 - 50 | 0.03 - 0.045 | 0.04 - 0.06 | 0.04 - 0.105 | 1xD |
| H | Hardened steel | - 60 HRC | 20 - 30 | 0.015 - 0.025 | 0.025 - 0.07 | 0.06 - 0.075 | 0.5xD |

Semi-finishing / Shouldering ($a_e = 0.1 \sim 0.4 \times D$)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|---------------|--------------|---------------|-----|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 150 - 220 | 0.045 - 0.09 | 0.09 - 0.11 | 0.1 - 0.12 | 2xD |
| | Alloy steel | - 300 HB | 70 - 160 | 0.03 - 0.075 | 0.06 - 0.1 | 0.065 - 0.105 | 2xD |
| M | Stainless steel | - 200 HB | 80 - 130 | 0.035 - 0.06 | 0.055 - 0.07 | 0.06 - 0.075 | 2xD |
| K | Cast iron | 150 - 250 HB | 130 - 220 | 0.045 - 0.075 | 0.06 - 0.09 | 0.09 - 0.105 | 2xD |
| N | Aluminium alloy | - | 350 - 850 | 0.06 - 0.09 | 0.09 - 0.12 | 0.12 - 0.15 | 2xD |
| S | Titanium alloy | - 40 HRC | 40 - 60 | 0.045 - 0.06 | 0.055 - 0.07 | 0.075 - 0.12 | 2xD |
| H | Hardened steel | - 60 HRC | 30 - 70 | 0.02 - 0.055 | 0.045 - 0.07 | 0.06 - 0.09 | 2xD |

Finishing (feed rate depending on required accuracy) / High feed machining at small width of cut ($a_e = 0.05 \sim 0.1 \times D$)

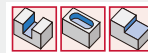
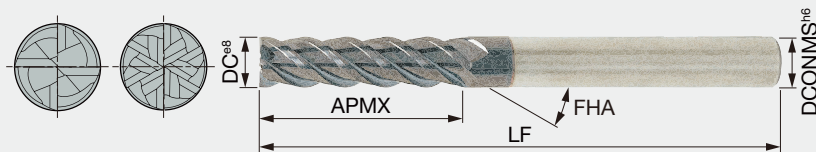
| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|---------------|--------------|---------------|-------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 170 - 280 | 0.075 - 0.11 | 0.11 - 0.12 | 0.12 - 0.15 | apmax |
| | Alloy steel | - 300 HB | 110 - 220 | 0.075 - 0.11 | 0.11 - 0.12 | 0.12 - 0.15 | apmax |
| M | Stainless steel | - 200 HB | 100 - 160 | 0.045 - 0.07 | 0.06 - 0.075 | 0.065 - 0.09 | apmax |
| K | Cast iron | 150 - 250 HB | 180 - 280 | 0.05 - 0.09 | 0.09 - 0.1 | 0.09 - 0.12 | apmax |
| N | Aluminium alloy | - | 350 - 900 | 0.065 - 0.11 | 0.11 - 0.15 | 0.15 - 0.22 | apmax |
| S | Titanium alloy | - 40 HRC | 50 - 70 | 0.055 - 0.075 | 0.06 - 0.09 | 0.09 - 0.12 | apmax |
| H | Hardened steel | - 60 HRC | 40 - 80 | 0.03 - 0.06 | 0.05 - 0.09 | 0.075 - 0.105 | apmax |


- When the depth of cut (a_e) is closer to the upper limit, please start with a lower limit value of cutting speed (Vc).
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed and feed at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed and feed by 20 to 40%.

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



4 - 6 flute endmill, 45° helix angle, long neck type

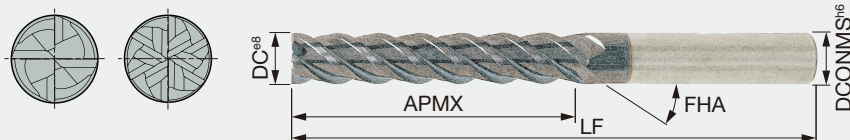



| Designation | AH725 | DC | DCONMS | NOF | APMX | FHA | LF |  | Shank |
|---------------------|-------|----|--------|-----|------|-----|-----|---|-------------|
| TEC060B4L-24C06-65 | ● | 6 | 6 | 4 | 24 | 45° | 65 | ✓ | Cylindrical |
| TEC060B4L-24W06-65 | ● | 6 | 6 | 4 | 24 | 45° | 65 | ✓ | Weldon |
| TEC080B4L-32C08-79 | ● | 8 | 8 | 4 | 32 | 45° | 79 | ✓ | Cylindrical |
| TEC080B4L-32W08-79 | ● | 8 | 8 | 4 | 32 | 45° | 79 | ✓ | Weldon |
| TEC100B4L-40C10-100 | ● | 10 | 10 | 4 | 40 | 45° | 100 | ✓ | Cylindrical |
| TEC100B4L-40W10-100 | ● | 10 | 10 | 4 | 40 | 45° | 100 | ✓ | Weldon |
| TEC120B4L-48C12-100 | ● | 12 | 12 | 4 | 48 | 45° | 100 | ✓ | Cylindrical |
| TEC120B4L-48W12-100 | ● | 12 | 12 | 4 | 48 | 45° | 100 | ✓ | Weldon |
| TEC140B4L-50C14-100 | ● | 14 | 14 | 4 | 50 | 45° | 100 | ✓ | Cylindrical |
| TEC140B4L-50W14-100 | ● | 14 | 14 | 4 | 50 | 45° | 100 | ✓ | Weldon |
| TEC160B6L-56C16-115 | ● | 16 | 16 | 6 | 56 | 45° | 115 | | Cylindrical |
| TEC160B6L-56W16-115 | ● | 16 | 16 | 6 | 56 | 45° | 115 | | Weldon |
| TEC200B6L-60C20-125 | ● | 20 | 20 | 6 | 60 | 45° | 125 | | Cylindrical |
| TEC200B6L-60W20-125 | ● | 20 | 20 | 6 | 60 | 45° | 125 | | Weldon |

● : Line up

TECB4/6X**

4 - 6 flute endmill, 45° helix angle, extra long neck type



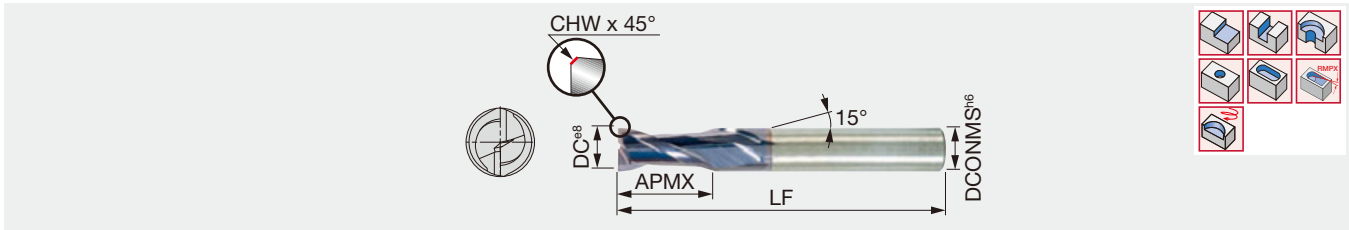
| Designation | AH725 | DC | DCONMS | NOF | APMX | FHA | LF |  | Shank |
|---------------------|-------|----|--------|-----|------|-----|-----|---|-------------|
| TEC100B4X-60C10-112 | ● | 10 | 10 | 4 | 60 | 45° | 112 | ✓ | Cylindrical |
| TEC100B4X-60W10-112 | ● | 10 | 10 | 4 | 60 | 45° | 112 | ✓ | Weldon |
| TEC120B4X-72C12-150 | ● | 12 | 12 | 4 | 72 | 45° | 150 | ✓ | Cylindrical |
| TEC120B4X-72W12-150 | ● | 12 | 12 | 4 | 72 | 45° | 150 | ✓ | Weldon |
| TEC160B6X-80C16-150 | ● | 16 | 16 | 6 | 80 | 45° | 150 | | Cylindrical |
| TEC160B6X-80W16-150 | ● | 16 | 16 | 6 | 80 | 45° | 150 | | Weldon |
| TEC200B6X-80C20-150 | ● | 20 | 20 | 6 | 80 | 45° | 150 | | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

TECC**A/B2

2 flute slotting endmill, 30° or 45° helix angle

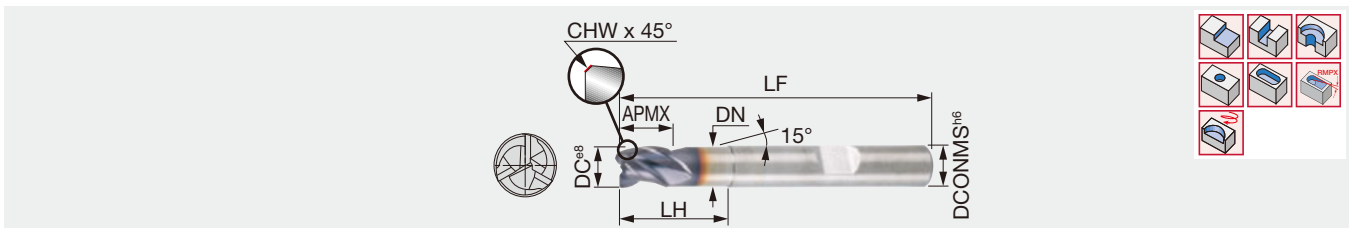


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | FHA | Shank |
|---------------------|-------|----|--------|-----|------|------|-----|-----|-------------|
| TECC020B2-07C03-38 | ● | 2 | 3 | 2 | 0.1 | 7 | 38 | 45° | Cylindrical |
| TECC030A2-10C03-38 | ● | 3 | 3 | 2 | 0.1 | 10 | 38 | 30° | Cylindrical |
| TECC040A2-12C04-50 | ● | 4 | 4 | 2 | 0.1 | 12 | 50 | 30° | Cylindrical |
| TECC050A2-14C05-50 | ● | 5 | 5 | 2 | 0.15 | 14 | 50 | 30° | Cylindrical |
| TECC060A2-16C06-57 | ● | 6 | 6 | 2 | 0.15 | 16 | 57 | 30° | Cylindrical |
| TECC080A2-20C08-63 | ● | 8 | 8 | 2 | 0.15 | 20 | 63 | 30° | Cylindrical |
| TECC100A2-22C10-72 | ● | 10 | 10 | 2 | 0.15 | 22 | 72 | 30° | Cylindrical |
| TECC120A2-25C12-83 | ● | 12 | 12 | 2 | 0.25 | 25 | 83 | 30° | Cylindrical |
| TECC160A2-32C16-92 | ● | 16 | 16 | 2 | 0.25 | 32 | 92 | 30° | Cylindrical |
| TECC200A2-38C20-104 | ● | 20 | 20 | 2 | 0.25 | 38 | 104 | 30° | Cylindrical |

● : Line up

TECS/TECCS**E3

3 flute slotting endmill, 38° helix angle, short type

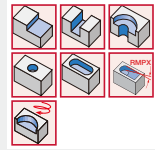
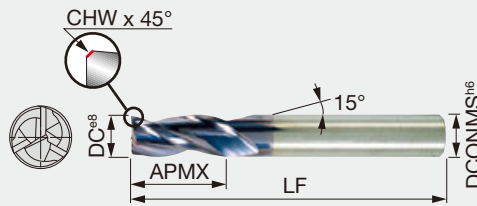


| Designation | AH725 | DC | DCONMS | NOF | CHW | DN | APMX | LH | LF | Shank |
|---------------------|-------|----|--------|-----|------|------|------|----|----|--------|
| TECS020E3-03W06-57 | ● | 2 | 6 | 3 | 0.1 | 1.9 | 3 | 7 | 57 | Weldon |
| TECS030E3-04W06-57 | ● | 3 | 6 | 3 | 0.1 | 2.9 | 4 | 10 | 57 | Weldon |
| TECS040E3-05W06-57 | ● | 4 | 6 | 3 | 0.1 | 3.9 | 5 | 12 | 57 | Weldon |
| TECS050E3-06W06-57 | ● | 5 | 6 | 3 | 0.15 | 4.9 | 6 | 14 | 57 | Weldon |
| TECCS060E3-07W06-57 | ● | 6 | 6 | 3 | 0.15 | 5.9 | 7 | 16 | 57 | Weldon |
| TECCS080E3-09W08-63 | ● | 8 | 8 | 3 | 0.15 | 7.6 | 9 | 20 | 63 | Weldon |
| TECCS100E3-11W10-72 | ● | 10 | 10 | 3 | 0.15 | 9.5 | 11 | 22 | 72 | Weldon |
| TECCS120E3-12W12-83 | ● | 12 | 12 | 3 | 0.25 | 11.3 | 12 | 25 | 83 | Weldon |
| TECCS160E3-16W16-92 | ● | 16 | 16 | 3 | 0.25 | 15.2 | 16 | 32 | 92 | Weldon |

● : Line up

Reference pages: Standard cutting conditions → [I047](#)

3 flute slotting endmill, 38° helix angle

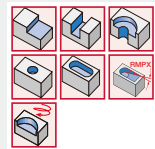
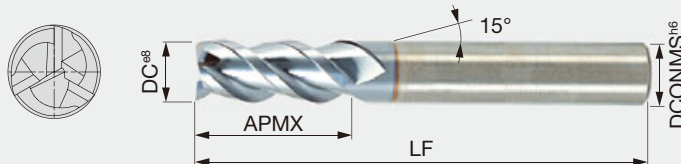


| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | FHA | Shank |
|---------------------|-------|----|--------|-----|------|------|-----|-----|-------------|
| TECC040E3-12C04-50 | ● | 4 | 4 | 3 | 0.1 | 12 | 50 | 38° | Cylindrical |
| TECC050E3-14C05-50 | ● | 5 | 5 | 3 | 0.15 | 14 | 50 | 38° | Cylindrical |
| TECC060E3-16C06-57 | ● | 6 | 6 | 3 | 0.15 | 16 | 57 | 38° | Cylindrical |
| TECC080E3-20C08-63 | ● | 8 | 8 | 3 | 0.15 | 20 | 63 | 38° | Cylindrical |
| TECC100E3-22C10-72 | ● | 10 | 10 | 3 | 0.15 | 22 | 72 | 38° | Cylindrical |
| TECC120E3-25C12-83 | ● | 12 | 12 | 3 | 0.25 | 25 | 83 | 38° | Cylindrical |
| TECC160E3-32C16-92 | ● | 16 | 16 | 3 | 0.25 | 32 | 92 | 38° | Cylindrical |
| TECC200E3-38C20-104 | ● | 20 | 20 | 3 | 0.25 | 38 | 104 | 38° | Cylindrical |

● : Line up

TEC**B3

3 flute slotting endmill, 45° helix angle

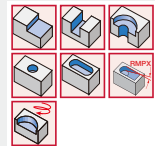
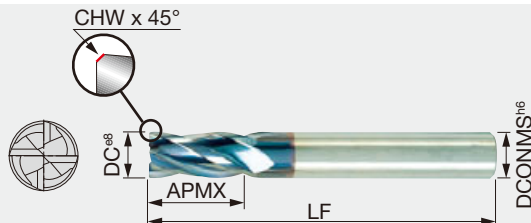


| Designation | AH725 | DC | NOF | DCONMS | APMX | LF | Shank |
|-------------------|-------|----|-----|--------|------|----|-------------|
| TEC060B3-16C06-57 | ● | 6 | 3 | 6 | 16 | 57 | Cylindrical |
| TEC080B3-20C08-63 | ● | 8 | 3 | 8 | 20 | 63 | Cylindrical |
| TEC090B3-20C09-67 | ● | 9 | 3 | 9 | 20 | 67 | Cylindrical |
| TEC100B3-22C10-72 | ● | 10 | 3 | 10 | 22 | 72 | Cylindrical |
| TEC120B3-25C12-83 | ● | 12 | 3 | 12 | 25 | 83 | Cylindrical |
| TEC180B3-32C18-92 | ● | 18 | 3 | 18 | 32 | 92 | Cylindrical |

● : Line up

TECC**A/B4

4 flute endmill, 30° or 45° helix angle



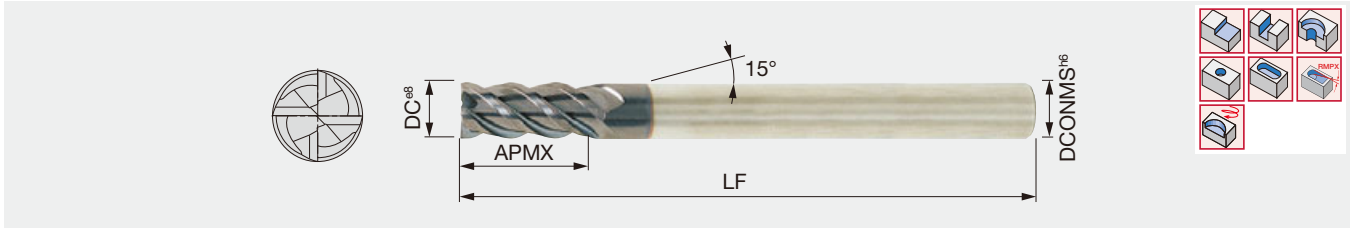
| Designation | AH725 | DC | DCONMS | NOF | CHW | APMX | LF | FHA | Shank |
|---------------------|-------|----|--------|-----|------|------|-----|-----|-------------|
| TECC020B4-07C03-38 | ● | 2 | 3 | 4 | 0.1 | 7 | 38 | 45° | Cylindrical |
| TECC030A4-10C03-38 | ● | 3 | 3 | 4 | 0.1 | 10 | 38 | 30° | Cylindrical |
| TECC040A4-12C04-50 | ● | 4 | 4 | 4 | 0.1 | 12 | 50 | 30° | Cylindrical |
| TECC050A4-14C05-50 | ● | 5 | 5 | 4 | 0.15 | 14 | 50 | 30° | Cylindrical |
| TECC060A4-16C06-57 | ● | 6 | 6 | 4 | 0.15 | 16 | 57 | 30° | Cylindrical |
| TECC080A4-20C08-63 | ● | 8 | 8 | 4 | 0.15 | 20 | 63 | 30° | Cylindrical |
| TECC100A4-22C10-72 | ● | 10 | 10 | 4 | 0.15 | 22 | 72 | 30° | Cylindrical |
| TECC120A4-25C12-83 | ● | 12 | 12 | 4 | 0.25 | 25 | 83 | 30° | Cylindrical |
| TECC160A4-32C16-92 | ● | 16 | 16 | 4 | 0.25 | 32 | 92 | 30° | Cylindrical |
| TECC200A4-38C20-104 | ● | 20 | 20 | 4 | 0.25 | 38 | 104 | 30° | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → I047

TEC**B4

4 flute endmill, 45° helix angle

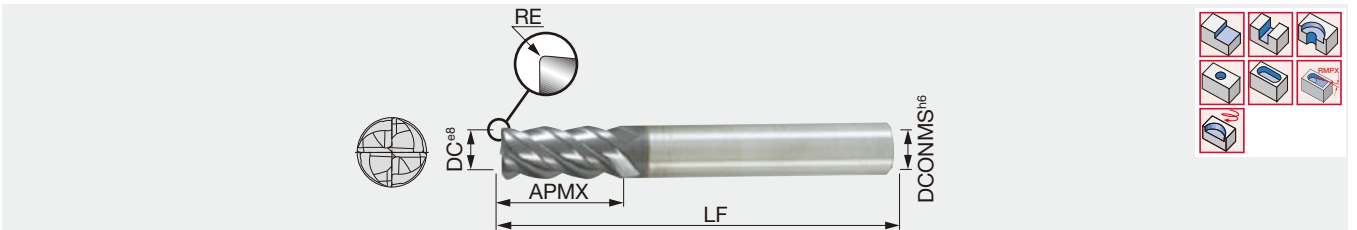


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|----|--------|-----|------|-----|-------------|
| TEC020B4-07C06-57 | ● | 2 | 6 | 4 | 7 | 57 | Cylindrical |
| TEC030B4-10C06-57 | ● | 3 | 6 | 4 | 10 | 57 | Cylindrical |
| TEC040B4-12C06-57 | ● | 4 | 6 | 4 | 12 | 57 | Cylindrical |
| TEC050B4-14C06-57 | ● | 5 | 6 | 4 | 14 | 57 | Cylindrical |
| TEC060B4-16C06-57 | ● | 6 | 6 | 4 | 16 | 57 | Cylindrical |
| TEC080B4-20C08-63 | ● | 8 | 8 | 4 | 20 | 63 | Cylindrical |
| TEC100B4-22C10-72 | ● | 10 | 10 | 4 | 22 | 72 | Cylindrical |
| TEC120B4-25C12-83 | ● | 12 | 12 | 4 | 25 | 83 | Cylindrical |
| TEC140B4-25C14-83 | ● | 14 | 14 | 4 | 25 | 83 | Cylindrical |
| TEC160B4-32C16-92 | ● | 16 | 16 | 4 | 32 | 92 | Cylindrical |
| TEC180B4-32C18-92 | ● | 18 | 18 | 4 | 32 | 92 | Cylindrical |
| TEC200B4-38C20-104 | ● | 20 | 20 | 4 | 38 | 104 | Cylindrical |

● : Line up

TEC**B4**R

4 flute radius endmill, 45° helix angle

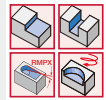
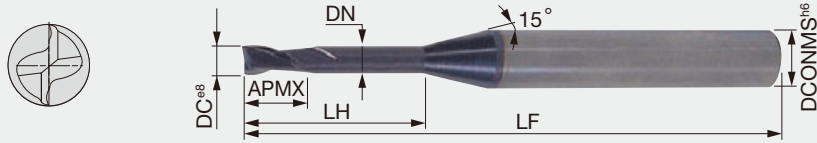


| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | LF | Shank |
|-----------------------|-------|----|--------|-----|-----|------|-----|-------------|
| TEC060B4-16C06R05-57 | ● | 6 | 6 | 4 | 0.5 | 16 | 57 | Cylindrical |
| TEC060B4-16C06R1-57 | ● | 6 | 6 | 4 | 1 | 16 | 57 | Cylindrical |
| TEC080B4-20C08R05-63 | ● | 8 | 8 | 4 | 0.5 | 20 | 63 | Cylindrical |
| TEC080B4-20C08R1-63 | ● | 8 | 8 | 4 | 1 | 20 | 63 | Cylindrical |
| TEC080B4-20C08R15-63 | ● | 8 | 8 | 4 | 1.5 | 20 | 63 | Cylindrical |
| TEC080B4-20C08R2-63 | ● | 8 | 8 | 4 | 2 | 20 | 63 | Cylindrical |
| TEC100B4-22C10R05-72 | ● | 10 | 10 | 4 | 0.5 | 22 | 72 | Cylindrical |
| TEC100B4-22C10R1-72 | ● | 10 | 10 | 4 | 1 | 22 | 72 | Cylindrical |
| TEC100B4-22C10R15-72 | ● | 10 | 10 | 4 | 1.5 | 22 | 72 | Cylindrical |
| TEC100B4-22C10R2-72 | ● | 10 | 10 | 4 | 2 | 22 | 72 | Cylindrical |
| TEC100B4-22C10R3-72 | ● | 10 | 10 | 4 | 3 | 22 | 72 | Cylindrical |
| TEC120B4-25C12R05-83 | ● | 12 | 12 | 4 | 0.5 | 25 | 83 | Cylindrical |
| TEC120B4-25C12R1-83 | ● | 12 | 12 | 4 | 1 | 25 | 83 | Cylindrical |
| TEC120B4-25C12R15-83 | ● | 12 | 12 | 4 | 1.5 | 25 | 83 | Cylindrical |
| TEC120B4-25C12R2-83 | ● | 12 | 12 | 4 | 2 | 25 | 83 | Cylindrical |
| TEC120B4-25C12R3-83 | ● | 12 | 12 | 4 | 3 | 25 | 83 | Cylindrical |
| TEC160B4-32C16R05-92 | ● | 16 | 16 | 4 | 0.5 | 32 | 92 | Cylindrical |
| TEC160B4-32C16R1-92 | ● | 16 | 16 | 4 | 1 | 32 | 92 | Cylindrical |
| TEC160B4-32C16R2-92 | ● | 16 | 16 | 4 | 2 | 32 | 92 | Cylindrical |
| TEC160B4-32C16R3-92 | ● | 16 | 16 | 4 | 3 | 32 | 92 | Cylindrical |
| TEC200B4-38C20R05-104 | ● | 20 | 20 | 4 | 0.5 | 38 | 104 | Cylindrical |
| TEC200B4-38C20R1-104 | ● | 20 | 20 | 4 | 1 | 38 | 104 | Cylindrical |
| TEC200B4-38C20R2-104 | ● | 20 | 20 | 4 | 2 | 38 | 104 | Cylindrical |
| TEC200B4-38C20R3-104 | ● | 20 | 20 | 4 | 3 | 38 | 104 | Cylindrical |
| TEC200B4-38C20R4-104 | ● | 20 | 20 | 4 | 4 | 38 | 104 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → I047

2 flute rib processing endmill, 30° helix angle, for hardened steel up to 55 HRC



| Designation | AH750 | DC | DCONMS | NOF | DN | APMX | LH | LF | Shank |
|-----------------------|-------|-----|--------|-----|------|------|----|----|-------------|
| TEC004A2-006/02C4M45 | ● | 0.4 | 4 | 2 | 0.37 | 0.6 | 2 | 45 | Cylindrical |
| TEC004A2-006/04C4M45 | ● | 0.4 | 4 | 2 | 0.37 | 0.6 | 4 | 45 | Cylindrical |
| TEC005A2-007/02C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 2 | 45 | Cylindrical |
| TEC005A2-007/04C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 4 | 45 | Cylindrical |
| TEC005A2-007/06C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 6 | 45 | Cylindrical |
| TEC006A2-009/02C4M45 | ● | 0.6 | 4 | 2 | 0.55 | 0.9 | 2 | 45 | Cylindrical |
| TEC006A2-009/04C4M45 | ● | 0.6 | 4 | 2 | 0.55 | 0.9 | 4 | 45 | Cylindrical |
| TEC006A2-009/06C4M45 | ● | 0.6 | 4 | 2 | 0.55 | 0.9 | 6 | 45 | Cylindrical |
| TEC007A2-010/02C4M45 | ● | 0.7 | 4 | 2 | 0.65 | 1 | 2 | 45 | Cylindrical |
| TEC008A2-012/04C4M45 | ● | 0.8 | 4 | 2 | 0.75 | 1.2 | 4 | 45 | Cylindrical |
| TEC008A2-012/06C4M45 | ● | 0.8 | 4 | 2 | 0.75 | 1.2 | 6 | 45 | Cylindrical |
| TEC008A2-012/08C4M45 | ● | 0.8 | 4 | 2 | 0.75 | 1.2 | 8 | 45 | Cylindrical |
| TEC009A2-0135/06C4M45 | ● | 0.9 | 4 | 2 | 0.85 | 1.35 | 6 | 45 | Cylindrical |
| TEC009A2-0135/10C4M45 | ● | 0.9 | 4 | 2 | 0.85 | 1.35 | 10 | 45 | Cylindrical |
| TEC010A2-015/04C4M45 | ● | 1 | 4 | 2 | 0.97 | 1.5 | 4 | 45 | Cylindrical |
| TEC010A2-015/06C4M45 | ● | 1 | 4 | 2 | 0.97 | 1.5 | 6 | 45 | Cylindrical |
| TEC010A2-015/08C4M45 | ● | 1 | 4 | 2 | 0.95 | 1.5 | 8 | 45 | Cylindrical |
| TEC010A2-015/10C4M45 | ● | 1 | 4 | 2 | 0.95 | 1.5 | 10 | 45 | Cylindrical |
| TEC010A2-015/12C4M45 | ● | 1 | 4 | 2 | 0.93 | 1.5 | 12 | 45 | Cylindrical |
| TEC010A2-015/16C4M50 | ● | 1 | 4 | 2 | 0.93 | 1.5 | 16 | 50 | Cylindrical |
| TEC012A2-018/06C4M45 | ● | 1.2 | 4 | 2 | 1.17 | 1.8 | 6 | 45 | Cylindrical |
| TEC012A2-018/08C4M45 | ● | 1.2 | 4 | 2 | 1.15 | 1.8 | 8 | 45 | Cylindrical |
| TEC012A2-018/10C4M45 | ● | 1.2 | 4 | 2 | 1.15 | 1.8 | 10 | 45 | Cylindrical |
| TEC012A2-018/16C4M50 | ● | 1.2 | 4 | 2 | 1.13 | 1.8 | 16 | 50 | Cylindrical |
| TEC014A2-021/06C4M45 | ● | 1.4 | 4 | 2 | 1.35 | 2.1 | 6 | 45 | Cylindrical |
| TEC014A2-021/08C4M45 | ● | 1.4 | 4 | 2 | 1.35 | 2.1 | 8 | 45 | Cylindrical |
| TEC014A2-021/10C4M45 | ● | 1.4 | 4 | 2 | 1.35 | 2.1 | 10 | 45 | Cylindrical |
| TEC015A2-023/06C4M45 | ● | 1.5 | 4 | 2 | 1.47 | 2.3 | 6 | 45 | Cylindrical |
| TEC015A2-023/08C4M45 | ● | 1.5 | 4 | 2 | 1.45 | 2.3 | 8 | 45 | Cylindrical |
| TEC015A2-023/10C4M45 | ● | 1.5 | 4 | 2 | 1.45 | 2.3 | 10 | 45 | Cylindrical |
| TEC015A2-023/12C4M45 | ● | 1.5 | 4 | 2 | 1.43 | 2.3 | 12 | 45 | Cylindrical |
| TEC015A2-023/16C4M50 | ● | 1.5 | 4 | 2 | 1.41 | 2.3 | 16 | 50 | Cylindrical |
| TEC015A2-023/18C4M55 | ● | 1.5 | 4 | 2 | 1.41 | 2.3 | 18 | 55 | Cylindrical |
| TEC015A2-023/20C4M55 | ● | 1.5 | 4 | 2 | 1.41 | 2.3 | 20 | 55 | Cylindrical |
| TEC016A2-024/06C4M45 | ● | 1.6 | 4 | 2 | 1.57 | 2.4 | 6 | 45 | Cylindrical |
| TEC016A2-024/08C4M45 | ● | 1.6 | 4 | 2 | 1.55 | 2.4 | 8 | 45 | Cylindrical |
| TEC016A2-024/10C4M45 | ● | 1.6 | 4 | 2 | 1.55 | 2.4 | 10 | 45 | Cylindrical |
| TEC016A2-024/18C4M55 | ● | 1.6 | 4 | 2 | 1.53 | 2.4 | 18 | 55 | Cylindrical |
| TEC016A2-024/20C4M55 | ● | 1.6 | 4 | 2 | 1.53 | 2.4 | 20 | 55 | Cylindrical |
| TEC016A2-024/26C4M60 | ● | 1.6 | 4 | 2 | 1.53 | 2.4 | 26 | 60 | Cylindrical |
| TEC018A2-027/06C4M45 | ● | 1.8 | 4 | 2 | 1.77 | 2.7 | 6 | 45 | Cylindrical |
| TEC018A2-027/08C4M45 | ● | 1.8 | 4 | 2 | 1.75 | 2.7 | 8 | 45 | Cylindrical |
| TEC018A2-027/10C4M45 | ● | 1.8 | 4 | 2 | 1.75 | 2.7 | 10 | 45 | Cylindrical |
| TEC018A2-027/12C4M45 | ● | 1.8 | 4 | 2 | 1.73 | 2.7 | 12 | 45 | Cylindrical |
| TEC020A2-030/06C4M45 | ● | 2 | 4 | 2 | 1.97 | 3 | 6 | 45 | Cylindrical |
| TEC020A2-030/08C4M45 | ● | 2 | 4 | 2 | 1.95 | 3 | 8 | 45 | Cylindrical |
| TEC020A2-030/10C4M45 | ● | 2 | 4 | 2 | 1.95 | 3 | 10 | 45 | Cylindrical |
| TEC020A2-030/12C4M45 | ● | 2 | 4 | 2 | 1.93 | 3 | 12 | 45 | Cylindrical |
| TEC020A2-030/16C4M50 | ● | 2 | 4 | 2 | 1.91 | 3 | 16 | 50 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

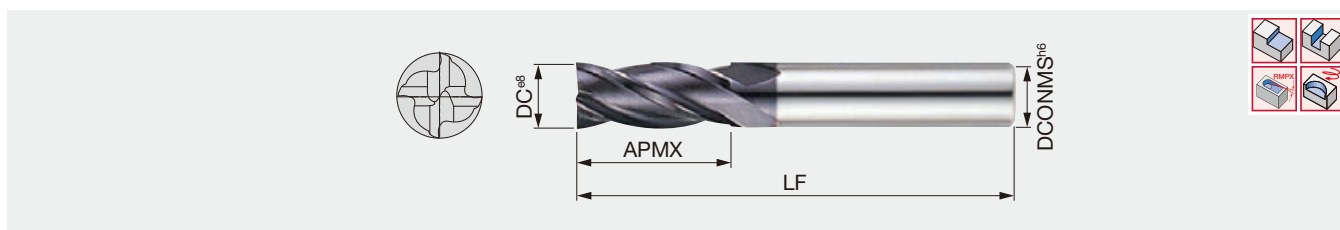
| Designation | AH750 | DC | DCONMS | NOF | DN | APMX | LH | LF | Shank |
|----------------------|-------|-----|--------|-----|------|------|----|----|-------------|
| TEC020A2-030/20C4M55 | ● | 2 | 4 | 2 | 1.89 | 3 | 20 | 55 | Cylindrical |
| TEC020A2-030/30C4M70 | ● | 2 | 4 | 2 | 1.89 | 3 | 30 | 70 | Cylindrical |
| TEC025A2-037/08C4M45 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 8 | 45 | Cylindrical |
| TEC025A2-037/10C4M45 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 10 | 45 | Cylindrical |
| TEC025A2-037/12C4M45 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 12 | 45 | Cylindrical |
| TEC025A2-037/16C4M55 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 16 | 55 | Cylindrical |
| TEC025A2-037/20C4M60 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 20 | 60 | Cylindrical |
| TEC025A2-037/30C4M80 | ● | 2.5 | 4 | 2 | 2.4 | 3.7 | 30 | 80 | Cylindrical |
| TEC030A2-045/08C6M45 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 8 | 45 | Cylindrical |
| TEC030A2-045/10C6M45 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 10 | 45 | Cylindrical |
| TEC030A2-045/12C6M45 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 12 | 45 | Cylindrical |
| TEC030A2-045/16C6M55 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 16 | 55 | Cylindrical |
| TEC030A2-045/20C6M60 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 20 | 60 | Cylindrical |
| TEC030A2-045/30C6M70 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 30 | 70 | Cylindrical |
| TEC030A2-045/40C6M90 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 40 | 90 | Cylindrical |

● : Line up

SOLIDMEISTER

TEC**A4

4 flute endmill, 30° helix angle, for hardened steel up to 65 HRC



| Designation | AH750 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|----|--------|-----|------|-----|-------------|
| TEC040A4-11C06-50 | ● | 4 | 6 | 4 | 11 | 50 | Cylindrical |
| TEC050A4-13C06-50 | ● | 5 | 6 | 4 | 13 | 50 | Cylindrical |
| TEC060A4-13C06-50 | ● | 6 | 6 | 4 | 13 | 50 | Cylindrical |
| TEC070A4-16C08-63 | ● | 7 | 8 | 4 | 16 | 63 | Cylindrical |
| TEC080A4-19C08-63 | ● | 8 | 8 | 4 | 19 | 63 | Cylindrical |
| TEC090A4-19C10-72 | ● | 9 | 10 | 4 | 19 | 72 | Cylindrical |
| TEC100A4-22C10-72 | ● | 10 | 10 | 4 | 22 | 72 | Cylindrical |
| TEC120A4-26C12-73 | ● | 12 | 12 | 4 | 26 | 73 | Cylindrical |
| TEC140A4-26C14-83 | ● | 14 | 14 | 4 | 26 | 83 | Cylindrical |
| TEC160A4-32C16-92 | ● | 16 | 16 | 4 | 32 | 92 | Cylindrical |
| TEC180A4-32C18-100 | ● | 18 | 18 | 4 | 32 | 100 | Cylindrical |
| TEC200A4-38C20-104 | ● | 20 | 20 | 4 | 38 | 104 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M

6 flute endmill, 45° helix angle, for finishing operation

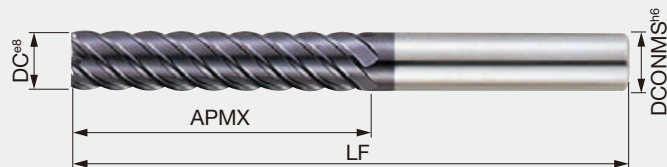


| Designation | AH725 | AH750 | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|-------|----|--------|-----|------|-----|-------------|
| TECH060B6-16C06-57 | ● | ● | 6 | 6 | 6 | 16 | 57 | Cylindrical |
| TECH060B6-16W06-57 | ● | | 6 | 6 | 6 | 16 | 57 | Weldon |
| TECH080B6-20C08-63 | ● | ● | 8 | 8 | 6 | 20 | 63 | Cylindrical |
| TECH080B6-20W08-63 | ● | | 8 | 8 | 6 | 20 | 63 | Weldon |
| TECH100B6-22C10-72 | ● | ● | 10 | 10 | 6 | 22 | 72 | Cylindrical |
| TECH100B6-22W10-72 | ● | | 10 | 10 | 6 | 22 | 72 | Weldon |
| TECH120B6-25C12-83 | ● | ● | 12 | 12 | 6 | 25 | 83 | Cylindrical |
| TECH120B6-25W12-83 | ● | | 12 | 12 | 6 | 25 | 83 | Weldon |
| TECH160B6-32C16-92 | ● | ● | 16 | 16 | 6 | 32 | 92 | Cylindrical |
| TECH160B6-32W16-92 | ● | | 16 | 16 | 6 | 32 | 92 | Weldon |
| TECH200B6-38C20-104 | ● | ● | 20 | 20 | 6 | 38 | 104 | Cylindrical |
| TECH200B6-38W20-104 | ● | | 20 | 20 | 6 | 38 | 104 | Weldon |

● : Line up

TECB6**

6 flute endmill, 45° helix angle, extra long neck type, for hardened steel up to 65 HRC



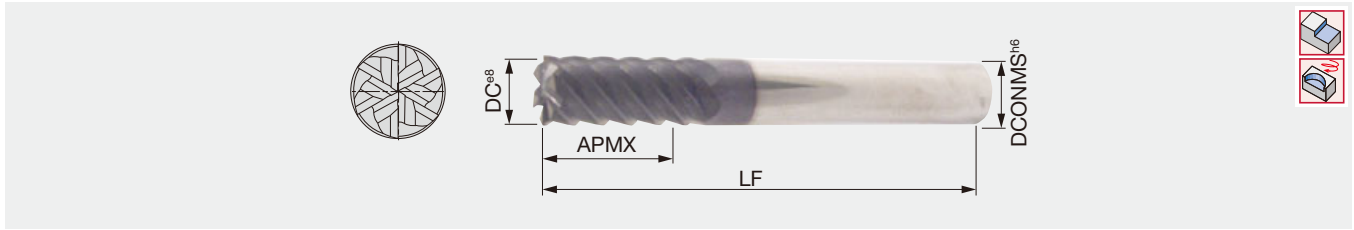
| Designation | AH750 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|----|--------|-----|------|-----|-------------|
| TEC060B6-26C06-70 | ● | 6 | 6 | 6 | 26 | 70 | Cylindrical |
| TEC080B6-36C08-90 | ● | 8 | 8 | 6 | 36 | 90 | Cylindrical |
| TEC100B6-46C10-100 | ● | 10 | 10 | 6 | 46 | 100 | Cylindrical |
| TEC120B6-56C12-110 | ● | 12 | 12 | 6 | 56 | 110 | Cylindrical |
| TEC160B6-66C16-130 | ● | 16 | 16 | 6 | 66 | 130 | Cylindrical |
| TEC200B6-76C20-140 | ● | 20 | 20 | 6 | 76 | 140 | Cylindrical |
| TEC250B6-92C25-180 | ● | 25 | 25 | 6 | 92 | 180 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I047](#)

TEC**D6

6 flute endmill, 50° helix angle, for hardened steel up to 65 HRC

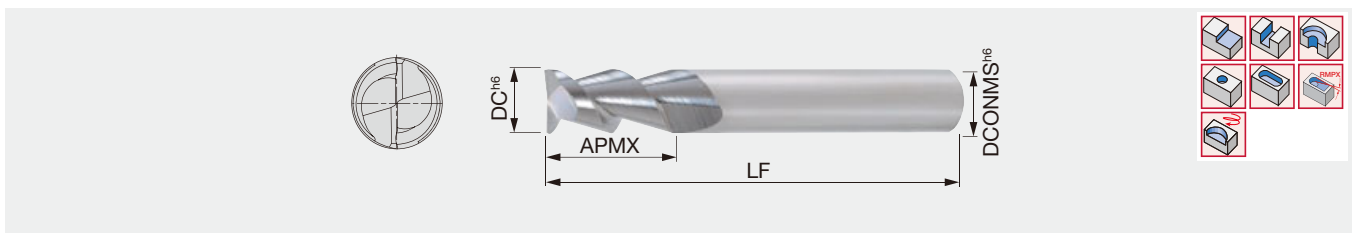


| Designation | AH750 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|----|--------|-----|------|-----|-------------|
| TEC060D6-13C06H57 | ● | 6 | 6 | 6 | 13 | 57 | Cylindrical |
| TEC080D6-20C08H63 | ● | 8 | 8 | 6 | 20 | 63 | Cylindrical |
| TEC100D6-22C10H72 | ● | 10 | 10 | 6 | 22 | 72 | Cylindrical |
| TEC120D6-25C12H83 | ● | 12 | 12 | 6 | 25 | 83 | Cylindrical |
| TEC140D6-30C14H83 | ● | 14 | 14 | 6 | 30 | 83 | Cylindrical |
| TEC160D6-32C16H92 | ● | 16 | 16 | 6 | 32 | 92 | Cylindrical |
| TEC200D6-38C20H104 | ● | 20 | 20 | 6 | 38 | 104 | Cylindrical |

● : Line up

TECA**B2

2 flute slotting endmill, 45° helix angle, for aluminium machining

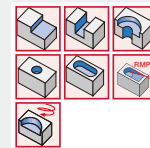
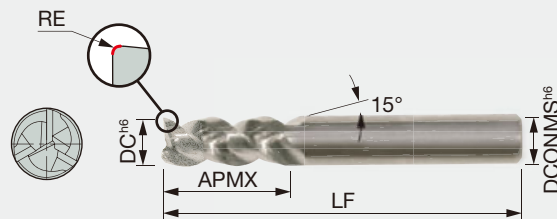


| Designation | KS15F | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|----|--------|-----|------|-----|-------------|
| TECA040B2-12C06-57 | ● | 4 | 6 | 2 | 12 | 57 | Cylindrical |
| TECA050B2-14C06-57 | ● | 5 | 6 | 2 | 14 | 57 | Cylindrical |
| TECA060B2-16C06-57 | ● | 6 | 6 | 2 | 16 | 57 | Cylindrical |
| TECA080B2-20C08-63 | ● | 8 | 8 | 2 | 20 | 63 | Cylindrical |
| TECA100B2-22C10-72 | ● | 10 | 10 | 2 | 22 | 72 | Cylindrical |
| TECA120B2-25C12-83 | ● | 12 | 12 | 2 | 25 | 83 | Cylindrical |
| TECA160B2-32C16-92 | ● | 16 | 16 | 2 | 32 | 92 | Cylindrical |
| TECA200B2-38C20-104 | ● | 20 | 20 | 2 | 38 | 104 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I047](#)

3 flute endmill, 45° helix angle, for aluminium machining

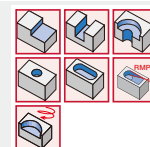
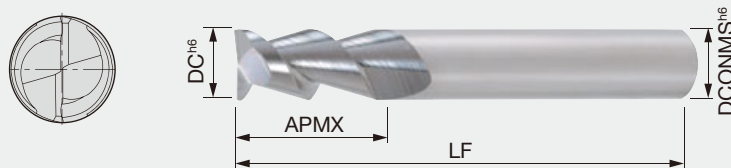


| Designation | KS15F | DC | DCONMS | NOF | RE | APMX | LF | Shank |
|-----------------------|-------|----|--------|-----|-----|------|-----|-------------|
| TECA040B3-12C06-57 | ● | 4 | 6 | 3 | 0.1 | 12 | 57 | Cylindrical |
| TECA040B3-12W06-57 | ● | 4 | 6 | 3 | 0.1 | 12 | 57 | Weldon |
| TECA050B3-14C06-57 | ● | 5 | 6 | 3 | 0.2 | 14 | 57 | Cylindrical |
| TECA050B3-14W06-57 | ● | 5 | 6 | 3 | 0.2 | 14 | 57 | Weldon |
| TECA060B3-16C06-57 | ● | 6 | 6 | 3 | 0.2 | 16 | 57 | Cylindrical |
| TECA060B3-16W06-57 | ● | 6 | 6 | 3 | 0.2 | 16 | 57 | Weldon |
| TECA080B3-20C08-63 | ● | 8 | 8 | 3 | 0.2 | 20 | 63 | Cylindrical |
| TECA080B3-20C08R30-63 | ● | 8 | 8 | 3 | 3 | 20 | 63 | Cylindrical |
| TECA080B3-20W08-63 | ● | 8 | 8 | 3 | 0.2 | 20 | 63 | Weldon |
| TECA100B3-22C10-72 | ● | 10 | 10 | 3 | 0.2 | 22 | 72 | Cylindrical |
| TECA100B3-22W10-72 | ● | 10 | 10 | 3 | 0.2 | 22 | 72 | Weldon |
| TECA100B3-25C10R30-72 | ● | 10 | 10 | 3 | 3 | 25 | 72 | Cylindrical |
| TECA100B3-25C10R40-72 | ● | 10 | 10 | 3 | 4 | 25 | 72 | Cylindrical |
| TECA120B3-25C12-83 | ● | 12 | 12 | 3 | 0.2 | 25 | 83 | Cylindrical |
| TECA120B3-25W12-83 | ● | 12 | 12 | 3 | 0.2 | 25 | 83 | Weldon |
| TECA120B3-30C12R30-83 | ● | 12 | 12 | 3 | 3 | 30 | 83 | Cylindrical |
| TECA120B3-30C12R40-83 | ● | 12 | 12 | 3 | 4 | 30 | 83 | Cylindrical |
| TECA140B3-30C14-83 | ● | 14 | 14 | 3 | 0.2 | 30 | 83 | Cylindrical |
| TECA140B3-30W14-83 | ● | 14 | 14 | 3 | 0.2 | 30 | 83 | Weldon |
| TECA160B3-32C16-92 | ● | 16 | 16 | 3 | 0.2 | 32 | 92 | Cylindrical |
| TECA160B3-32W16-92 | ● | 16 | 16 | 3 | 0.2 | 32 | 92 | Weldon |
| TECA200B3-38C20-104 | ● | 20 | 20 | 3 | 0.2 | 38 | 104 | Cylindrical |
| TECA200B3-38W20-104 | ● | 20 | 20 | 3 | 0.2 | 38 | 104 | Weldon |

● : Line up

TECAF2**

2 flute slotting endmill, 55° helix angle, for aluminium machining

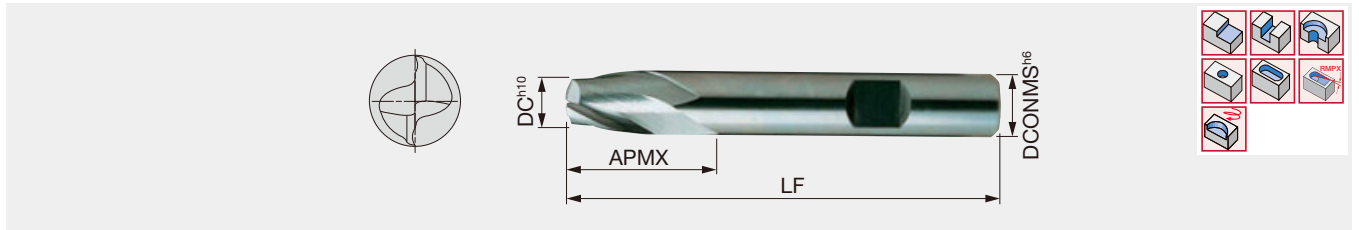


| Designation | KS15F | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|----|--------|-----|------|-----|-------------|
| TECA040F2-11C04-50 | ● | 4 | 4 | 2 | 11 | 50 | Cylindrical |
| TECA060F2-13C06-57 | ● | 6 | 6 | 2 | 13 | 57 | Cylindrical |
| TECA080F2-20C08-63 | ● | 8 | 8 | 2 | 20 | 63 | Cylindrical |
| TECA100F2-22C10-72 | ● | 10 | 10 | 2 | 22 | 72 | Cylindrical |
| TECA120F2-25C12-83 | ● | 12 | 12 | 2 | 25 | 83 | Cylindrical |
| TECA160F2-32C16-92 | ● | 16 | 16 | 2 | 32 | 92 | Cylindrical |
| TECA200F2-38C20-104 | ● | 20 | 20 | 2 | 38 | 104 | Cylindrical |
| TECA250F2-45C25-121 | ● | 25 | 25 | 2 | 45 | 121 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

2 flute endmill, 30° helix angle, short type

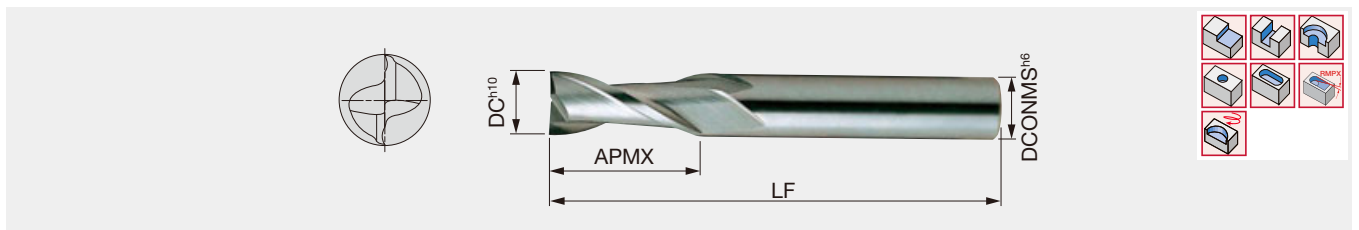


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|-----|--------|-----|------|----|--------|
| TEC020A2-03W06-E50 | ● | 2 | 6 | 2 | 3 | 50 | Weldon |
| TEC030A2-04W06-E50 | ● | 3 | 6 | 2 | 4 | 50 | Weldon |
| TEC040A2-05W06-E54 | ● | 4 | 6 | 2 | 5 | 54 | Weldon |
| TEC045A2-05W06-E54 | ● | 4.5 | 6 | 2 | 5 | 54 | Weldon |
| TEC050A2-06W06-E54 | ● | 5 | 6 | 2 | 6 | 54 | Weldon |
| TEC060A2-07W06-E54 | ● | 6 | 6 | 2 | 7 | 54 | Weldon |
| TEC080A2-09W08-E58 | ● | 8 | 8 | 2 | 9 | 58 | Weldon |
| TEC100A2-11W10-E66 | ● | 10 | 10 | 2 | 11 | 66 | Weldon |
| TEC200A2-20W20-E92 | ● | 20 | 20 | 2 | 20 | 92 | Weldon |

● : Line up

TEC**A2**E

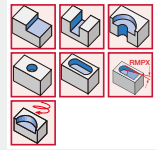
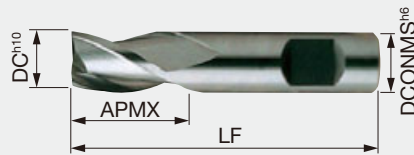
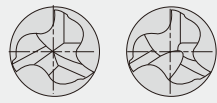
2 flute endmill, 30° helix angle



| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|-----|--------|-----|------|-----|-------------|
| TEC010A2-03C04-E50 | ● | 1 | 4 | 2 | 3 | 50 | Cylindrical |
| TEC015A2-04C04-E50 | ● | 1.5 | 4 | 2 | 4.5 | 50 | Cylindrical |
| TEC020A2-08C02-E32 | ● | 2 | 2 | 2 | 8 | 32 | Cylindrical |
| TEC025A2-08C025-E32 | ● | 2.5 | 2.5 | 2 | 8 | 32 | Cylindrical |
| TEC030A2-12C03-E38 | ● | 3 | 3 | 2 | 12 | 38 | Cylindrical |
| TEC035A2-12C035-E32 | ● | 3.5 | 3.5 | 2 | 12 | 32 | Cylindrical |
| TEC040A2-12C04-E50 | ● | 4 | 4 | 2 | 12 | 50 | Cylindrical |
| TEC050A2-14C05-E50 | ● | 5 | 5 | 2 | 14 | 50 | Cylindrical |
| TEC055A2-16C055-E50 | ● | 5.5 | 5.5 | 2 | 16 | 50 | Cylindrical |
| TEC060A2-16C06-E50 | ● | 6 | 6 | 2 | 16 | 50 | Cylindrical |
| TEC070A2-20C07-E60 | ● | 7 | 7 | 2 | 20 | 60 | Cylindrical |
| TEC080A2-20C08-E63 | ● | 8 | 8 | 2 | 20 | 63 | Cylindrical |
| TEC090A2-20C09-E60 | ● | 9 | 9 | 2 | 20 | 60 | Cylindrical |
| TEC100A2-22C10-E72 | ● | 10 | 10 | 2 | 22 | 72 | Cylindrical |
| TEC120A2-22C12-E73 | ● | 12 | 12 | 2 | 22 | 73 | Cylindrical |
| TEC140A2-25C14-E75 | ● | 14 | 14 | 2 | 25 | 75 | Cylindrical |
| TEC160A2-25C16-E92 | ● | 16 | 16 | 2 | 25 | 92 | Cylindrical |
| TEC200A2-32C20-E100 | ● | 20 | 20 | 2 | 32 | 100 | Cylindrical |

● : Line up

3 flute endmill, 30° or 38° helix angle, short type

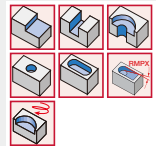
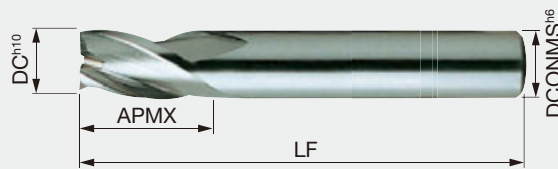


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | FHA | Shank |
|--------------------|-------|-----|--------|-----|------|----|-----|-------------|
| TEC020E3-04C06-E35 | ● | 2 | 6 | 3 | 4 | 35 | 38° | Cylindrical |
| TEC025E3-05C06-E36 | ● | 2.5 | 6 | 3 | 5 | 36 | 38° | Cylindrical |
| TEC030E3-05C06-E36 | ● | 3 | 6 | 3 | 5 | 36 | 38° | Cylindrical |
| TEC035A3-06W06-E37 | ● | 3.5 | 6 | 3 | 6 | 37 | 30° | Weldon |
| TEC040E3-07C06-E39 | ● | 4 | 6 | 3 | 7 | 39 | 38° | Cylindrical |
| TEC045A3-08W06-E38 | ● | 4.5 | 6 | 3 | 8 | 38 | 30° | Weldon |
| TEC050A3-08C06-E39 | ● | 5 | 6 | 3 | 8 | 39 | 30° | Cylindrical |
| TEC055A3-08W06-E39 | ● | 5.5 | 6 | 3 | 8 | 39 | 30° | Weldon |
| TEC060E3-08C06-E39 | ● | 6 | 6 | 3 | 8 | 39 | 38° | Cylindrical |
| TEC070A3-10W08-E42 | ● | 7 | 8 | 3 | 10 | 42 | 30° | Weldon |
| TEC080E3-11C08-E43 | ● | 8 | 8 | 3 | 11 | 43 | 38° | Cylindrical |
| TEC090A3-11W10-E48 | ● | 9 | 10 | 3 | 11 | 48 | 30° | Weldon |
| TEC100E3-13C10-E50 | ● | 10 | 10 | 3 | 13 | 50 | 38° | Cylindrical |

● : Line up

TECA/E3**E**

3 flute endmill, 30° or 38° helix angle



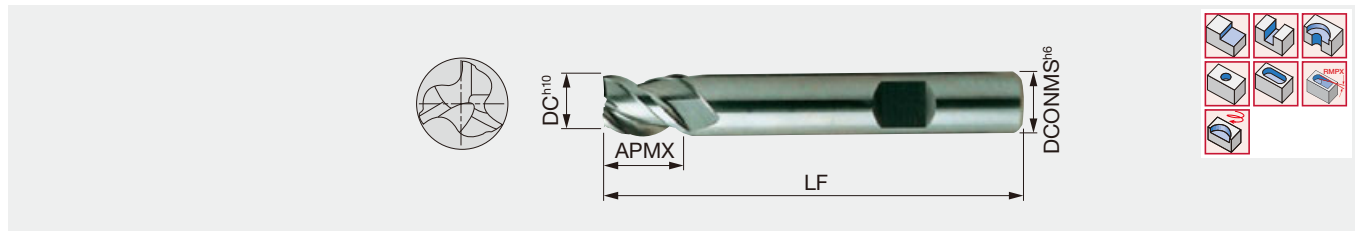
| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | FHA | Shank |
|--------------------|-------|----|--------|-----|------|----|-----|-------------|
| TEC020E3-08C02-E32 | ● | 2 | 2 | 3 | 8 | 32 | 38° | Cylindrical |
| TEC030E3-12C03-E38 | ● | 3 | 3 | 3 | 12 | 38 | 38° | Cylindrical |
| TEC040E3-12C04-E50 | ● | 4 | 4 | 3 | 12 | 50 | 38° | Cylindrical |
| TEC050E3-14C05-E50 | ● | 5 | 5 | 3 | 14 | 50 | 38° | Cylindrical |
| TEC060E3-16C06-E50 | ● | 6 | 6 | 3 | 16 | 50 | 38° | Cylindrical |
| TEC070E3-20C07-E60 | ● | 7 | 7 | 3 | 20 | 60 | 38° | Cylindrical |
| TEC080E3-20C08-E63 | ● | 8 | 8 | 3 | 20 | 63 | 38° | Cylindrical |
| TEC090A3-20C09-E60 | ● | 9 | 9 | 3 | 20 | 60 | 30° | Cylindrical |
| TEC100E3-22C10-E72 | ● | 10 | 10 | 3 | 22 | 72 | 38° | Cylindrical |
| TEC120E3-22C12-E73 | ● | 12 | 12 | 3 | 22 | 73 | 38° | Cylindrical |
| TEC140A3-25C14-E75 | ● | 14 | 14 | 3 | 25 | 75 | 30° | Cylindrical |
| TEC160A3-25C16-E75 | ● | 16 | 16 | 3 | 25 | 75 | 30° | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

TEC**B3**W

3 flute endmill, 45° helix angle, short type

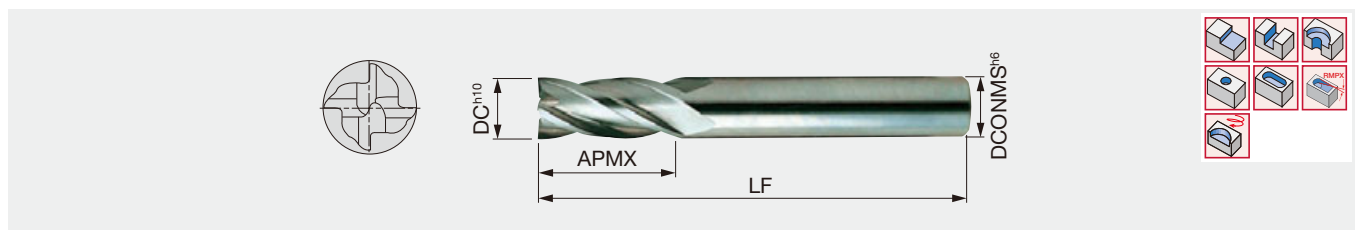


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|-------------------|-------|----|--------|-----|------|----|--------|
| TEC020B3-03W06-50 | ● | 2 | 6 | 3 | 3 | 50 | Weldon |
| TEC030B3-04W06-50 | ● | 3 | 6 | 3 | 4 | 50 | Weldon |
| TEC040B3-05W06-54 | ● | 4 | 6 | 3 | 5 | 54 | Weldon |
| TEC050B3-06W06-54 | ● | 5 | 6 | 3 | 6 | 54 | Weldon |
| TEC060B3-07W06-54 | ● | 6 | 6 | 3 | 7 | 54 | Weldon |
| TEC080B3-09W08-58 | ● | 8 | 8 | 3 | 9 | 58 | Weldon |
| TEC100B3-11W10-66 | ● | 10 | 10 | 3 | 11 | 66 | Weldon |
| TEC120B3-12W12-73 | ● | 12 | 12 | 3 | 12 | 73 | Weldon |
| TEC140B3-14W14-75 | ● | 14 | 14 | 3 | 14 | 75 | Weldon |
| TEC160B3-16W16-82 | ● | 16 | 16 | 3 | 16 | 82 | Weldon |
| TEC200B3-20W20-92 | ● | 20 | 20 | 3 | 20 | 92 | Weldon |

● : Line up

TEC**A4**E

4 flute endmill, 30° helix angle

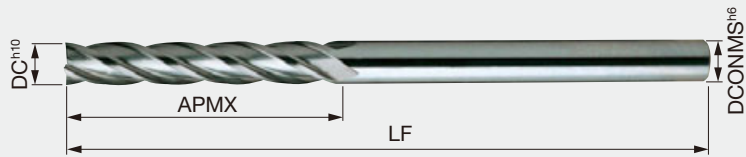


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|-----|--------|-----|------|-----|-------------|
| TEC020A4-08C02-E32 | ● | 2 | 2 | 4 | 8 | 32 | Cylindrical |
| TEC025A4-08C025-E32 | ● | 2.5 | 2.5 | 4 | 8 | 32 | Cylindrical |
| TEC030A4-12C03-E38 | ● | 3 | 3 | 4 | 12 | 38 | Cylindrical |
| TEC040A4-12C04-E50 | ● | 4 | 4 | 4 | 12 | 50 | Cylindrical |
| TEC050A4-14C05-E50 | ● | 5 | 5 | 4 | 14 | 50 | Cylindrical |
| TEC055A4-16C055-E50 | ● | 5.5 | 5.5 | 4 | 16 | 50 | Cylindrical |
| TEC060A4-16C06-E50 | ● | 6 | 6 | 4 | 16 | 50 | Cylindrical |
| TEC070A4-20C07-E60 | ● | 7 | 7 | 4 | 20 | 60 | Cylindrical |
| TEC080A4-20C08-E60 | ● | 8 | 8 | 4 | 20 | 60 | Cylindrical |
| TEC090A4-20C09-E60 | ● | 9 | 9 | 4 | 20 | 60 | Cylindrical |
| TEC100A4-22C10-E72 | ● | 10 | 10 | 4 | 22 | 72 | Cylindrical |
| TEC120A4-22C12-E73 | ● | 12 | 12 | 4 | 22 | 73 | Cylindrical |
| TEC140A4-25C14-E83 | ● | 14 | 14 | 4 | 25 | 83 | Cylindrical |
| TEC160A4-25C16-E82 | ● | 16 | 16 | 4 | 25 | 82 | Cylindrical |
| TEC200A4-32C20-E104 | ● | 20 | 20 | 4 | 32 | 104 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I047](#)

4 flute endmill, 30° helix angle, extra long neck type



| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|---------------------|-------|----|--------|-----|------|-----|-------------|
| TEC030A4-30C03-E75 | ● | 3 | 3 | 4 | 30 | 75 | Cylindrical |
| TEC040A4-30C04-E75 | ● | 4 | 4 | 4 | 30 | 75 | Cylindrical |
| TEC050A4-40C05-E100 | ● | 5 | 5 | 4 | 40 | 100 | Cylindrical |
| TEC060A4-50C06-E150 | ● | 6 | 6 | 4 | 50 | 150 | Cylindrical |
| TEC080A4-50C08-E150 | ● | 8 | 8 | 4 | 50 | 150 | Cylindrical |
| TEC100A4-60C10-E150 | ● | 10 | 10 | 4 | 60 | 150 | Cylindrical |
| TEC120A4-75C12-E150 | ● | 12 | 12 | 4 | 75 | 150 | Cylindrical |
| TEC140A4-65C14-E150 | ● | 14 | 14 | 4 | 65 | 150 | Cylindrical |
| TEC160A4-65C16-E150 | ● | 16 | 16 | 4 | 65 | 150 | Cylindrical |
| TEC200A4-65C20-E150 | ● | 20 | 20 | 4 | 65 | 150 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I047**

STANDARD CUTTING CONDITIONS

Slotting / Roughing

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap (Slotting) |
|----------|--------------------|--------------|------------|---------------|--------------|---------------|---------------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 140 - 180 | 0.025 - 0.035 | 0.03 - 0.045 | 0.04 - 0.055 | 1xD |
| | Alloy steel | - 300 HB | 70 - 150 | 0.02 - 0.03 | 0.03 - 0.045 | 0.04 - 0.055 | 1xD |
| M | Stainless steel | - 200 HB | 60 - 100 | 0.02 - 0.035 | 0.03 - 0.04 | 0.035 - 0.045 | 0.5xD |
| K | Cast iron | 150 - 250 HB | 80 - 180 | 0.02 - 0.04 | 0.03 - 0.05 | 0.04 - 0.06 | 1xD |
| N | Aluminium alloy | - | 300 - 750 | 0.02 - 0.04 | 0.03 - 0.05 | 0.03 - 0.07 | 1xD |
| S | Titanium alloy | - | 20 - 50 | 0.02 - 0.03 | 0.025 - 0.04 | 0.03 - 0.07 | 0.25xD |
| H | Hardened steel | - 60 HRC | 20 - 30 | 0.01 - 0.015 | 0.02 - 0.045 | 0.04 - 0.05 | 0.2xD |

Semi-finishing / Shouldering (ae = 0.1-0.4 x D)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|---------------|---------------|--------------|-----|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 150 - 220 | 0.03 - 0.06 | 0.06 - 0.07 | 0.07 - 0.08 | 2xD |
| | Alloy steel | - 300 HB | 70 - 160 | 0.02 - 0.05 | 0.04 - 0.065 | 0.045 - 0.07 | 2xD |
| M | Stainless steel | - 200 HB | 80 - 130 | 0.025 - 0.04 | 0.035 - 0.045 | 0.04 - 0.05 | 2xD |
| K | Cast iron | 150 - 250 HB | 130 - 220 | 0.03 - 0.05 | 0.04 - 0.06 | 0.06 - 0.07 | 2xD |
| N | Aluminium alloy | - | 350 - 850 | 0.04 - 0.06 | 0.06 - 0.08 | 0.08 - 0.1 | 2xD |
| S | Titanium alloy | - | 40 - 60 | 0.03 - 0.04 | 0.035 - 0.05 | 0.05 - 0.08 | 2xD |
| H | Hardened steel | - 60 HRC | 30 - 70 | 0.015 - 0.035 | 0.035 - 0.055 | 0.045 - 0.06 | 2xD |

Finishing (feed rate depending on required accuracy) / High feed machining at low depth of cut (ae = 0.05-0.1 x D)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|--------------|--------------|--------------|-------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 170 - 280 | 0.05 - 0.07 | 0.07 - 0.08 | 0.08 - 0.1 | apmax |
| | Alloy steel | - 300 HB | 110 - 220 | 0.05 - 0.07 | 0.07 - 0.08 | 0.08 - 0.1 | apmax |
| M | Stainless steel | - 200 HB | 100 - 160 | 0.03 - 0.045 | 0.04 - 0.05 | 0.045 - 0.06 | apmax |
| K | Cast iron | 150 - 250 HB | 180 - 280 | 0.035 - 0.06 | 0.06 - 0.065 | 0.065 - 0.08 | apmax |
| N | Aluminium alloy | - | 350 - 900 | 0.045 - 0.07 | 0.07 - 0.1 | 0.1 - 0.15 | apmax |
| S | Titanium alloy | - | 50 - 70 | 0.035 - 0.05 | 0.04 - 0.06 | 0.06 - 0.085 | apmax |
| H | Hardened steel | - 60 HRC | 40 - 80 | 0.02 - 0.04 | 0.04 - 0.06 | 0.05 - 0.07 | apmax |

- When the depth of cut (ae) is closer to the upper limit, please start with a lower limit value of cutting speed (Vc).
- The items with long slot (2xD or over) and the items with 5 cutting edges or more are not suitable for slotting operation.
- When using AH750, reducing cutting speed by 20 to 30% is effective for extending tool life.
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed and feed at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed and feed by 20 to 40% (Variable/FinishMeister is recommended for such operations).
- In slotting of high hardened steel, heat-resistant alloy, and some types of stainless steel, start with ap=0.2xD and increase the value gradually while checking the status of the operation.
- In shoulder milling of high hardened steel and heat-resistant alloy, the cutting width should be started at ae=0.05xD and increase the value gradually while checking the status of the operation.
- The items with many cutting edges are good for finishing and high feed machining of small width of cut.
- VariableMeister is suitable for machining large depth of cut.
- Low feed in finishing is recommended for good surface roughness.



VARIABLEMEISTER**TEB**E4L**CF**

4 flute chatter dampening ball nose endmill (2xD), 38°helix angle, variable pitch, relieved neck type, for hardened steel



| Designation | AH710 | DC | DCONMS | NOF | APMX | LH | LF | Shank |
|-------------------------|-------|----|--------|-----|------|----|----|-------------|
| TEB030E4L-06/09C06CFH57 | ● | 3 | 6 | 4 | 6 | 9 | 57 | Cylindrical |
| TEB040E4L-08/12C06CFH57 | ● | 4 | 6 | 4 | 8 | 12 | 57 | Cylindrical |
| TEB050E4L-10/15C06CFH57 | ● | 5 | 6 | 4 | 10 | 15 | 57 | Cylindrical |
| TEB060E4L-12/18C06CFH57 | ● | 6 | 6 | 4 | 12 | 18 | 57 | Cylindrical |
| TEB080E4L-16/24C08CFH63 | ● | 8 | 8 | 4 | 16 | 24 | 63 | Cylindrical |
| TEB100E4L-20/30C10CFH72 | ● | 10 | 10 | 4 | 20 | 30 | 72 | Cylindrical |
| TEB120E4L-24/36C12CFH83 | ● | 12 | 12 | 4 | 24 | 36 | 83 | Cylindrical |
| TEB160E4L-32/48C16CFH92 | ● | 16 | 16 | 4 | 32 | 48 | 92 | Cylindrical |

● : Line up

**SHREDMEISTER****TEBRF**T3/4**

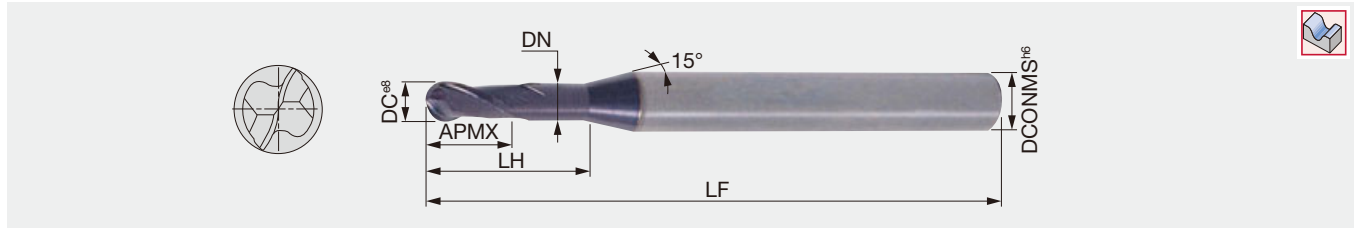
3 - 4 flute ball nose roughing endmill, 20° helix angle, long edge type, for hardened steel



| Designation | AH750 | DC | DCONMS | NOF | RE | APMX | LF | Shank |
|----------------------|-------|----|--------|-----|----|------|-----|-------------|
| TEBRF060T3-16C06M57 | ● | 6 | 6 | 3 | 3 | 16 | 57 | Cylindrical |
| TEBRF080T3-16C08M63 | ● | 8 | 8 | 3 | 4 | 16 | 63 | Cylindrical |
| TEBRF100T4-22C10M72 | ● | 10 | 10 | 4 | 5 | 22 | 72 | Cylindrical |
| TEBRF120T4-26C12M83 | ● | 12 | 12 | 4 | 6 | 26 | 83 | Cylindrical |
| TEBRF140T4-26C14M83 | ● | 14 | 14 | 4 | 7 | 26 | 83 | Cylindrical |
| TEBRF160T4-32C16M92 | ● | 16 | 16 | 4 | 8 | 32 | 92 | Cylindrical |
| TEBRF180T4-32C18M92 | ● | 18 | 18 | 4 | 9 | 32 | 92 | Cylindrical |
| TEBRF200T4-38C20M104 | ● | 20 | 20 | 4 | 10 | 38 | 104 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I053](#), Technical guide → [I054](#)

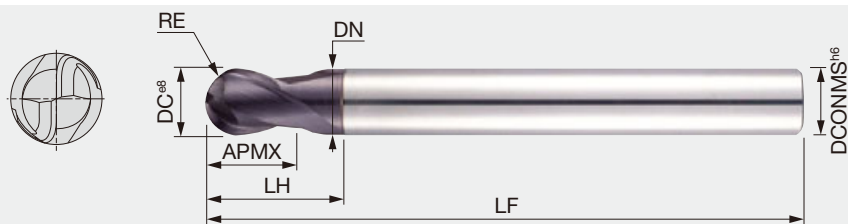


| Designation | AH750 | DC | DCONMS | NOF | DN | APMX | LH | LF | Shank |
|----------------------|-------|-----|--------|-----|------|------|----|----|-------------|
| TEB004A2-006/02C4M45 | ● | 0.4 | 4 | 2 | 0.36 | 0.6 | 2 | 45 | Cylindrical |
| TEB004A2-006/03C4M45 | ● | 0.4 | 4 | 2 | 0.36 | 0.6 | 3 | 45 | Cylindrical |
| TEB005A2-007/02C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 2 | 45 | Cylindrical |
| TEB005A2-007/04C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 4 | 45 | Cylindrical |
| TEB005A2-007/06C4M45 | ● | 0.5 | 4 | 2 | 0.45 | 0.7 | 6 | 45 | Cylindrical |
| TEB006A2-009/02C4M45 | ● | 0.6 | 4 | 2 | 0.55 | 0.9 | 2 | 45 | Cylindrical |
| TEB006A2-009/04C4M45 | ● | 0.6 | 4 | 2 | 0.55 | 0.9 | 4 | 45 | Cylindrical |
| TEB008A2-012/04C4M45 | ● | 0.8 | 4 | 2 | 0.75 | 1.2 | 4 | 45 | Cylindrical |
| TEB008A2-012/06C4M45 | ● | 0.8 | 4 | 2 | 0.75 | 1.2 | 6 | 45 | Cylindrical |
| TEB010A2-015/04C4M45 | ● | 1 | 4 | 2 | 0.97 | 1.5 | 4 | 45 | Cylindrical |
| TEB010A2-015/06C4M45 | ● | 1 | 4 | 2 | 0.97 | 1.5 | 6 | 45 | Cylindrical |
| TEB010A2-015/08C4M45 | ● | 1 | 4 | 2 | 0.95 | 1.5 | 8 | 45 | Cylindrical |
| TEB010A2-015/10C4M45 | ● | 1 | 4 | 2 | 0.95 | 1.5 | 10 | 45 | Cylindrical |
| TEB010A2-015/12C4M45 | ● | 1 | 4 | 2 | 0.93 | 1.5 | 12 | 45 | Cylindrical |
| TEB010A2-015/16C4M50 | ● | 1 | 4 | 2 | 0.93 | 1.5 | 16 | 50 | Cylindrical |
| TEB012A2-018/08C4M45 | ● | 1.2 | 4 | 2 | 1.17 | 1.8 | 8 | 45 | Cylindrical |
| TEB012A2-018/12C4M45 | ● | 1.2 | 4 | 2 | 1.13 | 1.8 | 12 | 45 | Cylindrical |
| TEB014A2-021/08C4M45 | ● | 1.4 | 4 | 2 | 1.35 | 2.1 | 8 | 45 | Cylindrical |
| TEB014A2-021/16C4M50 | ● | 1.4 | 4 | 2 | 1.31 | 2.1 | 16 | 50 | Cylindrical |
| TEB015A2-023/06C4M45 | ● | 1.5 | 4 | 2 | 1.47 | 2.3 | 6 | 45 | Cylindrical |
| TEB015A2-023/08C4M45 | ● | 1.5 | 4 | 2 | 1.45 | 2.3 | 8 | 45 | Cylindrical |
| TEB015A2-023/10C4M45 | ● | 1.5 | 4 | 2 | 1.45 | 2.3 | 10 | 45 | Cylindrical |
| TEB015A2-023/12C4M45 | ● | 1.5 | 4 | 2 | 1.43 | 2.3 | 12 | 45 | Cylindrical |
| TEB015A2-023/20C4M55 | ● | 1.5 | 4 | 2 | 1.39 | 2.3 | 20 | 55 | Cylindrical |
| TEB016A2-024/08C4M45 | ● | 1.6 | 4 | 2 | 1.55 | 2.4 | 8 | 45 | Cylindrical |
| TEB016A2-024/12C4M45 | ● | 1.6 | 4 | 2 | 1.53 | 2.4 | 12 | 45 | Cylindrical |
| TEB018A2-027/08C4M45 | ● | 1.8 | 4 | 2 | 1.75 | 2.7 | 8 | 45 | Cylindrical |
| TEB018A2-027/12C4M45 | ● | 1.8 | 4 | 2 | 1.73 | 2.7 | 12 | 45 | Cylindrical |
| TEB018A2-027/16C4M50 | ● | 1.8 | 4 | 2 | 1.71 | 2.7 | 16 | 50 | Cylindrical |
| TEB020A2-030/06C4M45 | ● | 2 | 4 | 2 | 1.97 | 3 | 6 | 45 | Cylindrical |
| TEB020A2-030/10C4M45 | ● | 2 | 4 | 2 | 1.93 | 3 | 10 | 45 | Cylindrical |
| TEB020A2-030/12C4M50 | ● | 2 | 4 | 2 | 1.93 | 3 | 12 | 50 | Cylindrical |
| TEB020A2-030/16C4M50 | ● | 2 | 4 | 2 | 1.91 | 3 | 16 | 50 | Cylindrical |
| TEB020A2-030/20C4M55 | ● | 2 | 4 | 2 | 1.89 | 3 | 20 | 55 | Cylindrical |
| TEB020A2-030/30C4M70 | ● | 2 | 4 | 2 | 1.89 | 3 | 30 | 70 | Cylindrical |
| TEB030A2-045/08C6M50 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 8 | 50 | Cylindrical |
| TEB030A2-045/10C6M50 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 10 | 50 | Cylindrical |
| TEB030A2-045/12C6M50 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 12 | 50 | Cylindrical |
| TEB030A2-045/16C6M55 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 16 | 55 | Cylindrical |
| TEB030A2-045/20C6M60 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 20 | 60 | Cylindrical |
| TEB030A2-045/30C6M70 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 30 | 70 | Cylindrical |
| TEB030A2-045/35C6M80 | ● | 3 | 6 | 2 | 2.85 | 4.5 | 35 | 80 | Cylindrical |

● : Line up



2 flute ball nose endmill, 30° helix angle, short type, for hardened steel

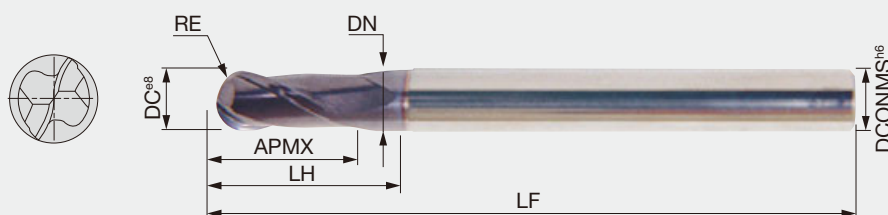


| Designation | AH750 | DC | DCONMS | NOF | DN | RE ^{±0.01} | APMX | LH | LF | Shank |
|-----------------------|-------|----|--------|-----|------|---------------------|------|-----|-----|-------------|
| TEB010A2-01/02C04H50 | ● | 1 | 4 | 2 | 0.95 | 0.5 | 1 | 2.2 | 50 | Cylindrical |
| TEB020A2-02/04C06H50 | ● | 2 | 6 | 2 | 1.9 | 1 | 2 | 4 | 50 | Cylindrical |
| TEB030A2-03/06C06H60 | ● | 3 | 6 | 2 | 2.9 | 1.5 | 3 | 6 | 60 | Cylindrical |
| TEB040A2-04/08C06H70 | ● | 4 | 6 | 2 | 3.9 | 2 | 4 | 8 | 70 | Cylindrical |
| TEB050A2-05/10C06H80 | ● | 5 | 6 | 2 | 4.9 | 2.5 | 5 | 10 | 80 | Cylindrical |
| TEB060A2-06/12C06H90 | ● | 6 | 6 | 2 | 5.9 | 3 | 6 | 12 | 90 | Cylindrical |
| TEB080A2-08/16C08H100 | ● | 8 | 8 | 2 | 7.9 | 4 | 8 | 16 | 100 | Cylindrical |
| TEB100A2-10/20C10H100 | ● | 10 | 10 | 2 | 9.9 | 5 | 10 | 20 | 100 | Cylindrical |
| TEB120A2-12/24C12H110 | ● | 12 | 12 | 2 | 11.9 | 6 | 12 | 24 | 110 | Cylindrical |
| TEB200A2-20/40C20H160 | ● | 20 | 20 | 2 | 19.8 | 10 | 20 | 40 | 160 | Cylindrical |

● : Line up

TEB**A2-**C**M...

2 flute ball nose rib processing endmill, 30° helix angle, for hardened steel



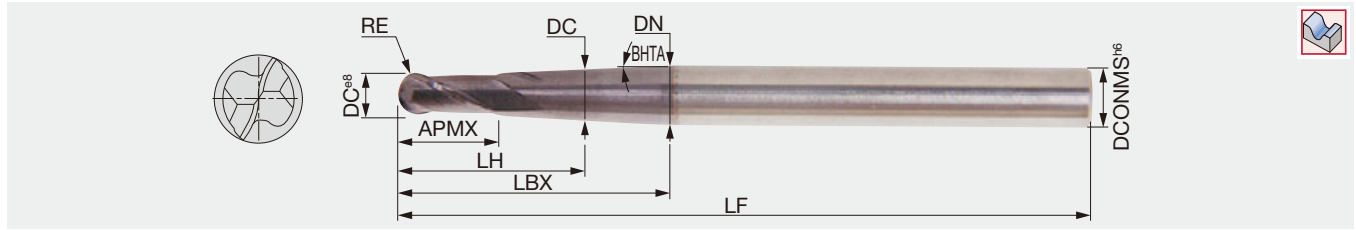
| Designation | AH750 | DC | DCONMS | NOF | DN | RE | APMX | LH | LF | Shank |
|-----------------------|-------|----|--------|-----|------|-----|------|----|-----|-------------|
| TEB030A2-08C03M100 | ● | 3 | 3 | 2 | - | 1.5 | 8 | - | 100 | Cylindrical |
| TEB030A2-08C06M70 | ● | 3 | 6 | 2 | - | 1.5 | 8 | - | 70 | Cylindrical |
| TEB040A2-08C06M70 | ● | 4 | 6 | 2 | - | 2 | 8 | - | 70 | Cylindrical |
| TEB040A2-08C04M100 | ● | 4 | 4 | 2 | - | 2 | 8 | - | 100 | Cylindrical |
| TEB050A2-12C06M80 | ● | 5 | 6 | 2 | - | 2.5 | 12 | - | 80 | Cylindrical |
| TEB060A2-10C06M120 | ● | 6 | 6 | 2 | - | 3 | 10 | - | 120 | Cylindrical |
| TEB060A2-12/22C06M80 | ● | 6 | 6 | 2 | 5.8 | 3 | 12 | 22 | 80 | Cylindrical |
| TEB080A2-14/27C08M90 | ● | 8 | 8 | 2 | 7.8 | 4 | 14 | 27 | 90 | Cylindrical |
| TEB100A2-18/31C10M100 | ● | 10 | 10 | 2 | 9.8 | 5 | 18 | 31 | 100 | Cylindrical |
| TEB120A2-22/35C12M110 | ● | 12 | 12 | 2 | 11.8 | 6 | 22 | 35 | 110 | Cylindrical |
| TEB160A2-30/50C16M140 | ● | 16 | 16 | 2 | 15.8 | 8 | 30 | 50 | 140 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I053](#), Technical guide → [I054](#)

TEBA2/**/**/**C**M...**

2 flute ball nose endmill, 30° helix angle, tapered neck type, for hardened steel

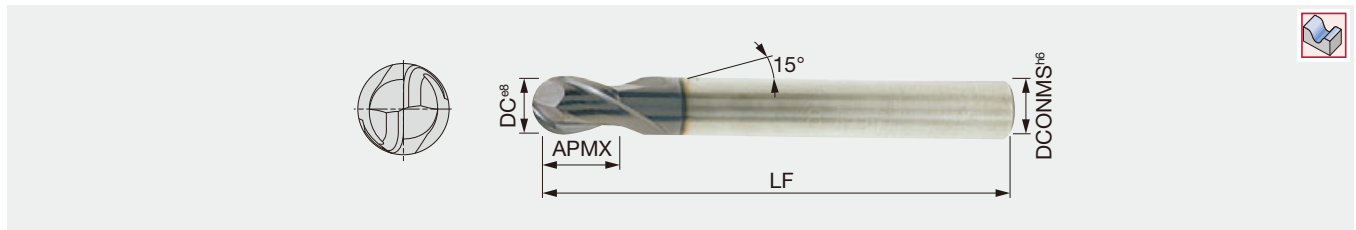


| Designation | AH750 | DC | DCONMS | NOF | DN | RE ^{+0.01} | APMX | LH | LBX | BHTA | LF | Shank |
|---------------------------|-------|----|--------|-----|-----|---------------------|------|----|-----|------|-----|-------------|
| TEB010A2-02/04/3.0C06M80 | ● | 1 | 6 | 2 | 5 | 0.5 | 2 | 4 | 42 | 3° | 80 | Cylindrical |
| TEB020A2-04/06/3.0C06M80 | ● | 2 | 6 | 2 | 5.7 | 1 | 4 | 6 | 41 | 3° | 80 | Cylindrical |
| TEB030A2-06/08/3.0C06M70 | ● | 3 | 6 | 2 | 5.6 | 1.5 | 6 | 8 | 32 | 3° | 70 | Cylindrical |
| TEB040A2-08/10/1.5C06M90 | ● | 4 | 6 | 2 | 6 | 2 | 8 | 10 | 49 | 1.5° | 90 | Cylindrical |
| TEB050A2-10/12/1.5C08M110 | ● | 5 | 8 | 2 | 7.6 | 2.5 | 10 | 12 | 61 | 1.5° | 110 | Cylindrical |
| TEB060A2-12/15/1.5C08M110 | ● | 6 | 8 | 2 | 8 | 3 | 12 | 15 | 53 | 1.5° | 110 | Cylindrical |
| TEB080A2-14/17/1.5C10M120 | ● | 8 | 10 | 2 | 10 | 4 | 14 | 17 | 55 | 1.5° | 120 | Cylindrical |
| TEB100A2-18/21/1.5C12M130 | ● | 10 | 12 | 2 | 12 | 5 | 18 | 21 | 59 | 1.5° | 130 | Cylindrical |

● : Line up

TEBA2-**C**-...**

2 flute ball nose endmill, 30° helix angle, short type

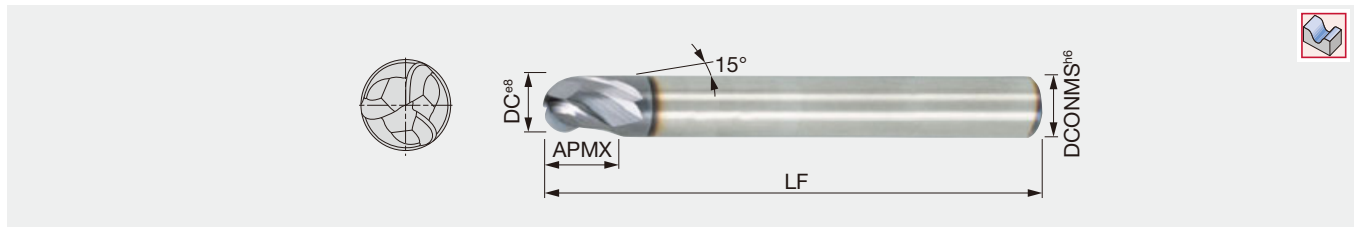


| Designation | AH750 | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|-------|----|--------|-----|------|-----|-------------|
| TEB030A2-05C06-57 | ● | ● | 3 | 6 | 2 | 5 | 57 | Cylindrical |
| TEB040A2-07C06-57 | ● | ● | 4 | 6 | 2 | 7 | 57 | Cylindrical |
| TEB050A2-08C06-57 | ● | ● | 5 | 6 | 2 | 8 | 57 | Cylindrical |
| TEB060A2-08C06-57 | ● | ● | 6 | 6 | 2 | 8 | 57 | Cylindrical |
| TEB080A2-11C08-63 | ● | ● | 8 | 8 | 2 | 11 | 63 | Cylindrical |
| TEB100A2-13C10-72 | ● | ● | 10 | 10 | 2 | 13 | 72 | Cylindrical |
| TEB120A2-14C12-83 | ● | ● | 12 | 12 | 2 | 14 | 83 | Cylindrical |
| TEB160A2-16C16-92 | ● | ● | 16 | 16 | 2 | 16 | 92 | Cylindrical |
| TEB200A2-20C20-104 | ● | ● | 20 | 20 | 2 | 20 | 104 | Cylindrical |

● : Line up

TEBA3**

3 flute ball nose endmill, 30° helix angle, short type

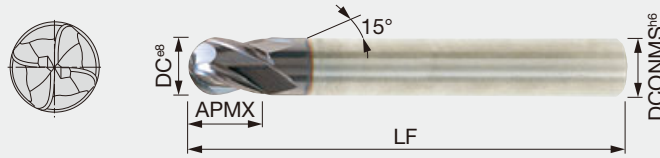


| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|-------------------|-------|----|--------|-----|------|----|-------------|
| TEB030A3-05C06-57 | ● | 3 | 6 | 3 | 5 | 57 | Cylindrical |
| TEB040A3-07C06-57 | ● | 4 | 6 | 3 | 7 | 57 | Cylindrical |
| TEB050A3-08C06-57 | ● | 5 | 6 | 3 | 8 | 57 | Cylindrical |
| TEB060A3-08C06-57 | ● | 6 | 6 | 3 | 8 | 57 | Cylindrical |
| TEB080A3-11C08-63 | ● | 8 | 8 | 3 | 11 | 63 | Cylindrical |
| TEB100A3-13C10-72 | ● | 10 | 10 | 3 | 13 | 72 | Cylindrical |
| TEB120A3-14C12-83 | ● | 12 | 12 | 3 | 14 | 83 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → **I053**, Technical guide → **I054**

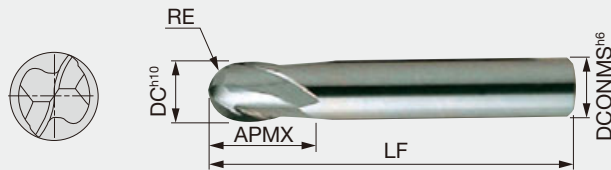
4 flute ball nose endmill, 30° helix angle, short type



| Designation | AH725 | DC | DCONMS | NOF | APMX | LF | Shank |
|--------------------|-------|----|--------|-----|------|-----|-------------|
| TEB030A4-05C06-57 | ● | 3 | 6 | 4 | 5 | 57 | Cylindrical |
| TEB040A4-07C06-50 | ● | 4 | 6 | 4 | 7 | 50 | Cylindrical |
| TEB050A4-08C06-57 | ● | 5 | 6 | 4 | 8 | 57 | Cylindrical |
| TEB060A4-08C06-57 | ● | 6 | 6 | 4 | 8 | 57 | Cylindrical |
| TEB080A4-11C08-63 | ● | 8 | 8 | 4 | 11 | 63 | Cylindrical |
| TEB100A4-13C10-72 | ● | 10 | 10 | 4 | 13 | 72 | Cylindrical |
| TEB120A4-14C12-83 | ● | 12 | 12 | 4 | 14 | 83 | Cylindrical |
| TEB200A4-20C20-104 | ● | 20 | 20 | 4 | 20 | 104 | Cylindrical |

● : Line up

2 flute ball nose endmill, 30° helix angle, short type



| Designation | AH725 | DC | DCONMS | NOF | RE | APMX | LF | Shank |
|--------------------|-------|-----|--------|-----|------|------|----|-------------|
| TEB020A2-04C06-E48 | ● | 2 | 6 | 2 | 1 | 4 | 48 | Cylindrical |
| TEB020A2-06C03-E38 | ● | 2 | 3 | 2 | 1 | 6 | 38 | Cylindrical |
| TEB025A2-04C06-E48 | ● | 2.5 | 6 | 2 | 1.25 | 4 | 48 | Cylindrical |
| TEB030A2-04C06-E48 | ● | 3 | 6 | 2 | 1.5 | 4 | 48 | Cylindrical |
| TEB040A2-06C06-E50 | ● | 4 | 6 | 2 | 2 | 6 | 50 | Cylindrical |
| TEB040A2-08W06-E57 | ● | 4 | 6 | 2 | 2 | 8 | 57 | Weldon |
| TEB060A2-07C06-E51 | ● | 6 | 6 | 2 | 3 | 7 | 51 | Cylindrical |
| TEB060A2-10W06-E57 | ● | 6 | 6 | 2 | 3 | 10 | 57 | Weldon |
| TEB080A2-09C08-E63 | ● | 8 | 8 | 2 | 4 | 9 | 63 | Cylindrical |
| TEB100A2-10C10-E66 | ● | 10 | 10 | 2 | 5 | 10 | 66 | Cylindrical |
| TEB120A2-14C12-E71 | ● | 12 | 12 | 2 | 6 | 14 | 71 | Cylindrical |
| TEB200A2-20C20-E82 | ● | 20 | 20 | 2 | 10 | 20 | 82 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → [I053](#), Technical guide → [I054](#)

VARIABLEMEISTER SHREDMEISTER SOLIDMEISTER ECOMEISTER

STANDARD CUTTING CONDITIONS - Ball nose type

Shape machining (Roughing to semi-finishing)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|---------------|---------------|--------------|---------------|
| | | | | ø3 - ø6 | ø8 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 125 - 200 | 0.02 - 0.055 | 0.04 - 0.08 | 0.06 - 0.11 | 0.05 - 0.12xD |
| | Alloy steel | - 300 HB | 100 - 150 | 0.01 - 0.035 | 0.03 - 0.05 | 0.045 - 0.06 | 0.04 - 0.1xD |
| M | Stainless steel | - 200 HB | 110 | 0.015 - 0.03 | 0.03 - 0.04 | 0.05 - 0.06 | 0.05 - 0.1xD |
| K | Cast iron | 150 - 250 HB | 150 - 180 | 0.03 - 0.06 | 0.06 - 0.09 | 0.09 - 0.12 | 0.08 - 0.15xD |
| H | Hardened steel | - 49 HRC | 70 - 80 | 0.008 - 0.02 | 0.025 - 0.03 | 0.03 - 0.04 | 0.04 - 0.08xD |
| | Hardened steel | 50 - 60 HRC | 30 - 40 | 0.005 - 0.008 | 0.007 - 0.013 | 0.009 - 0.02 | 0.03 - 0.06xD |

Finishing

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | ap |
|----------|--------------------|--------------|------------|---------------|---------------|---------------|--------|
| | | | | ø3 - ø6 | ø8 - ø12 | ø16 - ø20 | |
| P | Carbon steel | - 300 HB | 170 - 280 | 0.017 - 0.046 | 0.034 - 0.068 | 0.051 - 0.094 | 0.02xD |
| | Alloy steel | - 300 HB | 120 - 165 | 0.008 - 0.03 | 0.025 - 0.043 | 0.038 - 0.051 | 0.01xD |
| M | Stainless steel | - 200 HB | 150 | 0.012 - 0.026 | 0.025 - 0.034 | 0.042 - 0.051 | 0.01xD |
| K | Cast iron | 150 - 250 HB | 200 - 220 | 0.025 - 0.051 | 0.051 - 0.077 | 0.076 - 0.102 | 0.03xD |
| H | Hardened steel | - 49 HRC | 100 | 0.007 - 0.017 | 0.021 - 0.026 | 0.025 - 0.034 | 0.01xD |
| | Hardened steel | 50 - 60 HRC | 40 - 50 | 0.004 - 0.007 | 0.006 - 0.011 | 0.007 - 0.017 | 0.01xD |

- When using AH750, reducing cutting speed by 20 to 30% is effective for extending tool life.
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed and feed at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed and feed by 20 to 40% (VariableMeister is recommended for such operations).

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



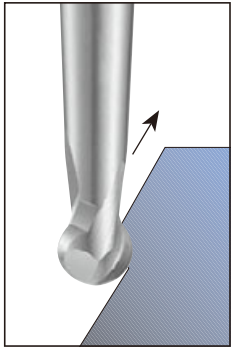
TECHNICAL GUIDE - Ball nose type

Ball Nose Characteristics

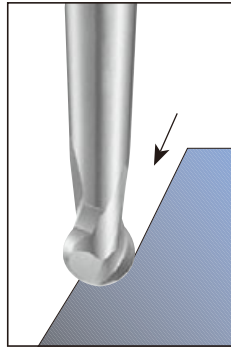
- Die & mold making, turbine manufacturing and aircraft industry, etc.
- Useful for intricate-shaped surfaces.
- Profiling of up to 70 HRC high hardened steels and alloy steels, nickel based alloys, titanium alloys.
- Ultra-fine grain carbide which increases both toughness and hardness.
- Suitable for dry and high speed cutting.
- Special sphere shaped tool geometry provides increased tool life and enables higher speed and feed operations.

Milling Features

- Operating angle: max 212°
- Excellent surface roughness and high milling process.
- Enables milling with high speed and feed in back milling mode.



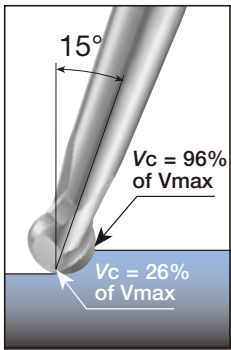
Favorable
Back Milling 



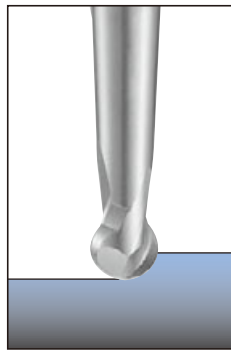
Unfavorable
Milling

Operating Recommendations

- It is recommended to machine with the tool inclined at a 15° angle. This technique eliminates cutting at nearly zero speed at the tool axis. Cutting is more efficient, and tool life substantially improves.
- Decreased cutting force.
- Excellent surface roughness and brightness.

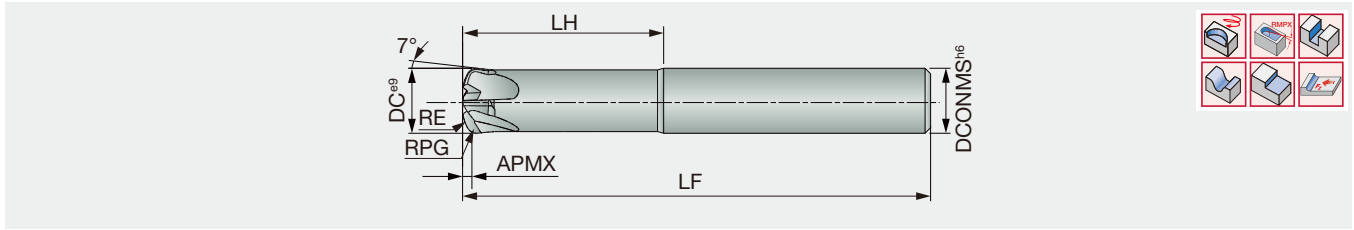


Favorable
Profiling 



Unfavorable
Profiling

4 flute high feed endmill



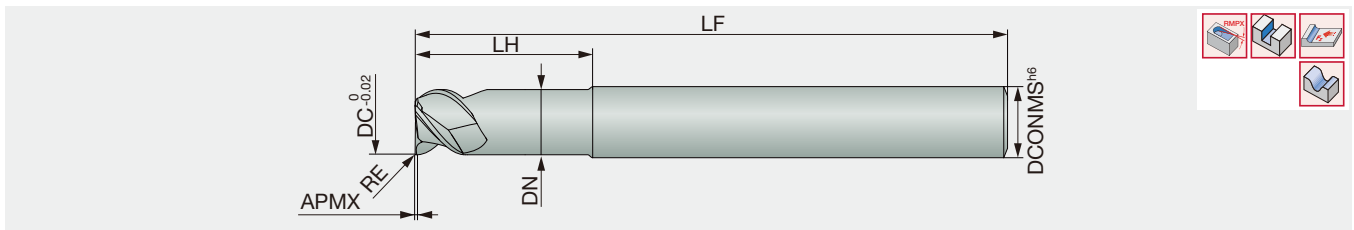
| Designation | AH750 | DC | DCONMS | NOF | RPG ⁽¹⁾ | RE | APMX | LH | LF | Max. fz (mm/t) |
|-------------------------|-------|----|--------|-----|--------------------|------|------|----|-----|----------------|
| TEFF060N4-030/20C06R10M | ● | 6 | 6 | 4 | 1.0 | 5.3 | 0.3 | 20 | 57 | 0.3 |
| TEFF080N4-035/26C08R13M | ● | 8 | 8 | 4 | 1.3 | 7 | 0.4 | 26 | 63 | 0.4 |
| TEFF100N4-040/30C10R16M | ● | 10 | 10 | 4 | 1.6 | 8.8 | 0.5 | 30 | 72 | 0.5 |
| TEFF120N4-045/34C12R20M | ● | 12 | 12 | 4 | 2.0 | 10.6 | 0.6 | 34 | 83 | 0.5 |
| TEFF160N4-055/42C16R26M | ● | 16 | 16 | 4 | 2.6 | 14 | 0.8 | 42 | 92 | 0.6 |
| TEFF200N4-060/46C20R32M | ● | 20 | 20 | 4 | 3.2 | 17.7 | 1 | 46 | 104 | 0.7 |

(1) RPG should be used for programming.

● : Line up

TCFF**A3

3 flute high feed endmill



| Designation | FX510 | DC | DCONMS | NOF | DN | RE | APMX | LH | LF |
|-----------------------|-------|----|--------|-----|------|------|------|----|----|
| TCFF060A3-06/15C6-50 | ● | 6 | 6 | 3 | 5.5 | 0.42 | 0.25 | 15 | 50 |
| TCFF080A3-08/20C8-57 | ● | 8 | 8 | 3 | 7.5 | 0.56 | 0.4 | 20 | 57 |
| TCFF100A3-08/25C10-65 | ● | 10 | 10 | 3 | 9.5 | 0.7 | 0.5 | 25 | 65 |
| TCFF120A3-10/30C12-72 | ● | 12 | 12 | 3 | 11.5 | 1.1 | 0.6 | 30 | 72 |
| TCFF160A3-12/35C16-83 | ● | 16 | 16 | 3 | 15.5 | 1.9 | 0.75 | 35 | 83 |
| TCFF200A3-15/40C20-93 | ● | 20 | 20 | 3 | 19.5 | 2.5 | 1 | 40 | 93 |

Caution:

High speed machining generates heat in the tool and chuck holder. Thermal expansion of the holder will often lead to tool damage. Use an air coolant during machining to cool the tool holder. Milling chucks are recommended for the toolholder to be used.

*Use the above corner radius values (RE) for programming.

● : Line up

STANDARD CUTTING CONDITIONS

Shape machining (roughing) TEFF**N4...

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | |
|----------|--------------------|--------------|------------|-------------|-------------|-------------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 |
| P | Carbon steel | - 300 HB | 140 - 180 | 0.25 - 0.48 | 0.35 - 0.67 | 0.52 - 0.9 |
| | Alloy steel | - 300 HB | 120 - 130 | 0.2 - 0.28 | 0.3 - 0.38 | 0.43 - 0.57 |
| M | Stainless steel | - 200 HB | 120 | 0.25 - 0.3 | 0.35 - 0.43 | 0.52 - 0.6 |
| K | Cast iron | 150 - 250 HB | 160 - 180 | 0.3 - 0.45 | 0.45 - 0.6 | 0.6 - 0.8 |
| H | Hardened steel | - 49 HRC | 100 | 0.16 - 0.2 | 0.25 - 0.33 | 0.4 - 0.48 |
| | Hardened steel | 50 - 60 HRC | 60 - 80 | 0.1 - 0.16 | 0.16 - 0.3 | 0.2 - 0.45 |

- Please be aware that the maximum depth of cut (APMX) and the feed (fz) will depend on each tool diameter.
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed (Vc) and feed (fz) at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed (Vc) and feed (fz) by 20 to 40%.

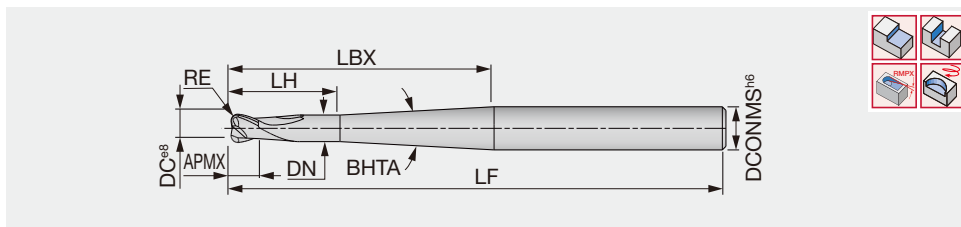
Shape machining (roughing) TCFF**A3...

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | |
|----------|------------------------------|--------------|------------|------------|-------------|-------------|
| | | | | ø6 - ø8 | ø10 - ø12 | ø16 - ø20 |
| K | Cast iron | 150 - 250 HB | 250 - 1000 | 0.1 - 0.15 | 0.17 - 0.19 | 0.23 - 0.25 |
| | Ductile cast iron | 150 - 250 HB | 250 - 1000 | 0.1 - 0.15 | 0.17 - 0.19 | 0.23 - 0.25 |
| | Malleable cast iron | 150 - 250 HB | 250 - 1000 | 0.1 - 0.15 | 0.17 - 0.19 | 0.23 - 0.25 |
| N | Non-ferrous metal / Graphite | - | 500 - 1500 | 0.1 - 0.15 | 0.17 - 0.19 | 0.23 - 0.25 |
| S | Nickel based alloy | - | 250 - 1000 | 0.1 - 0.13 | 0.15 - 0.18 | 0.20 - 0.22 |

*Dry cutting at the cutting speed more than 250m/min is recommended for machining nickel based alloy.

SOLIDMEISTER
TETR**A2**R

2 flute toroidal endmill



| Designation | AH725 | DC | DCONMS | NOF | DN | RE | APMX | LH | LBX | BHTA | LF | Shank |
|-------------------------|-------|----|--------|-----|-----|-----|------|----|-----|------|-----|-------------|
| TETR020A2-2/08C06R05M80 | ● | 2 | 6 | 2 | 1.9 | 0.5 | 2 | 8 | 40 | 3.6° | 80 | Cylindrical |
| TETR030A2-2/12C06R05M80 | ● | 3 | 6 | 2 | 2.8 | 0.5 | 2 | 12 | 40 | 3.3° | 80 | Cylindrical |
| TETR040A2-3/16C06R1M80 | ● | 4 | 6 | 2 | 3.7 | 1 | 3 | 16 | 40 | 2.8° | 80 | Cylindrical |
| TETR060A2-4/25C08R2M100 | ● | 6 | 8 | 2 | 5.6 | 2 | 4 | 25 | 66 | 2.0° | 100 | Cylindrical |

● : Line up

Reference pages: Standard cutting conditions → I057

STANDARD CUTTING CONDITIONS

Slotting / Roughing

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | |
|----------|--------------------|--------------|------------|-------------|-------------|-------------|-------------|
| | | | | ø2 | ø3 | ø4 | ø6 |
| P | Carbon steel | - 300 HB | 140 - 180 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| | Alloy steel | - 300 HB | 70 - 150 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| M | Stainless steel | - 200 HB | 60 - 100 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| K | Cast iron | 150 - 250 HB | 80 - 180 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| N | Aluminium alloy | - | 300 - 750 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| S | Titanium alloy | - | 20 - 50 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| H | Hardened steel | - 60 HRC | 20 - 30 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |

Semi-finishing / Shouldering (ae = 0.1-0.4 x D)

| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | |
|----------|--------------------|--------------|------------|-------------|-------------|-------------|-------------|
| | | | | ø2 | ø3 | ø4 | ø6 |
| P | Carbon steel | - 300 HB | 150 - 220 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| | Alloy steel | - 300 HB | 70 - 160 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| M | Stainless steel | - 200 HB | 80 - 130 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| K | Cast iron | 150 - 250 HB | 130 - 220 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| N | Aluminium alloy | - | 350 - 850 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| S | Titanium alloy | - | 40 - 60 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| H | Hardened steel | - 60 HRC | 30 - 70 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |

Finishing (feed rate depending on required accuracy) / High feed machining at low depth of cut (ae = 0.05-0.1 x D)

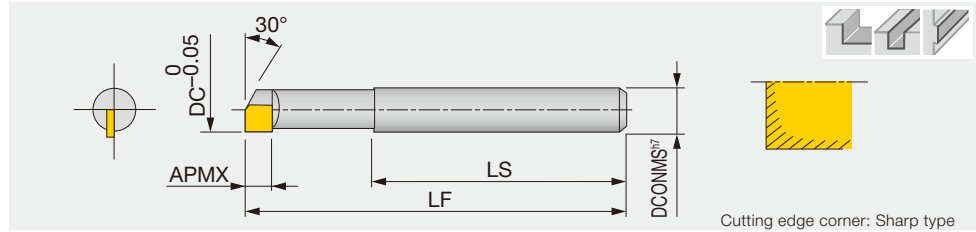
| ISO | Workpiece material | Hardness | Vc (m/min) | fz (mm/t) | | | |
|----------|--------------------|--------------|------------|-------------|-------------|-------------|-------------|
| | | | | ø2 | ø3 | ø4 | ø6 |
| P | Carbon steel | - 300 HB | 170 - 280 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| | Alloy steel | - 300 HB | 110 - 220 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| M | Stainless steel | - 200 HB | 100 - 160 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| K | Cast iron | 150 - 250 HB | 180 - 280 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| N | Aluminium alloy | - | 350 - 900 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| S | Titanium alloy | - | 50 - 70 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |
| H | Hardened steel | - 60 HRC | 40 - 80 | 0.01 - 0.03 | 0.01 - 0.04 | 0.02 - 0.05 | 0.03 - 0.07 |

- When the depth of cut (ae) is closer to the upper limit, please start with a lower limit value of cutting speed (Vc).
- The items with long slot (2xD or over) is not suitable for slotting operation.
- While air blow is recommended, water-soluble coolant will be good for stainless steel, titanium alloy, and heat-resistant alloy.
- When chattering occurs with low rigid machines or settings, reduce cutting speed and feed at an equal rate.
- When chattering occurs with long tool overhang, reduce cutting speed and feed by 20 to 40%.
- In slotting of high hardened steel, heat-resistant alloy, and some types of stainless steel, start with $ap=0.2xD$ and increase the value gradually while checking the status of the operation.
- In shoulder milling of high hardened steel and heat-resistant alloy, the cutting width should be started at $ae=0.05xD$ and increase the value gradually while checking the status of the operation.
- Low feed in finishing is recommended for good surface roughness.



DEB1000

T-DIA endmill for high speed aluminium machining



Cutting edge corner: Sharp type

| Designation | DX140 | DC | DCONMS | NOF | APMX | LS | LF |
|-------------|-------|----|--------|-----|------|----|----|
| DEB1040 | ● | 4 | 6 | 1 | 3.5 | 32 | 45 |
| DEB1050 | ● | 5 | 6 | 1 | 3.5 | 35 | 50 |
| DEB1060 | ● | 6 | 6 | 1 | 3.5 | 35 | 50 |
| DEB1080 | ● | 8 | 8 | 1 | 5 | 37 | 55 |
| DEB1100 | ● | 10 | 10 | 1 | 5 | 40 | 60 |
| DEB1120 | ● | 12 | 12 | 1 | 5 | 45 | 65 |

- The cutting edge is very sharp. Please handle it carefully. Do not directly measure the cutting edge with micrometer, etc. as it may cause chipping.
- Please keep the tool overhang from the milling chuck as short as possible.
- Please choose a machine that is as rigid as possible.

● : Line up

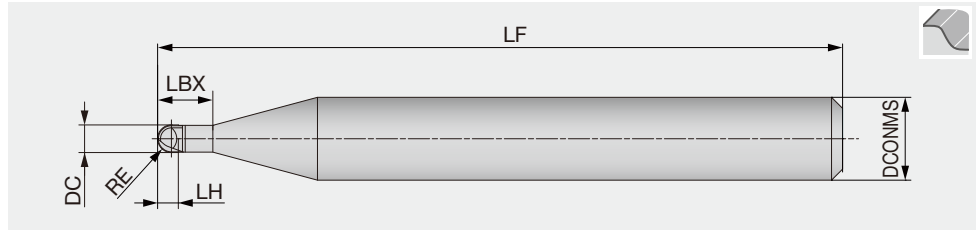
STANDARD CUTTING CONDITIONS**DEB1000**For side milling $a_p \leq 3D$, $a_e = 0.1 \text{ mm}$

| ISO | Workpiece material | Mill dia. (mm) | Cutting Speed V_c (m/min) | No. of revolutions n (min^{-1}) | Table feed V_f (mm/min) |
|----------|---------------------------------|-------------------|--------------------------------|---|------------------------------|
| N | Aluminium alloys, Copper alloys | $\phi 4$ | 120 - 180 | 12,000 | 120 |
| | | $\phi 5$ | 120 - 180 | 9,600 | 120 |
| | | $\phi 6$ | 120 - 180 | 8,000 | 120 |
| | | $\phi 8$ | 120 - 180 | 6,000 | 120 |
| | | $\phi 10$ | 120 - 180 | 4,800 | 120 |
| | | $\phi 12$ | 120 - 180 | 4,000 | 100 |

- Keep the tool overhang as short as possible. When the overhang is long, please reduce the number of revolutions and feed to prevent chattering.
- Please adjust the number of revolutions and feed speed according to the cutting condition, such as depth of cut and machine rigidity.

BBB2000

T-CBN ball nose endmill for dies and molds



| Designation | BX850 | DC | DCONMS | NOF | RE | LH | LBX | LF |
|-------------|-------|-----|--------|-----|-----|-----|-----|----|
| BBB2006 | ● | 0.6 | 6 | 2 | 0.3 | 0.5 | 1.2 | 50 |
| BBB2008 | ● | 0.8 | 6 | 2 | 0.4 | 0.6 | 1.6 | 50 |
| BBB2010 | ● | 1 | 6 | 2 | 0.5 | 0.7 | 2 | 50 |
| BBB2020 | ● | 2 | 6 | 2 | 1 | 1.5 | 4 | 50 |

● : Line up

Tolerance (BBB2000)

| R | R Tolerance | Tolerance on shank |
|---------|-------------|--------------------|
| 0.3 ~ 1 | ±0.005 | h6 |

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | No. of revolutions n (min ⁻¹) | Ball radius (RE) | | | | | | | |
|-----|--|----------|---|-----------------------------|--------------------|-----------------------------|--------------------|-----------------------------|--------------------|-----------------------------|--------------------|
| | | | | 0.3 | | 0.4 | | 0.5 | | 1 | |
| | | | | Depth of cut APMX × pf (mm) | Feed rate (mm/min) | Depth of cut APMX × pf (mm) | Feed rate (mm/min) | Depth of cut APMX × pf (mm) | Feed rate (mm/min) | Depth of cut APMX × pf (mm) | Feed rate (mm/min) |
| H | Prehardened steel (NAK80, etc.) Die steel (JIS SKD61, etc.) | ~ 52 HRC | 50,000 | 0.02 × 0.03 | 2,000 | 0.03 × 0.05 | 2,000 | 0.05 × 0.05 | 3,000 | 0.10 × 0.10 | 5,000 |
| | Die steel (JIS SKD11, DRM1 & 2, etc.) | ~ 62 HRC | 50,000 | 0.01 × 0.02 | 2,000 | 0.02 × 0.03 | 2,000 | 0.03 × 0.05 | 3,000 | 0.05 × 0.05 | 5,000 |
| | High speed steel, Die steel (JIS SKH, DRM3, etc.) | ~ 70 HRC | 50,000 | 0.01 × 0.02 | 1,500 | 0.01 × 0.03 | 1,500 | 0.02 × 0.03 | 2,000 | 0.03 × 0.05 | 3,000 |

- Depths of cut (APMX) shown in the table are the allowable maximum values.
- Mist cooling or air blow is recommended.
- The maximum number of revolutions of the machine to be used is lower than 50,000 min⁻¹, the revolutions and feed rate should be modified at same rate.
- Use smallest possible overhang.

| Ball radius (RE) | Inclined angle of workpiece (θ_1) / Effective neck length (Z) | | | |
|------------------|--|---------|---------|---------|
| 0.3 | 0°30'/1.25 | 1°/1.30 | 2°/1.35 | 3°/1.45 |
| 0.4 | 0°30'/1.65 | 1°/1.70 | 2°/1.80 | 3°/1.90 |
| 0.5 | 0°30'/2.05 | 1°/2.10 | 2°/2.25 | 3°/2.40 |
| 1 | 0°30'/4.15 | 1°/4.25 | 2°/4.50 | 3°/4.80 |

Optimal tool combination for maximum productivity

Significantly reduced tool indexing time improves machining efficiency

1 Wide range of geometries

45 kinds of geometries are available. The head indexing is easy and highly accurate with the precision thread.

2 Three kinds of shank material

Users can choose the most suitable combination according to the machining parameters, length and application required.

Steel: For general purpose

Carbide: For highly accurate machining due to excellent rigidity

Tungsten: Reduced chattering due to high vibration damping capacity



Straight shank & neck



Straight shank & taper neck



Straight shank & neck (carbide)



Straight (for slotting)



High rigidity shank



ER collet



Adaptor for TungFlex

No setup time

Machine downtime is decreased considerably. Simplified setup since only the head is indexed.

Increases productivity by 90%

Exchange time / Piece

TUNGMEISTER

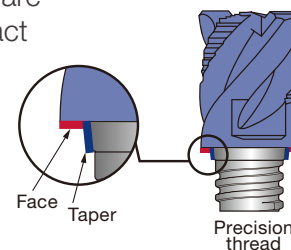
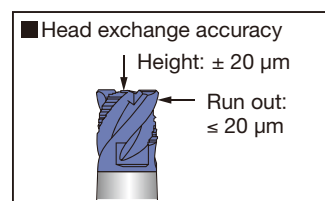
less than 1 minute

Solid endmill

10 minutes

High accuracy and repeatability

Repeatability and accuracy are maintained due to full contact of both taper and face.





VEH, VEE, VED

Extensive tool diameter range from 5 to 32 mm

Covers a broad range of applications from precision machining to large size parts.



VMT

Thread milling heads

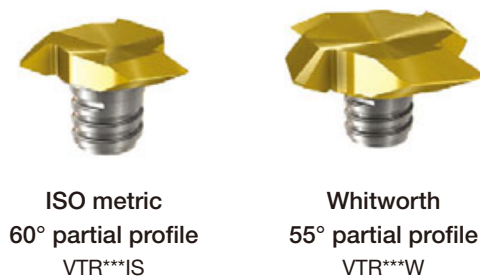
With multiple teeth for ISO, Unified, and Whitworth threads



VTR

Thread milling heads

With single tooth for ISO and Whitworth threads






Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



Quick Guide **TUNGMEISTER**



Square, Face mill, High feed

★ : First choice ☆ : Second choice

| Head geometry | Designation | Appearance | Application | | | Tool dia. (mm) | No. of cutting edges | Cutting edge length | | Corner geometry | Helix angle | Pitch | CRKS | Workpiece material | | | | | Remarks | Page | |
|--|--|---|-------------|---------------|-----------|----------------|----------------------|---------------------|------------|-----------------|--------------|----------|-----------|--------------------|---|---|---|---|---------|------------------------------------|------|
| | | | Roughing | Semifinishing | Finishing | | | L/D | APMX (mm) | | | | | P | M | K | N | S | | | H |
| | VEH... |  | ✓ | ✓ | ✓ | ø8 - ø20 | 4 | 0.6 - 0.8XD | 5 - 15 | R | Variable | Variable | S05 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1066 |
| | VEH... |  | ✓ | ✓ | ✓ | ø8 - ø32 | 4 | 1.2 - 1.5XD | 12 - 38 | R | Variable | Variable | S05 - S21 | ★ | ★ | ★ | ☆ | ★ | ☆ | Long edge | 1066 |
| | VEE**-04... VED**-04... |  | ✓ | ✓ | ✓ | ø5 - ø20 | 4 | 0.8XD | 4 - 15 | R | 30/45 | Regular | S04 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | General | 1067 |
| | VEE**I... |  | ✓ | ✓ | ✓ | ø8 - ø25 | 4 | 0.6 - 0.8XD | 5 - 22 | R/ Chamfered | 38 | Variable | S05 - S15 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1068 |
| | VEE**-03... |  | ✓ | ✓ | ✓ | ø7.7 - ø19.7 | 3 | 0.5XD | 4 - 12 | Sharp edge | 38/45 | Regular | S05 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | For key way | 1068 |
| | VEE**A02... |  | ✓ | ✓ | ✓ | ø10 - ø12 | 2 | 0.7XD | 7 - 9 | R | 45 | Regular | S06 - S08 | | | ☆ | ★ | | | | 1069 |
|  Square | VEE**A03... |  | ✓ | ✓ | ✓ | ø8 - ø20 | 3 | 0.6XD | 5 - 12 | R | 45 | Regular | S05 - S12 | | | ☆ | ★ | | | | 1069 |
| | VEE**R... |  | ✓ | | | ø8 - ø25 | 4, 5, 6 | 0.6 - 0.8XD | 5 - 22 | Chamfered | 45 | Regular | S05 - S15 | ★ | ★ | ★ | ☆ | ★ | ☆ | Serrated cutting edge | 1070 |
| | VED**R... |  | ✓ | | | ø8 - ø25 | 4, 5, 6 | 1.5XD | 12 - 37 | Chamfered | 47 | Regular | S05 - S15 | ★ | ★ | ★ | ☆ | ★ | ☆ | Serrated cutting edge/ Long edge | 1070 |
| | VEE**C... |  | ✓ | ✓ | | ø8 - ø25 | 4 | 0.6 - 0.8XD | 5 - 22 | Chamfered | 45 | Regular | S05 - S15 | ★ | ★ | ★ | ☆ | ★ | ☆ | Rough/ Finish combination geometry | 1071 |
| | VED**-06... VEE**-06... |  | ✓ | ✓ | ✓ | ø8 - ø12 | 6 | 0.6 - 0.8XD | 5 - 9 | R/ Chamfered | 30/45/ 50 | Regular | S05 - S08 | ☆ | ☆ | ☆ | | ★ | ★ | Small width of cut | 1071 |
| | VED**-08/10... VEE**-08/10... |  | ✓ | ✓ | ✓ | ø16 - ø25 | 8, 10 | 0.8XD | 12 - 22 | R/ Chamfered | 30/50 | Regular | S10 - S15 | ☆ | ☆ | ☆ | | ★ | ★ | Small width of cut | 1072 |
| | VED**-07/09... |  | ✓ | ✓ | ✓ | ø8 - ø25 | 7, 9 | 1.5XD | 12 - 37 | R | Variable | Variable | S05 - S15 | ☆ | ☆ | ☆ | | ★ | ★ | Small width of cut/Long edge | 1072 |
|  Face mill | VFM... |  | ✓ | ✓ | ✓ | ø12 - ø25 | 6 | 0.3XD | 3.6 - 7.5 | R | - | Variable | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1075 |
| | VFX**-02... |  | ✓ | | | ø10 - ø20 | 2 | 0.06XD | 0.6 - 1.5 | - | - | Regular | S06 - S12 | ★ | ★ | ★ | ☆ | ★ | ★ | | 1076 |
|  High feed | VFX**-04/06... |  | ✓ | | | ø12, ø16 | 4, 6 | 0.05XD | 0.6 - 1.05 | - | - | Regular | S08 - S10 | ★ | ★ | ★ | ☆ | ★ | ★ | With coolant hole | 1076 |








Profiling (ball, radius, barrel)

★ : First choice ☆ : Second choice

| Head geometry | Designation | Appearance | Application | | | Tool dia. (mm) | No. of cutting edges | Helix angle | Pitch | CRKS | Workpiece material | | | | | | Remarks | Page | |
|---|--|---|---|---------------|-----------|----------------|----------------------|-------------|---------|-----------|--------------------|---|---|---|---|---|--|-------------------------|------|
| | | | Roughing | Semifinishing | Finishing | | | | | | P | M | K | N | S | H | | | |
|  Ball | VBB**-BM... |  | ✓ | ✓ | | ø8 - ø16 | 2 | 0 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ★ | Economical type | 1078 | |
| | VBB**-BG... |  | | | ✓ | ø8 - ø16 | 2 | 0 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ★ | High accuracy h7 | 1078 | |
| | VBD**-BG... |  | | ✓ | ✓ | | ø8 - ø16 | 2 | 30 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ★ | Low cutting force | 1078 |
| | VBD**-BG-04... VBE**-BG-04... |  | ✓ | ✓ | ✓ | ø5 - ø25 | 4 | 30/38 | Regular | S04 - S15 | ★ | ★ | ★ | ☆ | ★ | ★ | Low cutting force | 1079 | |
| | VBB**-SG... |  | ✓ | ✓ | ✓ | ø10 - ø20 | 2 | 0 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ★ | High accuracy h7/ Sphere cutting edge | 1079 | |
| | VBE**-BGA... |  | ✓ | ✓ | ✓ | ø8 - ø20 | 2 | 45 | Regular | S05 - S12 | | | | ☆ | ★ | | | 1079 | |
|  Radius | VRB**-02... VRC**-02... |  | ✓ | ✓ | | ø10 - ø20 | 2 | 0/15 | Regular | S06 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | Economical type | 1081 | |
| | VRD**-06... |  | ✓ | ✓ | | ø8 - ø16 | 6 | 30 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1081 | |
| |  Barrel | VBO... |  | ✓ | ✓ | | ø8 - ø16 | 4, 5 | 30 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | Profiling/ Long edge | 1083 |
| VBO... | |  | ✓ | ✓ | | ø10 - ø16 | 4 | 30 | Regular | S06 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | Profiling/ Short edge | 1083 | |
|  Bull nose | VBN... |  | ✓ | ✓ | | ø10 - ø16 | 6 | 35 | Regular | S06 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | Profiling | 1083 | |
|  Lens | VBL... |  | ✓ | ✓ | | ø8 - ø16 | 6 | 30 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | Profiling | 1084 | |






Quick Guide **TUNGMEISTER**

Multi-function (chamfering, spot drill, center hole, counterboring) ★ : First choice ☆ : Second choice

| Head geometry | Designation | Appearance | Center edge (Z-feed capability) | Tool dia. (mm) | No. of cutting edges | Chamfering angle | Helix angle | Pitch | CRKS | Workpiece material | | | | | | Remarks | Page |
|--------------------------|----------------|--|---------------------------------|----------------|----------------------|------------------|-------------|---------|-----------|--------------------|---|---|---|---|---|----------------------------|------|
| | | | | | | | | | | P | M | K | N | S | H | | |
| Chamfering | VCA**-04/06... |  | Without | ø10 - ø20 | 4, 6 | 45 | 0 | Regular | S06 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1086 |
| | VCW**-02... |  | Without | ø11.8 | 2 | 45 | 0 | Regular | S06 | ★ | ★ | ★ | ☆ | ★ | ☆ | Back chamfering capability | 1086 |
| | VCR**-02... |  | Without | ø8 - ø20 | 2 | R | 0 | Regular | S05 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1086 |
| Chamfering Spot drill | VCP**-02... |  | With | ø8 - ø16.5 | 2 | 30/45/60 | 0 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1088 |
| | VDS... |  | With | ø8 - ø16 | 2 | 45 | 10 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | Low cutting force | 1088 |
| Center hole | VDP**-02... |  | With | ø1.07 - ø6.46 | 2 | - | 0 | Regular | S04 - S12 | ★ | ★ | ★ | ☆ | ★ | ☆ | For center hole | 1090 |
| Counterboring | VGC**-02... |  | With | ø7.8 - ø16 | 2 | - | 10 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | For counterboring | 1091 |







Slotting

★ : First choice ☆ : Second choice








| Head geometry | Designation | Appearance | Groove width (mm) | Tool dia. (mm) | No. of cutting edges | Edge shape | Helix angle | Pitch | CRKS | Workpiece material | | | | | | Remarks | Page |
|---------------|----------------|---|-------------------|----------------|----------------------|------------|-------------|---------|-----------|--------------------|---|---|---|---|---|-----------------------------------|------|
| | | | | | | | | | | P | M | K | N | S | H | | |
| Slotting | VST**-3... |  | 1.2 - 3.17 | ø15.7 - ø17.7 | 3 | R | 0 | Regular | S06 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1092 |
| | VST**-4/6... |  | 0.76 - 10 | ø21.7 - ø27.7 | 4, 6 | R | 0 | Regular | S08, S10 | ★ | ★ | ★ | ☆ | ☆ | ☆ | | 1093 |
| | VST**A45... |  | 3.4 - 5.5 | ø17.7 - ø21.7 | 3, 4 | Chamfered | 0 | Regular | S06, S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | For chamfering, 45° chamfer angle | 1093 |
| | VTB**-06... |  | 2 - 8 | ø13.5 - ø25 | 6 | R | 0 | Regular | S05 - S10 | ★ | ★ | ★ | ☆ | ★ | ☆ | | 1094 |
| | VTB**C15-06... |  | 2 | ø13.5 | 6 | Chamfered | 0 | Regular | S05 | ★ | ★ | ★ | ☆ | ★ | ☆ | With 45° chamfer | 1094 |

Threading

★ : First choice ☆ : Second choice

| Head geometry | Designation | Appearance | Feature | Wiper edge | No. of cutting edges | Tool dia. (mm) | Internal/ External | Thread type | Min. thread size | CRKS | Workpiece material | | | | | | Page |
|---|-----------------|---|-----------------|------------|----------------------|----------------|--------------------|---------------------|------------------|-----------|--------------------|---|---|---|---|---|------|
| | | | | | | | | | | | P | M | K | N | S | H | |
|  Threading | VMT***IS |  | Full profile | With | 3 - 6 | ø10 - ø16 | Internal | ISO metric | M12X0.75 | S05 - S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | I096 |
| | VMT***UN |  | Full profile | With | 3, 4, 5 | ø10 - ø16 | Internal | Unified | 9/16-24 UNEF | S05 - S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | I096 |
| | VMT***W |  | Full profile | With | 4 | ø10, 16 | Internal/ External | Whitworth | G1/4 | S05, S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | I097 |
| | VTR***IS |  | Partial profile | Without | 3, 4 | ø15.7 - ø21.7 | Internal/ External | 60° partial profile | M20X0.5 | S06, S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | I097 |
| | VTR***W |  | Partial profile | Without | 4 | ø21.7 | Internal/ External | 55° partial profile | G3/4 | S08 | ★ | ★ | ★ | ☆ | ★ | ☆ | I097 |

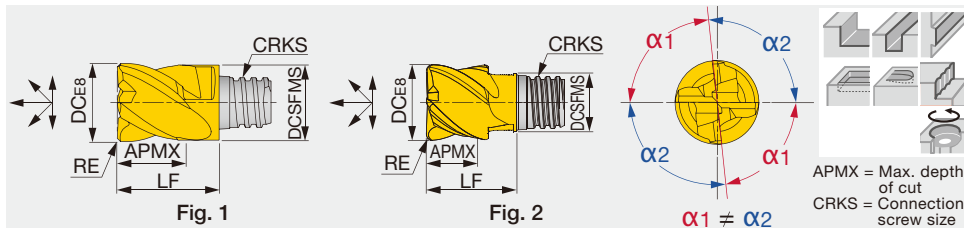
Shank

| Shank | Neck | Appearance | Material | | | | Page |
|----------------------|----------|---|----------|---------|-----------------------------|------------------------------|------------|
| | | | Steel | Carbide | Carbide (with coolant hole) | Tungsten (with coolant hole) | |
| Straight | Straight |  | ✓ | ✓ | ✓ | ✓ | I100, I101 |
| Weldon | Straight |  | ✓ | - | - | - | I102 |
| Straight | Taper |  | ✓ | ✓ | - | ✓ | I102, I103 |
| High rigidity shank | |  | ✓ | ✓ | - | - | I100 |
| Straight (slotting) | |  | ✓ | ✓ | ✓ | - | I103 |
| Adaptor for TungFlex | |  | ✓ | - | - | - | I104 |
| ER collet | |  | ✓ | - | - | - | I104 |

4 flute, roughing - finishing, variable helix and pitch



Square



| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* | Fig. |
|----------------------|-------|-------|-----|-----------|----|--------|------|-----|------|------|----------|---------|------|
| VEH080L05.0R05I04S05 | ● | | 4 | 41° - 45° | 8 | 7.7 | 5 | 0.5 | S05 | 10 | KEYV-S05 | 7 | 1 |
| VEH080L05.0R10I04S05 | | ● | 4 | 41° - 45° | 8 | 7.7 | 5 | 1 | S05 | 10 | KEYV-S05 | 7 | 1 |
| VEH100L07.0R10I04S05 | ● | | 4 | 41° - 45° | 10 | 7.7 | 7 | 1 | S05 | 12.8 | KEYV-S05 | 7 | 2 |
| VEH100L07.0R05I04S06 | | ● | 4 | 41° - 45° | 10 | 9.7 | 7 | 0.5 | S06 | 13 | KEYV-S06 | 10 | 1 |
| VEH100L07.0R10I04S06 | | ● | 4 | 41° - 45° | 10 | 9.7 | 7 | 1 | S06 | 13 | KEYV-S06 | 10 | 1 |
| VEH120L09.0R10I04S06 | ● | | 4 | 41° - 45° | 12 | 9.3 | 9 | 1 | S06 | 14.3 | KEYV-S06 | 10 | 2 |
| VEH120L09.0R05I04S08 | | ● | 4 | 41° - 45° | 12 | 11.7 | 9 | 0.5 | S08 | 16.5 | KEYV-S08 | 15 | 1 |
| VEH120L09.0R10I04S08 | | ● | 4 | 41° - 45° | 12 | 11.7 | 9 | 1 | S08 | 16.5 | KEYV-S08 | 15 | 1 |
| VEH160L12.0R10I04S08 | ● | | 4 | 41° - 45° | 16 | 11.7 | 12 | 1 | S08 | 20 | KEYV-S08 | 15 | 2 |
| VEH160L12.0R05I04S10 | | ● | 4 | 41° - 45° | 16 | 15.3 | 12 | 0.5 | S10 | 20.5 | KEYV-S10 | 28 | 1 |
| VEH160L12.0R10I04S10 | | ● | 4 | 41° - 45° | 16 | 15.3 | 12 | 1 | S10 | 20.5 | KEYV-S10 | 28 | 1 |
| VEH200L15.0R05I04S12 | | ● | 4 | 41° - 45° | 20 | 18.3 | 15 | 0.5 | S12 | 25.5 | KEYV-S12 | 28 | 1 |
| VEH200L15.0R10I04S12 | | ● | 4 | 41° - 45° | 20 | 18.3 | 15 | 1 | S12 | 25.5 | KEYV-S12 | 28 | 1 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up



Square



Ball



Radius



Chamfering



Slotting



Threading



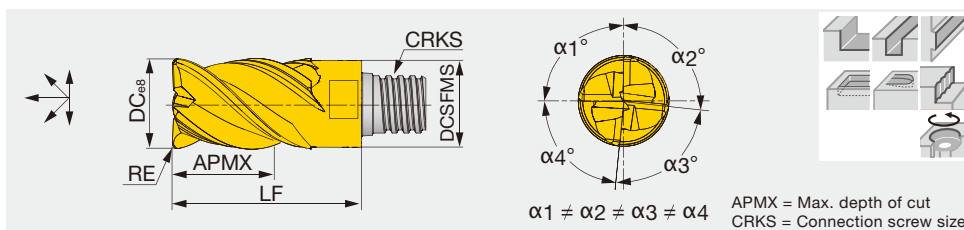
Others

VEH...

4 flute, roughing - finishing, long edge, variable helix and pitch



Square



| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----------|----|--------|------|-----|------|------|----------|---------|
| VEH080L12.0R05I04S05 | ● | 4 | 41° - 45° | 8 | 7.7 | 12 | 0.5 | S05 | 18 | KEYV-S05 | 7 |
| VEH080L12.0R10I04S05 | ● | 4 | 41° - 45° | 8 | 7.7 | 12 | 1 | S05 | 18 | KEYV-S05 | 7 |
| VEH100L15.0R05I04S06 | ● | 4 | 41° - 45° | 10 | 9.7 | 15 | 0.5 | S06 | 22 | KEYV-S06 | 10 |
| VEH100L15.0R10I04S06 | ● | 4 | 41° - 45° | 10 | 9.7 | 15 | 1 | S06 | 22 | KEYV-S06 | 10 |
| VEH120L18.0R05I04S08 | ● | 4 | 41° - 45° | 12 | 11.7 | 18 | 0.5 | S08 | 27 | KEYV-S08 | 15 |
| VEH120L18.0R10I04S08 | ● | 4 | 41° - 45° | 12 | 11.7 | 18 | 1 | S08 | 27 | KEYV-S08 | 15 |
| VEH160L24.0R05I04S10 | ● | 4 | 41° - 45° | 16 | 15.3 | 24 | 0.5 | S10 | 33.5 | KEYV-S10 | 28 |
| VEH160L24.0R10I04S10 | ● | 4 | 41° - 45° | 16 | 15.3 | 24 | 1 | S10 | 33.5 | KEYV-S10 | 28 |
| VEH200L30.0R05I04S12 | ● | 4 | 41° - 45° | 20 | 18.45 | 30 | 0.5 | S12 | 41 | KEYV-S12 | 28 |
| VEH200L30.0R10I04S12 | ● | 4 | 41° - 45° | 20 | 18.45 | 30 | 1 | S12 | 41 | KEYV-S12 | 28 |
| VEH250L37.0R05I04S15 | ● | 4 | 41° - 45° | 25 | 23.9 | 37 | 0.5 | S15 | 52.5 | KEYV-W20 | 40 |
| VEH250L37.0R10I04S15 | ● | 4 | 41° - 45° | 25 | 23.9 | 37 | 1 | S15 | 52.5 | KEYV-W20 | 40 |
| VEH320L38.0R00I04S21 | ● | 4 | 41° - 45° | 32 | 30 | 38 | - | S21 | 55 | KS-24 | 110 |
| VEH320L38.0R10I04S21 | ● | 4 | 41° - 45° | 32 | 30 | 38 | 1 | S21 | 55 | KS-24 | 110 |

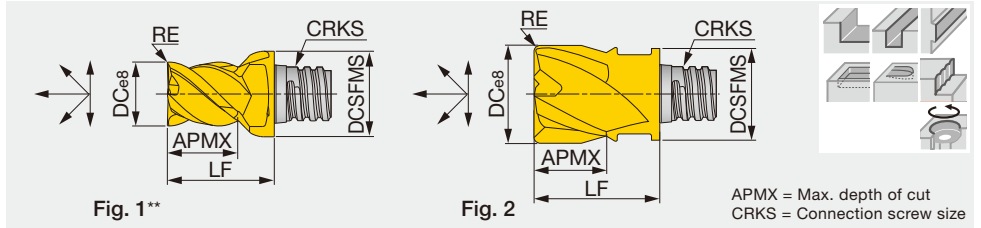
Torque*: Recommended clamping torque (N-m)
VEH080 - VEH160: 2 pieces per package
VEH200 - VEH320: 1 piece per package

● : Line up

Reference pages: Standard cutting conditions → **I073 - I074**

VEE**-04..., VED**-04...

4 flute, roughing - finishing, general



| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* | Fig. |
|----------------------|-------|-------|-----|-----|----|--------|------|-----|------|------|----------|---------|------|
| VEE050L04.0R05-04S04 | ● | | 4 | 45° | 5 | 6 | 4 | 0.5 | S04 | 8.5 | KEYV-S05 | 4 | 1 |
| VEE060L04.0R05-04S04 | | ● | 4 | 45° | 6 | 5.8 | 4 | 0.5 | S04 | 8.5 | KEYV-S05 | 4 | 2 |
| VEE060L05.0R00-04S05 | ● | ● | 4 | 45° | 6 | 8 | 5 | - | S05 | 10 | KEYV-S05 | 7 | 1 |
| VEE080L05.0R00-04S05 | | ● | 4 | 45° | 8 | 7.7 | 5 | - | S05 | 10 | KEYV-S05 | 7 | 2 |
| VED080L05.0R05-04S05 | | ● | 4 | 30° | 8 | 7.7 | 5 | 0.5 | S05 | 10 | KEYV-S05 | 7 | 2 |
| VED080L05.0R10-04S05 | | ● | 4 | 30° | 8 | 7.7 | 5 | 1 | S05 | 10 | KEYV-S05 | 7 | 2 |
| VED080L05.0R15-04S05 | | ● | 4 | 30° | 8 | 7.7 | 5 | 1.5 | S05 | 10 | KEYV-S05 | 7 | 2 |
| VEE100L07.0R00-04S06 | | ● | 4 | 45° | 10 | 9.7 | 7 | - | S06 | 13 | KEYV-S06 | 10 | 2 |
| VED100L07.0R05-04S06 | | ● | 4 | 30° | 10 | 9.7 | 7 | 0.5 | S06 | 13 | KEYV-S06 | 10 | 2 |
| VEE100L07.0R05-04S06 | | ● | 4 | 45° | 10 | 9.7 | 7 | 0.5 | S06 | 13 | KEYV-S06 | 10 | 2 |
| VED100L07.0R10-04S06 | | ● | 4 | 30° | 10 | 9.7 | 7 | 1 | S06 | 13 | KEYV-S06 | 10 | 2 |
| VEE100L07.0R10-04S06 | | ● | 4 | 45° | 10 | 9.7 | 7 | 1 | S06 | 13 | KEYV-S06 | 10 | 2 |
| VEE120L09.0R00-04S08 | ● | ● | 4 | 45° | 12 | 11.7 | 9 | - | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VED120L09.0R05-04S08 | | ● | 4 | 30° | 12 | 11.7 | 9 | 0.5 | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VEE120L09.0R05-04S08 | | ● | 4 | 45° | 12 | 11.7 | 9 | 0.5 | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VED120L09.0R10-04S08 | ● | ● | 4 | 30° | 12 | 11.7 | 9 | 1 | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VEE120L09.0R10-04S08 | | ● | 4 | 45° | 12 | 11.7 | 9 | 1 | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VEE160L12.0R00-04S10 | ● | ● | 4 | 45° | 16 | 15.3 | 12 | - | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R05-04S10 | ● | ● | 4 | 30° | 16 | 15.3 | 12 | 0.5 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R05-04S10 | | ● | 4 | 45° | 16 | 15.3 | 12 | 0.5 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R10-04S10 | | ● | 4 | 30° | 16 | 15.3 | 12 | 1 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R10-04S10 | | ● | 4 | 45° | 16 | 15.3 | 12 | 1 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R15-04S10 | | ● | 4 | 30° | 16 | 15.3 | 12 | 1.5 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R15-04S10 | | ● | 4 | 45° | 16 | 15.3 | 12 | 1.5 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R20-04S10 | | ● | 4 | 30° | 16 | 15.3 | 12 | 2 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R20-04S10 | | ● | 4 | 45° | 16 | 15.3 | 12 | 2 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R30-04S10 | | ● | 4 | 30° | 16 | 15.3 | 12 | 3 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R30-04S10 | ● | ● | 4 | 45° | 16 | 15.3 | 12 | 3 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VED160L12.0R40-04S10 | | ● | 4 | 30° | 16 | 15.3 | 12 | 4 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE160L12.0R40-04S10 | | ● | 4 | 45° | 16 | 15.3 | 12 | 4 | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VEE200L15.0R00-04S12 | | ● | 4 | 45° | 20 | 18.3 | 15 | - | S12 | 25.5 | KEYV-S12 | 28 | 2 |
| VED200L15.0R05-04S12 | | ● | 4 | 30° | 20 | 18.3 | 15 | 0.5 | S12 | 25.5 | KEYV-S12 | 28 | 2 |
| VED200L15.0R10-04S12 | ● | ● | 4 | 30° | 20 | 18.3 | 15 | 1 | S12 | 25.5 | KEYV-S12 | 28 | 2 |
| VED200L15.0R20-04S12 | | ● | 4 | 30° | 20 | 18.3 | 15 | 2 | S12 | 25.5 | KEYV-S12 | 28 | 2 |
| VED200L15.0R30-04S12 | | ● | 4 | 30° | 20 | 18.3 | 15 | 3 | S12 | 25.5 | KEYV-S12 | 28 | 2 |

Torque*: Recommended clamping torque (N·m)

**Fig. 1: Avoid interference with workpiece when using this cutting head. The shank diameter is larger than the cutter diameter when assembled.

2 pieces per package

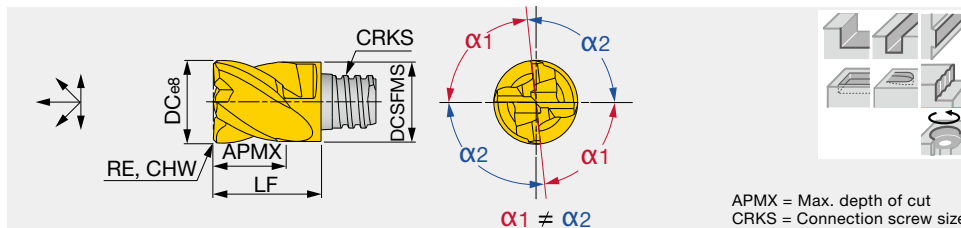
● : Line up



4 flute, roughing - finishing, variable pitch



Square



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CHW | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|----|--------|------|-----|-----|------|------|----------|---------|
| VEE080L05.0C30I04S05 | ● | | 4 | 38° | 8 | 7.7 | 5 | - | 0.3 | S05 | 10 | KEYV-S05 | 7 |
| VEE100L07.0C40I04S06 | ● | | 4 | 38° | 10 | 9.7 | 7 | - | 0.4 | S06 | 13 | KEYV-S06 | 10 |
| VEE120L09.0C50I04S08 | ● | | 4 | 38° | 12 | 11.7 | 9 | - | 0.5 | S08 | 16.5 | KEYV-S08 | 15 |
| VEE160L12.0C60I04S10 | ● | ● | 4 | 38° | 16 | 15.3 | 12 | - | 0.6 | S10 | 20.5 | KEYV-S10 | 28 |
| VEE200L15.0C60I04S12 | ● | ● | 4 | 38° | 20 | 18.3 | 15 | - | 0.6 | S12 | 25.5 | KEYV-S12 | 28 |
| VEE250L22.0C60I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | - | 0.6 | S15 | 37 | KEYV-W20 | 40 |
| VEE250L22.0R00I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | - | - | S15 | 37 | KEYV-W20 | 40 |
| VEE250L22.0R05I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | 0.5 | - | S15 | 37 | KEYV-W20 | 40 |
| VEE250L22.0R10I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | 1 | - | S15 | 37 | KEYV-W20 | 40 |
| VEE250L22.0R20I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | 2 | - | S15 | 37 | KEYV-W20 | 40 |
| VEE250L22.0R30I04S15 | ● | ● | 4 | 38° | 25 | 23.9 | 22 | 3 | - | S15 | 37 | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)

VEE080 - VEE200: 2 pieces per package

VEE250: 1 piece per package

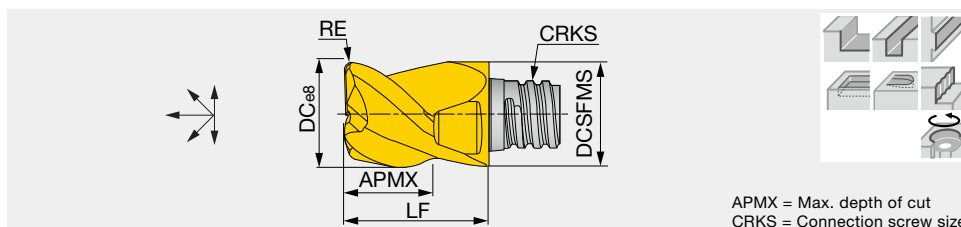
● : Line up

VEE**-03...

3 flute, roughing - finishing, general, for key way



Square



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|------|--------|------|-----|------|------|----------|---------|
| VEE077L04.0R02-03S05 | ● | | 3 | 38° | 7.7 | 7.7 | 4 | 0.2 | S05 | 10 | KEYV-S05 | 7 |
| VEE080L05.0R00-03S05 | ● | | 3 | 45° | 8 | 7.7 | 5 | - | S05 | 10 | KEYV-S05 | 7 |
| VEE097L05.0R03-03S06 | ● | | 3 | 38° | 9.7 | 9.7 | 5 | 0.3 | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0R00-03S06 | ● | ● | 3 | 45° | 10 | 9.7 | 7 | - | S06 | 13 | KEYV-S06 | 10 |
| VEE117L07.0R03-03S08 | ● | ● | 3 | 38° | 11.7 | 11.7 | 7 | 0.3 | S08 | 16.5 | KEYV-S08 | 15 |
| VEE120L09.0R00-03S08 | ● | ● | 3 | 45° | 12 | 11.7 | 9 | - | S08 | 16.5 | KEYV-S08 | 15 |
| VEE157L08.0R03-03S10 | ● | ● | 3 | 38° | 15.7 | 15.3 | 8 | 0.3 | S10 | 20.5 | KEYV-S10 | 28 |
| VEE197L12.0R04-03S12 | ● | ● | 3 | 38° | 19.7 | 18.3 | 12 | 0.4 | S12 | 25.5 | KEYV-S12 | 28 |

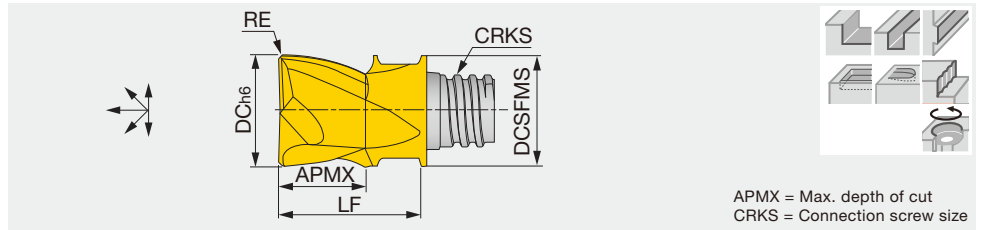
Torque*: Recommended clamping torque (N-m)

2 pieces per package

● : Line up

VEE**A02...

2 flute, roughing - finishing, for non-ferrous metal, general



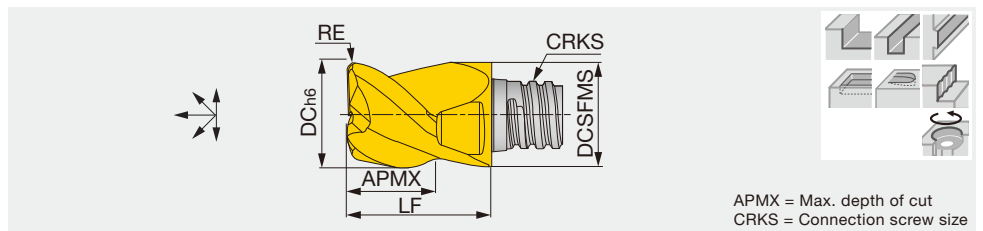
| Designation | KS15F | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|------|------|----------|---------|
| VEE100L07.0R05A02S06 | ● | 2 | 45° | 10 | 9.7 | 7 | 0.5 | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0R10A02S06 | ● | 2 | 45° | 10 | 9.7 | 7 | 1 | S06 | 13 | KEYV-S06 | 10 |
| VEE120L09.0R05A02S08 | ● | 2 | 45° | 12 | 11.7 | 9 | 0.5 | S08 | 16.5 | KEYV-S08 | 15 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

VEE**A03...

3 flute, roughing - finishing, for non-ferrous metal, general



| Designation | KS15F | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|------|------|----------|---------|
| VEE080L05.0R05A03S05 | ● | 3 | 45° | 8 | 7.7 | 5 | 0.5 | S05 | 10 | KEYV-S05 | 7 |
| VEE100L06.0R05A03S06 | ● | 3 | 45° | 10 | 9.7 | 6 | 0.5 | S06 | 13 | KEYV-S06 | 10 |
| VEE100L06.0R10A03S06 | ● | 3 | 45° | 10 | 9.7 | 6 | 1 | S06 | 13 | KEYV-S06 | 10 |
| VEE120L08.0R05A03S08 | ● | 3 | 45° | 12 | 11.7 | 8 | 0.5 | S08 | 16.5 | KEYV-S08 | 15 |
| VEE120L08.0R10A03S08 | ● | 3 | 45° | 12 | 11.7 | 8 | 1 | S08 | 16.5 | KEYV-S08 | 15 |
| VEE160L10.0R00A03S10 | ● | 3 | 45° | 16 | 15.3 | 10 | - | S10 | 20.5 | KEYV-S10 | 28 |
| VEE160L10.0R10A03S10 | ● | 3 | 45° | 16 | 15.3 | 10 | 1 | S10 | 20.5 | KEYV-S10 | 28 |
| VEE160L10.0R20A03S10 | ● | 3 | 45° | 16 | 15.3 | 10 | 2 | S10 | 20.5 | KEYV-S10 | 28 |
| VEE200L12.0R05A03S12 | ● | 3 | 45° | 20 | 18.3 | 12 | 0.5 | S12 | 25.5 | KEYV-S12 | 28 |
| VEE200L12.0R10A03S12 | ● | 3 | 45° | 20 | 18.3 | 12 | 1 | S12 | 25.5 | KEYV-S12 | 28 |
| VEE200L12.0R20A03S12 | ● | 3 | 45° | 20 | 18.3 | 12 | 2 | S12 | 25.5 | KEYV-S12 | 28 |

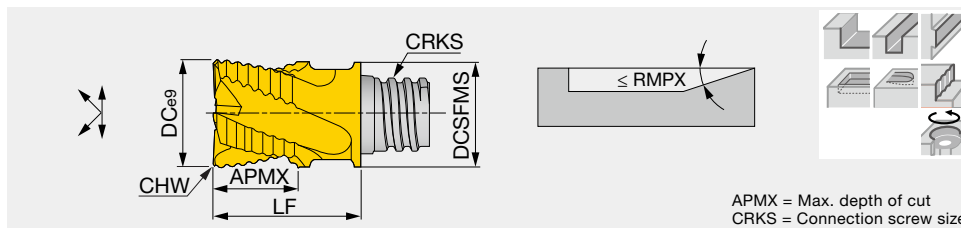
Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

4, 5, 6 flute, roughing, serrated cutting edge



Square

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | CHW | CRKS | LF | RMPX | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|----|--------|------|------|------|------|------|----------|---------|
| VEE080L05.0C25R04S05 | ● | ● | 4 | 45° | 8 | 7.7 | 5 | 0.25 | S05 | 10 | 5° | KEYV-S05 | 7 |
| VEE100L07.0C30R04S06 | ● | ● | 4 | 45° | 10 | 9.7 | 7 | 0.3 | S06 | 13 | 5° | KEYV-S06 | 10 |
| VEE120L09.0C35R04S08 | ● | ● | 4 | 45° | 12 | 11.7 | 9 | 0.35 | S08 | 16.5 | 5° | KEYV-S08 | 15 |
| VEE160L12.0C40R05S10 | ● | ● | 5 | 45° | 16 | 15.3 | 12 | 0.4 | S10 | 20.5 | 5° | KEYV-S10 | 28 |
| VEE200L15.0C40R06S12 | ● | ● | 6 | 45° | 20 | 18.3 | 15 | 0.4 | S12 | 25.5 | 3° | KEYV-S12 | 28 |
| VEE250L22.0C50R06S15 | ● | ● | 6 | 45° | 25 | 23.9 | 22 | 0.5 | S15 | 37 | 3° | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)

VEE080 - VEE200: 2 pieces per package

VEE250: 1 piece per package

● : Line up



Square



Ball



Radius



Chamfering



Slotting



Threading



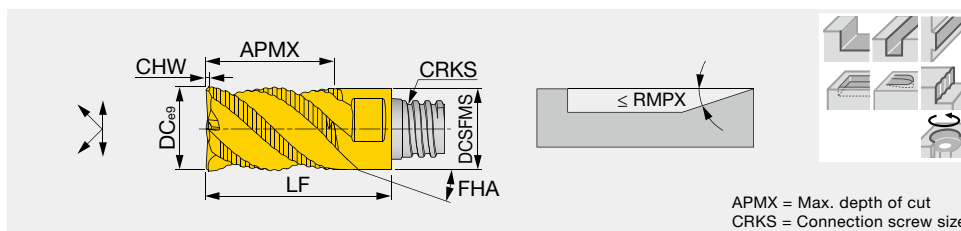
Others

VEDR...**

4, 5, 6 flute, roughing, long cutting edge, serrated cutting edge



Square

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | CHW | CRKS | LF | RMPX | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|------|------|------|------|----------|---------|
| VED080L12.0C25R04S05 | ● | 4 | 46° | 8 | 7.7 | 12 | 0.25 | S05 | 18 | 5° | KEYV-S05 | 7 |
| VED100L15.0C30R04S06 | ● | 4 | 46° | 10 | 9.6 | 15 | 0.3 | S06 | 22 | 5° | KEYV-S06 | 10 |
| VED120L18.0C35R04S08 | ● | 4 | 46° | 12 | 11.7 | 18 | 0.35 | S08 | 27 | 5° | KEYV-S08 | 15 |
| VED160L24.0C40R05S10 | ● | 5 | 40° | 16 | 15.3 | 24 | 0.4 | S10 | 33.5 | 5° | KEYV-S10 | 28 |
| VED200L30.0C40R06S12 | ● | 6 | 47° | 20 | 18.45 | 30 | 0.4 | S12 | 41 | 3° | KEYV-S12 | 28 |
| VED250L37.0C50R06S15 | ● | 6 | 47° | 25 | 23.9 | 37 | 0.5 | S15 | 52.5 | 3° | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)

VED080 - VED160: 2 pieces per package

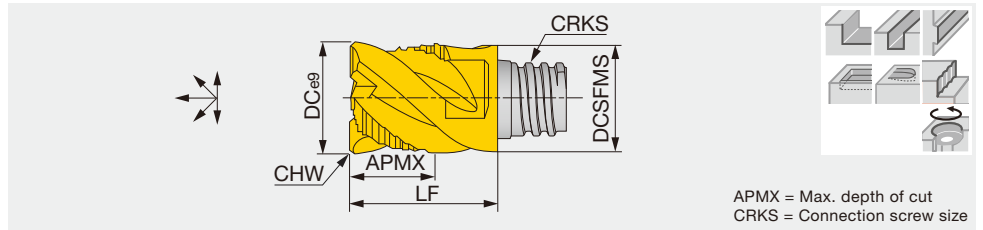
VED200, VED250: 1 piece per package

● : Line up

Reference pages: Standard cutting conditions → **I073 - I074**

VEE**C...

4 flute, roughing - semi finishing, roughing and finishing edge combination



APMX = Max. depth of cut
CRKS = Connection screw size

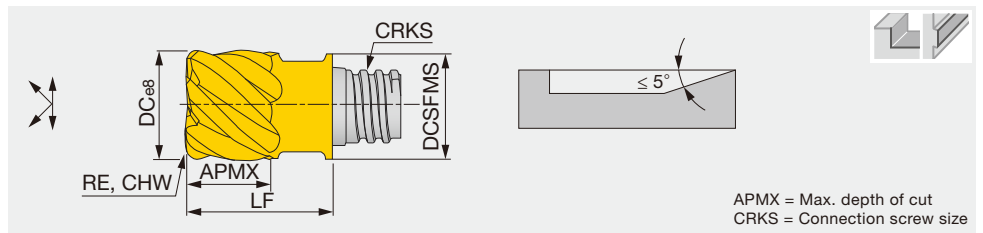
| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | CHW | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|------|------|----------|---------|
| VEE080L05.0C30C04S05 | ● | 4 | 45° | 8 | 7.7 | 5 | 0.3 | S05 | 10 | KEYV-S05 | 7 |
| VEE100L07.0C30C04S06 | ● | 4 | 45° | 10 | 9.7 | 7 | 0.3 | S06 | 13 | KEYV-S06 | 10 |
| VEE120L09.0C40C04S08 | ● | 4 | 45° | 12 | 11.7 | 9 | 0.4 | S08 | 16.5 | KEYV-S08 | 15 |
| VEE160L12.0C60C04S10 | ● | 4 | 45° | 16 | 15.3 | 12 | 0.6 | S10 | 20.5 | KEYV-S10 | 28 |
| VEE200L15.0C60C04S12 | ● | 4 | 45° | 20 | 18.3 | 15 | 0.6 | S12 | 25.5 | KEYV-S12 | 28 |
| VEE250L22.0C60C04S15 | ● | 4 | 45° | 25 | 23.9 | 22 | 0.6 | S15 | 37 | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)
VEE080 - VEE200: 2 pieces per package
VEE250: 1 piece per package

● : Line up

VED**-06..., VEE**-06...

6 flute, roughing - finishing, small width of cut



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | AH750 | NOF | FHA | DC | DCSFMS | APMX | RE | CHW | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|----|--------|------|-----|-----|------|------|----------|---------|
| VEE080L05.0R05-06S05 | ● | | 6 | 45° | 8 | 7.7 | 5 | 0.5 | - | S05 | 10 | KEYV-S05 | 7 |
| VEE080L05.0R10-06S05 | ● | | 6 | 45° | 8 | 7.7 | 5 | 1 | - | S05 | 10 | KEYV-S05 | 7 |
| VEE080L05.0R15-06S05 | ● | | 6 | 45° | 8 | 7.7 | 5 | 1.5 | - | S05 | 10 | KEYV-S05 | 7 |
| VEE080L05.0C10-06S05 | | ● | 6 | 50° | 8 | 7.7 | 5 | - | 0.1 | S05 | 10 | KEYV-S05 | 7 |
| VEE100L07.0R00-06S06 | ● | | 6 | 45° | 10 | 9.7 | 7 | - | - | S06 | 13 | KEYV-S06 | 10 |
| VED100L07.0R05-06S06 | ● | | 6 | 30° | 10 | 9.7 | 7 | 0.5 | - | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0R05-06S06 | ● | | 6 | 45° | 10 | 9.7 | 7 | 0.5 | - | S06 | 13 | KEYV-S06 | 10 |
| VED100L07.0R10-06S06 | ● | | 6 | 30° | 10 | 9.7 | 7 | 1 | - | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0R10-06S06 | ● | | 6 | 45° | 10 | 9.7 | 7 | 1 | - | S06 | 13 | KEYV-S06 | 10 |
| VED100L07.0R15-06S06 | ● | | 6 | 30° | 10 | 9.7 | 7 | 1.5 | - | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0R15-06S06 | ● | | 6 | 45° | 10 | 9.7 | 7 | 1.5 | - | S06 | 13 | KEYV-S06 | 10 |
| VEE100L07.0C10-06S06 | | ● | 6 | 50° | 10 | 9.7 | 7 | - | 0.1 | S06 | 13 | KEYV-S06 | 10 |
| VEE120L09.0R00-06S08 | ● | | 6 | 45° | 12 | 11.7 | 9 | - | - | S08 | 16.5 | KEYV-S08 | 15 |
| VED120L09.0R05-06S08 | ● | | 6 | 30° | 12 | 11.7 | 9 | 0.5 | - | S08 | 16.5 | KEYV-S08 | 15 |
| VED120L09.0R10-06S08 | ● | | 6 | 30° | 12 | 11.7 | 9 | 1 | - | S08 | 16.5 | KEYV-S08 | 15 |
| VEE120L09.0R10-06S08 | ● | | 6 | 45° | 12 | 11.7 | 9 | 1 | - | S08 | 16.5 | KEYV-S08 | 15 |
| VEE120L09.0R15-06S08 | ● | | 6 | 45° | 12 | 11.7 | 9 | 1.5 | - | S08 | 16.5 | KEYV-S08 | 15 |
| VEE120L09.0C10-06S08 | | ● | 6 | 50° | 12 | 11.7 | 9 | - | 0.1 | S08 | 16.5 | KEYV-S08 | 15 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

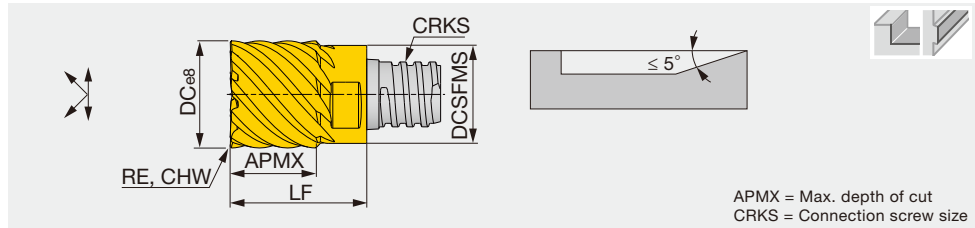
● : Line up

Reference pages: Standard cutting conditions → **I073 - I074**

8, 10 flute, roughing - finishing, small width of cut



Square



| Designation | AH715 | AH725 | AH750 | NOF | FHA | DC | DCSFMS | APMX | RE | CHW | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-------|-----|-----|----|--------|------|-----|-----|------|------|----------|---------|
| VED160L12.0R05-08S10 | ● | | | 8 | 30° | 16 | 15.3 | 12 | 0.5 | - | S10 | 20.5 | KEYV-S10 | 28 |
| VED160L12.0R10-08S10 | ● | ● | | 8 | 30° | 16 | 15.3 | 12 | 1 | - | S10 | 20.5 | KEYV-S10 | 28 |
| VED160L12.0R16-08S10 | ● | | | 8 | 30° | 16 | 15.3 | 12 | 1.6 | - | S10 | 20.5 | KEYV-S10 | 28 |
| VED160L12.0R20-08S10 | ● | | | 8 | 30° | 16 | 15.3 | 12 | 2 | - | S10 | 20.5 | KEYV-S10 | 28 |
| VEE160L12.0C20-08S10 | | | ● | 8 | 50° | 16 | 15.3 | 12 | - | 0.2 | S10 | 20.5 | KEYV-S10 | 28 |
| VED200L15.0R10-10S12 | | ● | | 10 | 30° | 20 | 18.3 | 15 | 1 | - | S12 | 25.5 | KEYV-S12 | 28 |
| VED200L15.0R20-10S12 | | ● | | 10 | 30° | 20 | 18.3 | 15 | 2 | - | S12 | 25.5 | KEYV-S12 | 28 |
| VEE200L15.0C20-10S12 | | | ● | 10 | 50° | 20 | 18.3 | 15 | - | 0.2 | S12 | 25.5 | KEYV-S12 | 28 |
| VED250L22.0R10-10S15 | | ● | | 10 | 30° | 25 | 23.9 | 22 | 1 | - | S15 | 37 | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)
VEE / VED160 - 200: 2 pieces per package
VED250: 1 piece per package

● : Line up



Square



Ball



Radius



Chamfering



Slotting



Threading



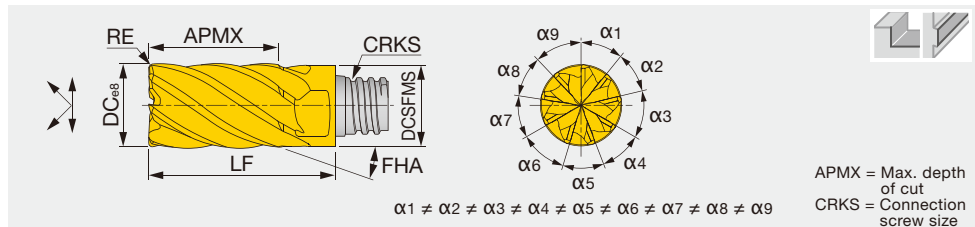
Others

VED**-07/09...

7, 9 flute, roughing - finishing, long edge, variable helix and pitch, small width of cut



Square



| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----------|----|--------|------|-----|------|------|----------|---------|
| VED080L12.0R05I07S05 | ● | 7 | 34° - 40° | 8 | 7.7 | 12 | 0.5 | S05 | 18 | KEYV-S05 | 7 |
| VED100L15.0R05I07S06 | ● | 7 | 34° - 40° | 10 | 9.6 | 15 | 0.5 | S06 | 22 | KEYV-S06 | 10 |
| VED120L18.0R05I07S08 | ● | 7 | 34° - 40° | 12 | 11.7 | 18 | 0.5 | S08 | 27 | KEYV-S08 | 15 |
| VED160L24.0R08I09S10 | ● | 9 | 34° - 40° | 16 | 15.3 | 24 | 0.8 | S10 | 33.5 | KEYV-S10 | 28 |
| VED200L30.0R10I09S12 | ● | 9 | 34° - 40° | 20 | 18.45 | 30 | 1 | S12 | 41 | KEYV-S12 | 28 |
| VED250L37.0R10I09S15 | ● | 9 | 34° - 40° | 25 | 23.9 | 37 | 1 | S15 | 52.5 | KEYV-W20 | 40 |

Torque*: Recommended clamping torque (N-m)
VED080 - VED160: 2 pieces per package
VED200, VED250: 1 piece per package

● : Line up

Reference pages: Standard cutting conditions → **I073 - I074**

STANDARD CUTTING CONDITIONS

Shoulder milling

VEH, VEE: 3 flutes, VED / VEE: 4 flutes, VEE-A, VEE-I, VEE-R, VED-R, VEE-C

| ISO | Workpiece material | Hardness | Cutting speed V_c (m/min) | Feed per tooth: f_z (mm/t) | | | | | | | | | Depth of cut a_p (mm) | Width of cut a_e (mm) |
|-----|--|--------------|-----------------------------|------------------------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|-------------------------|-------------------------|
| | | | | Tool diameter: DC (mm) | | | | | | | | | | |
| | | | | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 32 | | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 80 - 180 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 60 - 140 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 60 - 120 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 40 - 100 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 80 - 200 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 80 - 200 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| N | Aluminium alloys Si < 13% | - | 200 - 700 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 40 - 80 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 60 | 0.03 - 0.07 | 0.03 - 0.07 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.1 - 0.18 | 0.6 x DC | 0.25 x DC |

VED / VEE: 6 flutes, VED / VEE: 8, 10 flutes, VED: 7, 9 flutes

| ISO | Workpiece material | Hardness | Cutting speed V_c (m/min) | Feed per tooth: f_z (mm/t) | | | | | | Depth of cut a_p (mm) | Width of cut a_e (mm) |
|-----|---|-------------|-----------------------------|------------------------------|-------------|-------------|-------------|------------|------------|-------------------------|-------------------------|
| | | | | Tool diameter: DC (mm) | | | | | | | |
| | | | | 8 | 10 | 12 | 16 | 20 | 25 | | |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 60 - 120 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.6 x DC | 0.02 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 30 - 60 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.6 x DC | 0.02 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 80 - 160 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.6 x DC | 0.02 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 40 - 90 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 0.6 x DC | 0.02 x DC |



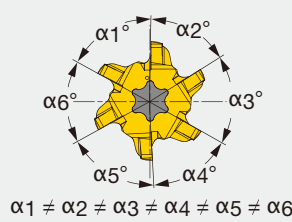
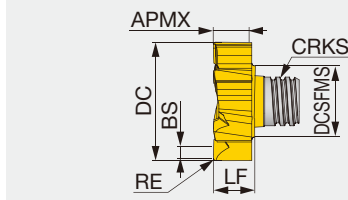
Slotting

VEH, VEE: 3 flutes, VED/VEE: 4 flutes, VEE-A, VEE-I,
VEE-R, VEE-C

| ISO | Workpiece material | Hardness | Cutting speed V _c (m/min) | Feed per tooth: fz (mm/t) | | | | | | | | | Depth of cut a _p (mm) |
|----------|--|-----------------|---|---------------------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|--|
| | | | | Tool diameter: DC (mm) | | | | | | | | | |
| | | | | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 32 | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 50 - 70 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 40 - 80 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 40 - 70 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 30 - 60 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 50 - 120 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 50 - 120 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| N | Aluminium alloys Si < 13% | - | 130 - 400 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Aluminium alloys Si ≥ 13% | - | 70 - 200 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 20 - 40 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 10 - 20 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 25 - 60 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 10 - 30 | 0.03 - 0.04 | 0.03 - 0.04 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.07 - 0.1 | 0.07 - 0.1 | 0.5 x DC |

VFM...

6 flute, roughing - finishing, for face milling



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | RE | BS | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|-----|------|------|-----------|---------|
| VFM120L03.6R02106S05 | ● | 6 | 10° | 12 | 7.7 | 3.6 | 0.2 | 1.2 | S05 | 4.4 | KEYV-T20 | 7 |
| VFM160L04.8R04106S06 | ● | 6 | 10° | 16 | 9.7 | 4.8 | 0.4 | 2 | S06 | 5.6 | KEYV-T25 | 10 |
| VFM200L06.0R04106S08 | ● | 6 | 10° | 20 | 11.7 | 6 | 0.4 | 2 | S08 | 7 | KEYV-T40L | 15 |
| VFM250L07.5R04106S10 | ● | 6 | 10° | 25 | 15.3 | 7.5 | 0.4 | 2 | S10 | 8.55 | KEYV-T50L | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

STANDARD CUTTING CONDITIONS

Face milling

VFM

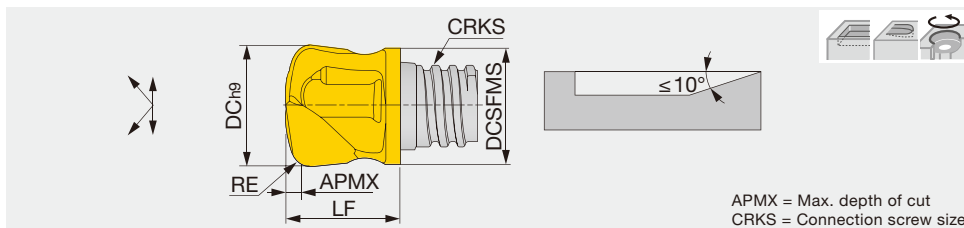
| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | Depth of cut ap (mm) | Width of cut ae (mm) |
|-----|--|--------------|--------------------------------|---------------------------|-------------|------------|------------|-------------------------|-------------------------|
| | | | | Tool diameter: DC (mm) | | | | | |
| | | | | 12 | 16 | 20 | 25 | | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 80 - 180 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 60 - 140 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 60 - 120 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 40 - 100 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 80 - 200 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 80 - 200 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| N | Aluminium alloys Si < 13% | - | 200 - 700 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 40 - 80 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 60 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.1 - 0.17 | 1 | 0.7 x DC |



2 flute, roughing



High feed



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE ⁽¹⁾ | CRKS | LF | Wrench | Torque* | fz(mm/t) |
|----------------------|-------|-----|-----|----|--------|------|-------------------|------|------|----------|---------|------------|
| VFX100L00.6R20-02S06 | ● | 2 | 0° | 10 | 9.6 | 0.6 | 2 | S06 | 12.5 | KEYV-S06 | 10 | 0.3 - 0.6 |
| VFX120L01.0R25-02S08 | ● | 2 | 0° | 12 | 11.5 | 1.0 | 2.5 | S08 | 11.1 | KEYV-S08 | 15 | 0.5 - 1 |
| VFX160L01.1R30-02S10 | ● | 2 | 0° | 16 | 15.2 | 1.1 | 3 | S10 | 13.5 | KEYV-S10 | 28 | 0.55 - 1.1 |
| VFX200L01.5R33-02S12 | ● | 2 | 0° | 20 | 18.3 | 1.5 | 3.3 | S12 | 17.5 | KEYV-S12 | 28 | 0.75 - 1.5 |

Torque*: Recommended clamping torque (N-m)

(1) Corner radius for CAM programming

For VFX head, taper neck shank or Tungsten shank should be recommended.

2 pieces per package

● : Line up



Square



Ball



Radius



Chamfering



Slotting



Threading



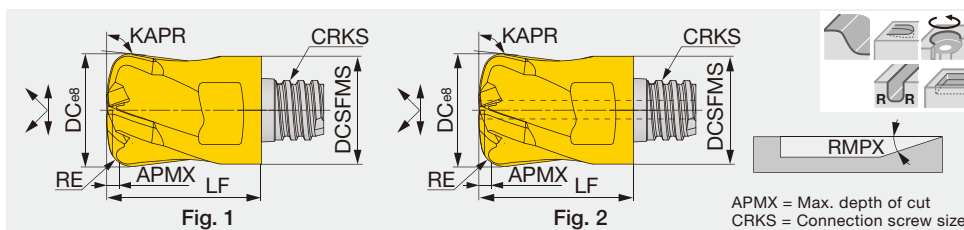
Others

VFX**-04/06...

4, 6 flute, roughing



High feed



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | AH750 | NOF | FHA | DC | DCSFMS | APMX | RE | KAPR | CRKS | LF | RMPX | Wrench | Torque* | fz(mm/t) | Fig. |
|----------------------|-------|-------|-------|-----|-----|----|--------|------|-----|------|------|------|------|----------|---------|-------------|------|
| VFX120L0.60R18E04S08 | ● | | | 4 | 20° | 12 | 11.5 | 0.6 | 1.8 | 97° | S08 | 16.5 | 5° | KEYV-S08 | 15 | 0.16 - 0.67 | 2 |
| VFX120L0.60R18H04S08 | | ● | | 4 | 20° | 12 | 11.5 | 0.6 | 1.8 | 97° | S08 | 16.5 | 5° | KEYV-S08 | 15 | 0.16 - 0.67 | 1 |
| VFX120L0.65R12E06S08 | | | ● | 6 | 20° | 12 | 11.5 | 0.65 | 0.6 | 97° | S08 | 12 | 3° | KEYV-S08 | 15 | 0.16 - 0.54 | 2 |
| VFX160L0.80R22E04S10 | ● | | | 4 | 20° | 16 | 15.4 | 0.8 | 2.2 | 97° | S10 | 20.5 | 5° | KEYV-S10 | 28 | 0.2 - 0.75 | 2 |
| VFX160L0.80R22H04S10 | | ● | | 4 | 20° | 16 | 15.4 | 0.8 | 2.2 | 97° | S10 | 20.5 | 5° | KEYV-S10 | 28 | 0.2 - 0.75 | 1 |
| VFX160L1.05R20E06S10 | | | ● | 6 | 20° | 16 | 15.4 | 1.05 | 1 | 97° | S10 | 16 | 3° | KEYV-S10 | 28 | 0.2 - 0.65 | 2 |

Torque*: Recommended clamping torque (N-m)

Slot milling is not recommended for workpiece materials such as stainless steel where chips tend to adhere.

Also max. ae < 0.4D.

2 pieces per package

● : Line up

STANDARD CUTTING CONDITIONS

High feed milling

VFX: 2, 4, 6 flutes

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | ø10 | | ø12 | | ø16 | | ø20 | | Width of cut ae (mm) |
|-----|--|--------------|--------------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|
| | | | | Feed per tooth fz (mm/t) | Depth of cut ap (mm) | Feed per tooth fz (mm/t) | Depth of cut ap (mm) | Feed per tooth fz (mm/t) | Depth of cut ap (mm) | Feed per tooth fz (mm/t) | Depth of cut ap (mm) | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 100 - 200 | 0.3 - 0.7 | 0.5 | 0.4 - 0.8 | 0.5 | 0.5 - 0.9 | 0.75 | 0.6 - 1 | 1 | 0.6 x DC |
| | Alloy steel SCM440, SCR420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 80 - 180 | 0.2 - 0.6 | 0.5 | 0.3 - 0.7 | 0.5 | 0.4 - 0.8 | 0.75 | 0.5 - 0.9 | 1 | 0.6 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 80 - 160 | 0.2 - 0.5 | 0.4 | 0.2 - 0.5 | 0.4 | 0.3 - 0.6 | 0.5 | 0.3 - 0.6 | 0.75 | 0.6 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 60 - 100 | 0.2 - 0.6 | 0.4 | 0.2 - 0.6 | 0.4 | 0.3 - 0.7 | 0.5 | 0.3 - 0.7 | 0.75 | 0.6 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 100 - 220 | 0.3 - 0.7 | 0.5 | 0.4 - 0.8 | 0.75 | 0.5 - 0.9 | 0.75 | 0.6 - 1 | 1 | 0.6 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 100 - 220 | 0.2 - 0.6 | 0.5 | 0.3 - 0.7 | 0.75 | 0.4 - 0.8 | 0.75 | 0.5 - 0.9 | 1 | 0.6 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.2 - 0.5 | 0.4 | 0.2 - 0.5 | 0.4 | 0.2 - 0.6 | 0.5 | 0.2 - 0.6 | 0.5 | 0.25 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.1 - 0.3 | 0.3 | 0.1 - 0.3 | 0.3 | 0.1 - 0.3 | 0.4 | 0.1 - 0.3 | 0.4 | 0.25 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 40 - 80 | 0.2 - 0.4 | 0.3 | 0.2 - 0.4 | 0.3 | 0.3 - 0.5 | 0.4 | 0.3 - 0.5 | 0.4 | 0.45 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 60 | 0.1 - 0.2 | 0.2 | 0.1 - 0.2 | 0.2 | 0.1 - 0.3 | 0.3 | 0.1 - 0.3 | 0.3 | 0.25 x DC |

Please note that the feed per tooth should not exceed the maximum feed per tooth for each product.

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

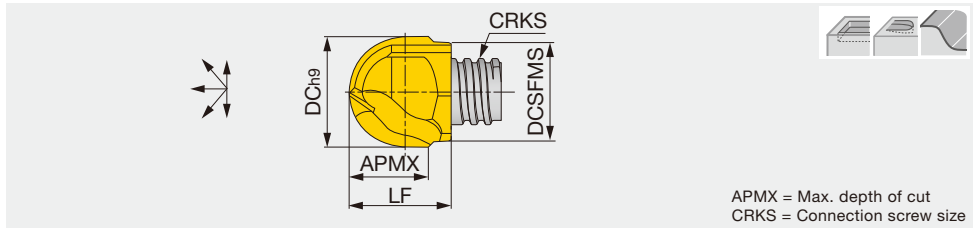
User's Guide

Index

2 flute, roughing - semi finishing, economical



Ball

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|------|------|----------|---------|
| VBB080L08.0-BM-02S05 | ● | 2 | 0° | 8 | 7.6 | 8 | S05 | 10 | KEYV-S05 | 7 |
| VBB100L10.0-BM-02S06 | ● | 2 | 0° | 10 | 9.5 | 10 | S06 | 12.4 | KEYV-S06 | 10 |
| VBB120L12.0-BM-02S08 | ● | 2 | 0° | 12 | 11.5 | 11.5 | S08 | 15.3 | KEYV-S08 | 15 |
| VBB160L16.0-BM-02S10 | ● | 2 | 0° | 16 | 15.2 | 16 | S10 | 19.1 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

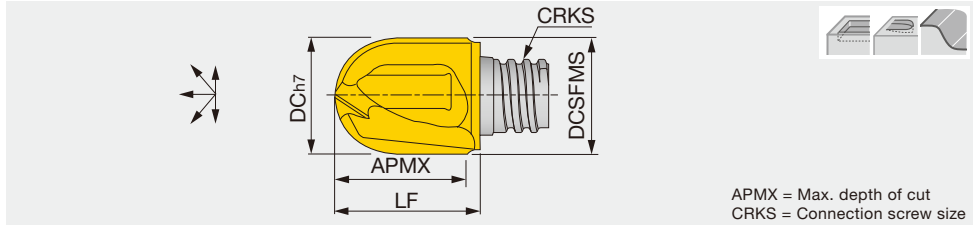
● : Line up

**VBB**-BG...**

2 flute, finishing, high accuracy (h7 tolerance), for hardened steel



Ball

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH750 | NOF | FHA | DC | DCSFMS | APMX | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|------|------|----------|---------|
| VBB080L08.0-BG-02S05 | ● | 2 | 0° | 8 | 7.6 | 8 | S05 | 10 | KEYV-S05 | 7 |
| VBB100L10.0-BG-02S06 | ● | 2 | 0° | 10 | 9.6 | 10 | S06 | 12.4 | KEYV-S06 | 10 |
| VBB120L12.0-BG-02S08 | ● | 2 | 0° | 12 | 11.5 | 12 | S08 | 15.3 | KEYV-S08 | 15 |
| VBB160L16.0-BG-02S10 | ● | 2 | 0° | 16 | 15.2 | 16 | S10 | 19.1 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

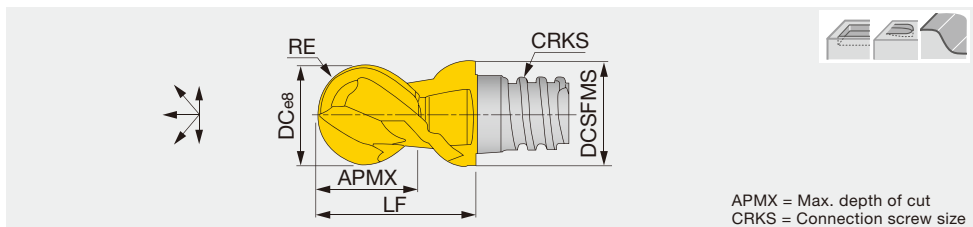
● : Line up

**VBD**-BG...**

2 flute, semi finishing - finishing, helix cutting edge



Ball

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|----------------------|------|------|----------|---------|
| VBD080L05.0-BG-02S05 | ● | 2 | 30° | 8 | 7.7 | 5 | 3.982 ⁽¹⁾ | S05 | 10 | KEYV-S05 | 7 |
| VBD100L07.0-BG-02S06 | ● | 2 | 30° | 10 | 9.7 | 7 | 4.982 ⁽¹⁾ | S06 | 13 | KEYV-S06 | 10 |
| VBD120L09.0-BG-02S08 | ● | 2 | 30° | 12 | 11.7 | 9 | 5.978 ⁽²⁾ | S08 | 16.5 | KEYV-S08 | 15 |
| VBD160L09.5-BG-02S10 | ● | 2 | 30° | 16 | 15.3 | 9 | 7.978 ⁽²⁾ | S10 | 20.5 | KEYV-S10 | 28 |

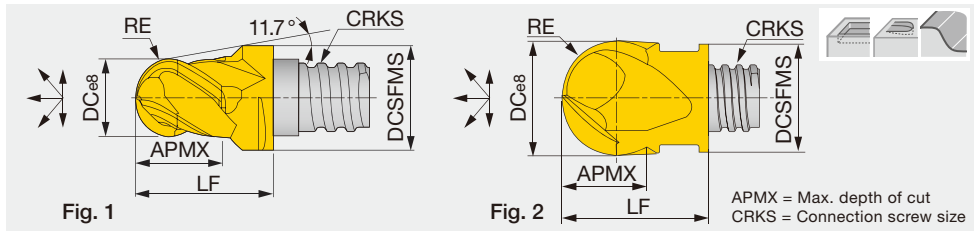
The tolerance of RE: (1) ± 0.01 (2) ± 0.012
Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → I080

VBD**-BG-04..., VBE**-BG-04...

4 flute, roughing - finishing, helix cutting edge



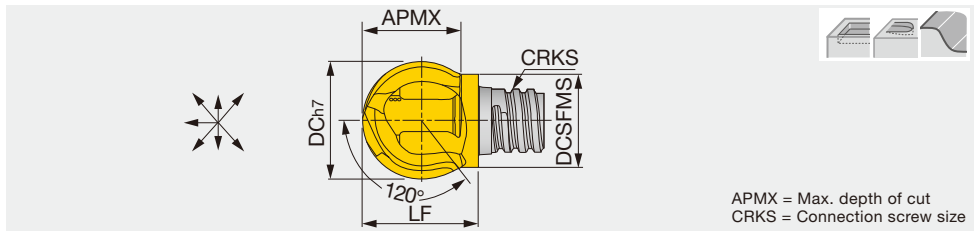
| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* | Fig. |
|----------------------|-------|-------|-----|-----|----|--------|------|----------------------|------|------|----------|---------|------|
| VBE050L04.0-BG-04S04 | ● | ● | 4 | 38° | 5 | 6 | 4 | 2.487 ⁽¹⁾ | S04 | 8.5 | KEYV-S05 | 4 | 1 |
| VBE060L04.0-BG-04S04 | ● | ● | 4 | 38° | 6 | 5.8 | 4 | 2.987 ⁽¹⁾ | S04 | 8.5 | KEYV-S05 | 4 | 2 |
| VBE060L05.5-BG-04S05 | ● | ● | 4 | 38° | 6 | 8 | 5.5 | 2.987 ⁽¹⁾ | S05 | 10 | KEYV-S05 | 7 | 1 |
| VBD080L05.0-BG-04S05 | ● | ● | 4 | 30° | 8 | 7.7 | 5 | 3.982 ⁽¹⁾ | S05 | 10 | KEYV-S05 | 7 | 2 |
| VBD100L07.0-BG-04S06 | ● | ● | 4 | 30° | 10 | 9.7 | 7 | 4.982 ⁽¹⁾ | S06 | 13 | KEYV-S06 | 10 | 2 |
| VBD120L09.0-BG-04S08 | ● | ● | 4 | 30° | 12 | 11.7 | 9 | 5.978 ⁽²⁾ | S08 | 16.5 | KEYV-S08 | 15 | 2 |
| VBD160L12.0-BG-04S10 | ● | ● | 4 | 30° | 16 | 15.3 | 12 | 7.978 ⁽²⁾ | S10 | 20.5 | KEYV-S10 | 28 | 2 |
| VBD200L15.0-BG-04S12 | ● | ● | 4 | 30° | 20 | 18.3 | 15 | 9.972 ⁽²⁾ | S12 | 25.5 | KEYV-S12 | 28 | 2 |

The tolerance of RE: (1) ± 0.01 (2) ± 0.012
 Torque*: Recommended clamping torque (N·m)
 VBE060/VBD080 ~ VBD200: 2 pieces per package
 VBD250: 1 piece per package

● : Line up

VBB**-SG...

2 flute, roughing - finishing, sphere cutting edge, high accuracy (h7 tolerance)



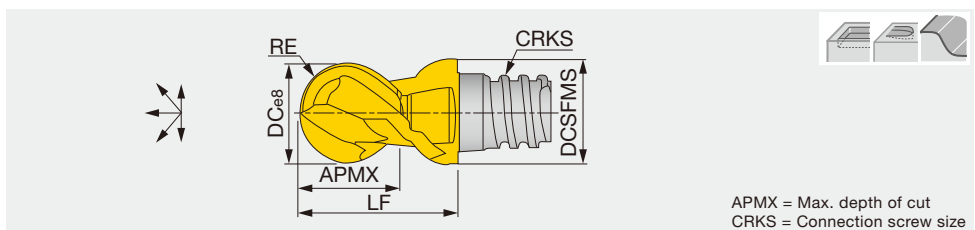
| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|------|------|-------------|---------|
| VBB100L08.0-SG-02S05 | ● | 2 | 0° | 10 | 7.6 | 7.5 | S05 | 10 | KEYV-S05 | 7 |
| VBB120L09.6-SG-02S06 | ● | 2 | 0° | 12 | 9.5 | 9 | S06 | 11.6 | ***KEYV-S08 | 10 |
| VBB160L12.9-SG-02S08 | ● | 2 | 0° | 16 | 12.2 | 12 | S08 | 15.4 | ***KEYV-S10 | 15 |
| VBB200L16.1-SG-02S10 | ● | 2 | 0° | 20 | 15.2 | 15 | S10 | 18.4 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N·m)
 *** The wrench size for these heads is different from the ones for the other head types.
 For pull-cutting on the vertical wall
 2 pieces per package

● : Line up

VBE**-BGA...

2 flute, roughing - finishing, for non-ferrous metal, helix cutting edge



| Designation | KS15F | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|----------------------|------|------|----------|---------|
| VBE080L05.0-BGA02S05 | ● | 2 | 45° | 8 | 7.7 | 5 | 3.982 ⁽¹⁾ | S05 | 10 | KEYV-S05 | 7 |
| VBE100L07.0-BGA02S06 | ● | 2 | 45° | 10 | 9.7 | 7 | 4.982 ⁽¹⁾ | S06 | 13 | KEYV-S06 | 10 |
| VBE120L09.0-BGA02S08 | ● | 2 | 45° | 12 | 11.7 | 9 | 5.978 ⁽²⁾ | S08 | 16.5 | KEYV-S08 | 15 |
| VBE160L12.0-BGA02S10 | ● | 2 | 45° | 16 | 15.3 | 12 | 7.978 ⁽²⁾ | S10 | 20.5 | KEYV-S10 | 28 |
| VBE200L15.0-BGA02S12 | ● | 2 | 45° | 20 | 18.3 | 15 | 9.972 ⁽²⁾ | S12 | 25.5 | KEYV-S12 | 28 |

The tolerance of RE: (1) ± 0.01 (2) ± 0.012
 Torque*: Recommended clamping torque (N·m)
 2 pieces per package

● : Line up

STANDARD CUTTING CONDITIONS

Profiling for roughing

VBB-BM / BG / SG, VBD-BG, VBE-BGA

| ISO | Workpiece material | Hardness | Cutting speed V _c (m/min) | Feed per tooth: fz (mm/t) | | | | | | | | Depth of cut a _p (mm) | Pick feed P _f (mm) |
|-----|--|--------------|--|---------------------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|--|-------------------------------------|
| | | | | Tool diameter: DC (mm) | | | | | | | | | |
| | | | | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 100 - 200 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 80 - 180 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 80 - 160 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 60 - 100 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 100 - 220 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 100 - 220 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| N | Aluminium alloys Si < 13% | - | 200 - 700 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.4 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.2 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.2 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 40 - 80 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.2 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 60 | 0.03 - 0.07 | 0.03 - 0.07 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.08 - 0.15 | 0.08 - 0.15 | 0.3 x DC | 0.2 x DC |

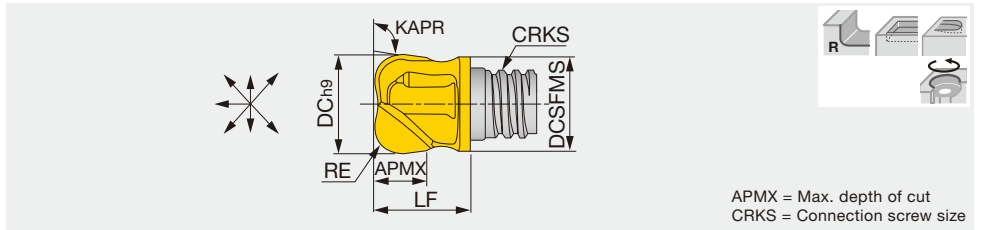
Profiling for semi-finishing and finishing

VBB-BM / BG / SG, VBD-BG, VBE-BGA

| ISO | Workpiece material | Hardness | Cutting speed V _c (m/min) | Feed per tooth: fz (mm/t) | | | | | | | | Depth of cut a _p (mm) | Pick feed P _f (mm) |
|-----|--|--------------|--|---------------------------|-------------|-------------|-------------|-------------|-------------|------------|------------|--|-------------------------------------|
| | | | | Tool diameter: DC (mm) | | | | | | | | | |
| | | | | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 120 - 250 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 100 - 220 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 100 - 200 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 80 - 120 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 120 - 280 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 120 - 280 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| N | Aluminium alloys Si < 13% | - | 300 - 1000 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| | Aluminium alloys Si ≥ 13% | - | 150 - 400 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.1 x DC | 0.15 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 50 - 100 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.08 x DC | 0.1 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 30 - 50 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.08 x DC | 0.1 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 50 - 100 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.08 x DC | 0.1 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 30 - 80 | 0.04 - 0.09 | 0.04 - 0.09 | 0.06 - 0.11 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.16 | 0.1 - 0.18 | 0.1 - 0.18 | 0.08 x DC | 0.1 x DC |

VRB**-02..., VRC**-02...

2 flute, roughing - semi finishing, economical



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | KAPR | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|------|------|------|-------------|---------|
| VRC100L07.0R10-02S06 | ● | 2 | 15° | 10 | 9.5 | 7 | 1 | 95° | S06 | 12.4 | KEYV-S06 | 10 |
| VRB100L06.0R20-02S06 | ● | 2 | 0° | 10 | 9.2 | 6 | 2 | 97° | S06 | 12.4 | KEYV-S06 | 10 |
| VRB120L05.7R30-02S06 | ● | 2 | 0° | 12 | 9.5 | 5.7 | 3 | 97° | S06 | 9.1 | ***KEYV-S08 | 10 |
| VRB120L05.4R40-02S06 | ● | 2 | 0° | 12 | 9.5 | 5.4 | 4 | 97° | S06 | 9.1 | ***KEYV-S08 | 10 |
| VRB120L06.3R16-02S08 | ● | 2 | 0° | 12 | 11.5 | 5.9 | 1.6 | 97° | S08 | 11.1 | KEYV-S08 | 15 |
| VRB120L06.2R20-02S08 | ● | 2 | 0° | 12 | 11.5 | 6.2 | 2 | 97° | S08 | 11.1 | KEYV-S08 | 15 |
| VRB120L06.1R25-02S08 | ● | 2 | 0° | 12 | 11.5 | 5.8 | 2.5 | 97° | S08 | 11.1 | KEYV-S08 | 15 |
| VRB120L06.1R30-02S08 | ● | 2 | 0° | 12 | 11.5 | 5.7 | 3 | 97° | S08 | 11.1 | KEYV-S08 | 15 |
| VRB120L05.9R40-02S08 | ● | 2 | 0° | 12 | 11.5 | 5.5 | 4 | 97° | S08 | 11.1 | KEYV-S08 | 15 |
| VRB160L08.0R50-02S10 | ● | 2 | 0° | 16 | 15.2 | 8 | 5 | 97° | S10 | 20.2 | KEYV-S10 | 28 |
| VRB200L11.1R30-02S12 | ● | 2 | 0° | 20 | 18.3 | 11 | 3 | 97° | S12 | 17 | KEYV-S12 | 28 |
| VRB200L11.5R40-02S12 | ● | 2 | 0° | 20 | 18.3 | 11.3 | 4 | 97° | S12 | 17.3 | KEYV-S12 | 28 |
| VRB200L11.5R50-02S12 | ● | 2 | 0° | 20 | 18.3 | 11.3 | 5 | 97° | S12 | 17.3 | KEYV-S12 | 28 |
| VRB200L11.4R60-02S12 | ● | 2 | 0° | 20 | 18.3 | 11.2 | 6 | 97° | S12 | 17.3 | KEYV-S12 | 28 |
| VRB200L11.3R80-02S12 | ● | 2 | 0° | 20 | 18.3 | 11.1 | 8 | 97° | S12 | 17.3 | KEYV-S12 | 28 |

Torque*: Recommended clamping torque (N-m)

*** The wrench size for these heads is different from the ones for the other head types.

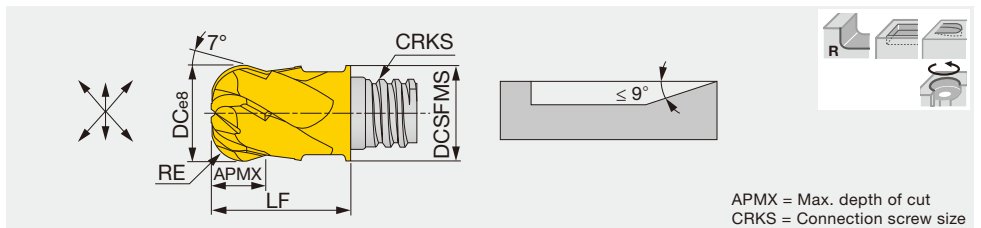
Suitable for contouring operation.

2 pieces per package

● : Line up

VRD**-06...

6 flute, semi finishing - finishing, helix cutting edge



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|----|------|------|----------|---------|
| VRD080L04.0R20-06S05 | ● | 6 | 30° | 8 | 7.7 | 4 | 2 | S05 | 10 | KEYV-S05 | 7 |
| VRD100L05.0R30-06S06 | ● | 6 | 30° | 10 | 9.7 | 5 | 3 | S06 | 13 | KEYV-S06 | 10 |
| VRD120L07.0R40-06S08 | ● | 6 | 30° | 12 | 11.7 | 7 | 4 | S08 | 16.5 | KEYV-S08 | 15 |
| VRD160L09.0R50-06S10 | ● | 6 | 30° | 16 | 15.3 | 9 | 5 | S10 | 20.5 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)

2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → [I082](#)

STANDARD CUTTING CONDITIONS

Shoulder milling

VRB, VRC, VRD

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | | Depth of cut ap (mm) | Width of cut ae (mm) |
|-----|--|--------------|--------------------------------|---------------------------|-------------|-------------|-------------|------------|-------------------------|-------------------------|
| | | | | Tool diameter: DC (mm) | | | | | | |
| | | | | 8 | 10 | 12 | 16 | 20 | | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 80 - 180 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 60 - 140 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 60 - 120 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 40 - 100 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 80 - 200 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 80 - 200 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| N | Aluminium alloys Si < 13% | - | 200 - 700 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 40 - 80 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 60 | 0.05 - 0.09 | 0.07 - 0.12 | 0.08 - 0.13 | 0.09 - 0.15 | 0.1 - 0.17 | 0.6 x DC | 0.25 x DC |

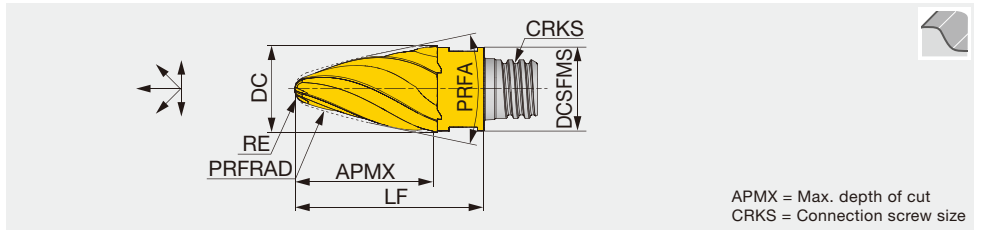
Slotting

VRB, VRC, VRD

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | | | Depth of cut ap (mm) |
|-----|--|--------------|--------------------------------|---------------------------|-------------|-------------|-------------|------------|----------------------------|
| | | | | Tool diameter: DC (mm) | | | | | |
| | | | | 8 | 10 | 12 | 16 | 20 | |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 50 - 70 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 40 - 80 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 40 - 70 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 30 - 60 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 50 - 120 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 50 - 120 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| N | Aluminium alloys Si < 13% | - | 130 - 400 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Aluminium alloys Si ≥ 13% | - | 70 - 200 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 20 - 40 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 10 - 20 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 25 - 60 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 10 - 30 | 0.03 - 0.04 | 0.04 - 0.05 | 0.05 - 0.06 | 0.06 - 0.08 | 0.07 - 0.1 | 0.5 x DC |

VBO...

4, 5 flute, semi finishing - finishing, long edge, high productive profiling



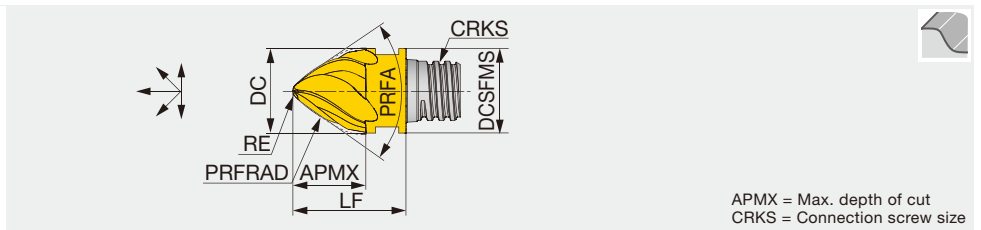
| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | RE | PRFRAD | PRFA | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|----|--------|-------|------|------|----------|---------|
| VBO080L12.0R900-4S05 | ● | 4 | 30° | 8 | 7.7 | 12 | 1 | 90 | 33.6° | S05 | 18 | KEYV-S05 | 7 |
| VBO100L15.0R850-5S06 | ● | 5 | 30° | 10 | 9.7 | 15 | 2 | 85 | 27.3° | S06 | 22 | KEYV-S06 | 10 |
| VBO120L19.0R800-5S08 | ● | 5 | 30° | 12 | 11.7 | 19 | 2 | 80 | 29.3° | S08 | 27 | KEYV-S08 | 15 |
| VBO160L25.0R750-5S10 | ● | 5 | 30° | 16 | 15.3 | 25 | 3 | 75 | 26.7° | S10 | 33.5 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

VBO...

4 flute, semi finishing - finishing, short edge, high productive profiling



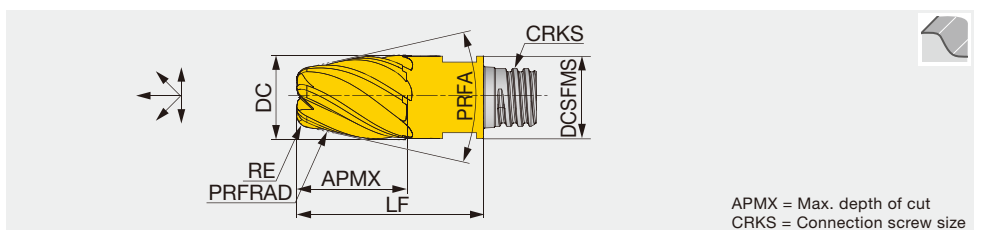
| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | RE | PRFRAD | PRFA | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|--------|-------|------|------|----------|---------|
| VBO100L08.0R250-4S06 | ● | 4 | 30° | 10 | 9.7 | 8 | 0.8 | 25 | 70.8° | S06 | 13 | KEYV-S06 | 10 |
| VBO120L09.0R300-4S08 | ● | 4 | 30° | 12 | 11.7 | 9 | 1.2 | 30 | 71.6° | S08 | 16.5 | KEYV-S08 | 15 |
| VBO160L13.0R400-4S10 | ● | 4 | 30° | 16 | 15.3 | 13 | 1.6 | 40 | 70.3° | S10 | 20.5 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

VBN...

6 flute, semi finishing - finishing, high productive profiling



| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | RE | PRFRAD | PRFA | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-----|--------|-------|------|------|----------|---------|
| VBN100L13.0R450-6S06 | ● | 6 | 35° | 10 | 9.7 | 13 | 1.5 | 45 | 15.1° | S06 | 22 | KEYV-S06 | 10 |
| VBN120L15.0R500-6S08 | ● | 6 | 35° | 12 | 11.7 | 15 | 2 | 50 | 15.1° | S08 | 27 | KEYV-S08 | 15 |
| VBN160L18.0R600-6S10 | ● | 6 | 35° | 16 | 15.3 | 18 | 2 | 60 | 15.1° | S10 | 33.5 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

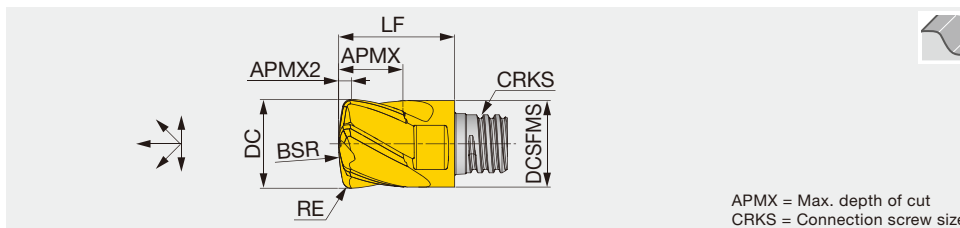
● : Line up

Reference pages: Standard cutting conditions → I085

6 flute, semi finishing - finishing, high productive profiling



Lens

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | NOF | FHA | DC | DCSFMS | APMX | APMX2 | RE | BSR | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|----|--------|------|-------|-----|-----|------|------|----------|---------|
| VBL080L0.90R160-6S05 | ● | 6 | 30° | 8 | 7.7 | 5.5 | 0.9 | 0.5 | 16 | S05 | 10 | KEYV-S05 | 7 |
| VBL100L1.40R200-6S06 | ● | 6 | 30° | 10 | 9.7 | 7.5 | 1.42 | 1 | 20 | S06 | 13 | KEYV-S06 | 10 |
| VBL120L1.50R240-6S08 | ● | 6 | 30° | 12 | 11.7 | 9 | 1.55 | 1 | 24 | S08 | 16.5 | KEYV-S08 | 15 |
| VBL160L1.80R320-6S10 | ● | 6 | 30° | 16 | 15.3 | 12 | 1.8 | 1 | 32 | S10 | 20.5 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up



TARGET APPLICATIONS

VBO-short

Convex-curved surfaces, tapered surfaces, and surfaces consisting of combinations of a small corner radius and walls (the corner radius must be larger than the tool's nose radius).



VBO-long

Convex-curved and tapered surfaces in gentler profile than those of VBO-short.



VBN

Impellers, blisks, blades, and other aerospace parts.

Reference pages: Standard cutting conditions → **I085**

STANDARD CUTTING CONDITIONS

Profiling

VBO, VBN, VBL

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth: fz (mm/t) | | | Cusp height (mm) |
|-----|--|--------------|-----------------------------|---------------------------|-------------|-------------|---------------------|
| | | | | Tool diameter: DC (mm) | | | |
| | | | | 10 | 12 | 16 | |
| P | Low carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 100 - 200 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | High carbon steel SCM440, SCr415, etc. 42CrMo4, 15Cr3, etc. | - 300 HB | 80 - 180 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 80 - 160 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 60 - 100 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc. | 150 - 250 HB | 100 - 220 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | Ductile cast iron FCD400, etc. 400-15S, etc. | 150 - 250 HB | 100 - 220 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| N | Aluminium alloys Si < 13% | - | 200 - 700 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 80 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | Heat-resistant alloys Inconel718, etc. | - 40 HRC | 20 - 40 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| H | Hardened steel SKD61, SKT4, etc. X40CrMoV5-1, 55NiCrMoV7, etc. | - | 40 - 80 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |
| | Hardened steel SKD11, SKH, etc. X153CrMoV12, HS18-0-1, etc. | 50 - 60 HRC | 20 - 60 | 0.05 - 0.1 | 0.06 - 0.11 | 0.07 - 0.13 | 0.1 |

TIPS FOR USING ON 3-AXIS MACHINES

The **VBO/VBN** milling heads are designed for the use on 5-axis machines. However, they are also effective on 3-axis machining centers when either of the following conditions is satisfied.

1. The angled walls or curved surfaces to be machined have tilt angles within the range specified in the chart on the right.
2. Use as a regular tapered ball mill with only the nose radius of the tool tip, and not the radius on the tool side, to be used. Please note that the working diameter will be smaller than those of a ball mill of the same working diameter.

| | Designation | Applicable ranges of tilt angles on workpiece | | |
|-----------|----------------------|---|-------|------|
| | | Min. | Mean | Max. |
| VBO-short | VBO100L08.0R250-4S06 | 56° | 70.8° | 85° |
| | VBO120L09.0R300-4S08 | 58° | 71.6° | 85° |
| | VBO160L13.0R400-4S10 | 56° | 70.3° | 85° |
| VBO-long | VBO100L15.0R850-5S06 | 20° | 27.3° | 35° |
| | VBO120L19.0R800-5S08 | 19° | 29.3° | 40° |
| | VBO160L25.0R750-5S10 | 10° | 26.7° | 43° |
| VBN | VBN100L13.0R450-6S06 | 0° | 15.1° | 29° |
| | VBN120L15.0R500-6S08 | 0° | 15.1° | 29° |
| | VBN160L18.0R600-6S10 | 0° | 15.1° | 29° |

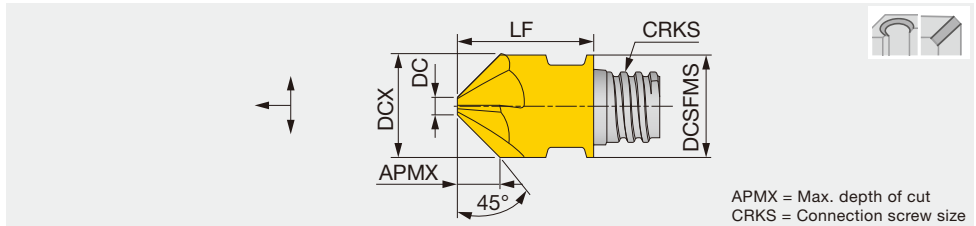
Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



4, 6 flute, chamfering angle: 45°



Chamfering

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | NOF | FHA | DCX | DCSFMS | APMX | DC | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|------|--------|------|------|------|------|----------|---------|
| VCA100L04.0A45-04S06 | ● | ● | 4 | 0° | 10 | 10 | 4 | 1.95 | S06 | 13 | KEYV-S06 | 10 |
| VCA120L05.0A45-04S08 | ● | ● | 4 | 0° | 12 | 12 | 5 | 1.95 | S08 | 16.5 | KEYV-S08 | 15 |
| VCA127L05.3A45-04S08 | | ● | 4 | 0° | 12.7 | 12.7 | 5.3 | 1.98 | S08 | 16.5 | KEYV-S08 | 15 |
| VCA160L06.5A45-06S10 | ● | ● | 6 | 0° | 16 | 16 | 6.5 | 3 | S10 | 20.3 | KEYV-S10 | 28 |
| VCA200L07.5A45-06S12 | | ● | 6 | 0° | 20 | 18.3 | 7.5 | 5 | S12 | 25.5 | KEYV-S12 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up



Square



Ball



Radius

VCW-02...**

2 flute, chamfering angle: 45°, back chamfering capability



Chamfering



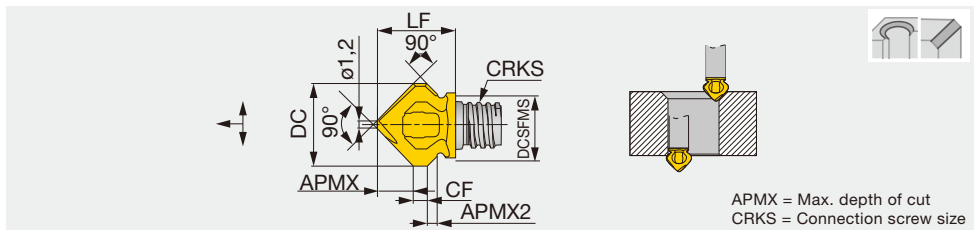
Slotting



Threading



Others

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | NOF | FHA | DC | DCSFMS | APMX | APMX2 | CF | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|------|--------|------|-------|----|------|------|-------------|---------|
| VCW118L05.0A45-02S06 | ● | ● | 2 | 0° | 11.8 | 9.3 | 5 | 1.2 | 2 | S06 | 11.2 | ***KEYV-S08 | 10 |

Torque*: Recommended clamping torque (N-m)

*** The wrench size for these heads is different from the ones for the other head types.

Available for chamfering of reverse side.

2 pieces per package

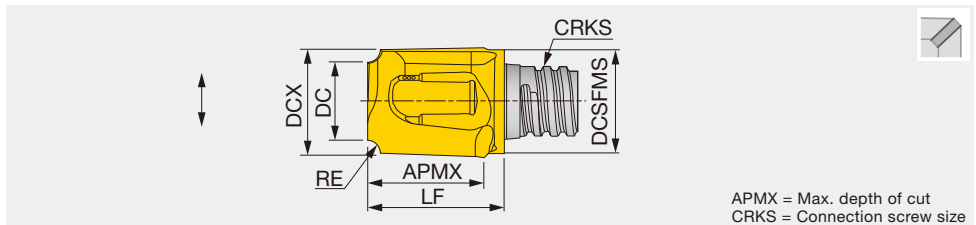
● : Line up

**VCR**-02...**

2 flute, radius chamfering



Chamfering

APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DCX | DCSFMS | DC | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|------|--------|-----|------|-----|------|------|----------|---------|
| VCR080L07.5R10-02S05 | ● | 2 | 0° | 8 | 7.6 | 5.8 | 7.5 | 1 | S05 | 10.5 | KEYV-S05 | 7 |
| VCR100L09.5R16-02S06 | ● | 2 | 0° | 10 | 9.5 | 6.8 | 9.5 | 1.6 | S06 | 12.5 | KEYV-S06 | 10 |
| VCR100L09.5R25-02S06 | ● | 2 | 0° | 10 | 9.5 | 5.1 | 9.5 | 2.5 | S06 | 12.5 | KEYV-S06 | 10 |
| VCR127L12.0R30-02S08 | ● | 2 | 0° | 12.7 | 12.2 | 6.5 | 12 | 3 | S08 | 15.6 | KEYV-S08 | 15 |
| VCR127L12.0R40-02S08 | ● | 2 | 0° | 12.7 | 12.2 | 4.7 | 12 | 4 | S08 | 15.6 | KEYV-S08 | 15 |
| VCR160L15.0R50-02S10 | ● | 2 | 0° | 16 | 15.2 | 6.2 | 15 | 5 | S10 | 19.1 | KEYV-S10 | 28 |
| VCR200L07.0R60-02S12 | ● | 2 | 0° | 20 | 18.3 | 8 | 7 | 6 | S12 | 17.4 | KEYV-S12 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → **I087**

STANDARD CUTTING CONDITIONS

Chamfering and countersinking (Milling, Z-feed chamfering)

VCA, VCW, VCR

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------------|-----------------------------|-----------------------------|
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 60 - 100 | 0.03 - 0.06 |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 50 - 80 | 0.03 - 0.06 |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 40 - 70 | 0.03 - 0.06 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 30 - 50 | 0.03 - 0.06 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 80 - 120 | 0.03 - 0.06 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 80 - 120 | 0.03 - 0.06 |
| N | Aluminium alloys | - | 100 - 200 | 0.04 - 0.08 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 30 - 50 | 0.025 - 0.05 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.02 - 0.04 |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 30 - 50 | 0.025 - 0.05 |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 40 | 0.02 - 0.04 |

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

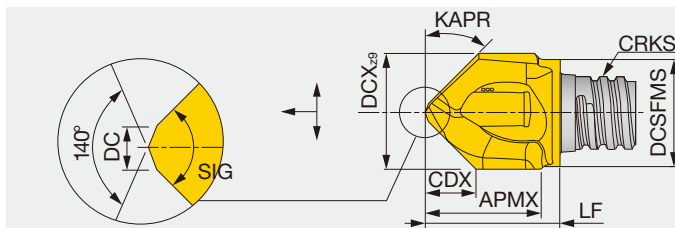
Drilling tool

Tooling System

User's Guide

Index

2 flute, chamfering angle: 30°, 45°, 60°

Chamfering
Spot drillCDX = Max. hole depth
APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH715 | AH725 | SIG | NOF | FHA | DCX | DCSFMS | APMX | CDX | CRKS | LF | DC | KAPR | Wrench | Torque* |
|----------------------|-------|-------|------|-----|-----|------|--------|------|-----|------|-------|-----|------|----------|---------|
| VCP100L09.5A30-02S06 | ● | | 60° | 2 | 0° | 10 | 9.5 | 8.5 | 7.5 | S06 | 11.75 | 1.5 | 60° | KEYV-S06 | 10 |
| VCP120L12.0A30-02S08 | ● | ● | 60° | 2 | 0° | 12 | 11.5 | 11 | 9.2 | S08 | 15.4 | 1.5 | 60° | KEYV-S08 | 15 |
| VCP160L15.0A30-02S10 | ● | ● | 60° | 2 | 0° | 16 | 15.2 | 16 | 12 | S10 | 20.2 | 2.5 | 60° | KEYV-S10 | 28 |
| VCP080L07.7A45-02S05 | ● | ● | 90° | 2 | 0° | 8 | 7.6 | 7.5 | 3.7 | S05 | 9.75 | 1 | 45° | KEYV-S05 | 7 |
| VCP083L07.9A45-02S05 | ● | ● | 90° | 2 | 0° | 8.3 | 7.6 | 7.5 | 3.8 | S05 | 10 | 1 | 45° | KEYV-S05 | 7 |
| VCP100L09.0A45-02S06 | ● | ● | 90° | 2 | 0° | 10 | 9.5 | 9.5 | 4.4 | S06 | 11.75 | 1.5 | 45° | KEYV-S06 | 10 |
| VCP104L09.0A45-02S06 | ● | ● | 90° | 2 | 0° | 10.4 | 9.5 | 9.5 | 4.6 | S06 | 11.75 | 1.5 | 45° | KEYV-S06 | 10 |
| VCP120L12.0A45-02S08 | ● | ● | 90° | 2 | 0° | 12 | 11.5 | 11.5 | 5.4 | S08 | 15.4 | 1.5 | 45° | KEYV-S08 | 15 |
| VCP124L12.0A45-02S08 | ● | ● | 90° | 2 | 0° | 12.4 | 11.5 | 11.5 | 5.6 | S08 | 15.4 | 1.5 | 45° | KEYV-S08 | 15 |
| VCP160L15.0A45-02S10 | ● | ● | 90° | 2 | 0° | 16 | 15.2 | 15 | 7.1 | S10 | 18.8 | 1.5 | 45° | KEYV-S10 | 28 |
| VCP165L15.0A45-02S10 | ● | ● | 90° | 2 | 0° | 16.5 | 15.2 | 15 | 7.1 | S10 | 18.8 | 1.5 | 45° | KEYV-S10 | 28 |
| VCP100L09.5A60-02S06 | ● | | 120° | 2 | 0° | 10 | 9.5 | 9.5 | 2.7 | S06 | 12.7 | 1.5 | 30° | KEYV-S06 | 10 |
| VCP120L12.0A60-02S08 | ● | ● | 120° | 2 | 0° | 12 | 11.5 | 11.5 | 3.3 | S08 | 15.2 | 1.5 | 30° | KEYV-S08 | 15 |
| VCP160L15.5A60-02S10 | ● | ● | 120° | 2 | 0° | 16 | 15.2 | 16 | 4.4 | S10 | 19.9 | 1.5 | 30° | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up



Square



Ball



Radius



Chamfering



Slotting



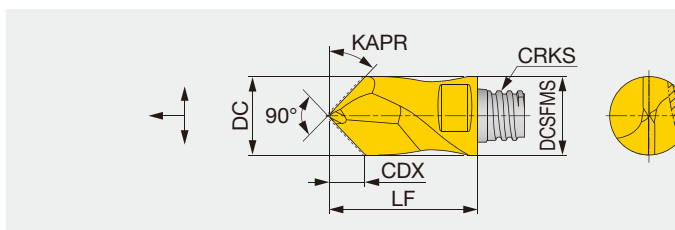
Threading



Others

VDS...

2 flute, chamfering angle: 45°, helix cutting edge

Chamfering
Spot drillCDX = Max. hole depth
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | CDX | KAPR | CRKS | LF | Wrench | Torque* |
|-----------------|-------|-----|-----|----|--------|-----|------|------|----|----------|---------|
| VDS080A45-02S05 | ● | 2 | 10° | 8 | 7.7 | 3.7 | 45° | S05 | 15 | KEYV-S05 | 7 |
| VDS100A45-02S06 | ● | 2 | 10° | 10 | 9.7 | 4.4 | 45° | S06 | 19 | KEYV-S06 | 10 |
| VDS120A45-02S08 | ● | 2 | 10° | 12 | 11.7 | 5.4 | 45° | S08 | 23 | KEYV-S08 | 15 |
| VDS160A45-02S10 | ● | 2 | 10° | 16 | 15.3 | 7.1 | 45° | S10 | 28 | KEYV-S10 | 28 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

STANDARD CUTTING CONDITIONS

Spot drill
VCP, VDS

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed f (mm/rev) |
|-----|--|--------------|-----------------------------|--------------------|
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 60 - 100 | 0.06 - 0.12 |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 50 - 80 | 0.06 - 0.12 |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 40 - 70 | 0.06 - 0.12 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 30 - 50 | 0.06 - 0.12 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 80 - 120 | 0.06 - 0.12 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 80 - 120 | 0.06 - 0.12 |
| N | Aluminium alloys | - | 100 - 200 | 0.08 - 0.16 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 30 - 50 | 0.05 - 0.1 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 20 - 40 | 0.04 - 0.08 |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 30 - 50 | 0.05 - 0.1 |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 20 - 40 | 0.04 - 0.08 |

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index



Center hole

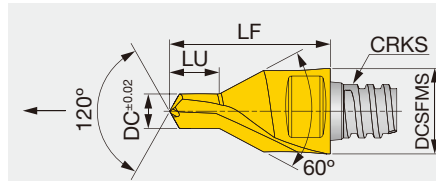


Fig. 1 Type A

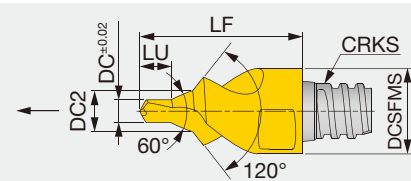


Fig. 2 Type B

CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC±0.02 | DC2 | DCSFMS | LU | CRKS | LF | Wrench | Torque* | Fig. |
|----------------------|-------|-----|-----|---------|-------|--------|-----|------|------|----------|---------|------|
| VDP107L1.60A30-02S04 | ● | 2 | 0° | 1.07 | - | 6 | 1.6 | S04 | 10 | KEYV-S05 | 4 | 1 |
| VDP165L2.40A30-02S04 | ● | 2 | 0° | 1.65 | - | 6 | 2.4 | S04 | 10 | KEYV-S05 | 4 | 1 |
| VDP207L2.90A30-02S04 | ● | 2 | 0° | 2.07 | - | 6 | 2.9 | S04 | 10 | KEYV-S05 | 4 | 1 |
| VDP328L04.6A30-02S05 | ● | 2 | 0° | 3.28 | - | 8 | 4.6 | S05 | 15 | KEYV-S05 | 7 | 1 |
| VDP412L05.9A30-02S06 | ● | 2 | 0° | 4.12 | - | 10 | 5.9 | S06 | 19 | KEYV-S06 | 10 | 1 |
| VDP513L07.2A30-02S08 | ● | 2 | 0° | 5.13 | - | 12 | 7.2 | S08 | 23 | KEYV-S08 | 15 | 1 |
| VDP646L08.9A30-02S10 | ● | 2 | 0° | 6.46 | - | 16 | 8.9 | S10 | 28 | KEYV-S10 | 28 | 1 |
| VDP324L4.38B30-02S08 | ● | 2 | 0° | 3.24 | 6.77 | 12 | 4.4 | S08 | 23 | KEYV-S08 | 15 | 2 |
| VDP409L5.60B30-02S08 | ● | 2 | 0° | 4.09 | 8.56 | 12.7 | 5.6 | S08 | 23 | KEYV-S08 | 15 | 2 |
| VDP509L6.89B30-02S12 | ● | 2 | 0° | 5.09 | 10.69 | 18.45 | 6.9 | S12 | 25.5 | KEYV-S12 | 28 | 2 |
| VDP641L8.63B30-02S12 | ● | 2 | 0° | 6.41 | 13.29 | 20 | 8.6 | S12 | 25.5 | KEYV-S12 | 28 | 2 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

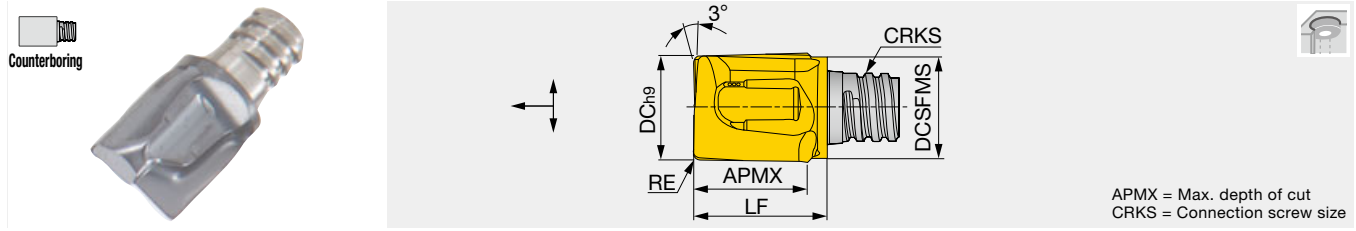
STANDARD CUTTING CONDITIONS

Center drill

VDP

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed : f (mm/rev) | | | | | | |
|-----|--|--------------|-----------------------------|-------------------|--------------|--------------|-------------|-------------|-------------|-------------|
| | | | | VDP107 | VDP165 | VDP2 | VDP3 | VDP4 | VDP5 | VDP6 |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 40 - 80 | 0.02 - 0.04 | 0.025 - 0.05 | 0.025 - 0.05 | 0.04 - 0.08 | 0.05 - 0.1 | 0.05 - 0.1 | 0.06 - 0.12 |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 30 - 50 | 0.02 - 0.04 | 0.025 - 0.05 | 0.025 - 0.05 | 0.04 - 0.08 | 0.05 - 0.1 | 0.05 - 0.1 | 0.06 - 0.12 |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 20 - 30 | 0.02 - 0.04 | 0.025 - 0.05 | 0.025 - 0.05 | 0.04 - 0.08 | 0.05 - 0.1 | 0.05 - 0.1 | 0.06 - 0.12 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 15 - 25 | 0.015 - 0.03 | 0.02 - 0.04 | 0.02 - 0.04 | 0.04 - 0.08 | 0.05 - 0.1 | 0.05 - 0.1 | 0.06 - 0.12 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 60 - 100 | 0.02 - 0.04 | 0.025 - 0.05 | 0.025 - 0.05 | 0.05 - 0.09 | 0.07 - 0.12 | 0.07 - 0.12 | 0.12 - 0.18 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 60 - 100 | 0.02 - 0.04 | 0.025 - 0.05 | 0.025 - 0.05 | 0.04 - 0.08 | 0.05 - 0.1 | 0.05 - 0.1 | 0.1 - 0.15 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 15 - 25 | 0.01 - 0.02 | 0.01 - 0.02 | 0.015 - 0.03 | 0.04 - 0.07 | 0.04 - 0.07 | 0.04 - 0.07 | 0.04 - 0.07 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 10 - 20 | 0.01 - 0.02 | 0.01 - 0.02 | 0.015 - 0.03 | 0.03 - 0.06 | 0.03 - 0.06 | 0.03 - 0.06 | 0.03 - 0.06 |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 15 - 25 | - | - | - | 0.04 - 0.07 | 0.04 - 0.07 | 0.04 - 0.07 | 0.04 - 0.07 |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 10 - 20 | - | - | - | 0.03 - 0.06 | 0.03 - 0.06 | 0.03 - 0.06 | 0.03 - 0.06 |

2 flute, for counterboring (can be used for milling)



APMX = Max. depth of cut
CRKS = Connection screw size

| Designation | AH725 | NOF | FHA | DC | DCSFMS | APMX | RE | CRKS | LF | Wrench | Torque* |
|----------------------|-------|-----|-----|-----|--------|------|-----|------|------|----------|---------|
| VGC078L08.0R02-02S05 | ● | 2 | 10° | 7.8 | 7.6 | 8 | 0.2 | S05 | 10 | KEYV-S05 | 7 |
| VGC080L08.0R04-02S05 | ● | 2 | 10° | 8 | 7.6 | 8 | 0.4 | S05 | 10 | KEYV-S05 | 7 |
| VGC080L08.0R10-02S05 | ● | 2 | 10° | 8 | 7.6 | 8 | 1 | S05 | 10 | KEYV-S05 | 7 |
| VGC080L08.0R20-02S05 | ● | 2 | 10° | 8 | 7.6 | 8 | 2 | S05 | 10 | KEYV-S05 | 7 |
| VGC098L09.0R03-02S06 | ● | 2 | 10° | 9.8 | 9.5 | 9.5 | 0.3 | S06 | 12.4 | KEYV-S06 | 10 |
| VGC100L09.0R04-02S06 | ● | 2 | 10° | 10 | 9.5 | 9.5 | 0.4 | S06 | 12.4 | KEYV-S06 | 10 |
| VGC100L09.0R10-02S06 | ● | 2 | 10° | 10 | 9.5 | 9.5 | 1 | S06 | 12.4 | KEYV-S06 | 10 |
| VGC100L09.0R20-02S06 | ● | 2 | 10° | 10 | 9.5 | 9.5 | 2 | S06 | 12.4 | KEYV-S06 | 10 |
| VGC120L10.0R04-02S08 | ● | 2 | 10° | 12 | 11.5 | 10 | 0.4 | S08 | 14.2 | KEYV-S08 | 15 |
| VGC120L10.0R10-02S08 | ● | 2 | 10° | 12 | 11.5 | 10 | 1 | S08 | 14.2 | KEYV-S08 | 15 |
| VGC120L10.0R20-02S08 | ● | 2 | 10° | 12 | 11.5 | 10 | 2 | S08 | 14.2 | KEYV-S08 | 15 |
| VGC160L15.0R04-02S10 | ● | 2 | 10° | 16 | 15.2 | 15 | 0.4 | S10 | 19 | KEYV-S10 | 28 |
| VGC160L15.0R08-02S10 | ● | 2 | 10° | 16 | 15.2 | 15 | 0.8 | S10 | 19 | KEYV-S10 | 28 |

Can drill with step feed (Maximum depth: ap x 0.5)
Torque*: Recommended clamping torque (N·m)
2 pieces per package

● : Line up

STANDARD CUTTING CONDITIONS

Counterboring

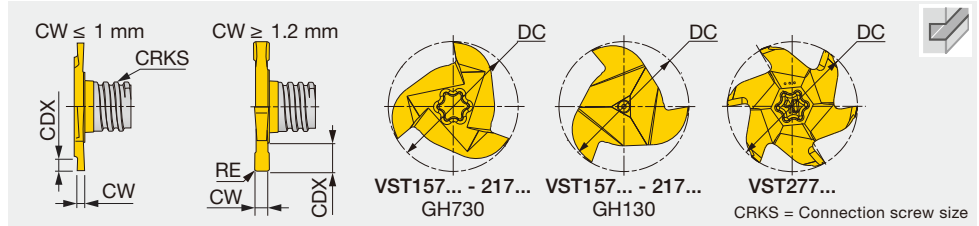
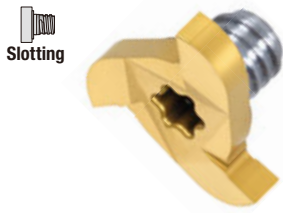
VGC

| ISO | Workpiece material | Hardness | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|-----|--|--------------|-----------------------------|-----------------------------|
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 40 - 80 | 0.04 - 0.08 |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 30 - 50 | 0.04 - 0.08 |
| | Prehardened steel PX5, NAK80, etc. | 30 - 40 HRC | 20 - 30 | 0.04 - 0.08 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 15 - 25 | 0.04 - 0.08 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 60 - 100 | 0.05 - 0.09 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 60 - 100 | 0.04 - 0.08 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 15 - 25 | 0.04 - 0.07 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 10 - 20 | 0.03 - 0.06 |
| H | Hardened steel SKD61, SKT4, etc. 55NiCrMoV7, etc. | 40 - 50 HRC | 15 - 25 | 0.04 - 0.07 |
| | Hardened steel SKD11, SKH51, etc. HS6-5-2, etc. | 50 - 60 HRC | 10 - 20 | 0.03 - 0.06 |

When drilling, pecking operation should be applied with the depth of 0.3 - 0.5 mm per step.
Apply the same cutting conditions as the VEE type head when conducting shoulder milling or slotting operations.



3 flute, for slotting



| Designation | GH730 | AH735 | GH130 | NOF | FHA | DC | CW±0.02 | RE | CRKS | CDX | Wrench | Torque* |
|----------------------|-------|-------|-------|-----|-----|------|--------------------|------|------|-----|---|---------|
| VST157W1.50R010-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 1.5 | 0.1 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST157W1.57R020-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 1.57 | 0.2 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST157W2.00R020-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 2 | 0.2 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST157W2.39R020-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 2.39 | 0.2 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST157W2.50R020-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 2.5 | 0.2 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST157W3.00R020-3S06 | ● | | ▲ | 3 | 0° | 15.7 | 3 | 0.2 | S06 | 2.8 | KEYV-177 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 10 |
| VST157W3.17R020-3S06 | | | ▲ | 3 | 0° | 15.7 | 3.17 | 0.2 | S06 | 2.8 | KEYV-177 | 10 |
| VST177W1.20R005-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 1.2 ⁽¹⁾ | 0.05 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W1.40R005-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 1.4 ⁽¹⁾ | 0.05 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W1.50R010-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 1.5 | 0.1 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W1.57R020-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 1.57 | 0.2 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W1.70R005-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 1.7 ⁽¹⁾ | 0.05 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W2.00R020-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 2 | 0.2 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W2.20R110-3S06 | | | ▲ | 3 | 0° | 17.7 | 2.20 | 1.1 | S06 | 3.8 | KEYV-177 | 10 |
| VST177W2.39R020-3S06 | | | ▲ | 3 | 0° | 17.7 | 2.39 | 0.2 | S06 | 3.8 | KEYV-177 | 10 |
| VST177W2.50R020-3S06 | ● | | ▲ | 3 | 0° | 17.7 | 2.5 | 0.2 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T20 ⁽³⁾ | 10 |
| VST177W3.00R020-3S06 | ● | ▲ | ▲ | 3 | 0° | 17.7 | 3 | 0.2 | S06 | 3.8 | KEYV-177 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 10 |
| VST177W3.17R020-3S06 | | | ▲ | 3 | 0° | 17.7 | 3.17 | 0.2 | S06 | 3.8 | KEYV-177 | 10 |

(1) CW is based on DIN471 / 472

(2) Applicable for GH130, AH735

(3) Applicable for GH730

Torque*: Recommended clamping torque (N·m)

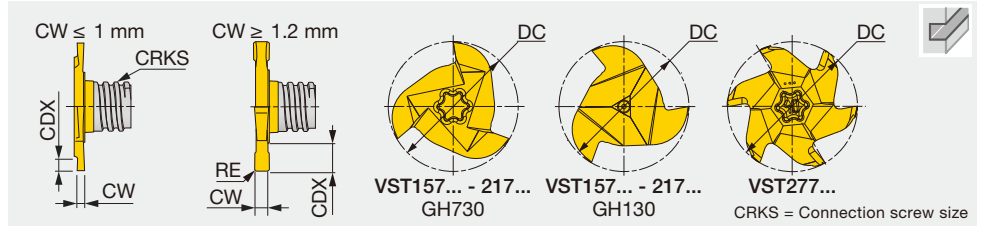
2 pieces per package

● : Line up

▲ : To be discontinued

VST**-4/6...

4, 6 flute, for slotting



| Designation | GH730 | AH735 | GH130 | NOF | FHA | DC | CW±0.02 | RE | CRKS | CDX | Wrench | Torque* |
|----------------------|-------|-------|-------|-----|-----|------|---------------------|------|------|-----|--|---------|
| VST217W0.76R000-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 0.76 ⁽¹⁾ | - | S08 | 1.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W0.86R000-4S08 | | | ▲ | 4 | 0° | 21.7 | 0.86 ⁽¹⁾ | - | S08 | 1.7 | KEYV-217 | 15 |
| VST217W0.96R000-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 0.96 ⁽¹⁾ | - | S08 | 1.9 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.00R005-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1 | 0.05 | S08 | 2 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.20R005-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1.2 ⁽¹⁾ | 0.05 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.40R005-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1.4 ⁽¹⁾ | 0.05 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.57R000-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1.57 | - | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.70R010-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1.7 ⁽¹⁾ | 0.1 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W1.95R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 1.95 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W2.00R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 2 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W2.25R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 2.25 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W2.39R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 2.39 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W2.50R020-4S08 | ● | ▲ | ▲ | 4 | 0° | 21.7 | 2.5 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W2.75R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 2.75 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T25 ⁽³⁾ | 15 |
| VST217W3.00R020-4S08 | ● | ▲ | ▲ | 4 | 0° | 21.7 | 3 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W3.17R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 3.17 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W3.25R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 3.25 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W4.00R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 4 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W4.25R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 4.25 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W4.75R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 4.75 | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST217W5.25R020-4S08 | ● | | ▲ | 4 | 0° | 21.7 | 5.25 ⁽¹⁾ | 0.2 | S08 | 4.5 | KEYV-217 ⁽²⁾ / KEYV-T30L ⁽³⁾ | 15 |
| VST277W2.50R020-6S10 | ● | | ▲ | 6 | 0° | 27.7 | 2.5 | 0.2 | S10 | 6 | KEYV-T40L | 28 |
| VST277W5.25R020-6S10 | ● | | ▲ | 6 | 0° | 27.7 | 5.25 ⁽¹⁾ | 0.2 | S10 | 6 | KEYV-T40L | 28 |
| VST277W10.0R020-6S10 | ● | | ▲ | 6 | 0° | 27.7 | 10 | 0.2 | S10 | 6 | KEYV-T40L | 28 |

(1) CW is based on DIN471 / 472

(2) Applicable for GH130, AH735

(3) Applicable for GH730

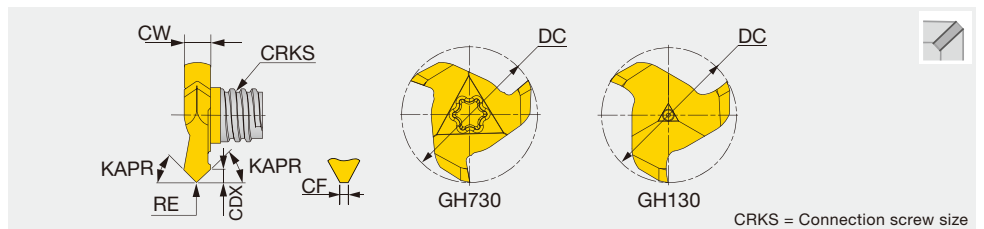
Torque*: Recommended clamping torque (N·m)

2 pieces per package

● : Line up
▲ : To be discontinued

VST**A45...

3, 4 flute, for slotting with 45° chamfer



| Designation | GH730 | GH130 | NOF | FHA | DC | CW | KAPR | CRKS | CDX | CF | RE | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|------|-----|------|------|-----|-----|-----|--|---------|
| VST177L01.40A45-3S06 | ● | ▲ | 3 | 0° | 17.7 | 3.4 | 45° | S06 | 1.4 | - | 0.1 | KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾ | 10 |
| VST217L01.70A45-4S08 | ● | ▲ | 4 | 0° | 21.7 | 5.5 | 45° | S08 | 1.7 | 1.5 | - | KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾ | 15 |

(1) Applicable for GH130

(2) Applicable for GH730

Torque*: Recommended clamping torque (N·m)

2 pieces per package

● : Line up
▲ : To be discontinued

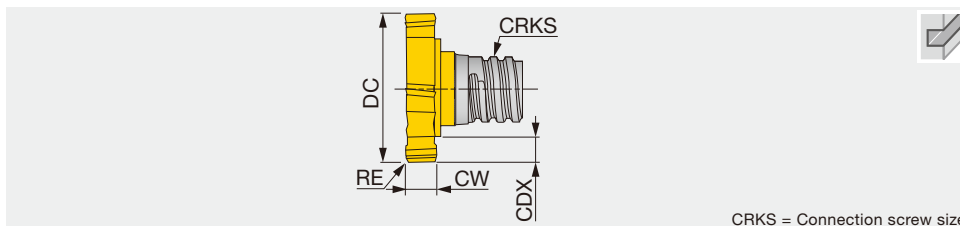
Reference pages: Standard cutting conditions → I095



6 flute, for T-slotting



Slotting



CRKS = Connection screw size

| Designation | GH730 | AH735 | GH130 | NOF | FHA | DC -0.05^0 | CW ± 0.02 | CDX | CRKS | RE | Wrench | Torque* |
|----------------------|-------|-------|-------|-----|-----|--------------|---------------|------|------|-----|-----------|---------|
| VTB135W3.00R04-06S05 | ● | | ▲ | 6 | 0° | 13.5 | 3 | 2.65 | S05 | 0.4 | KEYV-T20 | 7 |
| VTB135W4.00R04-06S05 | ● | | ▲ | 6 | 0° | 13.5 | 4 | 2.65 | S05 | 0.4 | KEYV-T20 | 7 |
| VTB160W2.00R04-06S06 | ● | | ▲ | 6 | 0° | 16 | 2 | 2.9 | S06 | 0.4 | KEYV-T20 | 10 |
| VTB160W3.00R04-06S06 | ● | | ▲ | 6 | 0° | 16 | 3 | 2.9 | S06 | 0.4 | KEYV-T25 | 10 |
| VTB160W4.00R04-06S06 | ● | | ▲ | 6 | 0° | 16 | 4 | 2.9 | S06 | 0.4 | KEYV-T25 | 10 |
| VTB165W2.00R04-06S06 | ● | | ▲ | 6 | 0° | 16.5 | 2 | 3.15 | S06 | 0.4 | KEYV-T20 | 10 |
| VTB165W3.00R04-06S06 | ● | | ▲ | 6 | 0° | 16.5 | 3 | 3.15 | S06 | 0.4 | KEYV-T25 | 10 |
| VTB165W4.00R04-06S06 | ● | | ▲ | 6 | 0° | 16.5 | 4 | 3.15 | S06 | 0.4 | KEYV-T25 | 10 |
| VTB195W4.00R04-06S08 | ● | | ▲ | 6 | 0° | 19.5 | 4 | 3.45 | S08 | 0.4 | KEYV-T30L | 15 |
| VTB195W5.00R04-06S08 | ● | | ▲ | 6 | 0° | 19.5 | 5 | 3.45 | S08 | 0.4 | KEYV-T30L | 15 |
| VTB195W6.00R04-06S08 | ● | | ▲ | 6 | 0° | 19.5 | 6 | 3.45 | S08 | 0.4 | KEYV-T30L | 15 |
| VTB225W5.00R04-06S08 | ● | | ▲ | 6 | 0° | 22.5 | 5 | 4.95 | S08 | 0.4 | KEYV-T40L | 15 |
| VTB225W6.00R04-06S08 | ● | | ▲ | 6 | 0° | 22.5 | 6 | 4.95 | S08 | 0.4 | KEYV-T40L | 15 |
| VTB225W8.00R04-06S08 | ● | | ▲ | 6 | 0° | 22.5 | 8 | 4.95 | S08 | 0.4 | KEYV-T40L | 15 |
| VTB250W6.00R04-06S08 | ● | | ▲ | 6 | 0° | 25 | 6 | 5.9 | S08 | 0.4 | KEYV-T50L | 15 |
| VTB250W8.00R04-06S08 | ● | | ▲ | 6 | 0° | 25 | 8 | 5.9 | S08 | 0.4 | KEYV-T50L | 15 |
| VTB250W5.00R04-06S10 | ● | | ▲ | 6 | 0° | 25 | 5 | 4.3 | S10 | 0.4 | KEYV-T50L | 28 |
| VTB250W6.00R04-06S10 | | ▲ | ▲ | 6 | 0° | 25 | 6 | 4.3 | S10 | 0.4 | KEYV-T50L | 28 |
| VTB250W8.00R04-06S10 | ● | | ▲ | 6 | 0° | 25 | 8 | 4.3 | S10 | 0.4 | KEYV-T50L | 28 |

Torque*: Recommended clamping torque (N·m)
2 pieces per package● : Line up
▲ : To be discontinued

2

3

4

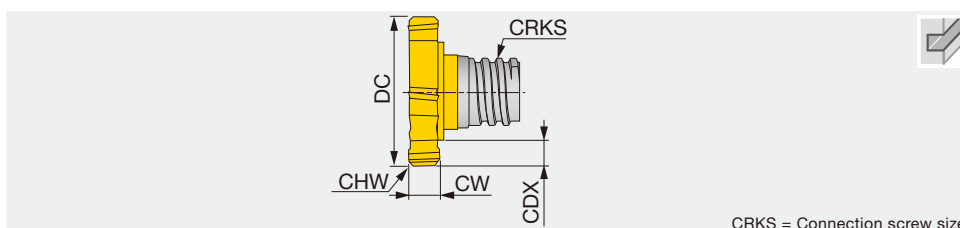
5

6
or more**VTB**C15-06...**

6 flute, for T-slotting with 45° chamfer



Slotting



CRKS = Connection screw size

| Designation | GH730 | GH130 | NOF | FHA | DC -0.05^0 | CW ± 0.02 | CDX | CRKS | CHW | Wrench | Torque* |
|----------------------|-------|-------|-----|-----|--------------|---------------|------|------|------|----------|---------|
| VTB135W2.00C15-06S05 | ● | ▲ | 6 | 0° | 13.5 | 2 | 2.65 | S05 | 0.15 | KEYV-T20 | 7 |

Torque*: Recommended clamping torque (N·m)
2 pieces per package● : Line up
▲ : To be discontinuedReference pages: Standard cutting conditions → **I095**

STANDARD CUTTING CONDITIONS

Slotting

VST, VTB

| ISO | Workpiece material | Hardness | VST | | VTB | |
|----------|--|--------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
| P | Carbon steel S45C, S55C, etc. C45, C55, etc. | - 300 HB | 80 - 180 | 0.05 - 0.15 | 80 - 180 | 0.08 - 0.18 |
| | Alloy steel SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc. | - 300 HB | 60 - 120 | 0.04 - 0.12 | 60 - 120 | 0.05 - 0.15 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. | - 200 HB | 50 - 120 | 0.04 - 0.12 | 50 - 120 | 0.05 - 0.15 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG250, GG300, etc. | 150 - 250 HB | 100 - 200 | 0.05 - 0.15 | 100 - 200 | 0.08 - 0.18 |
| | Ductile cast iron FCD450, etc. 450-10S, etc., GGG450, etc. | 150 - 250 HB | 100 - 200 | 0.04 - 0.12 | 100 - 200 | 0.05 - 0.15 |
| N | Aluminium alloys Si < 13% | - | 200 - 600 | 0.05 - 0.15 | 200 - 600 | 0.08 - 0.18 |
| | Aluminium alloys Si ≥ 13% | - | 100 - 300 | 0.03 - 0.13 | 100 - 300 | 0.05 - 0.15 |
| S | Titanium alloys Ti-6Al-4V, etc. | - 40 HRC | 40 - 60 | 0.04 - 0.12 | 40 - 60 | 0.05 - 0.15 |
| | Heat-resistant alloys Inconel 718, etc. | - 40 HRC | 15 - 35 | 0.02 - 0.1 | 15 - 35 | 0.02 - 0.1 |

Tolerance of tool diameter

| Basic dimensions (mm) | | Permissible dimensional deviations (µm) | | | | | | |
|-----------------------|----|---|------------|----------|----------|----------|----------|-------------|
| > | ≤ | e8 | e9 | h6 | h7 | h9 | h10 | z9 |
| 6 | 10 | -25 -47 | -25 -61 | 0 -9 | 0 -15 | 0 -36 | 0 -58 | +78 +42 |
| 10 | 14 | -32 -59 | -32 -75 | 0 -11 | 0 -18 | 0 -43 | 0 -70 | +93 +50 |
| 14 | 18 | -32 -59 | -32 -75 | 0 -11 | 0 -18 | 0 -43 | 0 -70 | +103 +60 |
| 18 | 30 | -40 -73 | -40 -92 | 0 -13 | 0 -21 | 0 -52 | 0 -84 | - |

JISB0401-2: 1998 (ISO286-2: 1988) extract

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index



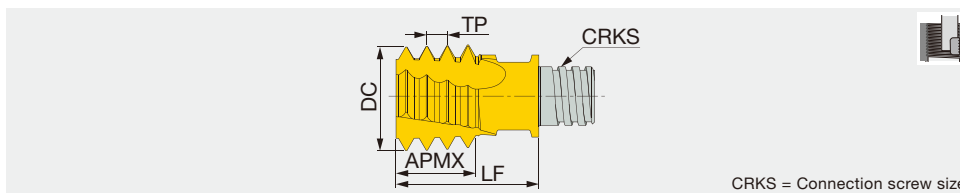
ISO metric (M)

VMT***IS

3 - 6 flute, full profile, for internal thread



Threading



CRKS = Connection screw size

| Designation | AH725 | TP | Application range | DC | NOF | APMX | LF | CRKS | Wrench | Torque* |
|--------------------|-------|------|-------------------|------|-----|------|------|------|-----------|---------|
| VMT100L06IS07-4S05 | ● | 0.75 | ≥ M12 | 10 | 4 | 6 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT100L06IS10-4S05 | ● | 1 | ≥ M12 | 10 | 4 | 6 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT100L06IS15-4S05 | ● | 1.5 | ≥ M13 | 10 | 4 | 6 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT120L08IS15-4S06 | ● | 1.5 | ≥ M16 | 12 | 4 | 7.6 | 14.3 | S06 | KEYV-S06 | 10 |
| VMT120L08IS20-4S06 | ● | 2 | ≥ M16 | 12 | 4 | 8 | 14.3 | S06 | KEYV-S06 | 10 |
| VMT160L12IS15-6S08 | ● | 1.5 | ≥ M20 | 16 | 6 | 12 | 19 | S08 | KEYV-T30L | 15 |
| VMT160L12IS20-5S08 | ● | 2 | ≥ M19 | 16 | 5 | 12 | 19 | S08 | KEYV-T30L | 15 |
| VMT154L13IS25-5S08 | ● | 2.5 | ≥ M20 | 15.4 | 5 | 12.7 | 20 | S08 | KEYV-S08 | 15 |
| VMT160L12IS30-3S08 | ● | 3 | ≥ M20 | 16 | 3 | 12 | 19 | S08 | KEYV-T30L | 15 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

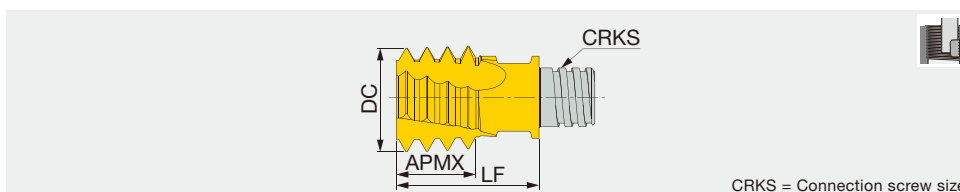
Unified (UN, UNC, UNF, UNEF, UNS)

VMT***UN

3, 4, 5 flute, full profile, for internal thread



Threading



CRKS = Connection screw size

| Designation | AH725 | TPI | Application range | DC | NOF | APMX | LF | CRKS | Wrench | Torque* |
|--------------------|-------|-----|-------------------|------|-----|------|------|------|-----------|---------|
| VMT100L06UN24-4S05 | ● | 24 | ≥ 1/2 | 10 | 4 | 5.3 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT100L06UN20-4S05 | ● | 20 | ≥ 1/2 | 10 | 4 | 5.1 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT120L08UN16-4S06 | ● | 16 | ≥ 5/8 | 12 | 4 | 8 | 14.3 | S06 | KEYV-S06 | 10 |
| VMT120L10UN14-4S06 | ● | 14 | ≥ 5/8 | 12 | 4 | 9 | 14.3 | S06 | KEYV-T25 | 10 |
| VMT160L13UN12-5S08 | ● | 12 | ≥ 13/16 | 16 | 5 | 12.7 | 19 | S08 | KEYV-T30L | 15 |
| VMT150L13UN10-4S08 | ● | 10 | ≥ 3/4 | 15.4 | 4 | 12.7 | 19 | S08 | KEYV-T30L | 15 |
| VMT160L11UN09-3S08 | ● | 9 | ≥ 7/8 | 16 | 3 | 11.3 | 19 | S08 | KEYV-T30L | 15 |
| VMT160L13UN08-3S08 | ● | 8 | ≥ 15/16 | 16 | 3 | 12.7 | 20 | S08 | KEYV-S08 | 15 |

Torque*: Recommended clamping torque (N-m)
2 pieces per package

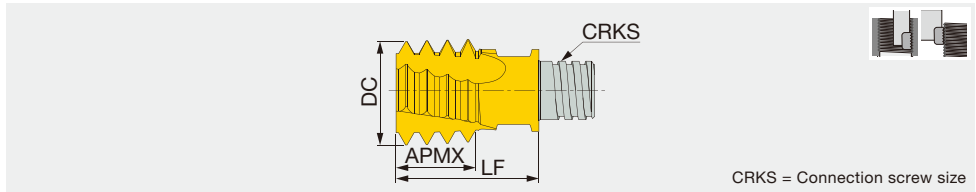
● : Line up

Reference pages: Standard cutting conditions → [I098](#)

Whitworth (G, Rp, BSP, PF, PS)

VMT***W

4 flute, full profile, for internal/external thread



CRKS = Connection screw size

| Designation | AH725 | TPI | Application range | DC | NOF | APMX | LF | CRKS | Wrench | Torque* |
|-------------------|-------|-----|--------------------|----|-----|------|------|------|-----------|---------|
| VMT100L06W19-4S05 | ● | 19 | 1/4, 3/8 | 10 | 4 | 5.3 | 12.8 | S05 | KEYV-S05 | 7 |
| VMT160L13W14-4S08 | ● | 14 | 1/2, 5/8, 3/4, 7/8 | 16 | 4 | 12.7 | 20 | S08 | KEYV-S08 | 15 |
| VMT160L11W11-4S08 | ● | 11 | ≥1 | 16 | 4 | 11.6 | 19 | S08 | KEYV-T30L | 15 |

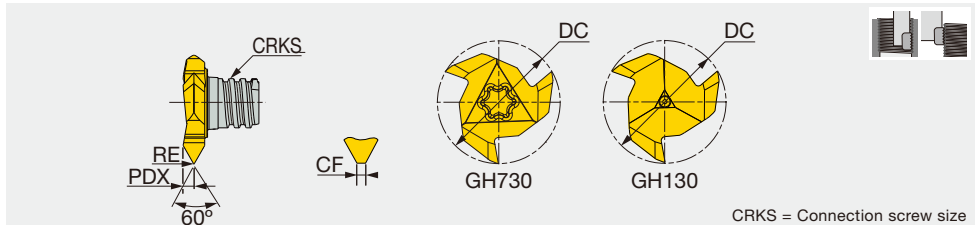
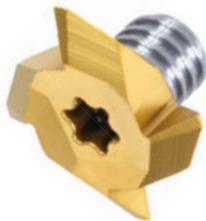
Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up

60° partial profile

VTR***IS

3, 4 flute, partial profile, for internal/external thread



CRKS = Connection screw size

| Designation | GH730 | GH130 | TP | | Smallest Possible thread | DC | NOF | RE | CF | PDX | CRKS | Wrench | Torque* |
|--------------------|-------|-------|-----|-----|--------------------------|------|-----|------|------|-----|------|--|---------|
| | | | TPN | TPX | | | | | | | | | |
| VTR160L12IS05-3S06 | ● | ▲ | 0.5 | 2 | M20 | 15.7 | 3 | - | 0.05 | 1.4 | S06 | KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾ | 10 |
| VTR160L12IS15-3S06 | ● | ▲ | 1.5 | 2 | M22 | 15.7 | 3 | 0.05 | - | 1.4 | S06 | KEYV-177 ⁽¹⁾ / KEYV-T25 ⁽²⁾ | 10 |
| VTR220L28IS30-4S08 | ● | ▲ | 3 | 4.5 | M36 | 21.7 | 4 | 0.2 | - | 2.8 | S08 | KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾ | 15 |

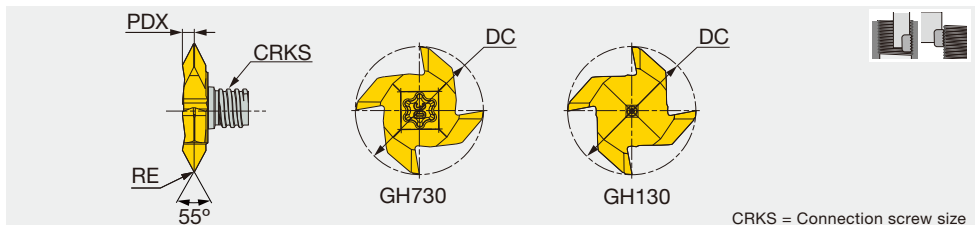
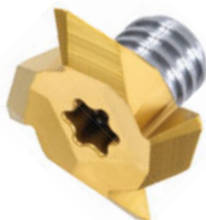
(1) Applicable for GH130
(2) Applicable for GH730
Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up
▲ : To be discontinued

55° partial profile

VTR***W

4 flute, partial profile, for internal/external thread



CRKS = Connection screw size

| Designation | GH730 | GH130 | TPI | | Smallest Possible thread | DC | NOF | RE | PDX | CRKS | Wrench | Torque* |
|-------------------|-------|-------|------|------|--------------------------|------|-----|-----|-----|------|--|---------|
| | | | TPIN | TPIX | | | | | | | | |
| VTR220L24W14-4S08 | ● | ▲ | 14 | 11 | 3/4 | 21.7 | 4 | 0.2 | 2.4 | S08 | KEYV-217 ⁽¹⁾ / KEYV-T30L ⁽²⁾ | 15 |

(1) Applicable for GH130
(2) Applicable for GH730
Torque*: Recommended clamping torque (N-m)
2 pieces per package

● : Line up
▲ : To be discontinued

Reference pages: Standard cutting conditions → I098

STANDARD CUTTING CONDITIONS

Threading

VMT, VTR

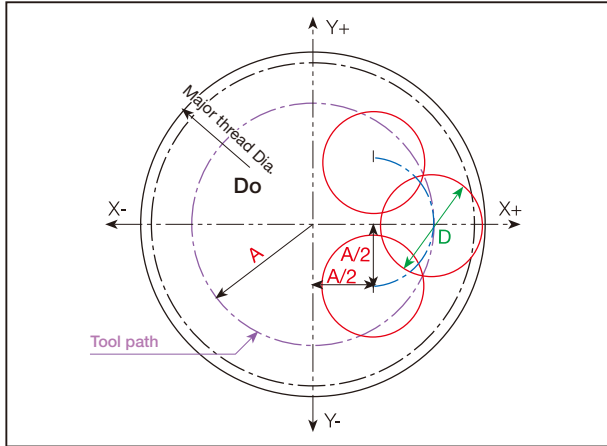
| ISO | Material | Condition | Tensile strength [N/mm ²] | Hardness | Cutting speed Vc (m/min) | Tool dia. : DC (mm) | | | | |
|---------------------|--|--|--|-----------|-----------------------------|---------------------------|------|-------------------------|-------|------|
| | | | | | | Feed per tooth: fz (mm/t) | | | | |
| | | | | | | ø10 | ø12 | ø15.4, ø15.7, ø16 | ø21.7 | |
| P | Non-alloy steel and cast steel, free cutting steel | < 0.25 %C | Annealed | 420 | 125 HB | 100 - 250 | 0.08 | 0.09 | 0.12 | 0.15 |
| | | ≥ 0.25 %C | Annealed | 650 | 190 HB | 80 - 210 | 0.08 | 0.09 | 0.12 | 0.15 |
| | | < 0.55 %C | Quenched and tempered | 850 | 250 HB | 65 - 170 | | | | |
| | | ≥ 0.55 %C | Annealed | 750 | 220 HB | 110 - 180 | 0.07 | 0.08 | 0.1 | 0.12 |
| | Low alloy steel and cast steel (less than 5% of alloying elements) | Quenched and tempered | | 1000 | 300 HB | 95 - 160 | 0.07 | 0.08 | 0.1 | 0.12 |
| | | | Annealed | 600 | 200 HB | 90 - 160 | 0.05 | 0.05 | 0.07 | 0.08 |
| | | Quenched and tempered | | 930 | 275 HB | 65 - 200 | 0.05 | 0.05 | 0.07 | 0.08 |
| | | | | 1000 | 300 HB | 70 - 210 | 0.05 | 0.05 | 0.07 | 0.08 |
| | | High alloyed steel, cast steel, and tool steel | Annealed | 680 | 200 HB | 130 - 170 | 0.05 | 0.05 | 0.07 | 0.08 |
| | | | Quenched and tempered | 1100 | 325 HB | 75 - 100 | 0.05 | 0.05 | 0.07 | 0.08 |
| | Stainless steel and cast steel | Ferritic/martensitic | 680 | 200 HB | 110 - 170 | 0.05 | 0.05 | 0.07 | 0.08 | |
| | | Martensitic | 820 | 240 HB | 70 - 155 | 0.05 | 0.05 | 0.07 | 0.08 | |
| M | Stainless steel | Annealed | 600 | 180 HB | 85 - 100 | 0.05 | 0.05 | 0.07 | 0.08 | |
| K | Cast iron nodular (GGG) | Ferritic/martensitic | | 180 HB | 120 - 160 | 0.08 | 0.09 | 0.12 | 0.15 | |
| | | Pearlitic | | 260 HB | 75 - 160 | 0.08 | 0.09 | 0.12 | 0.15 | |
| | Grey cast iron (GG) | Ferritic | | 160 HB | 70 - 150 | 0.08 | 0.09 | 0.12 | 0.15 | |
| | | Pearlitic | | 250 HB | 110 - 140 | 0.08 | 0.09 | 0.12 | 0.15 | |
| Malleable cast iron | Ferritic | | 130 HB | 120 - 160 | 0.08 | 0.09 | 0.12 | 0.15 | | |
| | Pearlitic | | 230 HB | 110 - 140 | 0.08 | 0.09 | 0.21 | 0.15 | | |
| N | Aluminium-wrought alloy | Not cureable | | 60 HB | 160 - 300 | 0.08 | 0.09 | 0.12 | 0.15 | |
| | | Cured | | 100 HB | | | | | | |
| | Aluminium-cast, alloyed | ≤12% Si | Not cureable | | 75 HB | 150 - 350 | 0.08 | 0.09 | 0.12 | 0.15 |
| | | >12% Si | High temperature | | 130 HB | 100 - 250 | 0.05 | 0.05 | 0.07 | 0.08 |
| | Copper alloys | >1% Pb | Free cutting | | 110 HB | | | | | |
| | | | Brass | | 90 HB | | | | | |
| | Non-metallic | | Duroplastics, fiber plastics | | | 100 - 400 | 0.11 | 0.12 | 0.15 | 0.18 |
| | | | Hard rubber | | | | | | | |
| S | High temp. alloys | Fe based | Annealed | | 200 HB | | | | | |
| | | | Cured | | 280 HB | | | | | |
| | | Ni or Co based | Annealed | | 250 HB | 20 - 80 | 0.03 | 0.03 | 0.04 | 0.04 |
| | | | Cured | | 350 HB | | | | | |
| | Titanium Ti alloys | | RM 400 | | | | | | | |
| | | Alpha+beta alloys cured | RM 1050 | | 20 - 80 | 0.03 | 0.03 | 0.04 | 0.04 | |
| H | Hardened steel | Hardened | | 55 HRC | 55 - 65 | | | | | |
| | | Hardened | | 60 HRC | 45 - 55 | | | | | |
| | Chilled cast iron | Cast | | 400 HB | 90 - 105 | | | | | |
| | Cast iron | Hardened | | 55 HRC | 55 - 65 | | | | | |

Thread Milling CNC Program for Internal Thread

Right-hand thread (climb milling) from bottom up. Program is based on tool center.
This method of programming needs no tool radius compensation value, other than an offset for wear.

General Program

```
G90 G00 G54 G43 H1X0 Y0 Z10 S (n : Number of revolutions)
G00 Z-(to thread depth)
G01 G91 G41 D1 X (A/2) Y-(A/2) Z0 F (Center of tool)
G03 X(A/2) Y(A/2) R (A/2) Z(1/8 pitch) F (Cutting edge)
G03 X0 Y0 I -(A) J0 Z (pitch)
G03 X-(A/2) Y(A/2) R (A/2) Z(1/8 pitch)
G01 G40 X -(A/2) Y-(A/2) Z0
G90 X0 Y0 Z0
```



$$A = \frac{D_o - D}{2}$$

A = Radius of tool path
Do = Major thread diameter
D = Cutting diameter

F (Center of tool) = $n \times f \times z$ n : Number of revolutions
F (Cutting edge) = $\frac{D_o - D}{D_o} \times n \times f \times z$ f : rev / tooth
z : Number of edge

Internal Thread

Example: M20x2.0 IN-RH (Thread depth 20 mm)

Tool : MTEC1010C27 2.0ISO

(Cutting dia. 10 mm)

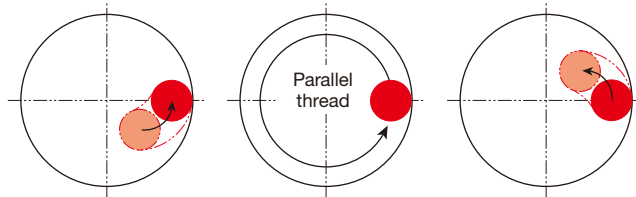
$$A = \frac{(D_o - D)}{2} = \frac{(20 - 10)}{2} = 5$$

$$A/2 = 2.5$$

(Tool compensation of radius=0)

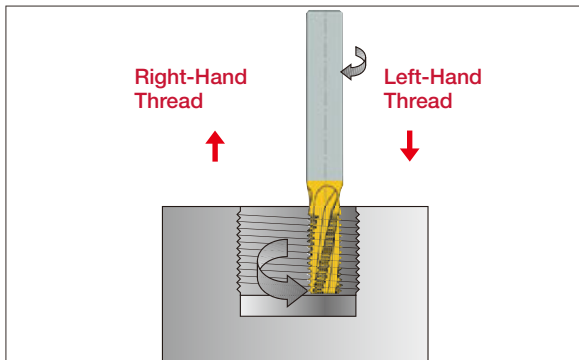
```
G90 G0 G54 G43 G17 H1X0 Y0 Z10 S4000
G0 Z-20
G01 G91 G41 D1X 2.5 Y-2.5 Z0 F840
G03 X2.5 Y2.5 R2.5 Z0.25 F420
G03 X0 Y0 I-5.0 J0 Z2.0
G03 X-2.5 Y2.5 R2.5 Z0.25
G01 G40 X-2.5 Y-2.5 Z0
G90 G0 X0 Y0 Z0
M30
%
```

Machining procedure

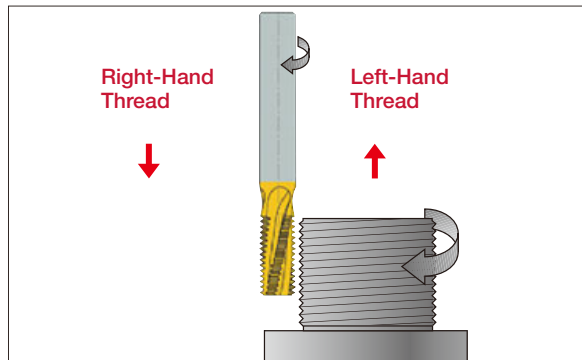


(a) Tool approach (b) Machining thread (c) Tool retraction

Internal Thread



External Thread

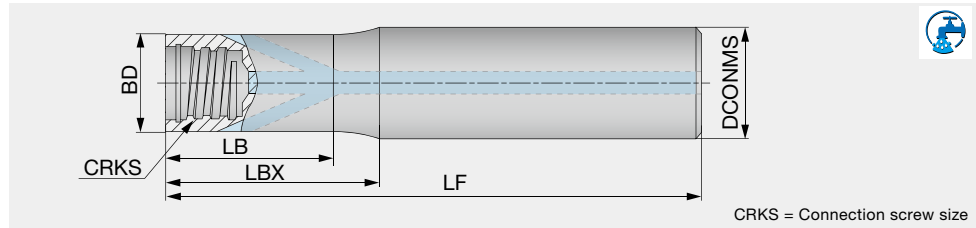


A thread milling operation is applicable for thread cutting in non-symmetrical parts utilizing the advantage of helical interpolation programs on modern machining centers.



For more details, please check ThreadMilling advisor.

Straight shank and neck with coolant hole



CRKS = Connection screw size

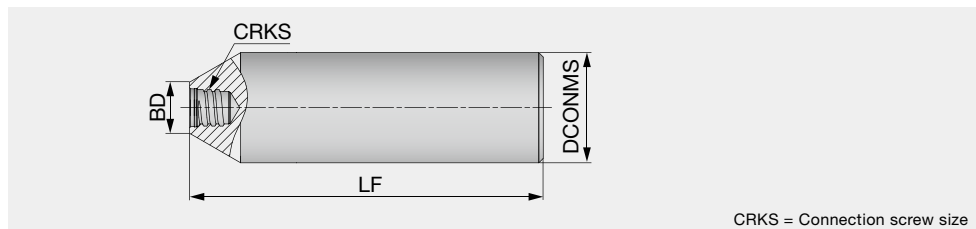
| Designation | DCONMS | BD | LF | LBX | LB | CRKS | Shank material |
|-------------------|--------|------|-----|-----|------|------|----------------|
| VSSD10L070S06-W-A | 10 | 9.6 | 70 | 20 | 19 | S06 | Tungsten |
| VSSD10L090S06-W-A | 10 | 9.6 | 90 | 40 | 39 | S06 | Tungsten |
| VSSD10L110S06-W-A | 10 | 9.6 | 110 | 60 | 59 | S06 | Tungsten |
| VSSD12L070S08-W-A | 12 | 11.5 | 70 | 20 | 19 | S08 | Tungsten |
| VSSD12L090S08-W-A | 12 | 11.5 | 90 | 40 | 39 | S08 | Tungsten |
| VSSD12L110S08-W-A | 12 | 11.5 | 110 | 60 | 59 | S08 | Tungsten |
| VSSD12L130S08-W-A | 12 | 11.5 | 130 | 80 | 79 | S08 | Tungsten |
| VSSD16L070S10-W-A | 16 | 15.2 | 70 | 20 | 18.5 | S10 | Tungsten |
| VSSD16L090S10-W-A | 16 | 15.2 | 90 | 40 | 36.5 | S10 | Tungsten |
| VSSD16L110S10-W-A | 16 | 15.2 | 110 | 60 | 58.5 | S10 | Tungsten |
| VSSD16L130S10-W-A | 16 | 15.2 | 130 | 80 | 78.5 | S10 | Tungsten |
| VSSD20L090S12-W-A | 20 | 18.3 | 90 | 40 | 37 | S12 | Tungsten |
| VSSD20L130S12-W-A | 20 | 18.3 | 130 | 80 | 77 | S12 | Tungsten |



Others

VSSD...

High rigidity shank (straight)

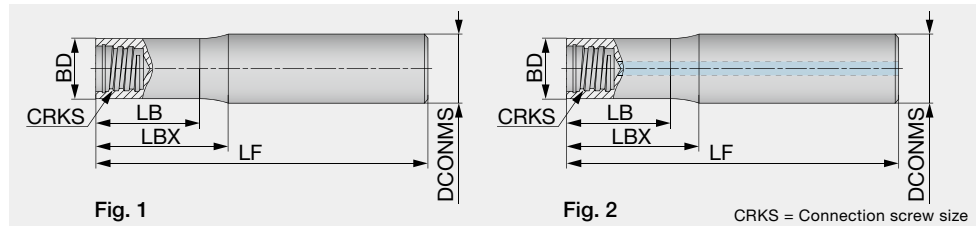


CRKS = Connection screw size

| Designation | DCONMS | BD | LF | CRKS | Shank shape | Shank material |
|-----------------|--------|------|-----|------|-------------|----------------|
| VSSD10L055S05-S | 10 | 7.6 | 55 | S05 | Cylindrical | Steel |
| VSSD12L065S06-S | 12 | 9.6 | 65 | S06 | Cylindrical | Steel |
| VSSD16L065S08-S | 16 | 11.6 | 65 | S08 | Cylindrical | Steel |
| VSSD20L070S10-S | 20 | 15.3 | 70 | S10 | Cylindrical | Steel |
| VSSD25L075S12-S | 25 | 18.3 | 75 | S12 | Cylindrical | Steel |
| VSSD32L100S15-S | 32 | 23.9 | 100 | S15 | Cylindrical | Steel |
| VSSD40L100S21-S | 40 | 30 | 100 | S21 | Cylindrical | Steel |

VSSD...

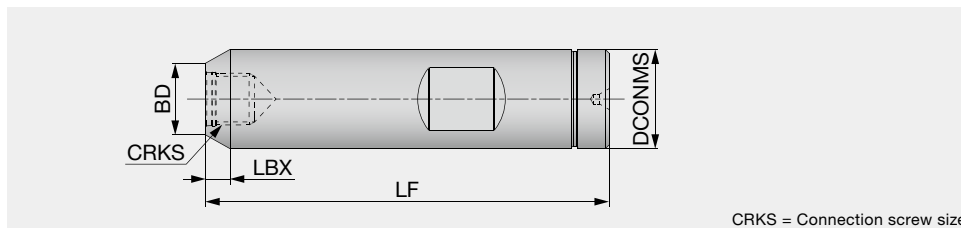
Straight neck and cylindrical shank



| Designation | DCONMS | BD | LF | LBX | LB | CRKS | Shank shape | Shank material | Fig. |
|--------------------|--------|------|-----|-----|------|------|-------------|----------------|------|
| VSSD06L050S04-S | 6 | 5.8 | 50 | 11 | 10 | S04 | Cylindrical | Steel | 1 |
| VSSD06L060S04-C | 6 | 5.8 | 60 | 18 | 17 | S04 | Cylindrical | Carbide | 1 |
| VSSD08L050S04-S | 8 | 5.8 | 50 | 14 | 10 | S04 | Cylindrical | Steel | 1 |
| VSSD08L060S04-C | 8 | 5.8 | 60 | 20 | 17 | S04 | Cylindrical | Carbide | 1 |
| VSSD08L060S05-S | 8 | 7.6 | 60 | 15 | 12.8 | S05 | Cylindrical | Steel | 1 |
| VSSD08L070S05-C | 8 | 7.6 | 70 | 20 | 19 | S05 | Cylindrical | Carbide | 1 |
| VSSD08L090S05-C | 8 | 7.6 | 90 | 40 | 39 | S05 | Cylindrical | Carbide | 1 |
| VSSD08L110S05-C | 8 | 7.6 | 110 | 60 | 59 | S05 | Cylindrical | Carbide | 1 |
| VSSD10L070S06-C | 10 | 9.6 | 70 | 20 | 18.5 | S06 | Cylindrical | Carbide | 1 |
| VSSD10L075S06-S | 10 | 9.6 | 75 | 20 | 19.4 | S06 | Cylindrical | Steel | 1 |
| VSSD10L090S06-C | 10 | 9.6 | 90 | 40 | 38.5 | S06 | Cylindrical | Carbide | 1 |
| VSSD10L110S06-C | 10 | 9.6 | 110 | 60 | 58.5 | S06 | Cylindrical | Carbide | 1 |
| VSSD10L150S06-C | 10 | 9.6 | 150 | 100 | 98.5 | S06 | Cylindrical | Carbide | 1 |
| VSSD12L070S08-C | 12 | 11.5 | 70 | 20 | 17 | S08 | Cylindrical | Carbide | 1 |
| VSSD12L070S08-C-A | 12 | 11.5 | 70 | 20 | 17 | S08 | Cylindrical | Carbide | 2 |
| VSSD12L090S08-C | 12 | 11.5 | 90 | 40 | 37 | S08 | Cylindrical | Carbide | 1 |
| VSSD12L090S08-S | 12 | 11.5 | 90 | 16 | 13.6 | S08 | Cylindrical | Steel | 1 |
| VSSD12L090S08-S-A | 12 | 11.5 | 90 | 16 | 13.6 | S08 | Cylindrical | Steel | 2 |
| VSSD12L090LS08-C-A | 12 | 11.5 | 90 | 40 | 37 | S08 | Cylindrical | Carbide | 2 |
| VSSD12L090LS08-S-A | 12 | 11.5 | 90 | 42 | 37 | S08 | Cylindrical | Steel | 2 |
| VSSD12L110S08-C | 12 | 11.5 | 110 | 60 | 58 | S08 | Cylindrical | Carbide | 1 |
| VSSD12L110S08-C-A | 12 | 11.5 | 110 | 60 | 57 | S08 | Cylindrical | Carbide | 2 |
| VSSD12L130S08-C | 12 | 11.5 | 130 | 80 | 78 | S08 | Cylindrical | Carbide | 1 |
| VSSD12L130S08-C-A | 12 | 11.5 | 130 | 80 | 77 | S08 | Cylindrical | Carbide | 2 |
| VSSD16L090S10-C | 16 | 15.2 | 90 | 40 | 38 | S10 | Cylindrical | Carbide | 1 |
| VSSD16L090S10-C-A | 16 | 15.2 | 90 | 40 | 38 | S10 | Cylindrical | Carbide | 2 |
| VSSD16L100S10-S | 16 | 15.2 | 100 | 20 | 18 | S10 | Cylindrical | Steel | 1 |
| VSSD16L100S10-S-A | 16 | 15.2 | 100 | 20 | 18 | S10 | Cylindrical | Steel | 2 |
| VSSD16L100LS10-S-A | 16 | 15.2 | 100 | 42 | 38 | S10 | Cylindrical | Steel | 2 |
| VSSD16L110S10-C | 16 | 15.2 | 110 | 60 | 58 | S10 | Cylindrical | Carbide | 1 |
| VSSD16L110S10-C-A | 16 | 15.2 | 110 | 60 | 58 | S10 | Cylindrical | Carbide | 2 |
| VSSD16L130S10-C | 16 | 15.2 | 130 | 80 | 78 | S10 | Cylindrical | Carbide | 1 |
| VSSD16L130S10-C-A | 16 | 15.2 | 130 | 80 | 78 | S10 | Cylindrical | Carbide | 2 |
| VSSD16L150S10-C | 16 | 15.2 | 150 | 100 | 98 | S10 | Cylindrical | Carbide | 1 |
| VSSD20L090S12-C | 20 | 18.3 | 90 | 40 | 37 | S12 | Cylindrical | Carbide | 1 |
| VSSD20L120S12-S | 20 | 18.3 | 120 | 25 | 20.5 | S12 | Cylindrical | Steel | 1 |
| VSSD20L130S12-C | 20 | 18.3 | 130 | 80 | 77 | S12 | Cylindrical | Carbide | 1 |
| VSSD20L200S12-C | 20 | 18.3 | 200 | 120 | 117 | S12 | Cylindrical | Carbide | 1 |
| VSSD25L120S15-C | 25 | 23.9 | 120 | 60 | 58 | S15 | Cylindrical | Carbide | 1 |
| VSSD25L135S15-S | 25 | 23.9 | 135 | 35 | 33 | S15 | Cylindrical | Steel | 1 |
| VSSD25L170S15-C | 25 | 23.9 | 170 | 100 | 98 | S15 | Cylindrical | Carbide | 1 |
| VSSD25L250S15-C | 25 | 23.9 | 250 | 150 | 148 | S15 | Cylindrical | Carbide | 1 |
| VSSD32L100S21-S | 32 | 30 | 100 | 35 | 32 | S21 | Cylindrical | Steel | 1 |
| VSSD32L150S21-S | 32 | 30 | 150 | 54 | 50 | S21 | Cylindrical | Steel | 1 |



High rigidity shank (weldon)

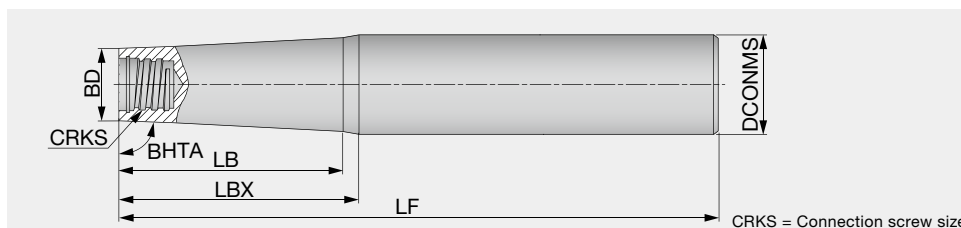


CRKS = Connection screw size

| Designation | DCONMS | BD | LF | LBX | CRKS | Shank shape | Shank material |
|-----------------|--------|------|----|-----|------|-------------|----------------|
| VSSD12L055W05-S | 12 | 7.6 | 55 | 3.8 | S05 | Weldon | Steel |
| VSSD16L065W06-S | 16 | 9.6 | 65 | 6 | S06 | Weldon | Steel |
| VSSD16L065W08-S | 16 | 11.5 | 65 | 4 | S08 | Weldon | Steel |
| VSSD20L070W10-S | 20 | 15.2 | 70 | 4 | S10 | Weldon | Steel |
| VSSD25L075W12-S | 25 | 18.3 | 75 | 6 | S12 | Weldon | Steel |

VTSD...

Taper neck and straight shank

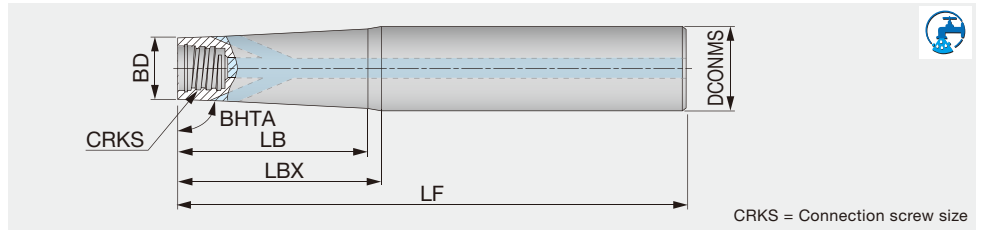


CRKS = Connection screw size

| Designation | BHTA | DCONMS | BD | LF | LBX | LB | CRKS | Shank material |
|-----------------|-------|--------|------|-----|------|-------|------|----------------|
| VTSD08L080S04-S | 87.4° | 8 | 5.8 | 80 | 24 | - | S04 | Steel |
| VTSD12L080S05-S | 85° | 12 | 7.6 | 80 | 25 | - | S05 | Steel |
| VTSD12L100S05-S | 89° | 12 | 7.6 | 100 | 35 | 29 | S05 | Steel |
| VTSD12L110S05-C | 89° | 12 | 7.6 | 110 | 60 | 56 | S05 | Carbide |
| VTSD12L130S05-C | 89° | 12 | 7.6 | 130 | 80 | 77 | S05 | Carbide |
| VTSD16L125S06-S | 85° | 16 | 9.6 | 125 | 34 | 31 | S06 | Steel |
| VTSD16L130S08-C | 89° | 16 | 11.5 | 130 | 80 | 76.5 | S08 | Carbide |
| VTSD16L140S08-S | 85° | 16 | 11.5 | 140 | 22 | 19 | S08 | Steel |
| VTSD16L150S05-C | 89° | 16 | 7.6 | 150 | 100 | 91 | S05 | Carbide |
| VTSD16L150S06-C | 89° | 16 | 9.6 | 150 | 100 | 94.5 | S06 | Carbide |
| VTSD16L150S08-C | 89° | 16 | 11.5 | 150 | 100 | 98 | S08 | Carbide |
| VTSD16L160S06-S | 89° | 16 | 9.6 | 160 | 55 | 46.5 | S06 | Steel |
| VTSD16L170S06-C | 89° | 16 | 9.6 | 170 | 120 | 116.5 | S06 | Carbide |
| VTSD20L140S10-S | 85° | 20 | 15.2 | 140 | 27.5 | - | S10 | Steel |
| VTSD20L170S08-C | 89° | 20 | 11.5 | 170 | 120 | 112 | S08 | Carbide |
| VTSD20L170S08-S | 89° | 20 | 11.5 | 170 | 80 | 69.5 | S08 | Steel |
| VTSD20L170S10-C | 89° | 20 | 15.2 | 170 | 120 | 119 | S10 | Carbide |
| VTSD20L190S10-C | 89° | 20 | 15.2 | 190 | 140 | - | S10 | Carbide |
| VTSD20L190S10-S | 89° | 20 | 15.2 | 190 | 80 | 73 | S10 | Steel |
| VTSD20L210S10-C | 89° | 20 | 15.2 | 210 | 160 | - | S10 | Carbide |
| VTSD25L160S12-S | 85° | 25 | 18.3 | 160 | 40 | - | S12 | Steel |
| VTSD25L170S10-S | 85° | 25 | 15.2 | 170 | 56 | - | S10 | Steel |
| VTSD25L180S12-C | 89° | 25 | 18.3 | 180 | 120 | 115 | S12 | Carbide |
| VTSD25L210S12-S | 89° | 25 | 18.3 | 210 | 100 | 94.5 | S12 | Steel |
| VTSD25L250S12-C | 89° | 25 | 18.3 | 250 | 140 | 136.5 | S12 | Carbide |
| VTSD32L155S15-S | 85° | 32 | 23.9 | 155 | 45 | - | S15 | Steel |
| VTSD32L190S12-S | 85° | 32 | 18.3 | 190 | 80 | - | S12 | Steel |
| VTSD32L220S15-S | 88° | 32 | 23.9 | 220 | 100 | - | S15 | Steel |
| VTSD32L250S15-C | 89° | 32 | 23.9 | 250 | 150 | 145 | S15 | Carbide |
| VTSD32L300S15-C | 89° | 32 | 23.9 | 300 | 200 | 198 | S15 | Carbide |
| VTSD40L150S21-S | 85° | 40 | 30 | 150 | 57 | - | S21 | Steel |

VTSD**-W-A...

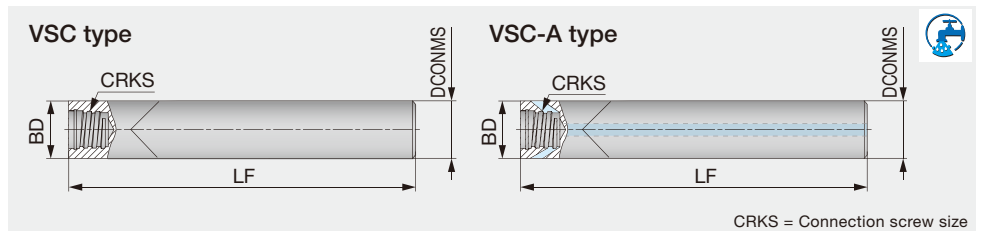
Straight shank and taper neck with coolant hole



| Designation | BHTA | DCONMS | BD | LF | LBX | LB | CRKS | Shank material |
|-------------------|------|--------|-----|-----|-----|-----|------|----------------|
| VTSD12L110S06-W-A | 89° | 12 | 9.6 | 110 | 60 | 59 | S06 | Tungsten |
| VTSD16L170S06-W-A | 89° | 16 | 9.6 | 170 | 120 | 116 | S06 | Tungsten |

VSC...

Straight shank for VST type slotting heads



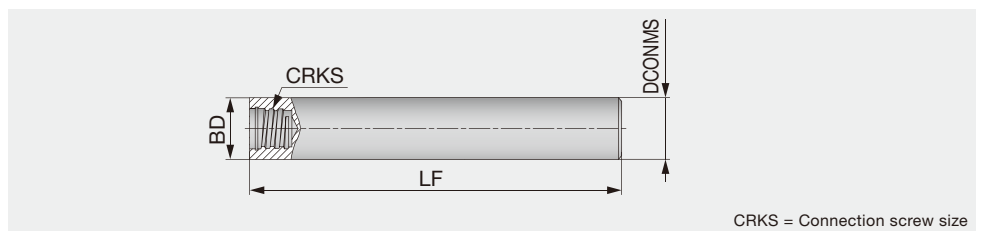
| Designation | DCONMS | BD | LF | CRKS | Air hole | Shank material |
|-------------------|--------|----|-----|------|----------|----------------|
| VSC100L100S06-C | 10 | 10 | 100 | S06 | without | Carbide |
| VSC120L100S08-C-A | 12 | 12 | 100 | S08 | with | Carbide |

For VSC-C type shank, just VST slotting head is recommended.

If other heads are used on the VSC-C shank, the depth of cut must be smaller than the max. ap in each head. The VSC-C type shank does not have external clearance, so the shank may interfere with the work piece.

VSTD...

Straight shank for VTB type T-slotting heads

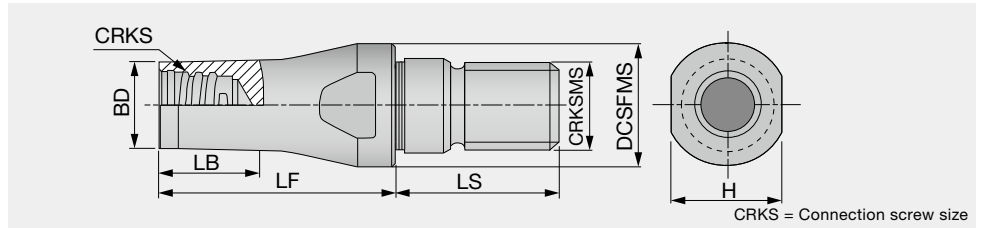


| Designation | DCONMS | BD | LF | CRKS | Shank material |
|-----------------|--------|----|-----|------|----------------|
| VSTD06L070S04-S | 6 | 6 | 70 | S04 | Steel |
| VSTD08L070S05-S | 8 | 8 | 70 | S05 | Steel |
| VSTD10L080S06-S | 10 | 10 | 80 | S06 | Steel |
| VSTD12L090S08-S | 12 | 12 | 90 | S08 | Steel |
| VSTD16L100S10-S | 16 | 16 | 100 | S10 | Steel |

For VSTD type shank, just VTB T-slotting head is recommended.

If other heads are used on the VSTD shank, the depth of cut must be smaller than the max. ap in each head. The VSTD type shank does not have external clearance, so the shank may interfere with the work piece.

TungFlex conversion adaptor

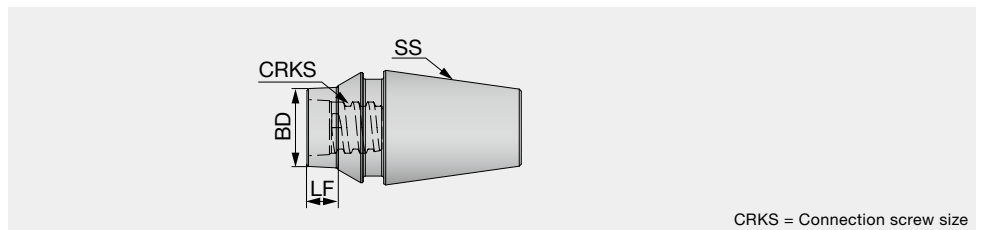


CRKS = Connection screw size

| Designation | BD | DCSFMS | LF | LS | LB | CRKS | CRKSMS | H | Shank material |
|---------------------|------|--------|----|------|----|------|--------|-------|----------------|
| VAD130L016S08-S-M8 | 11.7 | 13 | 16 | 17.5 | 6 | S08 | M8 | 11 | Steel |
| VAD130L025S08-S-M8 | 11.7 | 13 | 25 | 17.5 | 20 | S08 | M8 | 11 | Steel |
| VAD180L020S08-S-M10 | 11.7 | 18 | 20 | 20 | 12 | S08 | M10 | 13 | Steel |
| VAD180L025S08-S-M10 | 11.7 | 18 | 25 | 20 | 15 | S08 | M10 | 11 | Steel |
| VAD210L020S08-S-M12 | 11.7 | 21 | 20 | 20 | 10 | S08 | M12 | 12.75 | Steel |
| VAD210L025S08-S-M12 | 11.7 | 21 | 25 | 20 | 13 | S08 | M12 | 12.75 | Steel |

VER...

Straight neck with ER11/16 collet




CRKS = Connection screw size

| Designation | SS | BD | LF | CRKS | Shank material |
|-----------------|------|------|----|------|----------------|
| VER11AL006S04-S | ER11 | 5.8 | 6 | S04 | Steel |
| VER11AL006S05-S | ER11 | 7.9 | 6 | S05 | Steel |
| VER11AL020S05-S | ER11 | 7.9 | 20 | S05 | Steel |
| VER16AL012S05-S | ER16 | 7.9 | 12 | S05 | Steel |
| VER16AL020S05-S | ER16 | 7.9 | 20 | S05 | Steel |
| VER16AL010S06-S | ER16 | 9.9 | 10 | S06 | Steel |
| VER16AL020S06-S | ER16 | 9.9 | 20 | S06 | Steel |
| VER16AL006S08-S | ER16 | 11.6 | 6 | S08 | Steel |
| VER16AL020S08-S | ER16 | 11.6 | 20 | S08 | Steel |

■ WRENCH

| Appearance | Designation | Connection screw size | Torque (N-m) | Applicable head |
|------------|-------------|-----------------------|--------------|--|
| | KEYV-S05 | S04 | 4 | Square Ball Radius Drilling Chamfering Counterboring Barrel Lens Bull nose Indexable modular head |
| | | S05 | 7 | |
| | KEYV-S06 | S06 | 10 | |
| | KEYV-S08 | S08 | 15 | |
| | KEYV-S10 | S10 | 28 | |
| | KEYV-S12 | S12 | 28 | |
| | KEYV-W20 | S15 | 40 | Square Ball |
| | KS-24 | S21 | 110 | |
| | KEYV-177 | S06 | 10 | Slotting VST Threading VTR |
| | KEYV-217 | S08 | 15 | |

Note: Wrenches are sold separately.

| Appearance | Designation | Connection screw size | Torque (N-m) | Applicable head |
|---|-------------|-----------------------|--------------|--------------------------------|
|  | KEYV-T20 | S05 | 7 | Slotting VTB Face mill |
| | | S06 | 10 | |
| | KEYV-T25 | S06 | 10 | |
| | KEYV-T30L | S08 | 15 | Slotting VST, VTB Face mill |
| | KEYV-T40L | S08 | 15 | |
| | | S10 | 28 | |
| | KEYV-T50L | S08 | 15 | Slotting VTB Face mill |
| | | S10 | 28 | |

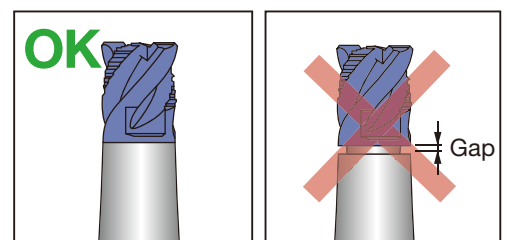
Note: Wrenches are sold separately.

TORQUE WRENCHES

| Appearance | Designation | Stock | Connection screw size | TM Head description | Torque (N-m) |
|--|------------------------|-------|-----------------------|--|--------------|
| Handle  | TORQUEWRENCH5-50NM9x12 | ● | - | - | 5 - 50 |
| Open wrenches for cylindrical heads  | TM-WRENCH-6-05 | ● | S05 | VEH, VED, VEE, VEE-I, VEE-R, VEE-C, VEE-A, VFX**-04/06, VRD, VBD-BG, VBE-BG, VBE-BGA, VDP, VDS, VCA, VBO, VBL, VBN, HPAV06-S | 7 |
| | TM-WRENCH-8-06 | ● | S06 | | 10 |
| | TM-WRENCH-10-08 | ● | S08 | | 15 |
| | TM-WRENCH-13-10 | ● | S10 | | 28 |
| | TM-WRENCH-16-12 | ● | S12 | | 28 |
| | TM-WRENCH-20-15 | ● | S15 | | 40 |
| Open wrenches for 2 flute heads  | TM-WRENCH-4E-05 | ● | S05 | VRB, VRC, VFX**-02, VBB-BM, VBB-BG, VBB-SG, VCP, VGC, VCW, VCR | 7 |
| | TM-WRENCH-5E-06 | ● | S06 | | 10 |
| | TM-WRENCH-7E-08 | ● | S08 | | 15 |
| | TM-WRENCH-8E-10 | ● | S10 | | 28 |
| | TM-WRENCH-9E-12 | ● | S12 | | 28 |
| 90° adaptor for Torx bits  | INSERT-TOOL-9X12MM | ● | - | - | - |
| Torx bits sockets  | BIT-SOCKET-T20-DRIVE | ● | S05, S06 | VFM120, VTB135, VTB160W2.00, VTB165W2.00 | 7, 10 |
| | BIT-SOCKET-T25-DRIVE | ● | S06 | VFM160, VTB160W3.00, VTB160W4.00, VTB165W3.00, VTB165W4.00 | 10 |
| | BIT-SOCKET-T30-DRIVE | ● | S08 | VTB195 | 15 |
| | BIT-SOCKET-T40-DRIVE | ● | S08, S10 | VFM200, VST277, VTB225 | 15, 28 |
| | BIT-SOCKET-T50-DRIVE | ● | S08, S10 | VFM250, VTB250 | 15, 28 |

CAUTIONARY POINTS IN USE

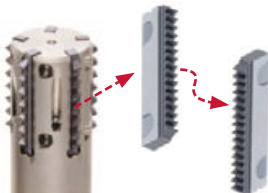
- The cutting heads specified by Tungaloy must be used. Avoid using alternate heads that are not Tungaloy products as this will damage the shank and can cause severe accident or injury.
- Before setting the head, clean the connection screw with an air blast or a wiping cloth to remove chips and other foreign matter that may remain.
- Do not apply the lubricant to the connection screw.
- Please use the correct wrench with the correct cutting head. Tighten the head slowly until the face of the head contacts the shank. (Please refer to the picture shown on the right.) Do not re-tightening or over-tightening. Excessive tightening may cause the cutting head to break.
- Do not apply excessive force or a hammer when tightening or exchanging the cutting heads.



THREADMILLING

Highly economical tool design

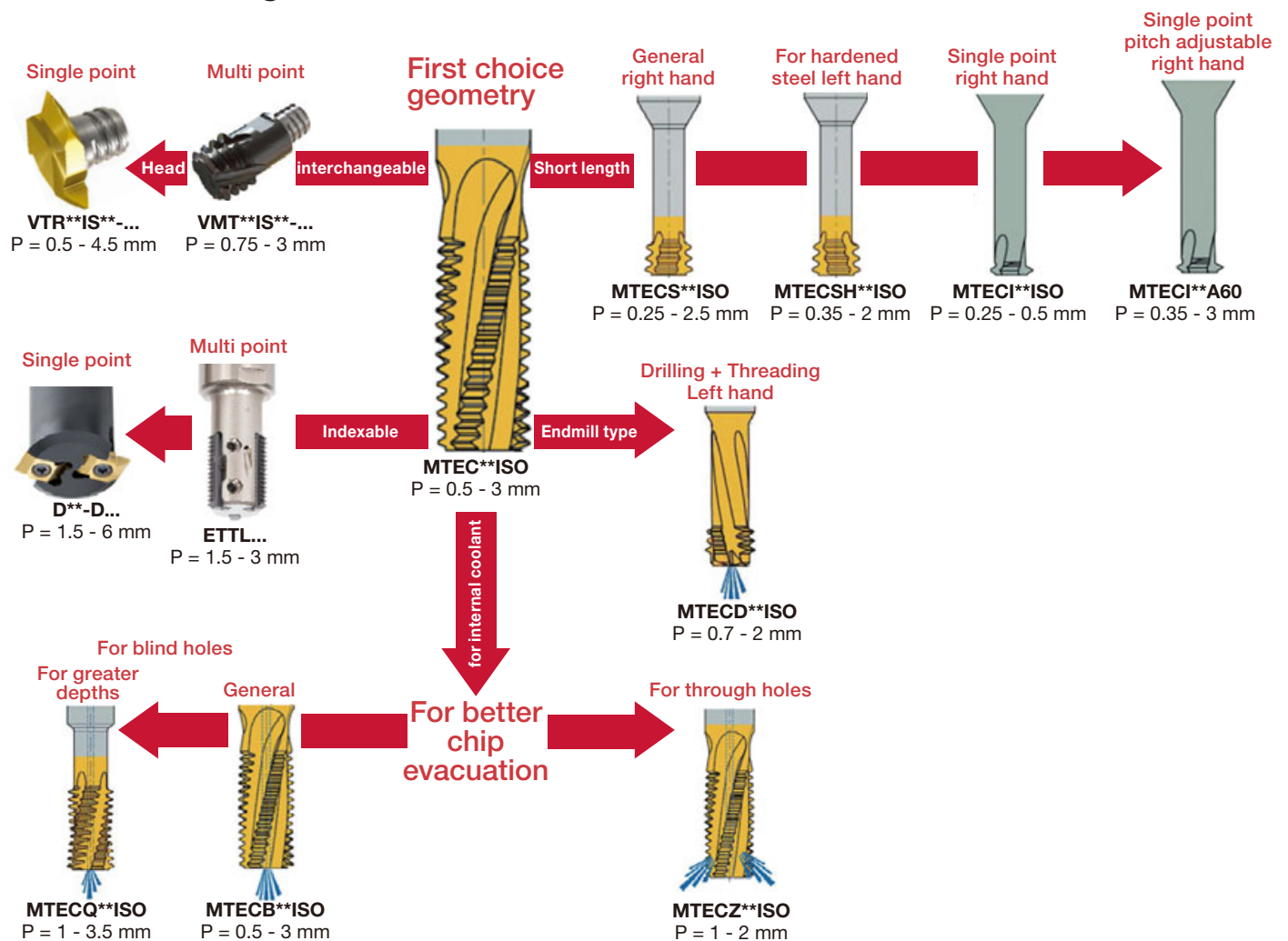
Cost reduction



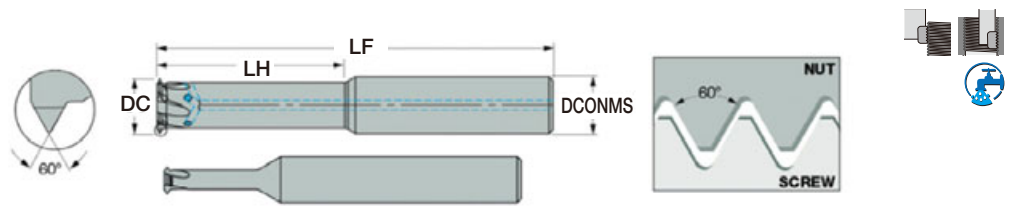
2-corner double sided inserts



Tool selection guide for internal ISO metric threads



Reference pages: **I107 - I129**

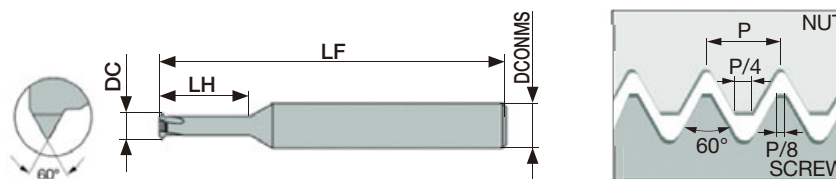


| Designation | ISO Metric | | | | | | Unified | | | | | | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|-----------------|------------|------|---|----------|------|-----|-------------------|---|------|----------|----|-----|--------|------|-----|---------|-------|--------------|-------|
| | Internal | | | External | | | Internal | | | External | | | | | | | | | |
| | Pitch | | Application range | Pitch | | TPI | Application range | | TPI | | | | | | | | | | |
| | min. | max. | | min. | max. | | min. | max. | min. | max. | | | | | | | | | |
| MTECI03019C5A60 | 0.35 | 0.6 | ≥M2.5x0.35 ≥M2.5x0.4 ≥M2.5x0.45 ≥M3x0.5 ≥M3x0.6 | 0.35 | 0.6 | 40 | 72 | ≥#3-72UN ≥#3-64UN ≥#3-56UN ≥#3-48UN ≥#4-44UN ≥#4-40UN | 40 | 72 | 3 | 1.9 | 3 | 5.2 | 39 | Without | AH710 | | |
| MTECI06032C9A60 | 0.5 | 1.0 | ≥M4x0.5 ≥M4x0.6 ≥M4x0.7 ≥M4.5x0.75 ≥M4.5x0.8 ≥M5x1 | 0.5 | 1.0 | 24 | 48 | ≥#8-48UN ≥#8-44UN ≥#8-40UN ≥#8-36UN ≥#8-48UN ≥#10-28UN ≥#10-24UN | 24 | 48 | 6 | 3.2 | 3 | 9.5 | 57 | Without | AH710 | | |
| MTECI0604C12A60 | 0.5 | 1.0 | ≥M5x0.5 ≥M5x0.6 ≥M5x0.7 ≥M5x0.75 ≥M5x0.8 ≥M6x1 | 0.5 | 1.0 | 24 | 48 | ≥#10-48UN ≥#10-44UN ≥#10-40UN ≥#10-36UN ≥#12-32UN ≥#12-28UN ≥#12-24UN | 24 | 48 | 6 | 4 | 3 | 12.5 | 58 | Without | AH710 | | |
| MTECI0605D20A60 | 0.5 | 0.8 | ≥M6 | 0.4 | 0.8 | 28 | 56 | ≥M1/4 | 32 | 64 | 6 | 5 | 4 | 20 | 58 | With | AH725 | | |
| MTECI0808D28A60 | 0.5 | 0.8 | ≥M9 | 0.4 | 0.8 | 28 | 56 | ≥M3/8 | 32 | 64 | 8 | 8 | 4 | 28 | 64 | With | AH725 | | |
| MTECI0808D30A60 | 1.0 | 1.75 | ≥M10 | 0.8 | 1.5 | 14 | 28 | ≥M7/16 | 16 | 32 | 8 | 8 | 4 | 30 | 64 | With | AH725 | | |
| MTECI1010D35A60 | 1.0 | 1.75 | ≥M12 | 0.8 | 1.5 | 14 | 28 | ≥M1/2 | 16 | 32 | 10 | 10 | 4 | 35 | 73 | With | AH725 | | |
| MTECI1212E40A60 | 2.0 | 3.0 | ≥M16 | 1.75 | 2.5 | 8 | 13 | ≥M11/16 | 10 | 15 | 12 | 12 | 5 | 40 | 84 | With | AH725 | | |
| MTECI1616E50A60 | 2.0 | 3.0 | ≥M20 | 1.75 | 2.5 | 8 | 13 | ≥M13/16 | 10 | 15 | 16 | 16 | 5 | 50 | 101 | With | AH725 | | |



SOLIDTHREAD**ISO metric (M)****MTECI-ISO**

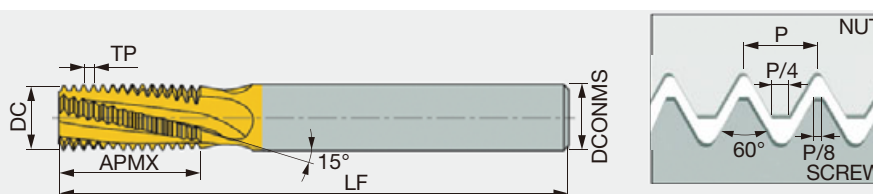
Solid carbide internal threading endmill, for ISO metric profile



| Designation | Pitch | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|---------------------|-------|-------------------|--------|------|-----|------|----|--------------|-------|
| MTECI03007C30.25ISO | 0.25 | ≥M1 | 6 | 0.72 | 3 | 3.6 | 39 | Without | AH710 |
| MTECI03009C40.25ISO | 0.25 | ≥M1.2 | 6 | 0.9 | 3 | 4.3 | 39 | Without | AH710 |
| MTECI03011C50.3ISO | 0.3 | ≥M1.4 | 6 | 1.05 | 3 | 5.0 | 39 | Without | AH710 |
| MTECI03012C60.35ISO | 0.35 | ≥M1.6 | 6 | 1.2 | 3 | 5.7 | 39 | Without | AH710 |
| MTECI03016C70.4ISO | 0.4 | ≥M2 | 6 | 1.55 | 3 | 7.1 | 39 | Without | AH710 |
| MTECI03024C100.5ISO | 0.5 | ≥M3 | 6 | 2.37 | 3 | 10.6 | 39 | Without | AH710 |

MTEC-ISO

Solid carbide internal threading endmill, for ISO metric profile

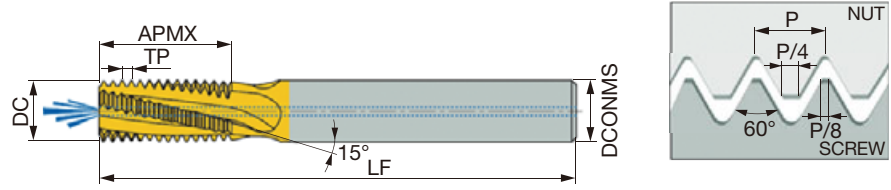


| Designation | TP | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|---------------------|------|-------------------|--------|-----|-----|------|-----|--------------|-------|
| MTEC06022C50.5ISO | 0.5 | ≥ M3 | 6 | 2.2 | 3 | 5.3 | 58 | Without | AH725 |
| MTEC06038C100.5ISO | 0.5 | ≥ M5 | 6 | 3.8 | 3 | 10.3 | 58 | Without | AH725 |
| MTEC06031C70.7ISO | 0.7 | ≥ M4 | 6 | 3.1 | 3 | 7.4 | 58 | Without | AH725 |
| MTEC06045C100.75ISO | 0.75 | ≥ M6 | 6 | 4.5 | 3 | 10 | 58 | Without | AH725 |
| MTEC06036C90.8ISO | 0.8 | ≥ M5 | 6 | 3.6 | 3 | 9.2 | 58 | Without | AH725 |
| MTEC0604C101.0ISO | 1 | ≥ M6 | 6 | 4 | 3 | 10.5 | 58 | Without | AH725 |
| MTEC0604C141.0ISO | 1 | ≥ M6 | 6 | 4 | 3 | 14.5 | 58 | Without | AH725 |
| MTEC0606C121.0ISO | 1 | ≥ M9 | 6 | 6 | 3 | 12.5 | 58 | Without | AH725 |
| MTEC0808D161.0ISO | 1 | ≥ M10 | 8 | 8 | 4 | 16.5 | 64 | Without | AH725 |
| MTEC0605C141.25ISO | 1.25 | ≥ M8 | 6 | 5 | 3 | 14.4 | 58 | Without | AH725 |
| MTEC0605C191.25ISO | 1.25 | ≥ M8 | 6 | 5 | 3 | 19.4 | 58 | Without | AH725 |
| MTEC0807C171.5ISO | 1.5 | ≥ M10 | 8 | 7 | 3 | 17.3 | 64 | Without | AH725 |
| MTEC0807C241.5ISO | 1.5 | ≥ M10 | 8 | 7 | 3 | 24.8 | 76 | Without | AH725 |
| MTEC1010D211.5ISO | 1.5 | ≥ M14 | 10 | 10 | 4 | 21.8 | 73 | Without | AH725 |
| MTEC1616F331.5ISO | 1.5 | ≥ M20 | 16 | 16 | 6 | 33.8 | 105 | Without | AH725 |
| MTEC0808C201.75ISO | 1.75 | ≥ M12 | 8 | 8 | 3 | 20.1 | 64 | Without | AH725 |
| MTEC0808C281.75ISO | 1.75 | ≥ M12 | 8 | 8 | 3 | 28.9 | 76 | Without | AH725 |
| MTEC1010C272.0ISO | 2 | ≥ M14 | 10 | 10 | 3 | 27 | 73 | Without | AH725 |
| MTEC1010C392.0ISO | 2 | ≥ M14 | 10 | 10 | 3 | 39 | 105 | Without | AH725 |
| MTEC1212D272.0ISO | 2 | ≥ M18 | 12 | 12 | 4 | 27 | 84 | Without | AH725 |
| MTEC2020F412.0ISO | 2 | ≥ M24 | 20 | 20 | 6 | 41 | 105 | Without | AH725 |
| MTEC1414D332.5ISO | 2.5 | ≥ M20 | 14 | 14 | 4 | 33.8 | 84 | Without | AH725 |
| MTEC1414D482.5ISO | 2.5 | ≥ M20 | 14 | 14 | 4 | 48.8 | 105 | Without | AH725 |
| MTEC1616C403.0ISO | 3 | ≥ M24 | 16 | 16 | 3 | 40.5 | 105 | Without | AH725 |
| MTEC1616C583.0ISO | 3 | ≥ M24 | 16 | 16 | 3 | 58.5 | 120 | Without | AH725 |

Reference pages: Standard cutting conditions → [I120 - I122](#)

MTECB-ISO

Solid carbide internal threading endmill, with coolant hole, for ISO metric profile



| Designation | TP | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|----------------------|------|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECB06038C100.5ISO | 0.5 | ≥ M5 | 6 | 3.8 | 3 | 10.3 | 58 | With | AH725 |
| MTECB06031C70.7ISO | 0.7 | ≥ M4 | 6 | 3.1 | 3 | 7.4 | 58 | With | AH725 |
| MTECB06045C100.75ISO | 0.75 | ≥ M6 | 6 | 4.5 | 3 | 10.1 | 58 | With | AH725 |
| MTECB1010D240.75ISO | 0.75 | ≥ M12 | 10 | 10 | 4 | 24.4 | 73 | With | AH725 |
| MTECB06038C90.8ISO | 0.8 | ≥ M5 | 6 | 3.8 | 3 | 9.2 | 58 | With | AH725 |
| MTECB06046C101.0ISO | 1 | ≥ M6 | 6 | 4.6 | 3 | 10.5 | 58 | With | AH725 |
| MTECB06046C141.0ISO | 1 | ≥ M6 | 6 | 4.6 | 3 | 14.5 | 58 | With | AH725 |
| MTECB0606C121.0ISO | 1 | ≥ M9 | 6 | 6 | 3 | 12.5 | 58 | With | AH725 |
| MTECB0808D161.0ISO | 1 | ≥ M10 | 8 | 8 | 4 | 16.5 | 64 | With | AH725 |
| MTECB1010D241.0ISO | 1 | ≥ M12 | 10 | 10 | 4 | 24.5 | 73 | With | AH725 |
| MTECB0606C141.25ISO | 1.25 | ≥ M8 | 6 | 6 | 3 | 14.4 | 58 | With | AH725 |
| MTECB0606C191.25ISO | 1.25 | ≥ M8 | 6 | 6 | 3 | 19.4 | 58 | With | AH725 |
| MTECB08078C171.5ISO | 1.5 | ≥ M10 | 8 | 7.8 | 3 | 17 | 64 | With | AH725 |
| MTECB08078C241.5ISO | 1.5 | ≥ M10 | 8 | 7.8 | 3 | 24.8 | 76 | With | AH725 |
| MTECB1010D211.5ISO | 1.5 | ≥ M14 | 10 | 10 | 4 | 21.8 | 73 | With | AH725 |
| MTECB1212D261.5ISO | 1.5 | ≥ M16 | 12 | 12 | 4 | 26.3 | 84 | With | AH725 |
| MTECB1616F331.5ISO | 1.5 | ≥ M20 | 16 | 16 | 6 | 33.8 | 105 | With | AH725 |
| MTECB1009C201.75ISO | 1.75 | ≥ M12 | 10 | 9 | 3 | 20.1 | 73 | With | AH725 |
| MTECB1009C281.75ISO | 1.75 | ≥ M12 | 10 | 9 | 3 | 28.9 | 73 | With | AH725 |
| MTECB1010C272.0ISO | 2 | ≥ M14 | 10 | 10 | 3 | 27 | 73 | With | AH725 |
| MTECB12118D272.0ISO | 2 | ≥ M16 | 12 | 11.8 | 4 | 27 | 84 | With | AH725 |
| MTECB12118D392.0ISO | 2 | ≥ M16 | 12 | 11.8 | 4 | 39 | 105 | With | AH725 |
| MTECB1615E332.5ISO | 2.5 | ≥ M20 | 16 | 15 | 5 | 33.8 | 105 | With | AH725 |
| MTECB1615E482.5ISO | 2.5 | ≥ M20 | 16 | 15 | 5 | 48.8 | 105 | With | AH725 |
| MTECB2018D583.0ISO | 3 | ≥ M24 | 20 | 18 | 4 | 58.5 | 120 | With | AH725 |

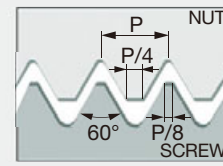
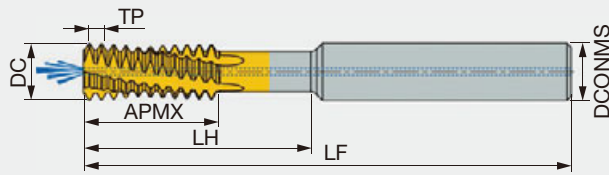
Reference pages: Standard cutting conditions → [I120 - I122](#)



SOLIDTHREAD

MTECQ-ISO

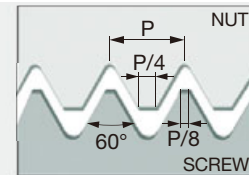
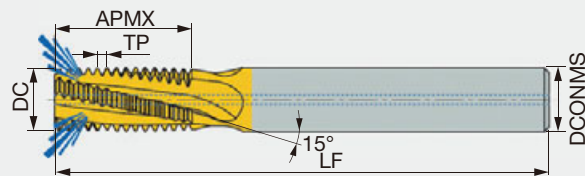
Solid carbide deep internal threading endmill, with internal coolant hole, for ISO metric profile



| Designation | TP | Application range | DCONMS | DC | NOF | APMX | LH | LF | Coolant hole | Grade |
|--------------------|-----|-------------------|--------|----|-----|------|------|-----|--------------|-------|
| MTECQ1212D381.0ISO | 1 | ≥M14 | 12 | 12 | 4 | 21 | 38 | 84 | With | AH725 |
| MTECQ1010D301.5ISO | 1.5 | ≥M13 | 10 | 10 | 4 | 18 | 30 | 73 | With | AH725 |
| MTECQ2020F562.0ISO | 2 | ≥M24 | 20 | 20 | 6 | 34 | 56 | 105 | With | AH725 |
| MTECQ2020D453.5ISO | 3.5 | ≥M26 | 20 | 20 | 4 | 28 | 45.5 | 105 | With | AH725 |

MTECZ-ISO

Solid carbide internal threading endmill for through hole, with coolant hole in the flute, for ISO metric profile

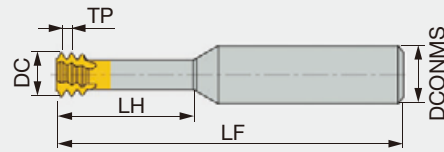


| Designation | TP | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|---------------------|------|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECZ06048C101.0ISO | 1 | ≥ M6 | 6 | 4.8 | 3 | 10.5 | 58 | With | AH725 |
| MTECZ0808D161.0ISO | 1 | ≥ M10 | 8 | 8 | 4 | 16.5 | 64 | With | AH725 |
| MTECZ0606C141.25ISO | 1.25 | ≥ M8 | 6 | 6 | 3 | 14.4 | 58 | With | AH725 |
| MTECZ0606C191.25ISO | 1.25 | ≥ M8 | 6 | 6 | 3 | 19.4 | 58 | With | AH725 |
| MTECZ08078C171.5ISO | 1.5 | ≥ M10 | 8 | 7.8 | 3 | 17 | 64 | With | AH725 |
| MTECZ1010D211.5ISO | 1.5 | ≥ M14 | 10 | 10 | 4 | 21.8 | 73 | With | AH725 |
| MTECZ1212D261.5ISO | 1.5 | ≥ M16 | 12 | 12 | 4 | 26.3 | 84 | With | AH725 |
| MTECZ1616E331.5ISO | 1.5 | ≥ M20 | 16 | 16 | 5 | 33.8 | 101 | With | AH725 |
| MTECZ1009C281.75ISO | 1.75 | ≥ M12 | 10 | 9 | 3 | 28.9 | 73 | With | AH725 |
| MTECZ1010C272.0ISO | 2 | ≥ M14 | 10 | 10 | 3 | 27 | 73 | With | AH725 |
| MTECZ12118D272.0ISO | 2 | ≥ M16 | 12 | 11.8 | 4 | 27 | 84 | With | AH725 |

Reference pages: Standard cutting conditions → [I120 - I122](#)

MTECS-ISO

Small diameter solid carbide internal threading endmill, short edge type, for ISO metric profile



| Designation | TP | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|----------------------|------|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECS03007C20.25ISO | 0.25 | ≥M1 | 3 | 0.72 | 3 | 2.5 | 39 | Without | AH725 |
| MTECS03009C30.25ISO | 0.25 | ≥M1.2 | 3 | 0.9 | 3 | 3 | 39 | Without | AH725 |
| MTECS03011C40.3ISO | 0.3 | ≥M1.4 | 3 | 1.05 | 3 | 4 | 39 | Without | AH725 |
| MTECS03012C50.35ISO | 0.35 | ≥M1.6 | 3 | 1.2 | 3 | 4.8 | 39 | Without | AH725 |
| MTECS03016C60.4ISO | 0.4 | ≥M2 | 3 | 1.53 | 3 | 6 | 39 | Without | AH725 |
| MTECS06016C40.4ISO | 0.4 | ≥M2 | 6 | 1.53 | 3 | 4.5 | 58 | Without | AH725 |
| MTECS03017C70.45ISO | 0.45 | ≥M2.2 | 3 | 1.65 | 3 | 7 | 39 | Without | AH725 |
| MTECS06017C50.45ISO | 0.45 | ≥M2.2 | 6 | 1.65 | 3 | 5 | 58 | Without | AH725 |
| MTECS0602C50.45ISO | 0.45 | ≥M2.5 | 6 | 1.95 | 3 | 5.5 | 58 | Without | AH725 |
| MTECS0602C70.45ISO | 0.45 | ≥M2.5 | 6 | 1.95 | 3 | 7.5 | 58 | Without | AH725 |
| MTECS06024C60.5ISO | 0.5 | ≥M3 | 6 | 2.37 | 3 | 6.5 | 58 | Without | AH725 |
| MTECS06024C90.5ISO | 0.5 | ≥M3 | 6 | 2.37 | 3 | 9.5 | 58 | Without | AH725 |
| MTECS06024C90.5ISOL | 0.5 | ≥M3 | 6 | 2.37 | 3 | 9.5 | 105 | Without | AH725 |
| MTECS03024C120.5ISO | 0.5 | ≥M3 | 3 | 2.4 | 3 | 12.5 | 39 | Without | AH725 |
| MTECS03024C150.5ISO | 0.5 | ≥M3 | 3 | 2.4 | 3 | 15.5 | 39 | Without | AH725 |
| MTECS06054D200.5ISO | 0.5 | ≥M6 | 6 | 5.35 | 4 | 20 | 58 | Without | AH725 |
| MTECS06028C100.6ISO | 0.6 | ≥M3.5 | 6 | 2.75 | 3 | 10.5 | 58 | Without | AH725 |
| MTECS06028C70.6ISO | 0.6 | ≥M3.5 | 6 | 2.75 | 3 | 7.5 | 58 | Without | AH725 |
| MTECS06031C120.7ISO | 0.7 | ≥M4 | 6 | 3.1 | 3 | 12.5 | 58 | Without | AH725 |
| MTECS06031C120.7ISOL | 0.7 | ≥M4 | 6 | 3.1 | 3 | 12.5 | 105 | Without | AH725 |
| MTECS06031C160.7ISO | 0.7 | ≥M4 | 6 | 3.1 | 3 | 16.7 | 58 | Without | AH725 |
| MTECS06031C90.7ISO | 0.7 | ≥M4 | 6 | 3.1 | 3 | 9 | 58 | Without | AH725 |
| MTECS0808D250.75ISO | 0.75 | ≥M10 | 8 | 8 | 4 | 25 | 64 | Without | AH725 |
| MTECS06038C120.8ISO | 0.8 | ≥M5 | 6 | 3.8 | 3 | 12.5 | 58 | Without | AH725 |
| MTECS06038C160.8ISO | 0.8 | ≥M5 | 6 | 3.8 | 3 | 16 | 58 | Without | AH725 |
| MTECS06038C160.8ISOL | 0.8 | ≥M5 | 6 | 3.8 | 3 | 16 | 105 | Without | AH725 |
| MTECS06047C141.0ISO | 1 | ≥M6 | 6 | 4.65 | 3 | 14 | 58 | Without | AH725 |
| MTECS06047C201.0ISO | 1 | ≥M6 | 6 | 4.65 | 3 | 20 | 58 | Without | AH725 |
| MTECS06047C201.0ISOL | 1 | ≥M6 | 6 | 4.65 | 3 | 20 | 105 | Without | AH725 |
| MTECS0606C181.25ISO | 1.25 | ≥M8 | 6 | 6 | 3 | 18 | 58 | Without | AH725 |
| MTECS0606C241.25ISO | 1.25 | ≥M8 | 6 | 6 | 3 | 24 | 58 | Without | AH725 |
| MTECS08078C231.5ISO | 1.5 | ≥M10 | 8 | 7.8 | 3 | 23 | 64 | Without | AH725 |
| MTECS08078C311.5ISO | 1.5 | ≥M10 | 8 | 7.8 | 3 | 31.5 | 64 | Without | AH725 |
| MTECS1009C261.75ISO | 1.75 | ≥M12 | 10 | 9 | 3 | 26 | 73 | Without | AH725 |
| MTECS12118D352.0ISO | 2 | ≥M16 | 12 | 11.8 | 4 | 35 | 84 | Without | AH725 |
| MTECS12118D502.0ISO | 2 | ≥M16 | 12 | 11.8 | 4 | 50 | 105 | Without | AH725 |
| MTECS1615E432.5ISO | 2.5 | ≥M20 | 16 | 15 | 5 | 43 | 100 | Without | AH725 |

Reference pages: Standard cutting conditions → **I120 - I122**



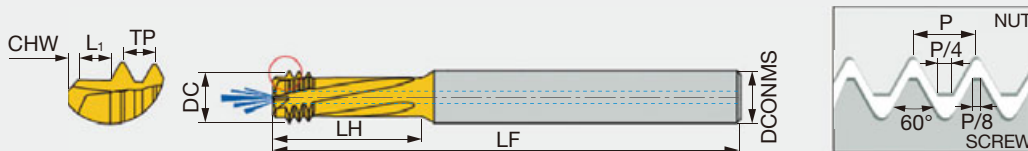
Small diameter solid carbide internal threading endmill, short edge type, left hand cutting, for ISO metric profile



| Designation | TP | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|----------------------|------|-------------------|--------|------|-----|------|----|--------------|-------|
| MTECSH03012C50.35ISO | 0.35 | ≥M1.6 | 3 | 1.2 | 3 | 4.8 | 39 | Without | AH750 |
| MTECSH03016C60.4ISO | 0.4 | ≥M2 | 3 | 1.55 | 3 | 6 | 39 | Without | AH750 |
| MTECSH06016C40.4ISO | 0.4 | ≥M2 | 6 | 1.55 | 3 | 4.5 | 58 | Without | AH750 |
| MTECSH06017C50.45ISO | 0.45 | ≥M2.2 | 6 | 1.65 | 3 | 5 | 58 | Without | AH750 |
| MTECSH0602C50.45ISO | 0.45 | ≥M2.5 | 6 | 1.95 | 3 | 5.5 | 58 | Without | AH750 |
| MTECSH0602C70.45ISO | 0.45 | ≥M2.5 | 6 | 1.95 | 3 | 7.5 | 58 | Without | AH750 |
| MTECSH06024C60.5ISO | 0.5 | ≥M3 | 6 | 2.35 | 3 | 6.5 | 58 | Without | AH750 |
| MTECSH06024C90.5ISO | 0.5 | ≥M3 | 6 | 2.35 | 3 | 9.5 | 58 | Without | AH750 |
| MTECSH06028C70.6ISO | 0.6 | ≥M3.5 | 6 | 2.75 | 3 | 7.5 | 58 | Without | AH750 |
| MTECSH06031C120.7ISO | 0.7 | ≥M4 | 6 | 3.1 | 3 | 12.5 | 58 | Without | AH750 |
| MTECSH06038C120.8ISO | 0.8 | ≥M5 | 6 | 3.8 | 3 | 12.5 | 58 | Without | AH750 |
| MTECSH06047C141.0ISO | 1 | ≥M6 | 6 | 4.65 | 3 | 14 | 58 | Without | AH750 |
| MTECSH06047C201.0ISO | 1 | ≥M6 | 6 | 4.65 | 3 | 20 | 58 | Without | AH750 |
| MTECSH0606C181.25ISO | 1.25 | ≥M8 | 6 | 5.95 | 3 | 18 | 58 | Without | AH750 |
| MTECSH0606C241.25ISO | 1.25 | ≥M8 | 6 | 5.95 | 3 | 24 | 58 | Without | AH750 |
| MTECSH08078C231.5ISO | 1.5 | ≥M10 | 8 | 7.8 | 3 | 23 | 64 | Without | AH750 |
| MTECSH1009C261.75ISO | 1.75 | ≥M12 | 10 | 9 | 3 | 26 | 73 | Without | AH750 |
| MTECSH12118D352.0ISO | 2 | ≥M16 | 12 | 11.8 | 4 | 35 | 84 | Without | AH750 |

MTECD-ISO

Small diameter solid carbide endmill for internal threading, drilling, and chamfering, short edge type, left hand cutting, for ISO metric profile



| Designation | TP | Application range | DCONMS | DC | NOF | LH | LF | CHW | L1 | Coolant hole | Grade |
|----------------------|------|-------------------|--------|------|-----|------|----|-----|-----|--------------|-------|
| MTECD06032C110.7ISO | 0.7 | M4 | 6 | 3.15 | 3 | 11.6 | 58 | 0.2 | 0.7 | Without | AH725 |
| MTECD0604C140.8ISO | 0.8 | M5 | 6 | 4 | 3 | 14.4 | 58 | 0.3 | 0.8 | Without | AH725 |
| MTECD08047C141.0ISO | 1 | M6-M7 | 8 | 4.7 | 3 | 14 | 64 | 0.4 | 1 | With | AH725 |
| MTECD08061D181.25ISO | 1.25 | M8-M9 | 8 | 6.1 | 4 | 18 | 64 | 0.5 | 1.3 | With | AH725 |
| MTECD08078D231.5ISO | 1.5 | M10-M12 | 8 | 7.8 | 4 | 23 | 64 | 0.6 | 1.5 | With | AH725 |
| MTECD1009D261.75ISO | 1.75 | M12-M14 | 10 | 9 | 4 | 26 | 73 | 0.6 | 1.8 | With | AH725 |
| MTECD12118D352.0ISO | 2 | M16-M19 | 12 | 11.8 | 4 | 35 | 84 | 0.6 | 2 | With | AH725 |

MTECE-ISO

Solid carbide external threading endmill, for ISO metric profile

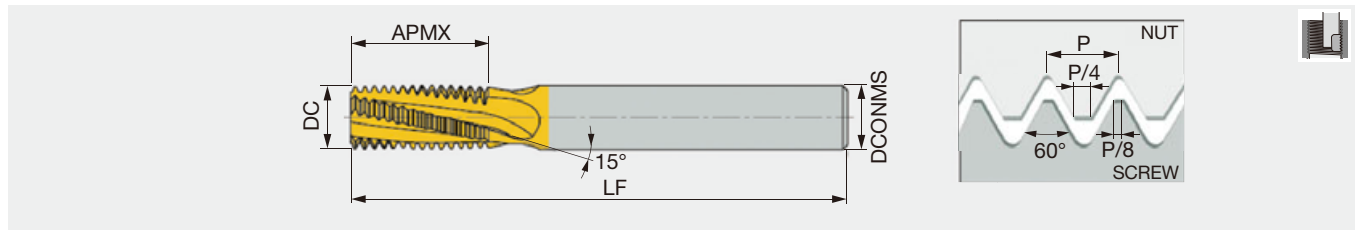


| Designation | TP | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|---------------------|------|--------|----|-----|------|----|--------------|-------|
| MTECE1010D161.0ISO | 1 | 10 | 10 | 4 | 16.5 | 73 | Without | AH725 |
| MTECE1010D161.25ISO | 1.25 | 10 | 10 | 4 | 16.9 | 73 | Without | AH725 |
| MTECE1010D151.5ISO | 1.5 | 10 | 10 | 4 | 15.8 | 73 | Without | AH725 |
| MTECE1212D201.5ISO | 1.5 | 12 | 12 | 4 | 20.3 | 84 | Without | AH725 |
| MTECE1212D201.75ISO | 1.75 | 12 | 12 | 4 | 20.1 | 84 | Without | AH725 |
| MTECE1212D212.0ISO | 2 | 12 | 12 | 4 | 21 | 84 | Without | AH725 |

Unified (UN, UNC, UNF, UNFE, UNS)

MTEC-UN

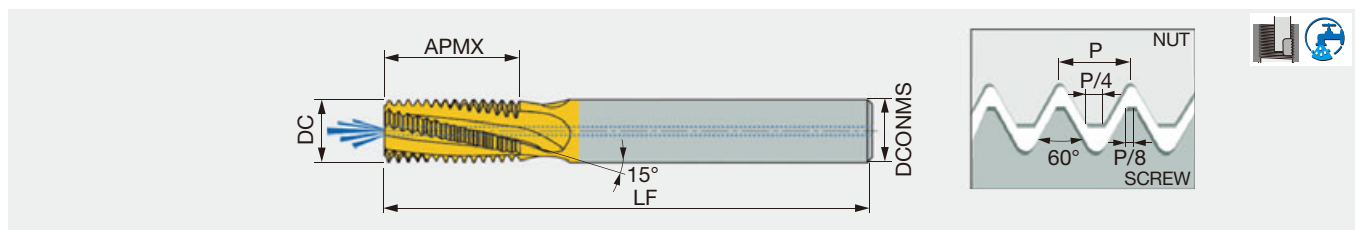
Solid carbide internal threading endmill, for UN profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|------------------|-----|-------------------|--------|-----|-----|------|-----|--------------|-------|
| MTEC06032C632UN | 32 | ≤ #8 (0.164) | 6 | 3.2 | 3 | 6.8 | 58 | Without | AH725 |
| MTEC0604C1128UN | 28 | ≤ 1/4 | 6 | 4 | 3 | 11.3 | 58 | Without | AH725 |
| MTEC0606C1428UN | 28 | ≤ 5/16 | 6 | 6 | 3 | 14.5 | 58 | Without | AH725 |
| MTEC0605C1424UN | 24 | ≤ 5/16 | 6 | 5 | 3 | 14.3 | 58 | Without | AH725 |
| MTEC0807C2124UN | 24 | ≤ 3/8 | 8 | 7 | 3 | 20 | 64 | Without | AH725 |
| MTEC06045C1220UN | 20 | ≤ 1/4 | 6 | 4.5 | 3 | 12.1 | 58 | Without | AH725 |
| MTEC0807C2120UN | 20 | ≤ 7/16 | 8 | 7 | 3 | 20 | 64 | Without | AH725 |
| MTEC1212E2720UN | 20 | ≤ 11/16 | 12 | 12 | 5 | 27.3 | 84 | Without | AH725 |
| MTEC0605C1418UN | 18 | ≤ 5/16 | 6 | 5 | 3 | 14.8 | 58 | Without | AH725 |
| MTEC1010D2618UN | 18 | ≤ 9/16 | 10 | 10 | 4 | 26.1 | 73 | Without | AH725 |
| MTEC0606C1616UN | 16 | ≤ 3/8 | 6 | 6 | 3 | 16.7 | 58 | Without | AH725 |
| MTEC1212D3116UN | 16 | ≤ 5/8 | 12 | 12 | 4 | 30 | 84 | Without | AH725 |
| MTEC1615E3714UN | 14 | ≤ 13/16 | 16 | 15 | 5 | 37.2 | 105 | Without | AH725 |
| MTEC0808C2213UN | 13 | ≤ 1/2 | 8 | 8 | 3 | 22.5 | 64 | Without | AH725 |
| MTEC1010C2612UN | 12 | ≤ 9/16 | 10 | 10 | 3 | 26.5 | 73 | Without | AH725 |
| MTEC1616E4112UN | 12 | ≤ 13/16 | 16 | 16 | 5 | 41.3 | 105 | Without | AH725 |
| MTEC1010C2811UN | 11 | ≤ 5/8 | 10 | 10 | 3 | 28.9 | 73 | Without | AH725 |
| MTEC1212C3410UN | 10 | ≤ 11/16 | 12 | 12 | 3 | 34.3 | 84 | Without | AH725 |
| MTEC1615C389UN | 9 | ≤ 7/8 | 16 | 15 | 3 | 38.1 | 105 | Without | AH725 |
| MTEC1616C428UN | 8 | ≤ 15/16 | 16 | 16 | 3 | 42.9 | 105 | Without | AH725 |

MTECB-UN

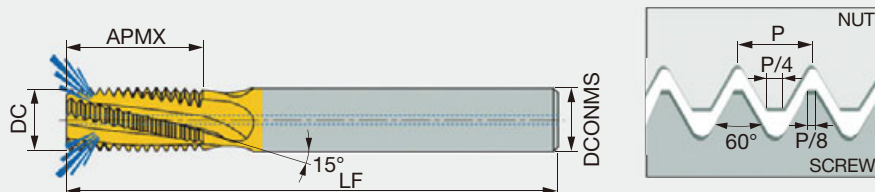
Solid carbide internal threading endmill, with coolant hole, for UN profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|-------------------|-----|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECB06032C632UN | 32 | ≥ #8 (0.164) | 6 | 3.2 | 3 | 6.8 | 58 | With | AH725 |
| MTECB0606C1432UN | 32 | ≥ 5/16 | 6 | 6 | 3 | 16 | 58 | With | AH725 |
| MTECB0605C1128UN | 28 | ≥ 1/4 | 6 | 5 | 3 | 11.3 | 58 | With | AH725 |
| MTECB08066C1424UN | 24 | ≥ 5/16 | 8 | 6.6 | 3 | 14.3 | 64 | With | AH725 |
| MTECB0808D2124UN | 24 | ≥ 3/8 | 8 | 8 | 4 | 20.6 | 64 | With | AH725 |
| MTECB0808C2120UN | 20 | ≥ 7/16 | 8 | 8 | 3 | 21 | 64 | With | AH725 |
| MTECB1010D2220UN | 20 | ≥ 1/2 | 10 | 10 | 4 | 22.3 | 73 | With | AH725 |
| MTECB06056C1418UN | 18 | ≥ 5/16 | 6 | 5.6 | 3 | 14.8 | 58 | With | AH725 |
| MTECB12113D2618UN | 18 | ≥ 9/16 | 12 | 11.3 | 4 | 26.1 | 84 | With | AH725 |
| MTECB08067C1616UN | 16 | ≥ 3/8 | 8 | 6.7 | 3 | 16.7 | 64 | With | AH725 |
| MTECB1212D3116UN | 16 | ≥ 5/8 | 12 | 12 | 4 | 31 | 84 | With | AH725 |
| MTECB1616E3714UN | 14 | ≥ 13/16 | 16 | 16 | 5 | 37.2 | 105 | With | AH725 |
| MTECB10092C2213UN | 13 | ≥ 1/2 | 10 | 9.2 | 3 | 22.5 | 73 | With | AH725 |
| MTECB12114C2811UN | 11 | ≥ 5/8 | 12 | 11.4 | 3 | 28.9 | 84 | With | AH725 |
| MTECB16144D3410UN | 10 | ≥ 3/4 | 16 | 14.4 | 4 | 34.3 | 105 | With | AH725 |
| MTECB20195D428UN | 8 | ≥ 1 | 20 | 19.5 | 4 | 42.9 | 105 | With | AH725 |

Reference pages: Standard cutting conditions → [I120 - I122](#)

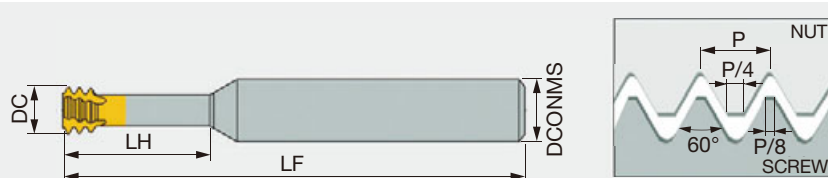
Solid carbide internal threading endmill, with coolant hole in the flute, for UN profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|-------------------|-----|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECZ1010D2220UN | 20 | ≥ 1/2 | 10 | 10 | 4 | 22.3 | 73 | With | AH725 |
| MTECZ12113D2618UN | 18 | ≥ 9/16 | 12 | 11.3 | 4 | 26.1 | 84 | With | AH725 |
| MTECZ08067C1616UN | 16 | ≥ 3/8 | 8 | 6.7 | 3 | 16.7 | 64 | With | AH725 |
| MTECZ16144D3410UN | 10 | ≥ 3/4 | 16 | 14.4 | 4 | 34.3 | 101 | With | AH725 |

MTECS-UN

Small diameter solid carbide internal threading endmill, short edge type, for UN profile

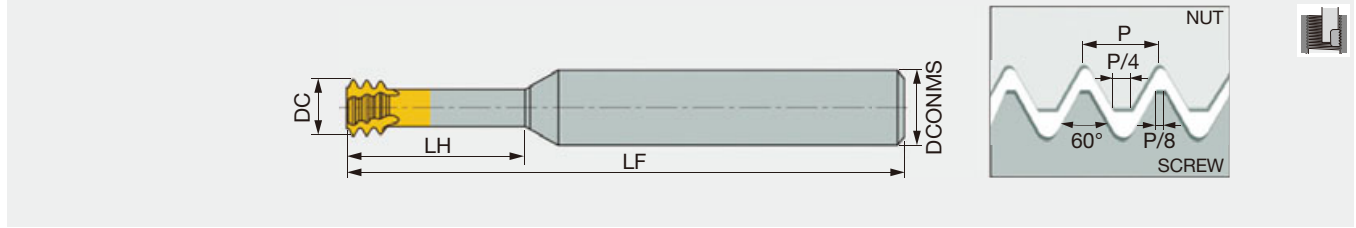


| Designation | TPI | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|---------------------|-----|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECS03012C880UN | 80 | ≤ #0 (0.060) | 3 | 1.15 | 3 | 8 | 39 | Without | AH725 |
| MTECS03015C672UN | 72 | ≤ #1 (0.073) | 3 | 1.45 | 3 | 6 | 39 | Without | AH725 |
| MTECS06016C656UN | 56 | ≤ #2 (0.086) | 6 | 1.65 | 3 | 6.6 | 58 | Without | AH725 |
| MTECS06016C456UN | 56 | ≤ #2 (0.086) | 6 | 1.65 | 3 | 4.4 | 58 | Without | AH725 |
| MTECS06019C548UN | 48 | ≤ #3 (0.099) | 6 | 1.9 | 3 | 5.2 | 58 | Without | AH725 |
| MTECS03021C1240UN | 40 | ≤ #4 (0.112) | 3 | 2.1 | 3 | 12 | 39 | Without | AH725 |
| MTECS06021C840UN | 40 | ≤ #4 (0.112) | 6 | 2.1 | 3 | 8 | 58 | Without | AH725 |
| MTECS06021C640UN | 40 | ≤ #4 (0.112) | 6 | 2.1 | 3 | 6.3 | 58 | Without | AH725 |
| MTECS06024C940UN | 40 | ≤ #5 (0.125) | 6 | 2.45 | 3 | 9.6 | 58 | Without | AH725 |
| MTECS06033C936UN | 36 | ≤ #8 (0.164) | 6 | 3.3 | 3 | 9 | 58 | Without | AH725 |
| MTECS06025C732UN | 32 | ≤ #6 (0.138) | 6 | 2.55 | 3 | 7.1 | 58 | Without | AH725 |
| MTECS06025C1032UN | 32 | ≤ #6 (0.138) | 6 | 2.55 | 3 | 10.5 | 58 | Without | AH725 |
| MTECS06032C932UN | 32 | ≤ #8 (0.164) | 6 | 3.2 | 3 | 9.5 | 58 | Without | AH725 |
| MTECS06032C1232UN | 32 | ≤ #8 (0.164) | 6 | 3.2 | 3 | 12.5 | 58 | Without | AH725 |
| MTECS06037C1032UN | 32 | ≤ #10 (0.190) | 6 | 3.7 | 3 | 10.5 | 58 | Without | AH725 |
| MTECS06037C1532UN | 32 | ≤ #10 (0.190) | 6 | 3.7 | 3 | 15 | 58 | Without | AH725 |
| MTECS0605C1428UN | 28 | ≤ 1/4 | 6 | 5 | 3 | 14.5 | 58 | Without | AH725 |
| MTECS0605C1928UN | 28 | ≤ 1/4 | 6 | 5 | 3 | 19 | 58 | Without | AH725 |
| MTECS08066C1724UN | 24 | ≤ 5/16 | 8 | 6.6 | 3 | 17 | 64 | Without | AH725 |
| MTECS08066C2424UN | 24 | ≤ 5/16 | 8 | 6.6 | 3 | 24 | 64 | Without | AH725 |
| MTECS06047C1420UN | 20 | ≤ 1/4 | 6 | 4.75 | 3 | 14 | 58 | Without | AH725 |
| MTECS06047C1920UN | 20 | ≤ 1/4 | 6 | 4.75 | 3 | 19 | 58 | Without | AH725 |
| MTECS06047C1920UN-L | 20 | ≤ 1/4 | 6 | 4.75 | 3 | 19 | 105 | Without | AH725 |
| MTECS0808C2520UN | 20 | ≤ 7/16 | 8 | 8 | 3 | 25 | 64 | Without | AH725 |
| MTECS0606C1718UN | 18 | ≤ 5/16 | 6 | 6 | 3 | 17 | 58 | Without | AH725 |
| MTECS0606C2318UN | 18 | ≤ 5/16 | 6 | 6 | 3 | 23 | 58 | Without | AH725 |
| MTECS1212D3518UN | 18 | ≤ 5/8 | 12 | 12 | 4 | 35 | 84 | Without | AH725 |
| MTECS08067C2216UN | 16 | ≤ 3/8 | 8 | 6.7 | 3 | 22 | 64 | Without | AH725 |
| MTECS08067C3016UN | 16 | ≤ 3/8 | 8 | 6.7 | 3 | 30.2 | 64 | Without | AH725 |
| MTECS08077C2514UN | 14 | ≤ 7/16 | 8 | 7.7 | 3 | 25 | 64 | Without | AH725 |
| MTECS10092C2713UN | 13 | ≤ 1/2 | 10 | 9.2 | 3 | 27.5 | 73 | Without | AH725 |
| MTECS12114C3411UN | 11 | ≤ 5/8 | 12 | 11.4 | 3 | 34.5 | 84 | Without | AH725 |
| MTECS12114C5011UN | 11 | ≤ 5/8 | 12 | 11.4 | 3 | 50 | 105 | Without | AH725 |

Reference pages: Standard cutting conditions → [I120](#) - [I122](#)

MTECSH-UN

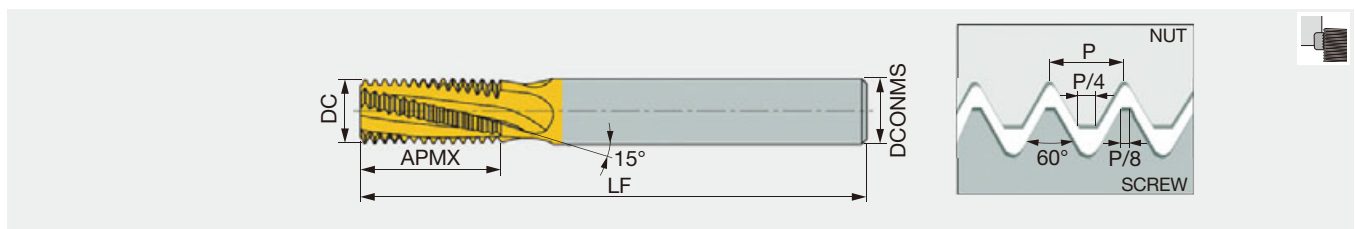
Small diameter solid carbide internal threading endmill, short edge type, left hand cutting, for UN profile, for hardened steel



| Designation | TPI | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|--------------------|-----|-------------------|--------|------|-----|------|----|--------------|-------|
| MTECSH06012C480UN | 80 | ≥ #0 (0.060) | 6 | 1.15 | 3 | 4 | 58 | Without | AH725 |
| MTECSH06016C656UN | 56 | ≥ #2 (0.086) | 6 | 1.65 | 3 | 6.6 | 58 | Without | AH725 |
| MTECSH06019C548UN | 48 | ≥ #3 (0.099) | 6 | 1.9 | 3 | 5.2 | 58 | Without | AH725 |
| MTECSH06021C640UN | 40 | ≥ #4 (0.112) | 6 | 2.1 | 3 | 6.3 | 58 | Without | AH725 |
| MTECSH06021C840UN | 40 | ≥ #4 (0.112) | 6 | 2.1 | 3 | 8 | 58 | Without | AH725 |
| MTECSH06024C740UN | 40 | ≥ #5 (0.125) | 6 | 2.45 | 3 | 7 | 58 | Without | AH725 |
| MTECSH06024C940UN | 40 | ≥ #5 (0.125) | 6 | 2.45 | 3 | 9.6 | 58 | Without | AH725 |
| MTECSH06025C1032UN | 32 | ≥ #6 (0.138) | 6 | 2.55 | 3 | 10.5 | 58 | Without | AH725 |
| MTECSH06032C932UN | 32 | ≥ #8 (0.164) | 6 | 3.2 | 3 | 9.5 | 58 | Without | AH725 |
| MTECSH06037C1032UN | 32 | ≥ #10 (0.190) | 6 | 3.7 | 3 | 10.5 | 58 | Without | AH725 |
| MTECSH06037C1532UN | 32 | ≥ #10 (0.190) | 6 | 3.7 | 3 | 15 | 58 | Without | AH725 |
| MTECSH06042C1128UN | 28 | ≥ #12 (0.216) | 6 | 4.2 | 3 | 11 | 58 | Without | AH725 |
| MTECSH0605C1428UN | 28 | ≥ 1/4 | 6 | 5 | 3 | 14.5 | 58 | Without | AH725 |
| MTECSH06035C1024UN | 24 | ≥ #10 (0.190) | 6 | 3.5 | 3 | 10.6 | 58 | Without | AH725 |
| MTECSH08066C1724UN | 24 | ≥ 5/16 | 8 | 6.6 | 3 | 17 | 64 | Without | AH725 |
| MTECSH08066C2424UN | 24 | ≥ 5/16 | 8 | 6.6 | 3 | 24 | 64 | Without | AH725 |
| MTECSH06047C1920UN | 20 | ≥ 1/4 | 6 | 4.75 | 3 | 19 | 58 | Without | AH725 |
| MTECSH0808C2520UN | 20 | ≥ 7/16 | 8 | 8 | 3 | 25 | 64 | Without | AH725 |
| MTECSH0606C1718UN | 18 | ≥ 5/16 | 6 | 6 | 3 | 17 | 58 | Without | AH725 |
| MTECSH0606C2318UN | 18 | ≥ 5/16 | 6 | 6 | 3 | 23 | 58 | Without | AH725 |
| MTECSH08067C2216UN | 16 | ≥ 3/8 | 8 | 6.7 | 3 | 22 | 64 | Without | AH725 |
| MTECSH08077C2514UN | 14 | ≥ 7/16 | 8 | 7.7 | 3 | 25 | 64 | Without | AH725 |
| MTECSH10092C2713UN | 13 | ≥ 1/2 | 10 | 9.2 | 3 | 27.5 | 73 | Without | AH725 |
| MTECSH12114C3411UN | 11 | ≥ 5/8 | 12 | 11.4 | 3 | 34.5 | 84 | Without | AH725 |

MTEC E-UN

Solid carbide external threading endmill, for UN profile



| Designation | TPI | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|------------------|-----|--------|----|-----|------|----|--------------|-------|
| MTECE1010D1624UN | 24 | 10 | 10 | 4 | 16.4 | 73 | Without | AH725 |
| MTECE1212E2120UN | 20 | 12 | 12 | 5 | 21 | 84 | Without | AH725 |

SOLIDTHREAD**Whitworth parallel pipe thread (G, Rp, BSP, PF, PS)****MTEC-W**

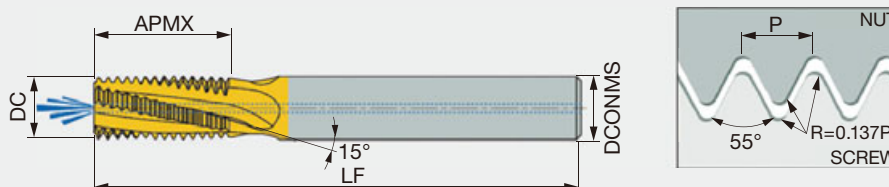
Solid carbide internal and external threading endmill, for G, BSP profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|----------------|-----|--------------------|--------|----|-----|------|-----|--------------|-------|
| MTEC0606C928W | 28 | 1/16, 1/8 | 6 | 6 | 3 | 9.5 | 58 | Without | AH725 |
| MTEC0808C1419W | 19 | 1/4, 3/8 | 8 | 8 | 3 | 14 | 64 | Without | AH725 |
| MTEC1212D1914W | 14 | 1/2, 5/8, 3/4, 7/8 | 12 | 12 | 4 | 19.3 | 84 | Without | AH725 |
| MTEC1212D2614W | 14 | 1/2, 5/8, 3/4, 7/8 | 12 | 12 | 4 | 26.3 | 84 | Without | AH725 |
| MTEC1212C2411W | 11 | ≥ 1 | 12 | 12 | 3 | 24.2 | 84 | Without | AH725 |
| MTEC1616D3811W | 11 | ≥ 1 | 16 | 16 | 4 | 38.1 | 105 | Without | AH725 |

MTECB-W

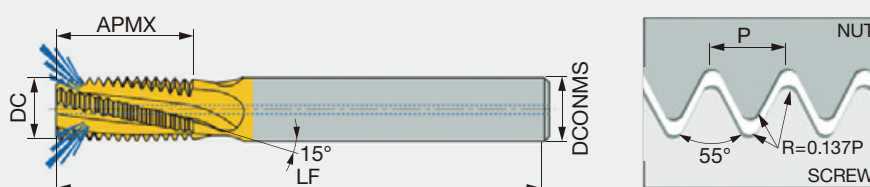
Solid carbide internal and external threading endmill, with coolant hole, for G, BSP profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|------------------|-----|--------------------|--------|-----|-----|------|-----|--------------|-------|
| MTECB08078C1428W | 28 | 1/8 | 8 | 7.8 | 3 | 14.1 | 64 | Without | AH725 |
| MTECB1010D1619W | 19 | 1/4, 3/8 | 10 | 10 | 4 | 16.7 | 73 | Without | AH725 |
| MTECB1616E2614W | 14 | 1/2, 5/8, 3/4, 7/8 | 16 | 16 | 5 | 26.3 | 105 | Without | AH725 |
| MTECB1616D3811W | 11 | ≥ 1 | 16 | 16 | 4 | 38.1 | 105 | Without | AH725 |
| MTECB2020E4711W | 11 | ≥ 1 | 20 | 20 | 5 | 47.3 | 105 | Without | AH725 |

MTECZ-W

Solid carbide internal and external threading endmill for through hole, with coolant hole, for G, BSP profile

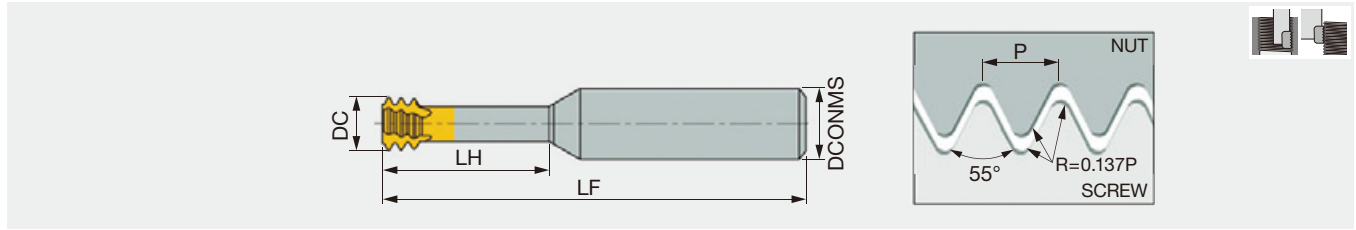


| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|------------------|-----|--------------------|--------|-----|-----|------|-----|--------------|-------|
| MTECZ08078C1428W | 28 | 1/8 | 8 | 7.8 | 3 | 14.1 | 64 | With | AH725 |
| MTECZ1010D1619W | 19 | 1/4, 3/8 | 10 | 10 | 4 | 16.7 | 73 | With | AH725 |
| MTECZ1616E2614W | 14 | 1/2, 5/8, 3/4, 7/8 | 16 | 16 | 5 | 26.3 | 101 | With | AH725 |

Reference pages: Standard cutting conditions → [I120 - I122](#)

MTECS-W

Solid carbide internal and external threading endmill, short edge type, for G, BSP profile

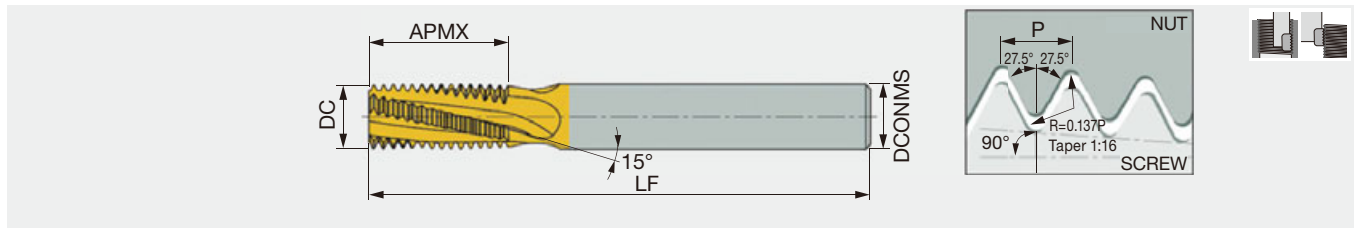


| Designation | TPI | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|------------------|-----|--------------------|--------|-----|-----|------|----|--------------|-------|
| MTECS08078C1928W | 28 | 1/8 | 8 | 7.8 | 3 | 19.5 | 64 | Without | AH725 |
| MTECS1010D3019W | 19 | 1/4, 3/8 | 10 | 10 | 4 | 30 | 73 | Without | AH725 |
| MTECS1212D3714W | 14 | 1/2, 5/8, 3/4, 7/8 | 12 | 12 | 4 | 37 | 84 | Without | AH725 |

Tapered pipe thread (R, Rc, RT, BSPT)

MTEC-BSPT

Solid carbide internal and external threading endmill. for R, RC, BSPT profile

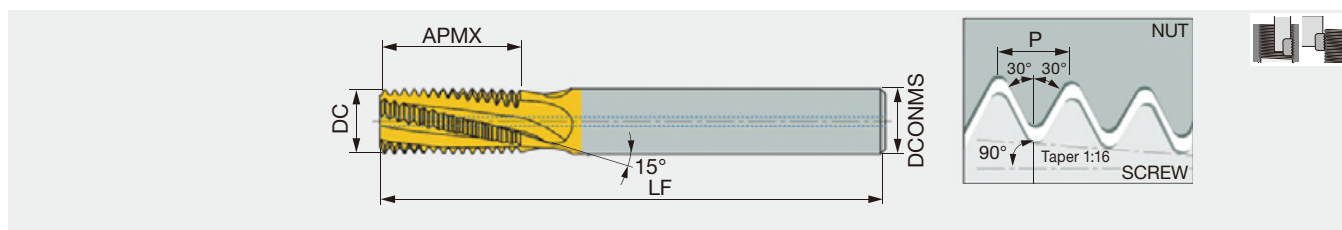


| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|----------------------------------|-----|---------------------------|--------|----|-----|------|-----|--------------|-------|
| MTEC0606C928BSPT | 28 | 1/8 | 6 | 6 | 3 | 9.5 | 58 | Without | AH725 |
| MTEC0808C1419BSPT | 19 | 1/4, 3/4 | 8 | 8 | 3 | 14 | 64 | Without | AH725 |
| MTEC1212D1914BSPT | 14 | 1/2, 7/8 | 12 | 12 | 4 | 19.1 | 84 | Without | AH725 |
| MTEC1616D2811BSPT ⁽¹⁾ | 11 | 1, 1 1/4, 1 1/2, 2, 2 1/2 | 16 | 16 | 4 | 28.9 | 105 | Without | AH725 |

(1) When the hole depth to be threaded exceeds APMX, use ETTL025M022W25.0F043R03-RT instead.

SOLIDTHREAD**NPT
MTEC-NPT**

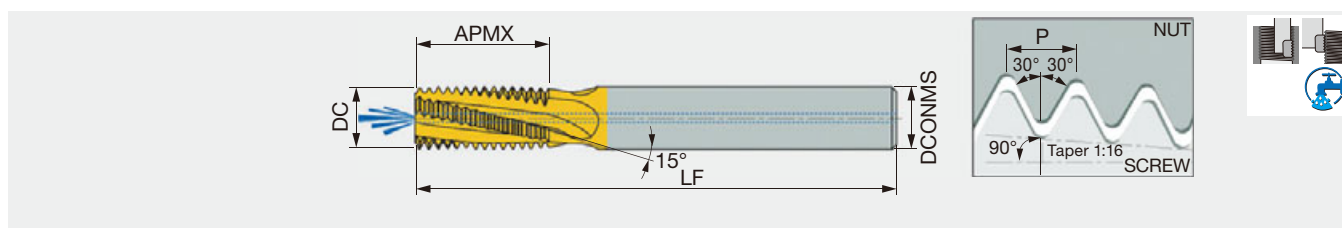
Solid carbide internal and external threading endmill. for NPT profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|--------------------------------|------|--------------------|--------|----|-----|------|-----|--------------|-------|
| MTEC0606C927NPT | 27 | 1/16, 1/8 | 6 | 6 | 3 | 9.9 | 58 | Without | AH725 |
| MTEC0808C1418NPT | 18 | 1/4, 3/8 | 8 | 8 | 3 | 14.8 | 64 | Without | AH725 |
| MTEC1212D2014NPT | 14 | 1/2, 3/4 | 12 | 12 | 4 | 20.9 | 84 | Without | AH725 |
| MTEC1616D2711.5NPT | 11.5 | 1, 1 1/4, 1 1/2, 2 | 16 | 16 | 4 | 27.6 | 105 | Without | AH725 |
| MTEC2020D398NPT ⁽¹⁾ | 8 | 2 1/2 - 6 | 20 | 20 | 4 | 39.7 | 105 | Without | AH725 |

MTECB-NPT

Solid carbide internal and external threading endmill, with coolant hole, for NPT profile



| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|--------------------|-----|-------------------|--------|------|-----|------|-----|--------------|-------|
| MTECB08076C1027NPT | 27 | 1/8 | 8 | 7.6 | 3 | 10.8 | 64 | With | AH725 |
| MTECB1010D1618NPT | 18 | 1/4, 3/8 | 10 | 10 | 4 | 16.2 | 73 | With | AH725 |
| MTECB16155D2214NPT | 14 | 1/2, 3/4 | 16 | 15.5 | 4 | 22.7 | 105 | With | AH725 |

2

3

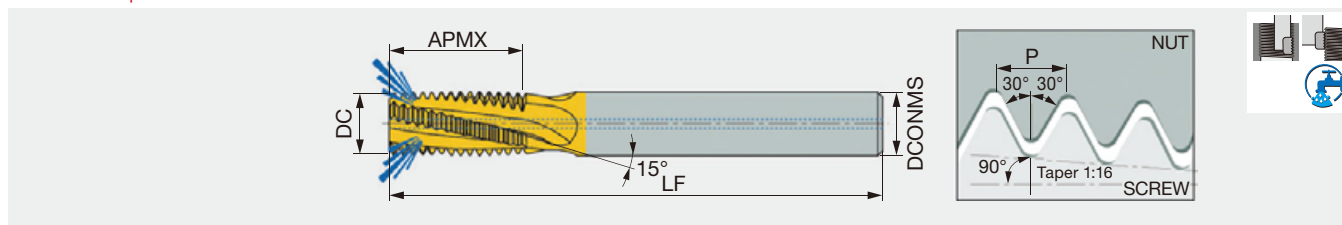
4

5

6以上

NPTF**MTECZ-NPTF**

Solid carbide internal and external threading endmill for through hole, with coolant hole in the flute, for NPTF profile



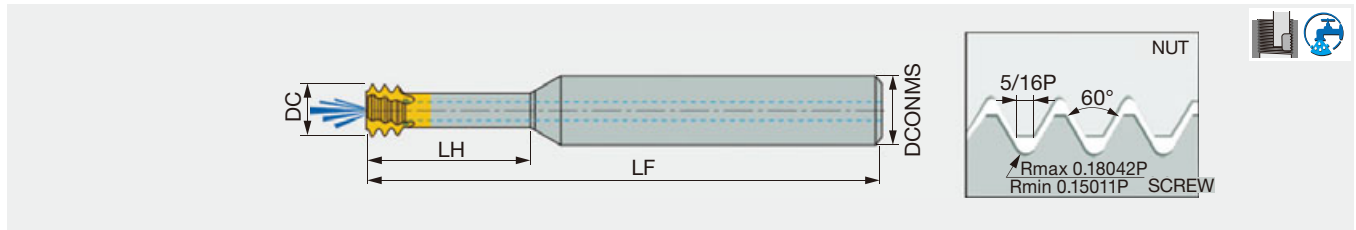
| Designation | TPI | Application range | DCONMS | DC | NOF | APMX | LF | Coolant hole | Grade |
|---------------------|-----|-------------------|--------|-----|-----|------|----|--------------|-------|
| MTECZ08076C1027NPTF | 27 | 1/8 | 8 | 7.6 | 3 | 10.8 | 64 | With | AH725 |
| MTECZ1010D1618NPTF | 18 | 1/4, 3/8 | 10 | 10 | 4 | 16.2 | 73 | With | AH725 |

Reference pages: Standard cutting conditions → [I120](#) - [I122](#)

MJ

MTECS-MJ

Small diameter solid carbide internal threading endmill, short edge type, with coolant hole, for MJ profile

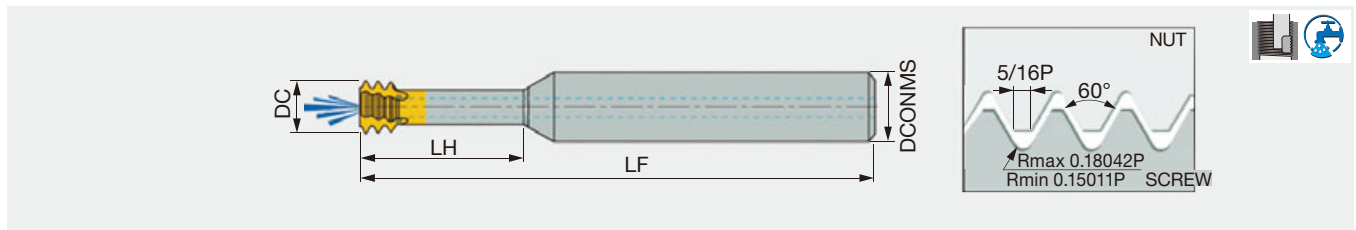


| Designation | TP | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|---------------------|------|-------------------|--------|-----|-----|------|----|--------------|-------|
| MTECS06032C100.7MJ | 0.7 | ≥ 4 | 6 | 3.2 | 3 | 10 | 58 | Without | AH725 |
| MTECS06039C120.8MJ | 0.8 | ≥ 5 | 6 | 3.9 | 3 | 12.5 | 58 | Without | AH725 |
| MTECS06048C151.0MJ | 1 | ≥ 6 | 6 | 4.8 | 3 | 15 | 58 | Without | AH725 |
| MTECS08061C201.25MJ | 1.25 | ≥ 8 | 8 | 6.1 | 3 | 20 | 64 | With | AH725 |
| MTECS0808C251.5MJ | 1.5 | ≥ 10 | 8 | 8 | 3 | 25 | 64 | With | AH725 |
| MTECS10092C301.75MJ | 1.75 | ≥ 12 | 10 | 9.2 | 3 | 30 | 73 | With | AH725 |
| MTECS1010C352.0MJ | 2 | ≥ 14 | 10 | 10 | 3 | 35 | 73 | With | AH725 |

UNJ (UNJ, UNJC, UNJF, UNJEF)

MTECS-UNJ

Small diameter solid carbide internal threading endmill, short edge type, with coolant hole, for UNJ profile



| Designation | TPI | Application range | DCONMS | DC | NOF | LH | LF | Coolant hole | Grade |
|--------------------|-----|-------------------|--------|------|-----|------|----|--------------|-------|
| MTECS06033C1032UNJ | 32 | ≥ #8 | 6 | 3.3 | 3 | 10.5 | 58 | Without | AH725 |
| MTECS08051C1628UNJ | 28 | ≥ 1/4 | 8 | 5.1 | 3 | 16 | 64 | With | AH725 |
| MTECS08067C2024UNJ | 24 | ≥ 5/16 | 8 | 6.7 | 3 | 20 | 64 | With | AH725 |
| MTECS06049C1620UNJ | 20 | ≥ 1/4 | 6 | 4.9 | 3 | 16 | 58 | Without | AH725 |
| MTECS0808C2820UNJ | 20 | ≥ 7/16 | 8 | 8 | 3 | 28 | 64 | With | AH725 |
| MTECS08061C2018UNJ | 18 | ≥ 5/16 | 8 | 6.15 | 3 | 20 | 64 | With | AH725 |
| MTECS08069C2416UNJ | 16 | ≥ 3/8 | 8 | 6.9 | 3 | 24 | 64 | With | AH725 |
| MTECS10094C2713UNJ | 13 | ≥ 1/2 | 10 | 9.4 | 3 | 27.5 | 73 | With | AH725 |

Reference pages: Standard cutting conditions → [I120 - I122](#)

THREADMILLING

STANDARD CUTTING CONDITIONS

| ISO | Material | Condition | Tensile strength [N/mm ²] | Hardness HB | Cutting speed Vc (m/min) | |
|--------------|--|--|--|----------------|-----------------------------|---------|
| | | | | | AH725 | |
| P | Non-alloy steel and cast steel, free cutting steel | < 0.25 %C | Annealed | 420 | 125 | 100-250 |
| | | ≥ 0.25 %C | Annealed | 650 | 190 | 80-210 |
| | | < 0.55 %C | Quenched and tempered | 850 | 250 | 65-170 |
| | | ≥ 0.55 %C | Annealed | 750 | 220 | 110-180 |
| | Low alloy steel and cast steel (less than 5% of alloying elements) | Quenched and tempered | 1000 | 300 | 95-160 | |
| | | | 600 | 200 | 90-160 | |
| | | Annealed | 930 | 275 | 65-200 | |
| | | | 1000 | 300 | 70-210 | |
| | | High alloyed steel, cast steel, and tool steel | Annealed | 680 | 200 | 130-170 |
| | | | Quenched and tempered | 1100 | 325 | 75-100 |
| | Stainless steel and cast steel | Ferritic/martensitic | 680 | 200 | 110-170 | |
| | | Martensitic | 820 | 240 | 70-155 | |
| M | Stainless steel | Austenitic | 600 | 180 | 85-100 | |
| K | Cast iron nodular (GGG) | Ferritic/martensitic | 180 | 120-160 | | |
| | | Pearlitic | 260 | 75-160 | | |
| | Grey cast iron (GG) | Ferritic | 160 | 70-150 | | |
| | | Pearlitic | 250 | 110-140 | | |
| | Malleable cast iron | Ferritic | 130 | 120-160 | | |
| Pearlitic | 230 | 110-140 | | | | |
| N | Aluminum- wrought alloy | Not cureable | 60 | 160-300 | | |
| | | Cured | 100 | | | |
| | Aluminum-cast, alloyed | ≤12% Si | Not cureable | 75 | 150-350 | |
| | | >12% Si | Cured | 90 | | |
| | | >1% Pb | High temperature | 130 | 100-250 | |
| | Copper alloys | Brass | 90 | | | |
| | | Electrolitic copper | 100 | | | |
| Non-metallic | Duroplastics, fiber plastics | | 100-400 | | | |
| | Hard rubber | | | | | |
| S | High temp. alloys | Fe based | Annealed | 200 | | |
| | | Cured | 280 | | | |
| | | Ni or Co based | Annealed | 250 | 20-80 | |
| | | Cured | 350 | | | |
| | Titanium Ti alloys | Cast | 320 | | | |
| | | Alpha+beta alloys cured | RM 400 | 20-80 | | |
| H | Hardened steel | Hardened | 55 HRC | 55-65 | | |
| | | Hardened | 60 HRC | 45-55 | | |
| | Chilled cast iron | Cast | 400 | 90-105 | | |
| | Cast iron | Hardened | 55 HRC | 55-65 | | |



| Tool dia.: DC (mm) | | | | | | | | | | | |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|
| Feed: f (mm/t) | | | | | | | | | | | |
| ø2 | ø3 | ø4 | ø6 | ø8 | ø10 | ø12 | ø14 | ø16 | ø20 | ø25 | ø30 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.02 | 0.03 | 0.03 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.1 | 0.12 | 0.15 | 0.18 |
| 0.02 | 0.03 | 0.03 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.1 | 0.12 | 0.15 | 0.18 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.1 | 0.11 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.03 | 0.04 | 0.04 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.15 | 0.18 | 0.21 |
| 0.02 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.08 | 0.10 | 0.12 |
| 0.05 | 0.06 | 0.07 | 0.09 | 0.1 | 0.11 | 0.12 | 0.13 | 0.15 | 0.18 | 0.22 | 0.25 |
| 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 |
| 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 |

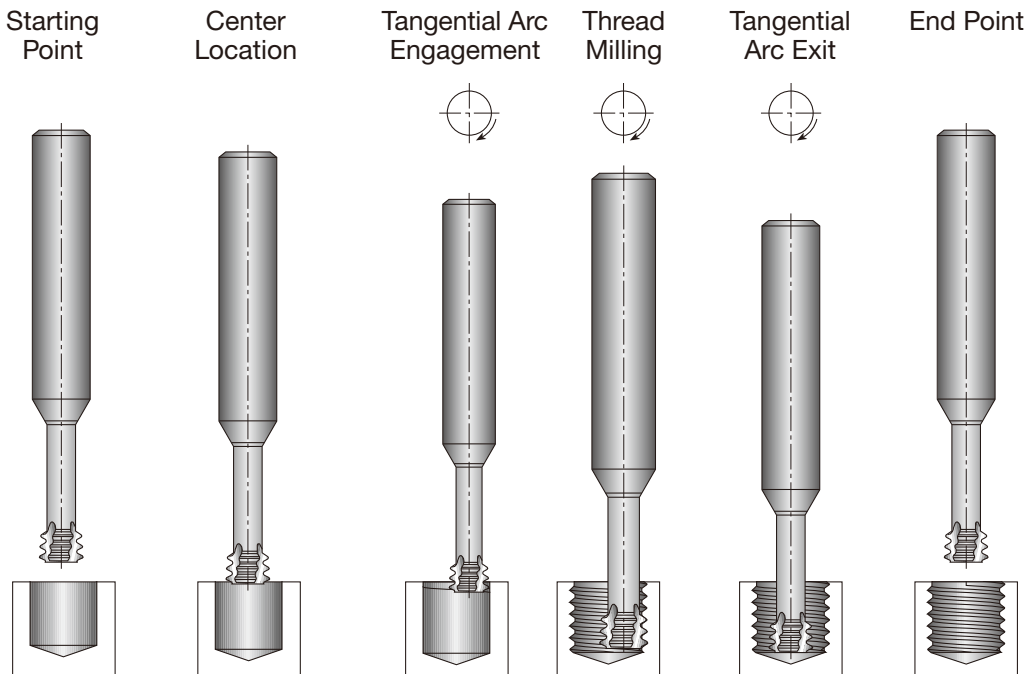
When using long edge type tools, Feed should be reduced to 40% of above table.

THREADMILLING

MTECS

Small Diameter, Short edge type

Thread Milling - Procedure



STANDARD CUTTING CONDITIONS

| ISO | Material | Cutting speed V_c (m/min) | Feed: f (mm/t) | | | | | | | | | | | | |
|----------|--|--------------------------------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| | | | $\phi 1.5$ | $\phi 2$ | $\phi 3$ | $\phi 4$ | $\phi 5$ | $\phi 6$ | $\phi 7$ | $\phi 8$ | $\phi 9$ | $\phi 10$ | $\phi 12$ | $\phi 14$ | $\phi 15$ |
| P | Low & medium carbon steels | 60-120 | 0.05 | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.14 | 0.15 | 0.16 | 0.16 | 0.17 | 0.18 | 0.18 |
| | High carbon steels | 60-90 | 0.04 | 0.05 | 0.06 | 0.08 | 0.09 | 0.1 | 0.12 | 0.13 | 0.14 | 0.14 | 0.16 | 0.17 | 0.18 |
| | Alloy steels, treated steels | 50-80 | 0.04 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.07 | 0.08 | 0.09 | 0.1 | 0.12 | 0.13 | 0.14 |
| | Cast steels | 70-90 | 0.04 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.07 | 0.08 | 0.09 | 0.1 | 0.12 | 0.13 | 0.14 |
| M | Stainless steels | 60-90 | 0.03 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.07 | 0.08 | 0.09 | 0.1 | 0.11 | 0.12 | 0.13 |
| K | Cast iron | 40-80 | 0.05 | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.14 | 0.15 | 0.16 | 0.16 | 0.17 | 0.18 | 0.18 |
| N | Aluminum | 80-150 | 0.05 | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.14 | 0.15 | 0.16 | 0.16 | 0.17 | 0.18 | 0.18 |
| | Synthetics, duroplastics, thermoplastics | 50-200 | 0.1 | 0.11 | 0.12 | 0.14 | 0.16 | 0.18 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.2 | 0.2 |
| S | Nickel alloys, titanium alloys | 20-40 | 0.03 | 0.03 | 0.04 | 0.04 | 0.05 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 |

MTECS Small Diameter, Short edge type

SolidThread MTECS is used for the production of small internal threads. These thread mills feature a short 3-tooth cutting zone with 3 flutes and a released neck between the cutting zone and the shank. This unique tool design offers very precise profiles and a high performance AH725 submicron carbide grade with PVD titanium aluminum nitride coating. The very short profile exerts a low force which minimizes tool bending. This facilitates parallel and high thread precision for the entire length.



Compared to taps, the **SOLIDTHREAD** is more accurate, thread machining is substantially faster and there is no danger of a broken tap being stuck in the hole.

SolidThread vs. Tap

| Criteria | Thread mill | Taps |
|----------------------------|---|---|
| Thread surface quality | High | Medium |
| Thread geometry | Very accurate | Medium |
| Thread tolerance | 4H, 5H, 6H with std. cutter | 6H with standard tap, 4H with special tap |
| Machining time | Shorter or same as tap | Short |
| Machining load | Very low | High |
| Range of thread diameters | Wide range of diameters (able to thread a wide range of hole sizes) | Specific tap for each thread size |
| Right-/Left-hand threading | Same cutter | Specific tap for right- and left-hand |

Features

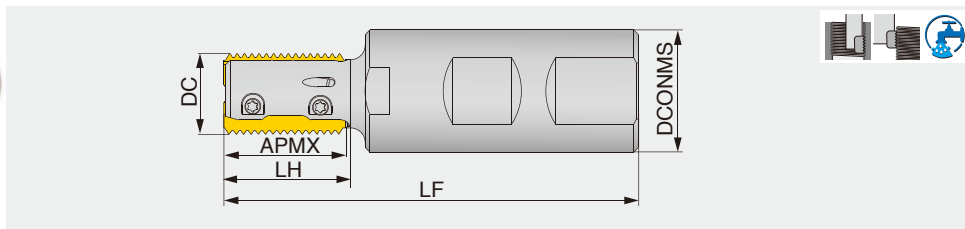
- Minimum thread size of MTECS: **M1x0.25** (0.75 mm pre hole diameter) up to M20x2.50
- 2xD and 3xD threading lengths
- High cutting speeds
- Short cycle time
- Low cutting forces due to the short contact profile resulting in accurate and parallel thread
- Prevents oval threads near thin walls
- No more dealing with broken taps
- Reliable threading in blind holes
- Excellent performance on hardened steel, high temperature alloys and titanium



THREADMILLING

Thread milling cutter

Indexable thread milling cutter, long edge type



| Designation | DC | APMX | CICT | DCONMS | LH | LF | Oil hole | Insert |
|---------------------------------------|------|------|------|--------|----|-----|----------|----------|
| ETTL25M017W25.0F026R02 ⁽¹⁾ | 17 | 25 | 2 | 25 | 26 | 85 | with | TL25D... |
| ETTL25M017W25.0F036R02 ⁽¹⁾ | 17 | 25 | 2 | 25 | 36 | 95 | with | TL25D... |
| ETTL25M019W25.0F032R02 | 19 | 25 | 2 | 25 | 32 | 92 | with | TL25D... |
| ETTL25M019W25.0F044R02 | 19 | 25 | 2 | 25 | 44 | 104 | with | TL25D... |
| ETTL25M021W25.0F037R03 | 20.5 | 25 | 3 | 25 | 37 | 96 | with | TL25D... |
| ETTL25M021W25.0F044R03 | 20.5 | 25 | 3 | 25 | 44 | 103 | with | TL25D... |
| ETTL25M022W25.0F043R03 | 22 | 25 | 3 | 25 | 43 | 102 | with | TL25D... |
| ETTL25M022W25.0F055R03 | 22 | 25 | 3 | 25 | 55 | 114 | with | TL25D... |
| ETTL25M030W25.0F055R05 | 30 | 25 | 5 | 25 | 55 | 115 | with | TL25D... |

(1) Inserts with a thread pitch of ≥ 3 mm or ≥ 9 TPI are not mountable.

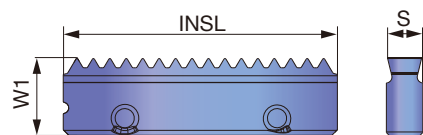
SPARE PARTS

| Designation | Clamping screw | Wrench |
|-------------|----------------|--------|
| ETTL25... | SSTM4-3.6P | T-8D |

Recommended clamping torque: 1.2 N·m

INSERT

TL25D...



| | Material | Coated |
|---|----------------|--------|
| P | Steel | ★ |
| M | Stainless | ☆ |
| K | Cast iron | ☆ |
| N | Non-ferrous | ☆ |
| S | Superalloys | ★ |
| H | Hard materials | ★ |

★ : First choice
☆ : Second choice

| Thread type | Application | Designation | Pitch | Threads per inch | Number of threads per edge | Coated | | INSL | W1 | S | Applicable thread sizes for the given cutter diameters: DC (mm) | | | | |
|---------------------------|-----------------------|------------------------------|-------|------------------|----------------------------|--------|--|------|----|-----|---|---------|---------|---------|---------|
| | | | | | | AH725 | | | | | ø17 | ø19 | ø20.5 | ø22 | ø30 |
| ISO Metric | Internal | TL25DIR1.5ISO | 1.5 | - | 16 | ● | | 25 | 7 | 3.1 | ≥ M19 | ≥ M21 | ≥ M23 | ≥ M24 | ≥ M32 |
| | | TL25DIR2.0ISO | 2 | - | 12 | ● | | 25 | 7 | 3.1 | ≥ M20 | ≥ M22 | ≥ M23 | ≥ M25 | ≥ M33 |
| | | TL25DIR3.0ISO ⁽²⁾ | 3 | - | 8 | ● | | 25 | 7 | 3.1 | - | ≥ M23 | ≥ M25 | ≥ M26 | ≥ M34 |
| Unified | Internal | TL25DIR20UN | - | 20 | 19 | ● | | 25 | 7 | 3.1 | ≥ 3/4 | ≥ 7/8 | ≥ 7/8 | ≥ 15/16 | ≥ 15/16 |
| | | TL25DIR12UN | - | 12 | 11 | ● | | 25 | 7 | 3.1 | ≥ 13/16 | ≥ 7/8 | ≥ 15/16 | ≥ 1 | ≥ 15/16 |
| | | TL25DIR9UN ⁽²⁾ | - | 9 | 8 | ● | | 25 | 7 | 3.1 | - | ≥ 7/8 | ≥ 15/16 | ≥ 1 | ≥ 13/8 |
| | | TL25DIR8UN ⁽²⁾ | - | 8 | 7 | ● | | 25 | 7 | 3.1 | - | ≥ 15/16 | ≥ 1 | ≥ 11/16 | ≥ 13/8 |
| Whitworth (parallel pipe) | Internal and external | TL25DEIR14W | - | 14 | 13 | ● | | 25 | 7 | 3.1 | ≥ G1/2 | ≥ G5/8 | ≥ G3/4 | ≥ G3/4 | - |
| | | TL25DEIR11W | - | 11 | 10 | ● | | 25 | 7 | 3.1 | ≥ G1 | ≥ G1 | ≥ G1 | ≥ G1 | ≥ G1 |

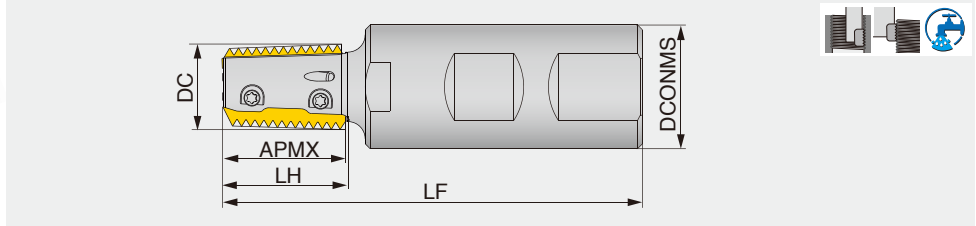
Do not use this tool when the hole depth to be threaded exceeds the cutter's LH value.
(2) Does not fit the DC = 17 mm holder

●: Line up

Reference pages: Standard cutting conditions → [I126](#)

Thread milling cutter

Indexable thread milling cutter, long edge type



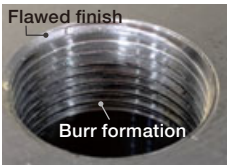
| Designation | DC | APMX | CICT | DCONMS | LH | LF | Oil hole | Insert |
|---------------------------|-------|------|------|--------|------|-----|----------|-------------|
| ETTL25M017W25.0F026R02-PT | 17.47 | 25 | 2 | 25 | 25.5 | 85 | with | TL25SEIR... |
| ETTL25M022W25.0F043R03-PT | 22.2 | 25 | 3 | 25 | 43 | 102 | with | TL25SEIR... |

SPARE PARTS

| Designation | Clamping screw | Wrench |
|-------------|----------------|--------|
| ETTL...-PT | SSTM4-3.6P | T-8D |

Recommended clamping torque: 1.2 N·m

Excellent surface finish



Helical tap
(of HSS)

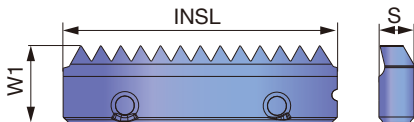


THREADMILLING
ETTL25M017W25.0F026R02-PT,
TL25SEIR11BSPT

Machine: BT50
Thread: Rc1

INSERT

TL25SEIR...



| | | | |
|----------|----------------|---|--|
| P | Steel | ★ | |
| M | Stainless | ☆ | |
| K | Cast iron | ☆ | |
| N | Non-ferrous | ☆ | |
| S | Superalloys | ★ | |
| H | Hard materials | ★ | |

★ : First choice
☆ : Second choice

| Thread type | Application | Designation | Pitch | Threads per inch | Number of threads per edge | Coated | | INSL | W1 | S | Applicable thread sizes for the given cutter diameters: DC (mm) | |
|-------------|-----------------------|-----------------|-------|------------------|----------------------------|--------|--|------|----|-----|---|-----------------------------------|
| | | | | | | AH725 | | | | | ø17.47 | ø22.2 |
| BSPT | Internal and external | TL25SEIR14BSPT | - | 14 | 13 | ● | | 25 | 7 | 3.1 | 1/2, 3/4 | 3/4 |
| | | TL25SEIR11BSPT | - | 11 | 10 | ● | | 25 | 7 | 3.1 | ≥ 1 ⁽¹⁾ | ≥ 1 ⁽¹⁾ |
| NPT | Internal and external | TL25SEIR14NPT | - | 14 | 13 | ● | | 25 | 7 | 3.1 | 1/2, 3/4 | 3/4 |
| | | TL25SEIR11.5NPT | - | 11.5 | 11 | ● | | 25 | 7 | 3.1 | 1, 1 1/4, 1 1/2, 2 ⁽¹⁾ | 1, 1 1/4, 1 1/2, 2 ⁽¹⁾ |
| NPTF | Internal and external | TL25SEIR14NPTF | - | 14 | 13 | ● | | 25 | 7 | 3.1 | 1/2, 3/4 | 3/4 |

(1) Do not use this insert when the hole depth to be threaded exceeds the cutter's LH.

●: Line up

Reference pages: Standard cutting conditions → I126

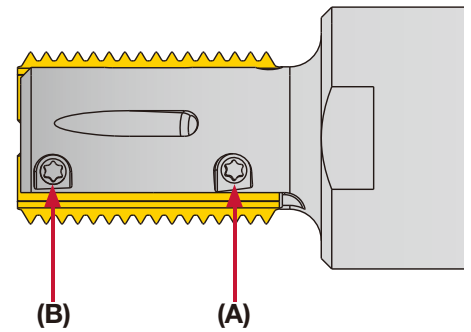
STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Grades | Cutting speed V_c (m/min) | Feed per tooth f_z (mm/t) |
|----------|-----------------------|--------|--------------------------------|--------------------------------|
| P | Low carbon steel | AH725 | 100 - 200 | 0.1 - 0.3 |
| | High carbon steel | AH725 | 70 - 150 | 0.1 - 0.3 |
| | High carbon steels | AH725 | 70 - 170 | 0.1 - 0.3 |
| | Cast steel | AH725 | 70 - 170 | 0.1 - 0.3 |
| M | Stainless steel | AH725 | 90 - 140 | 0.1 - 0.3 |
| K | Cast iron | AH725 | 60 - 130 | 0.05 - 0.3 |
| N | Aluminium alloys | AH725 | 80 - 400 | 0.1 - 0.4 |
| S | Heat-resistant alloys | AH725 | 10 - 30 | 0.02 - 0.1 |
| | Titanium alloy | AH725 | 20 - 90 | 0.02 - 0.1 |

Climb milling is recommended.

Insert installation

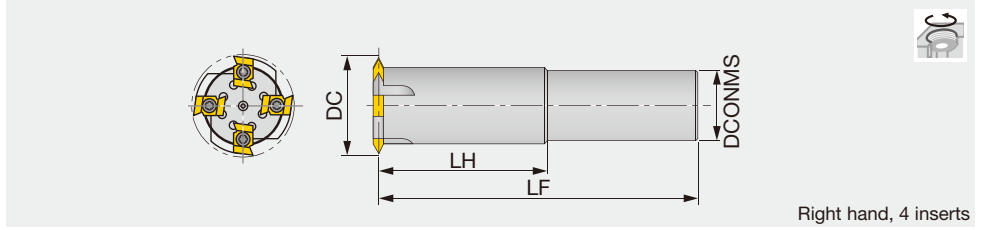
1. Use airgun or rag to thoroughly clean all the insert pockets free from dust or chips.
2. Lightly tighten Screw "A" first, then Screw "B" until the insert becomes stationary.
3. Lightly tighten the screws for other insert(s) in the same matter as mentioned in #1 and #2 above.
4. Firmly tighten Screw "A", then Screw "B".
Use the recommended torque strengths when tightening the screws.
5. Firmly tighten the screws for other insert(s) in the same manner as mentioned in #4 above.
6. Inspect to make sure there is no gap between the insert and the insert seat. Measure the radial runout before use.



THREADMILLING

Thread milling cutter

Indexable thread milling cutter, single tooth



| Designation | DC | CICT | DCONMS | LH | LF | Range of internal thread | Insert |
|--------------|----|------|--------|-----|-----|--------------------------|---------|
| D23-D25-45R | 23 | 1 | 25 | 45 | 115 | M28 - M30 | T1-R... |
| D25-D25-45R | 25 | 1 | 25 | 45 | 115 | M32 - M42 | T1-R... |
| D38-D32-85R | 38 | 2 | 32 | 85 | 165 | M45 - M56 | T1-R... |
| D50-D42-100R | 50 | 4 | 42 | 100 | 190 | M58 - M68 | T1-R... |
| D55-D42-100R | 55 | 4 | 42 | 100 | 190 | M64 - M85 | T2-R... |
| D60-D42-100R | 60 | 4 | 42 | 100 | 190 | M70 - M85 | T2-R... |
| D80-D42-100R | 80 | 6 | 42 | 100 | 190 | M90 - | T2-R... |

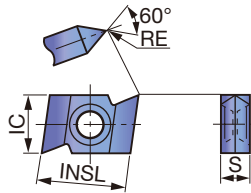
SPARE PARTS

| Designation | Clamping screw | Wrench |
|-------------------------|----------------|--------|
| D23-D25... - D50-D42... | CSTB-4 | T-15F |
| D55-D42... - D80-D42... | CSTB-5 | T-20F |

Recommended clamping torque: CSTB-4 = 3.5 N·m, CSTB-5 = 5 N·m

INSERT

T*-R...



| | | | | | | | | | |
|-------------------------|---|--|--|--|--|--|--|--|--|
| P Steel | ★ | | | | | | | | |
| M Stainless | ★ | | | | | | | | |
| K Cast iron | | | | | | | | | |
| N Non-ferrous | | | | | | | | | |
| S Superalloys | | | | | | | | | |
| H Hard materials | | | | | | | | | |

★ : First choice
 ☆ : Second choice

| Designation | RE | Coated | | | | | | | | INSL | IC | S |
|-------------|------|--------|--|--|--|--|--|--|--|------|-------|------|
| | | GH330 | | | | | | | | | | |
| T1-R14 | 0.14 | ● | | | | | | | | 14.4 | 9.525 | 4.76 |
| T1-R28 | 0.28 | ● | | | | | | | | 14.4 | 9.525 | 4.76 |
| T2-R14 | 0.14 | ● | | | | | | | | 17.8 | 12.7 | 6.35 |
| T2-R28 | 0.28 | ● | | | | | | | | 17.8 | 12.7 | 6.35 |

●: Line up

Reference pages: Standard cutting conditions → I129

STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | Hardness | Grades | Cutting speed Vc (m/min) | Feed per tooth fz (mm/t) |
|----------|---------------------------------|----------|--------|--------------------------|--------------------------|
| P | Mild steels , Unhardened steels | ≥ 200 HB | GH330 | 150 - 200 | 0.3 - 0.4 |
| | Carbon steels, Alloy steels | ≥ 300 HB | GH330 | 150 - 200 | 0.17 - 0.26 |
| | Die steels | ≥ 50 HRC | GH330 | 30 - 50 | 0.14 - 0.2 |
| M | Stainless steels | ≥ 300 HB | GH330 | 150 - 200 | 0.05 - 0.12 |

Climb milling is recommended.

When threading a blind hole, use the right hand cutter in right-hand rotation. Cut up from the bottom to prevent chip recutting.

THREADING MILLS AND APPLICABLE THREADS

Internal threading - Metric threads (M)

| Designation | Insert | Pitch (mm) | | | | | | | | | | |
|--------------|--------|------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 1.5 | 1.75 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 |
| D23-D25-45R | T1-R14 | M28 | M28 | M29 | M29 | M30 | M30 | - | - | - | - | - |
| | T1-R28 | - | - | - | - | M30 | M30 | - | - | - | - | - |
| D25-D25-45R | T1-R14 | M30 | M30 | M31 | M31 | M32 | M32 | M36 | M36 | - | - | - |
| | T1-R28 | - | - | - | - | M32 | M32 | M36 | M36 | - | - | - |
| D38-D32-85R | T1-R14 | M43 | M43 | M44 | M44 | M45 | M45 | M46 | M46 | M48 | M56 | - |
| | T1-R28 | - | - | - | - | M45 | M45 | M46 | M46 | M48 | M56 | - |
| D50-D42-100R | T1-R14 | M55 | M55 | M56 | M56 | M57 | M57 | M58 | M58 | M59 | M59 | - |
| | T1-R28 | - | - | - | - | M57 | M57 | M58 | M58 | M59 | M59 | - |
| D55-D42-100R | T2-R14 | M60 | M60 | M61 | M61 | M62 | M62 | M63 | M63 | M64 | M64 | M65 |
| | T2-R28 | - | - | - | - | M62 | M62 | M63 | M63 | M64 | M64 | M65 |
| D60-D42-100R | T2-R14 | M65 | M65 | M66 | M66 | M67 | M67 | M68 | M68 | M69 | M69 | M70 |
| | T2-R28 | - | - | - | - | M67 | M67 | M68 | M68 | M69 | M69 | M70 |
| D80-D42-100R | T2-R14 | M85 | M85 | M86 | M86 | M87 | M87 | M88 | M88 | M89 | M89 | M90 |
| | T2-R28 | - | - | - | - | M87 | M87 | M88 | M88 | M89 | M89 | M90 |

Internal threading - Unified threads (UN, UNC, UNF, UNEF)


| Designation | Insert | TPI | | | | | | | | | | | | |
|--------------|--------|---------|--------|--------|-------|-------|--------|--------|--------|---------|---------|-------|-------|-------|
| | | 16 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4.5 | 4 |
| D23-D25-45R | T1-R14 | 1 1/8 | 1 1/8 | 1 1/8 | 1 1/8 | 1 1/8 | 1 3/16 | 1 3/16 | 1 3/16 | 1 3/16 | - | - | - | - |
| | T1-R28 | - | - | - | - | - | 1 3/16 | 1 3/16 | 1 3/16 | 1 3/16 | - | - | - | - |
| D25-D25-45R | T1-R14 | 1 3/16 | 1 3/16 | 1 3/16 | 1 1/4 | 1 1/4 | 1 1/4 | 1 1/4 | 1 1/4 | 1 5/16 | 1 3/8 | 1 3/4 | - | - |
| | T1-R28 | - | - | - | - | - | 1 1/4 | 1 1/4 | 1 1/4 | 1 5/16 | 1 3/8 | 1 3/4 | - | - |
| D38-D32-85R | T1-R14 | 1 11/16 | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 1 3/4 | 1 13/16 | 1 13/16 | 1 7/8 | 2 | - |
| | T1-R28 | - | - | - | - | - | 1 3/4 | 1 3/4 | 1 3/4 | 1 13/16 | 1 13/16 | 1 7/8 | 2 | - |
| D50-D42-100R | T1-R14 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 3/8 | 2 3/8 | 2 3/8 | - |
| | T1-R28 | - | - | - | - | - | 2 1/4 | 2 1/4 | 2 1/4 | 2 1/4 | 2 3/8 | 2 3/8 | 2 3/8 | - |
| D55-D42-100R | T2-R14 | 2 3/8 | 2 3/8 | 2 3/8 | 2 3/8 | 2 1/2 | 2 1/2 | 2 1/2 | 2 1/2 | 2 1/2 | 2 1/2 | 2 5/8 | 2 5/8 | 2 3/4 |
| | T2-R28 | - | - | - | - | - | 2 1/2 | 2 1/2 | 2 1/2 | 2 1/2 | 2 1/2 | 2 5/8 | 2 5/8 | 2 3/4 |
| D60-D42-100R | T2-R14 | 2 5/8 | 2 5/8 | 2 5/8 | 2 5/8 | 2 5/8 | 2 5/8 | 2 5/8 | 2 5/8 | 2 3/4 | 2 3/4 | 2 3/4 | 2 7/8 | 3 |
| | T2-R28 | - | - | - | - | - | 2 5/8 | 2 5/8 | 2 5/8 | 2 3/4 | 2 3/4 | 2 3/4 | 2 7/8 | 3 |
| D80-D42-100R | T2-R14 | 3 3/8 | 3 3/8 | 3 3/8 | 3 3/8 | 3 3/8 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 5/8 | 3 3/4 |
| | T2-R28 | - | - | - | - | - | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 1/2 | 3 5/8 | 3 3/4 |

Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index




Milling Insert (Old item)


● ACMT**PR-MJ

| Shape | Designation | Coated | | | | | | | | | Applicable mill |
|---|-----------------|--------|-------|-------|-------|--|--|--|--|--|------------------------------|
| | | AH120 | AH140 | GH330 | T3130 | | | | | | |
|  Rake angle Land width -MJ | ACMT060308PR-MJ | ● | ● | ● | ● | | | | | | ELP07/09/12... (old item) |
| | ACMT07T308PR-MJ | ● | ● | ● | ● | | | | | | |
| | ACMT100408PR-MJ | ● | ● | ● | ● | | | | | | |
| | | | | | | | | | | | |


● ADMT**PR-MJ

| Shape | Designation | Coated | | | | | | | | Applicable mill |
|---|-----------------|--------|-------|-------|--|--|--|--|--|------------------------------|
| | | AH120 | AH140 | T3130 | | | | | | |
|  Rake angle Land width -MJ | ADMT130308PR-MJ | ● | ● | ● | | | | | | ELP13/17/21... (old item) |
| | ADMT17T308PR-MJ | ● | ● | ● | | | | | | |
| | ADMT210408PR-MJ | ● | ● | ● | | | | | | |
| | | | | | | | | | | |

● AECW**PEFR, AECW**PESR, AEMW**PEFR, AEMW**PETR

| Shape | Designation | Coated | | Cermet | | Uncoated | | | | | Applicable mill |
|---|--------------|--------|-------|--------|--|----------|------|---|---|--|--|
| | | AH120 | GH330 | NS740 | | UX30 | TH10 | | | | |
|  | AECW1403PEFR | | | | | | | ● | | | EPE4000/5000/ 6000... (old item) |
| | AECW1403PESR | ● | ● | ● | | | | ● | | | |
| | AECW16T3PEFR | | | | | | | | ● | | |
| | AECW16T3PESR | ● | ● | ● | | | | ● | | | |
| | AECW1804PEFR | | | | | | | | ● | | |
| | AECW1804PESR | ● | ● | ● | | | | ● | | | |
| | AEMW1403PEFR | | | | | | | | ● | | |
| | AEMW1403PETR | | ● | ● | | | | ● | | | |
| | AEMW16T3PEFR | | | | | | | | ● | | |
| | AEMW16T3PETR | | ● | ● | | | | ● | | | |
| | AEMW1804PEFR | | | | | | | | ● | | |
| AEMW1804PETR | | ● | ● | ● | | | ● | | | | |

● ANEA542TN, ANEA642TN

| Shape | Designation | Uncoated | | | | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|--|--|--|----------------------|
| | | UX30 | | | | | | | | |
|  | ANEA542TN | ● | | | | | | | | VSN... (old item) |
| | ANEA642TN | ● | | | | | | | | |

●: Line up

Milling Insert (Old item)

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index



● ANMT**PPPR-MJ, ANMT**PPPR-ML

| Shape | Designation | Coated | | | | | | | | Applicable mill |
|------------|-----------------|--------|-------|-------|--|--|--|--|--|---|
| | | AH120 | GH330 | T3130 | | | | | | |
| <p>-MJ</p> | ANMT09T3PPPR-MJ | ● | ● | ● | | | | | | EPN09 (old item) EPN14... TPN14... (old item) |
| | ANMT09T3PPPR-ML | ● | | | | | | | | |
| | ANMT1404PPPR-MJ | ● | ● | ● | | | | | | |
| | ANMT1404PPPR-ML | ● | | | | | | | | |
| <p>-ML</p> | | | | | | | | | | |

● APMT**PN-MJ

| Shape | Designation | Coated | | | | | | | | Applicable mill |
|------------|-----------------|--------|-------|-------|-------|--|--|--|--|------------------------------|
| | | AH120 | AH140 | GH330 | T3130 | | | | | |
| <p>-MJ</p> | APMT070308PN-MJ | ● | ● | ● | ● | | | | | ELP07/09/12... (old item) |
| | APMT09T308PN-MJ | ● | ● | ● | ● | | | | | |
| | APMT120408PN-MJ | ● | ● | ● | ● | | | | | |


● ASMT17**PDPR-MJ, ASGT17**PDFR-AJ, ASMT170508PDPR-MS

| Shape | Designation | Coated | | | | | Cermet | Uncoated | | | Applicable mill |
|------------|-------------------|--------|-------|-------|-------|-------|--------|----------|--|--|--|
| | | AH120 | AH130 | AH140 | T1115 | T3130 | DS1100 | NS740 | | | |
| <p>-MJ</p> | ASMT170504PDPR-MJ | ● | | | ● | ● | ● | | | | TPS17... (old item) EPS17... (old item) |
| | ASMT170508PDPR-MJ | ● | | | ● | ● | ● | | | | |
| | ASMT170512PDPR-MJ | ● | | | | ● | ● | | | | |
| | ASMT170516PDPR-MJ | ● | | | | ● | ● | | | | |
| | ASMT170520PDPR-MJ | ● | | | | ● | ● | | | | |
| | ASMT170530PDPR-MJ | ● | | | | ● | ● | | | | |
| <p>-MS</p> | ASMT170532PDPR-MJ | ● | | | | ● | ● | | | | |
| | ASMT170508PDPR-MS | | ● | ● | | | | | | | |
| <p>-AJ</p> | ASGT170504PDFR-AJ | | | | | | ● | ● | | | |
| | ASGT170508PDFR-AJ | | | | | | ● | ● | | | |


●: Line up

Milling Insert (Old item)


● CPMW**-EN, CPMT**-EN

| Shape | Designation | Coated | | | | | Uncoated | | | | | Applicable mill |
|---|--------------|--------|--|--|--|--|----------|--|--|--|--|-----------------------|
| | | GH330 | | | | | UX30 | | | | | |
|  | CPMW050208EN | ● | | | | | ● | | | | | EVP1000 (old item) |
| | CPMW06T208EN | ● | | | | | ● | | | | | |
| | CPMT080308EN | ● | | | | | ● | | | | | |

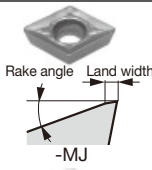
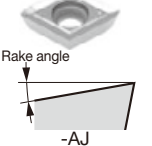
● EDKW53ZTR

| Shape | Designation | Coated | | | | | Uncoated | | | | | Applicable mill |
|---|-------------|--------|--|--|--|--|----------|--|--|--|--|-----------------------|
| | | GH330 | | | | | UX30 | | | | | |
|  | EDKW53ZTR | ● | | | | | ● | | | | | ESD5000 (old item) |


● ENEQ**TN-T

| Shape | Designation | Coated | | | | | Uncoated | | | | | Applicable mill |
|---|----------------|--------|--|--|--|--|----------|--|--|--|--|----------------------|
| | | AH120 | | | | | | | | | | |
|  | ENEQ090508TN-T | ● | | | | | | | | | | VSNE09... (old item) |
| | ENEQ100508TN-T | ● | | | | | | | | | | VSNE10... (old item) |
| | ENEQ130608TN-T | ● | | | | | | | | | | VSNE13... (old item) |
| | ENEQ160608TN-T | ● | | | | | | | | | | VSNE16... (old item) |

● GDMT**PDPR-MJ, GDGT**PDFR-AJ

| Shape | Designation | Coated | | | | | Uncoated | | | | | | | Applicable mill |
|--|-----------------|--------|-------|-------|-------|--------|----------|------|--|--|--|--|--|-----------------|
| | | AH120 | AH140 | AH330 | T3130 | DS1100 | UX30 | TH10 | | | | | | |
|  -MJ | GDMT10H3PDPR-MJ | ● | ● | ● | ● | | ● | | | | | | TSD10/17... (old item) ESD10/17... (old item) HSD10/17... (old item) | |
| | GDMT17X6PDPR-MJ | ● | ● | ● | ● | | ● | | | | | | | |
| | GDGT10H3PDFR-AJ | | | | | ● | | ● | | | | | | |
| | GDGT17X6PDFR-AJ | | | | | ● | | ● | | | | | | |
|  -AJ | | | | | | | | | | | | | | |

● HEHN532FN

| Shape | Designation | Uncoated | | | | | | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|--|--|--|--|--|-----------------------|
| | | TH10 | | | | | | | | | | |
|  | HEHN532FN | ● | | | | | | | | | | QYE5300 (old item) |


●: Line up

Milling Insert (Old item)


Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M


● HPKN532FN

| Shape | Designation | Uncoated | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|-----------------------|
| | | TH10 | | | | | |
|  | HPKN532FN | ● | | | | | QYP5300 (old item) |


● LNCA64ZTR

| Shape | Designation | Coated | Uncoated | | | | Applicable mill |
|---|-------------|--------|----------|--|--|--|------------------------|
| | | T3130 | UX30 | | | | |
|  | LNCA64ZTR | ● | ● | | | | VSN6000I (old item) |

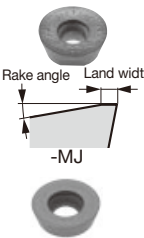
● RDCA2004TN, RDCN2004TN, RDKN2004...

| Shape | Designation | Coated | Uncoated | | | | Applicable mill |
|---|-------------|--------|--------------|--|--|--|-----------------------|
| | | AH120 | UX30 TH10 | | | | |
|  | RDCA2004TN | | ● | | | | TRD6000 (old item) |
| | RDCN2004TN | | ● | | | | |
| | RDKN2004FN | | ● | | | | ERD6000 (old item) |
| | RDKN2004TN | ● | ● | | | | |

● RDCM1203TN, RDMA1203TN

| Shape | Designation | Uncoated | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|-----------------------|
| | | UX30 | | | | | |
|  | RDCM1203TN | ● | | | | | ERD4000 (old item) |
| | RDMA1203TN | ● | | | | | |


● RDMT**ZDPN-MJ, RDMW**ZDSN

| Shape | Designation | Coated | | | | | Uncoated | | | | Applicable mill |
|--|-----------------|--------|-------|-------|-------|-------|----------|--|--|--|---------------------------|
| | | AH120 | AH130 | AH140 | AH330 | T3130 | UX30 | | | | |
|  <p>Rake angle Land width -MJ</p> | RDMT1204ZDPN-MJ | ● | | ● | ● | ● | ● | | | | TRD12/16... (old item) |
| | RDMW1204ZDSN | ● | | ● | ● | ● | ● | | | | |
| | RDMT1606ZDPN-MJ | ● | ● | ● | ● | ● | ● | | | | ERD12/16... (old item) |
| | RDMW1606ZDSN | ● | | ● | ● | ● | ● | | | | |


●: Line up

Milling Insert (Old item)


● RFEN2004ZFTN, RFEN2004M0TN

| Shape | Designation | Coated | | Uncoated | | Applicable mill |
|---|--------------|--------|-------|----------|------|-----------------------|
| | | AH120 | GH330 | UX30 | KS20 | |
|  | RFEN2004ZFTN | ● | ● | ● | ● | TRF6000 (old item) |
| | RFEN2004M0TN | | ● | ● | ● | ERF6000 (old item) |


● SDCN1504ZDSR, SDEN1504ZDSR, SDNN1504ZDSR

| Shape | Designation | Coated | | | | Applicable mill |
|---|--------------|--------|-------|-------|-------|---|
| | | AH120 | AH140 | T1115 | T3130 | |
|  | SDCN1504ZDSR | ● | ● | | ● | MILLFEED TXD15... (old item) |
| | SDEN1504ZDSR | ● | ● | ● | ● | |
| | SDNN1504ZDSR | ● | ● | ● | ● | |


● SDCN42HTR, SDKN42HTR

| Shape | Designation | Coated | | | | Applicable mill |
|---|-------------|--------|--|--|--|-----------------------|
| | | GH330 | | | | |
|  | SDCN42HTR | ● | | | | EUD4600 (old item) |
| | SDKN42HTR | ● | | | | |

● SDKN42EF..., SDEN42EFTR24

| Shape | Designation | Coated | Cermet | Uncoated | | Applicable mill |
|---|--------------|--------|--------|----------|------|------------------------|
| | | T3130 | NS740 | TH10 | UX30 | |
|  | SDKN42EFTR | ● | ● | | | TMD4100I (old item) |
| | SDKN42EFFR | | | ● | | |
| | SDEN42EFTR24 | | ● | | ● | |

● SDCN53HTR, SDKN53HTR

| Shape | Designation | Coated | | | | Applicable mill |
|---|-------------|--------|--|--|--|-----------------------|
| | | GH330 | | | | |
|  | SDCN53HTR | ● | | | | TUD5600 (old item) |
| | SDKN53HTR | ● | | | | |

●: Line up

Milling Insert (Old item)

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index



● SDMT1204AFPN-MJ, SDMT1204AFTN-MJ, SDMT1204AFPN-ML, SDMT1204AFPN-MS, SDGT1204AFTN-MJ, SDGT1204AFFN-AJ

| Shape | Designation | Coated | | | | | Cermet | | Uncoated | | Applicable mill |
|---|-----------------|--------|-------|-------|-------|-------|--------|--|----------|--|------------------------------------|
| | | AH120 | AH140 | AH330 | GH330 | T3130 | NS740 | | TH10 | | |
| Rake angle Land width -MJ Rake angle -AJ Rake angle Land width -ML Rake angle Land width -MS | SDMT1204AFPN-MJ | ● | ● | ● | ● | ● | | | | | TAD12... EAD12... (old item) |
| | SDMT1204AFTN-MJ | | | | | | ● | | | | |
| | SDMT1204AFPN-ML | ● | | ● | | | | | | | |
| | SDMT1204AFPN-MS | | ● | | | | | | | | |
| | SDGT1204AFTN-MJ | ● | | ● | | | ● | | | | |
| | SDGT1204AFFN-AJ | | | | | | | | ● | | |

● SDMT1204PDSR-MJ, SDMT1204PDTR-MJ, SDMT1204PDPR-ML, SDMT1204PDPR-MS, SDGT1204PDTR-MJ, SDGT1204PDFR-AJ

| Shape | Designation | Coated | | | | | Cermet | | Uncoated | | Applicable mill |
|---|-----------------|--------|-------|-------|-------|-------|--------|--|----------|--|------------------------------------|
| | | AH120 | AH140 | AH330 | GH330 | T3130 | NS740 | | TH10 | | |
| Rake angle Land width -MJ Rake angle -AJ Rake angle Land width -ML Rake angle Land width -MS | SDMT1204PDSR-MJ | ● | ● | ● | ● | ● | | | | | TPD12... EPD12... (old item) |
| | SDMT1204PDTR-MJ | | | | | | ● | | | | |
| | SDMT1204PDPR-ML | ● | | ● | | | | | | | |
| | SDMT1204PDPR-MS | | ● | | | | | | | | |
| | SDGT1204PDTR-MJ | ● | | ● | | | ● | | | | |
| | SDGT1204PDFR-AJ | | | | | | | | ● | | |


● SDMW090308TN, SDMW120408TN

| Shape | Designation | Uncoated | | | | | | | Applicable mill |
|-------|--------------|----------|--|--|--|--|--|--|-----------------------|
| | | UX30 | | | | | | | |
| | SDMW090308TN | ● | | | | | | | ELD3000 |
| | SDMW120408TN | ● | | | | | | | ELD4000 (old item) |

●: Line up









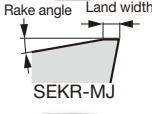
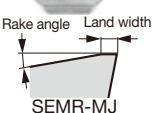
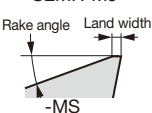
Milling Insert (Old item)

● SECN422TN, SECN422FN, SEEN422TN, SEEN422FN, SECN422FN-DIA


| Shape | Designation | ISO Designation (Metric) | Cermet | | Uncoated | | PCD | | Applicable mill |
|---|---------------|-----------------------------|--------|------|----------|------|-------|--|-----------------------|
| | | | NS740 | N308 | UX30 | TH10 | DX140 | | |
|  -DIA | SECN422TN | SECN120308TN | ● | ● | ● | | | | EGE4000 (old item) |
| | SECN422FN | SECN120308FN | | | | ● | | | |
| | SEEN422TN | SEEN120308TN | ● | ● | ● | | | | QHE4000 (old item) |
| | SEEN422FN | SEEN120308FN | | | | ● | | | |
| | SECN422FN-DIA | SECN120308FN-D | | | | | ● | | |

DX140: Packing quantity = 1pc.


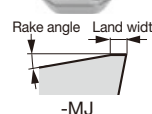
● SEEN1203AFTNCR-14, SEKN42AFTN, SEKN42AFFN, SEKN42AFTN16, SEKR42AFSR-MJ, SEKR1203AFPN-MS, SEKR1203AFTN-MJ, SEMR1203AFTN-MJ

| Shape | Designation | ISO Designation (Metric) | Coated | | | | | Cermet | Uncoated | | Applicable mill |
|---|-------------------|-----------------------------|--------|-------|-------|-------|-------|--------|----------|------------------------|-----------------------|
| | | | AH120 | AH130 | AH140 | GH330 | T3130 | NS740 | TH10 | UX30 | |
|            | SEEN1203AFTNCR-14 | | | | | | ● | | | TGE4400I (old item) | |
| | SEKN42AFTN | SEKN1203AFTN | ● | ● | ● | ● | | | ● | | |
| | SEKN42AFFN | SEKN1203AFFN | | | | | | | ● | | EGE4400 (old item) |
| | SEKN42AFTN16 | SEKN1203AFTN-16 | | | | | ● | | | | |
| | SEKR42AFSR-MJ | SEKR1203AFSR-MJ | | | | ● | ● | | | | |
| | SEKR1203AFPN-MS | | | | | ● | | | | | |
| | SEKR1203AFTN-MJ | | | | | | | ● | | | |
| | SEMR1203AFTN-MJ | | | | | | | ● | | | |

● SECN42EFTRCR, SEEN42EFTRCR, SEKN42EFTR, SEKN42EFFR

| Shape | Designation | ISO Designation (Metric) | Coated | | Cermet | Uncoated | | Applicable mill |
|---|--------------|-----------------------------|--------|-------|--------|----------|------|-----------------------|
| | | | GH330 | T3130 | NS740 | UX30 | TH10 | |
|  | SECN42EFTRCR | SECN1203EFTR | | | ● | | | EGE4100 (old item) |
| | SEEN42EFTRCR | SEEN1203EFTR | | | ● | | | |
| | SEKN42EFTR | SEKN1203EFTR | ● | ● | ● | | | |
| | SEKN42EFFR | SEKN1203EFFR | | | | | ● | |

● SEKR1504AFSR-MJ

| Shape | Designation | Coated | | | | | Applicable mill |
|--|-----------------|--------|--|--|--|--|-----------------|
| | | T3130 | | | | | |
|   | SEKR1504AFSR-MJ | ● | | | | | (old item) |

Milling Insert (Old item)

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index



● SF*N42ZFN, SFCN42ZFN-DIA

| Shape | Designation | Uncoated | | PCD | | Applicable mill |
|-------|---------------|----------|--|-------|--|--------------------------|
| | | TH10 | | DX140 | | |
| | SFCN42ZFN | ● | | | | THF4400RIA (old item) |
| | SFEN42ZFN | ● | | | | |
| | SFCN42ZFN-DIA | | | ● | | |

DX140: Packing quantity = 1pc.

● SF*N53ZFN, SFCN53ZFN-DIA

| Shape | Designation | Uncoated | | PCD | | Applicable mill |
|-------|---------------|----------|--|-------|--|--------------------------|
| | | TH10 | | DX140 | | |
| | SFCN53ZFN | ● | | | | THF5400RIA (old item) |
| | SFEN53ZFN | ● | | | | |
| | SFCN53ZFN-DIA | | | ● | | |

DX140: Packing quantity = 1pc.

● SNCN43Z..., SNKF43Z..., SNKN43ZTN

| Shape | Designation | Coated | | Cermet | | Ceramic | Uncoated | | Applicable mill |
|-------|-------------|--------|-------|--------|------|---------|----------|------|--------------------------|
| | | T1115 | T3130 | NS740 | N308 | FX105 | UX30 | TH10 | |
| | SNCN43ZFN | | | | | | | ● | TGN4200R-A (old item) |
| | SNCN43ZTN | | | ● | ● | | ● | | |
| | SNKF43ZFN | | | | | | | ● | |
| | SNKF43ZTN | ● | | | | | ● | | |
| | SNKN43ZTN | ● | ● | ● | | ● | ● | | |

● SNEN12**Z...

| Shape | Designation | Uncoated | | Applicable mill |
|-------|-------------|----------|------|-----------------------|
| | | UX30 | TH10 | |
| | SNEN12T2ZFN | | ● | SVN4000 (old item) |
| | SNEN12T2ZTN | ● | | |
| | SNEN1233ZFN | | ● | |
| | SNEN1233ZTN | ● | | |


● SNMN1204**TN

| Shape | Designation | Coated | | | Cermic | Uncoated | Applicable mill |
|-------|--------------|--------|-------|-------|--------|----------|--------------------------|
| | | AH120 | T1115 | T3130 | FX105 | UX30 | |
| | SNMN120408TN | | | | ● | | TGN4200R-A (Old item) |
| | SNMN120412TN | ● | ● | ● | ● | ● | |
| | SNMN120416TN | | | | ● | | |
| | SNMN120420TN | | | | ● | | |
| | SNMN120424TN | | | | ● | | |




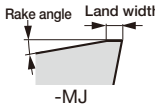
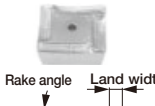

●: Line up

Milling Insert (Old item)


● SPGN120412TN

| Shape | Designation | Coated | | Ceramic | | Applicable mill |
|---|---------------------|--------|--|---------|--|------------------------------|
| | | T1115 | | FX105 | | |
|  | SPGN120412TN | ● | | ● | | QFP4000 (Old item) |



● SPMR1605PPTR-MJ, SPMR1605PPPR-ML, SPMR1605PPTR-MH

| Shape | Designation | Coated | | | Uncoated | | Applicable mill |
|---|------------------------|--------|-------|-------|----------|--|-------------------------------|
| | | GH330 | T1115 | T3130 | UX30 | | |
|  | SPMR1605PPTR-MJ | ● | ● | ● | ● | | TPP16... (Old item) |
|  | SPMR1605PPPR-ML | ● | | | | | |
|  | SPMR1605PPTR-MH | ● | | ● | ● | | |
|  | -MJ | | | | | | |
|  | -ML | | | | | | |
|  | -MH | | | | | | |

● TDMN**N

| Shape | Designation | Cermet | | Uncoated | | Applicable mill |
|---|---------------------|--------|--|----------|------|------------------------------|
| | | NS740 | | TH10 | UX30 | |
|  | TDMN110304TN | ● | | | ● | ESD2000 (Old item) |
| | TDMN110304FN | | | ● | | |
| | TDMN110308TN | ● | | | ● | |

● TNKF64ZTR

| Shape | Designation | Uncoated | | | | Applicable mill |
|---|------------------|----------|--|--|--|-------------------------------|
| | | UX30 | | | | |
|  | TNKF64ZTR | ● | | | | TPN64001 (Old item) |
|  | | | | | | |


●: Line up

Milling Insert (Old item)


Grade
Insert
Ext. Toolholder
Int. Toolholder
Threading
Grooving
Miniature tool
Milling cutter
Endmill
Drilling tool
Tooling System
User's Guide
Index

A
B
C
D
E
F
G
H
I
J
K
L
M


●TNMN43ZENS

| Shape | Designation | Uncoated | | | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|--|--|----------------------------------|
| | | UX30 | | | | | | | |
|  | TNMN43ZENS | ● | | | | | | | TSN4000 ESN4000 (Old item) |

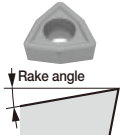
●TPCA43ZTRW1, TPMA432TNW1

| Shape | Designation | Cermet | | Uncoated | | | | | Applicable mill |
|---|----------------------------|--------|--|----------|------|--|--|--|--------------------------|
| | | NS740 | | UX30 | TH10 | | | | |
|  | TPCA43ZTRW1 TPMA432TNW1 | ● | | ● | ● | | | | PES1500... (Old item) |


●TPMN**TN

| Shape | Designation | Cermet | | | | | | | Applicable mill |
|---|--|--------|---|---|---|---|---|---|-----------------|
| | | NS740 | | | | | | | |
|  | TPMN110304TN TPMN110308TN TPMN160308TN TPMN160312TN TPMN220408TN TPMN220412TN | ● | ● | ● | ● | ● | ● | ● | (Old item) |

●WCMT**-D4

| Shape | Designation | Coated | | | | | | | Applicable mill |
|---|--------------------------------|--------|-------|--|--|--|--|--|--|
| | | AH120 | AH140 | | | | | | |
|  | WCMT050308-D4 WCMT06T308-D4 | ● | ● | | | | | | EVX... (Old item) HVX... (Old item) |

●WFCN**ZFR-DIA



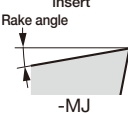
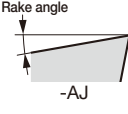
| Shape | Designation | PCD | | | | | | | Applicable mill |
|---|--------------------------------|-------|---|--|--|--|--|--|--|
| | | DX140 | | | | | | | |
|  | WFCN42ZFR-DIA WFCN53ZFR-DIA | ● | ● | | | | | | THF4400RIA (Old item) THF5400RIA (Old item) |

DX140: Packing quantity = 1pc.


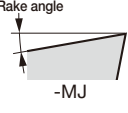
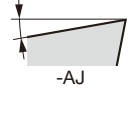
●: Line up

Milling Insert (Old item)

● XVGT**EC-MJ, XVGT**EP-MJ, XVGT**FC-AJ, XVGT**FP-AJ

| Shape | Designation | Coated | | | | | | | Applicable mill |
|--|-----------------|--------|--------|--|--|--|--|--|--|
| | | AH730 | DS1200 | | | | | | |
|  Center edge insert  Peripheral edge insert  Rake angle -MJ  Rake angle -AJ | XVGT06H205EC-MJ | ● | | | | | | | HYBRIDTACMILL EVH... (Old item) |
| | XVGT07X305EC-MJ | ● | | | | | | | |
| | XVGT09X405EC-MJ | ● | | | | | | | |
| | XVGT06H205EP-MJ | ● | | | | | | | |
| | XVGT07X305EP-MJ | ● | | | | | | | |
| | XVGT09X405EP-MJ | ● | | | | | | | |
| | XVGT06H205FC-AJ | | ● | | | | | | |
| | XVGT07X305FC-AJ | | ● | | | | | | |
| | XVGT09X405FC-AJ | | ● | | | | | | |
| | XVGT06H205FP-AJ | | ● | | | | | | |
| | XVGT07X305FP-AJ | | ● | | | | | | |
| | XVGT09X405FP-AJ | | ● | | | | | | |

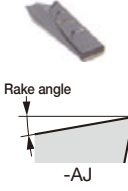
● XHGR**ER-MJ, XHGR**FR-AJ

| Shape | Designation | Coated | | | | | | | Applicable mill | |
|---|-----------------|--------|--------|---|--|--|--|--|--|--|
| | | AH730 | DS1200 | | | | | | | |
|   Rake angle -MJ  Rake angle -AJ | XHGR110202ER-MJ | ● | | | | | | | HYBRIDTACMILL EPH11/13/18... (Old item) | |
| | XHGR110204ER-MJ | ● | | | | | | | | |
| | XHGR110205ER-MJ | ● | | | | | | | | |
| | XHGR110208ER-MJ | ● | | | | | | | | |
| | XHGR110210ER-MJ | ● | | | | | | | | |
| | XHGR110212ER-MJ | ● | | | | | | | | |
| | XHGR110215ER-MJ | ● | | | | | | | | |
| | XHGR110216ER-MJ | ● | | | | | | | | |
| | XHGR110220ER-MJ | ● | | | | | | | | |
| | XHGR130202ER-MJ | ● | | | | | | | | |
| | XHGR130204ER-MJ | ● | | | | | | | | |
| | XHGR130205ER-MJ | ● | | | | | | | | |
| | XHGR130208ER-MJ | ● | | | | | | | | |
| | XHGR130210ER-MJ | ● | | | | | | | | |
| | XHGR130212ER-MJ | ● | | | | | | | | |
| | XHGR130215ER-MJ | ● | | | | | | | | |
| | XHGR130216ER-MJ | ● | | | | | | | | |
| | XHGR130220ER-MJ | ● | | | | | | | | |
| | XHGR18T202ER-MJ | ● | | | | | | | | |
| | XHGR18T204ER-MJ | ● | | | | | | | | |
| | XHGR18T205ER-MJ | ● | | | | | | | | |
| | XHGR18T208ER-MJ | ● | | | | | | | | |
| | XHGR18T210ER-MJ | ● | | | | | | | | |
| | XHGR18T212ER-MJ | ● | | | | | | | | |
| | XHGR18T215ER-MJ | ● | | | | | | | | |
| | XHGR18T216ER-MJ | ● | | | | | | | | |
| | XHGR18T220ER-MJ | ● | | | | | | | | |
| | XHGR110200FR-AJ | | | ● | | | | | | |
| | XHGR110202FR-AJ | | | ● | | | | | | |
| | XHGR110204FR-AJ | | | ● | | | | | | |
| | XHGR110205FR-AJ | | | ● | | | | | | |
| | XHGR110208FR-AJ | | | ● | | | | | | |
| XHGR110210FR-AJ | | | ● | | | | | | | |

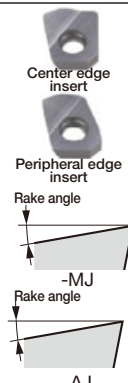
●: Line up

Milling Insert (Old item)



● XHGR**ER-MJ, XHGR**FR-AJ

| Shape | Designation | Coated | | Applicable mill |
|---|-----------------|--------|--------|--|
| | | AH730 | DS1200 | |
|  <p>Rake angle -AJ</p> | XHGR130212FR-AJ | ● | | HYBRIDTACMILL EPH11/13/18... (Old item) |
| | XHGR130215FR-AJ | ● | | |
| | XHGR130216FR-AJ | ● | | |
| | XHGR130220FR-AJ | ● | | |
| | XHGR18T200FR-AJ | ● | | |
| | XHGR18T202FR-AJ | ● | | |
| | XHGR18T204FR-AJ | ● | | |
| | XHGR18T205FR-AJ | ● | | |
| | XHGR18T208FR-AJ | ● | | |
| | XHGR18T210FR-AJ | ● | | |
| | XHGR18T212FR-AJ | ● | | |
| | XHGR18T215FR-AJ | ● | | |
| | XHGR18T216FR-AJ | ● | | |
| | XHGR18T220FR-AJ | ● | | |

● XXGT**EC-MJ, XXGT**FC-AJ, XXGT**EP-MJ, XXGT**FP-AJ

| Shape | Designation | Coated | | Applicable mill |
|--|-----------------|--------|--------|--|
| | | AH730 | DS1200 | |
|  <p>Center edge insert Peripheral edge insert Rake angle -MJ Rake angle -AJ</p> | XXGT06H205EC-MJ | ● | | HYBRIDTACMILL EXH... (Old item) |
| | XXGT07X305EC-MJ | ● | | |
| | XXGT09X408EC-MJ | ● | | |
| | XXGT06H205FC-AJ | | ● | |
| | XXGT07X305FC-AJ | | ● | |
| | XXGT09X408FC-AJ | | ● | |
| | XXGT06H205EP-MJ | ● | | |
| | XXGT07X305EP-MJ | ● | | |
| | XXGT09X408EP-MJ | ● | | |
| | XXGT06H205FP-AJ | | ● | |
| | XXGT07X305FP-AJ | | ● | |
| | XXGT09X408FP-AJ | | ● | |

● YDEN1505ADFR-D, YDEN1505ADFR-WD

| Shape | Designation | PCD | | Applicable mill |
|---|-----------------|-------|--|------------------------|
| | | DX140 | | |
|  <p>Regular edge</p> | YDEN1505ADFR-D | ● | | DAD15... (Old item) |
| | YDEN1505ADFR-WD | ● | | |
|  <p>Wiper edge</p> | | | | |



DX140: Packing quantity = 1 pc.

●: Line up






Milling Insert (Old item)

● YDEN1505PDR-D, YDEN1505PDR-WD

| Shape | Designation | PCD | | | | | Applicable mill |
|---|----------------|-------|--|--|--|--|-------------------------------------|
| | | DX140 | | | | | |
|  Regular edge | YDEN1505PDR-D | ● | | | | | DPD15... EDPD15... (Old item) |
| | YDEN1505PDR-WD | ● | | | | | |
|  Wiper edge | | | | | | | |


DX140: Packing quantity = 1pc.

● YDEN2405PDR-D, YDEN2405PDR-WD, YDEN2405PDR-BD

| Shape | Designation | PCD | | | | | Applicable mill |
|--|----------------|-------|--|--|--|--|------------------------|
| | | DX140 | | | | | |
|  Regular edge | YDEN2405PDR-D | ● | | | | | DPD24... (Old item) |
| | YDEN2405PDR-WD | ● | | | | | |
| | YDEN2405PDR-BD | ● | | | | | |
|  Wiper edge | | | | | | | |
|  Wiper for burr removal | | | | | | | |

DX140: Packing quantity = 1pc.

● ZDCA**TN

| Shape | Designation | Uncoated | | | | | Applicable mill |
|---|-------------|----------|--|--|--|--|-----------------------|
| | | UX30 | | | | | |
|  | ZDCA0804TN | ● | | | | | TBF1000 (Old item) |
| | ZDCA1105TN | ● | | | | | |

●: Line up

Milling Insert (Old item) CBN

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool


Tooling System

User's Guide



Index





● 2QP-SNGN..

| Shape | Designation | CBN | | | | | | Applicable mill |
|---|----------------|-------|--|--|--|--|--|-----------------|
| | | BX910 | | | | | | |
|  | 2QP-SNGN090308 | ● | | | | | | |
| | 2QP-SNGN090312 | ● | | | | | | |





● 2QP-SPGW..., 2QP-SPGN...

| Shape | Designation | CBN | | | | | | Applicable mill |
|---|----------------|-------|--|--|--|--|--|-----------------|
| | | BX910 | | | | | | |
|  | 2QP-SPGW09T308 | ● | | | | | | |
| | 2QP-SPGW09T312 | ● | | | | | | |
| | 2QP-SPGW120408 | ● | | | | | | |
|  | 2QP-SPGW120412 | ● | | | | | | |
| | 2QP-SPGW120416 | ● | | | | | | |
| | 2QP-SPGN090308 | ● | | | | | | |
| | 2QP-SPGN090312 | ● | | | | | | |

● 3QP-TPGW..., 3QP-TPGN...

| Shape | Designation | CBN | | | | | | Applicable mill |
|---|----------------|-------|--|--|--|--|--|-----------------|
| | | BX910 | | | | | | |
|  | 3QP-TPGW110308 | ● | | | | | | |
| | 3QP-TPGN110308 | ● | | | | | | |
| | 3QP-TPGN110312 | ● | | | | | | |
|  | | | | | | | | |

● S-CNGN..., S-RNGN..., S-SNGN..., S-TNGN...

| Shape | Designation | CBN | | | | | | Applicable mill |
|---|--------------|-------|--|--|--|--|--|-----------------|
| | | BXC90 | | | | | | |
|  | S-CNGN090308 | ● | | | | | | |
| | S-CNGN090312 | ● | | | | | | |
| | S-CNGN120408 | ● | | | | | | |
|  | S-CNGN120412 | ● | | | | | | |
| | S-RNGN090300 | ● | | | | | | |
| | S-RNGN120400 | ● | | | | | | |
| | S-SNGN090308 | ● | | | | | | |
| | S-SNGN090312 | ● | | | | | | |
| | S-SNGN120308 | ● | | | | | | |
|  | S-SNGN120312 | ● | | | | | | |
| | S-SNGN120408 | ● | | | | | | |
| | S-SNGN120412 | ● | | | | | | |
| | S-TNGN110308 | ● | | | | | | |
| | S-TNGN110312 | ● | | | | | | |
| | S-TNGN160408 | ● | | | | | | |
|  | S-TNGN160412 | ● | | | | | | |

●: Line up

Alphanumeric Index

Milling

| Designation | Product name | Page |
|--------------------|--------------|------|
| 1QP-SECW12X4ZETR-B | TFE insert | H098 |
| 1QP-SECW12X4ZETR-W | TFE insert | H098 |
| 2QP-SECW12X412ZETR | TFE insert | H098 |

| A | | |
|--------------------|--|------|
| AOGT□□□□□PDFR-AJ | TungRec insert | H145 |
| AOGT070204PDFR-AJ | TungRec insert | H145 |
| AOMT□□□□□PDPFR-MJ | TungRec insert | H145 |
| AOMT070□□□PDPFR-MJ | TungRec insert | H145 |
| AOMT070208PDPFR-HJ | TungRec insert | H145 |
| APMR190616PR-MJ | TZP19 insert | H228 |
| APMT120416PR-MJ | TZP12 insert | H226 |
| ASG□□N... | TungMini-Slit side cutter | H181 |
| ASGT11T□□□PDFR-AJ | TungRec insert | H145 |
| ASGW11T30□□PDFR-D | TungRec insert | H145 |
| ASMT11T□□□PDPFR-MJ | TungRec insert | H145 |
| ASMT11T304PDPFR-MS | TungRec insert | H145 |
| ASN□□R□□□M... | TecTangential-Slot axial drive slot mill | H189 |
| ASV□□N... | TungThinSlit axial drive slot mill | H185 |
| ASW□□N... | TungUniversalSlot axial drive slot mill | H187 |
| AVGT□□□□□PBER-MJ | TungForce-Rec insert | H126 |
| AVGT□□□□□PBFRAJ | TungForce-Rec insert | H126 |
| AVGT□□□□□PDPFR-AM | TungForce-Rec insert | H126 |
| AVMT□□□□□PDER-MM | TungForce-Rec insert | H126 |
| AVMT□□□□□PPER-MM | TungForce-Rec insert | H126 |

| B | | |
|---------------------|---|------------------------|
| BBB... | T-CBN ball nose endmill for dies and mold | I059 |
| BT50-FMA31.75-... | TPX, TZP12/19, TZF arbor | H055, H227, H229, H231 |
| BT50-FMA38.1-375-98 | Arbor for TZP19 | H229 |
| BT50-FMC22-... | TPX, TZP12, TZF arbor | H055, H227, H231 |

| C | | |
|--------------------|--|------|
| C□TLA15M□□□R□□L... | Tung-Tri roughing cutter with TungCap connection | H134 |

| D | | |
|--------------|--|------|
| D□□-D□□-□□R | Indexable threading cutter | I128 |
| DCMW□□□□04TN | EBP insert | H207 |
| DEB... | T-DIA endmill for high speed aluminium machining | I058 |
| DPCW11T3ZFR | TZF11 insert | H230 |
| DPD09... | DPD09 cutter body | H100 |

| E | | |
|----------------|------------------------------------|------|
| EASD05M□□□C... | TungQuad chamfering cutter | H210 |
| EAW13R□□□M... | TungMill face endmill, shank type | H068 |
| EBB□□□MS | EBB endmill | H208 |
| EBD... | EBD endmill | H209 |
| EBFM□□□□C... | BallFinishNose endmill, shank type | H193 |
| EBFM□□□□S... | BallFinishNose endmill, shank type | H193 |

| Designation | Product name | Page |
|----------------------------|---|------------|
| EBP... | EBP endmill | H206 |
| EBRM□□T... | BallRoughNose endmill, shank type | H201 |
| ECC31005R-... | Chamfering cutter | H214 |
| ECP44□□R | Chamfering cutter | H213 |
| EDPD09063R | EDPD09 endmill, shank type | H100 |
| EEN09R□□□M... | DoPent endmill, shank type | H070 |
| EFE12050R | TFE endmill, shank type | H096 |
| EFP40□□R | EFP4000R endmill, shank type | H236 |
| EGD44□□R | EGD4400 endmill, shank type | H110 |
| ELD05R□□□M... | TungQuad roughing endmill, shank type | H148 |
| ELS11R□□□M... | TungRec roughing endmill, shank type | H143 |
| EMD4403RI-S32 | EMD4400RI endmill, shank type | H106 |
| EME44□□R... | EME4400 endmill, shank type | H103 |
| EMS09080R | EMS09 endmill, shank type | H232 |
| EPA□□R□□□M... | Tung-Tri endmill, shank type | H130 |
| EPAV□□M□□□C... | TungForce-Rec endmill, shank type | H122 |
| EPD05R□□□M... | TungQuad chamfering cutter | H148 |
| EPM11R□□□M... | TecMill square shoulder endmill, shank type | H163 |
| EPO□□R□□□M... | TungRec endmill, shank type | H140, H141 |
| EPQ□□R□□□M... | DoRec endmill, shank type | H154 |
| EPTC16M□□□C... | TungTri-Shred endmill, shank type | H170 |
| EPTN□□M0□□□C... | DoForce-Tri endmill, shank type | H150 |
| EPV16R□□□M... | Tung-AluMill endmill, shank type | H160 |
| EPW13R□□□M... | TungMill endmill, shank type | H167 |
| EPYD06M050C32.0R... | TungSpeed-Mill endmill, shank type | H092 |
| EPYP12M□□□C... | TungSpeed-Mill cutter body | H158 |
| ERC□□R0□□M... | RoundSplit endmill, shank type | H074 |
| ERP□□R□□□M... | FixRMill endmill, shank type | H080 |
| ERRQ12M040C32.0R04 | FixRMill -New design- endmill, shank type | H078 |
| ESE30□□R | ESE3000R endmill, shank type | H173 |
| ESE40□□R... | ESE4000R endmill, shank type | H175 |
| ETTTL25M□□□W25.0F□□□R... | Indexable threading cutter | I124 |
| ETTTL25M□□□W25.0F□□□R□□-PT | Indexable threading cutter | I125 |
| EVLX□□M□□□C□□.0R... | DoMultiRec endmill | H221 |
| EVX... | Endmill with central cutting edge, shank type | H224 |
| EWD□□□□R | EWD05/07/10 endmill, shank type | H203 |
| EXLN□□□M□□□C... | DoTwistBall endmill, shank type | H046 |
| EXLS02M□□□C... | TungForceFeed endmill, shank type | H038 |
| EXN02R□□□M... | AddDoFeed endmill, shank type | H020 |
| EXN03R□□□M... | DoFeed endmill, shank type | H024 |
| EXN06R□□□M... | DoFeed endmill, shank type | H025 |
| EXP□□□□R... | MillFeed endmill, shank type | H051 |
| EXSW09M□□□C... | MillQuadFeed cutter head | H057 |
| EXWX03M□□□C... | DoFeedTri endmill, shank type | H042 |

| H | | |
|-------------------|----------------------------|------|
| HBFM□□M... | BallFinishNose cutter head | H194 |
| HBRM□□M... | BallRoughNose cutter head | H201 |
| HFWX04M□□□M... | DoMini-Mill cutter head | H200 |
| HFZN10M□□□M□□R... | AddForceBarrel cutter head | H198 |

| Designation | Product name | Page |
|------------------|---------------------------|------|
| HPA□□R□□□MM... | Tung-Tri cutter head | H131 |
| HPAV□□M□□□M... | TungForce-Rec cutter head | H124 |
| HPAV06M□□□S... | TungForce-Rec cutter head | H123 |
| HPO□□R□□□MM... | TungRec cutter head | H141 |
| HRP□□R□□□MM... | FixRMill cutter head | H080 |
| HVLX□□M□□□M□□R02 | DoMultiRec cutter head | H221 |
| HWD07R□□□MM... | HWD07 Cutter head | H203 |
| HXLN□□M□□□M... | DoTwistBall cutter head | H046 |
| HXLS02M□□□M... | TungForceFeed cutter head | H038 |
| HXN02R□□□M... | AddDoFeed cutter head | H020 |
| HXN03R□□□MM... | DoFeed cutter head | H025 |
| HXSW09M□□□M... | MillQuadFeed cutter head | H057 |
| HXWX03M□□□C... | DoFeedTri cutter head | H042 |

| L | | |
|-------------------|-------------------------------|------|
| LMEU□□□□□□ZNER-MJ | TecTangential-Slot insert | H191 |
| LMMU□□□□□□PNER-MJ | TecMill insert | H165 |
| LNCQ0906□-... | NMS09 / EMS09 insert | H233 |
| LNGU0303ZER-MH | DoFeed 03insert | H029 |
| LNGU06X5ZER-MH | DoFeed 06insert | H029 |
| LNGU06X5ZER-W | DoFeed 06insert | H029 |
| LNMU0202ZER-MM | AddDoFeed 02insert | H021 |
| LNMU0303ER-MJ | DoFeed 03insert | H029 |
| LNMU0303ER-ML | DoFeed 03insert | H029 |
| LNMU0303ZER-MS | DoFeed 03insert | H029 |
| LNMU06X5ZER-MJ | DoFeed 06insert | H029 |
| LNMU06X5ZER-ML | DoFeed 06insert | H029 |
| LNMX□□□□R□-MJ | DoTwistBall insert | H047 |
| LNMX□□□□R□-ML | DoTwistBall insert | H047 |
| LNMX□□□□ZER-HJ | DoTwistBall insert | H047 |
| LNMX0405ZER-HL | DoTwistBall insert | H047 |
| LPTC16□□□□B... | TungTri-Shred roughing cutter | H170 |
| LQMU□□□□□□P□ER-MJ | DoRec insert | H155 |
| LSMT0202R2-MM | TungForceFeed insert | H039 |
| LSMT0202ZER-HM | TungForceFeed insert | H039 |
| LXMU□□□□□□PER-MM | DoMultiRec insert | H222 |

| M | | |
|---------------------|---|------|
| MS□□R/L | MS cutter body | H234 |
| MTEC□□□□□□□□.□ISO | 60° solid carbide threading endmill | I108 |
| MTEC□□□□□□□□BSPT | BSPT solid carbide threading endmill | I117 |
| MTEC□□□□□□□□UN | 60° solid carbide threading endmill | I113 |
| MTEC□□□□□□□□NPT | BSPT solid carbide threading endmill | I118 |
| MTEC□□□□□□□□W | BSPT solid carbide threading endmill | I116 |
| MTECB□□□□□□□□.□ISO | ISO solid carbide threading endmill, with coolant hole | I109 |
| MTECB□□□□□□□□NPT | NPT solid carbide threading endmill, with coolant hole | I118 |
| MTECB□□□□□□□□UN | ISO solid carbide threading endmill, with coolant hole | I113 |
| MTECB□□□□□□□□W | NPT solid carbide threading endmill, with coolant hole | I116 |
| MTECD□□□□□□□□.□ISO | ISO solid carbide thread mill for boring, threading, chamfering | I112 |
| MTECE□□□□□□□□.□ISO | ISO solid carbide external threading endmill | I112 |
| MTECE□□□□□□□□UN | ISO solid carbide external threading endmill | I115 |
| MTECI□□□□□□□□.□ISO | 60° solid carbide threading endmill | I108 |
| MTECI□□□□□□□□A60 | 60° solid carbide threading endmill | I107 |
| MTECI□□□□□□□□A60 | 60° solid carbide threading endmill | I107 |
| MTECI□□□□□□□□E□□A60 | 60° solid carbide threading endmill | I107 |
| MTECQ□□□□□□□□.□ISO | ISO solid carbide deep threading endmill, with coolant hole, with coolant hole | I110 |
| MTECS□□□□□□□□.□ISO | ISO small diameter solid carbide threading endmill, short edge type | I111 |
| MTECS□□□□□□□□.□ISOL | ISO small diameter solid carbide threading endmill, short edge type | I111 |
| MTECS□□□□□□□□.□MJ | MJ small diameter solid carbide threading endmill, short edge type, with coolant hole | I119 |
| MTECS□□□□□□□□.□MJ | MJ small diameter solid carbide threading endmill, short edge type, with coolant hole | I119 |
| MTECS□□□□□□□□UN-L | ISO small diameter solid carbide threading endmill, short edge type | I114 |
| MTECS□□□□□□□□UNJ | MJ small diameter solid carbide threading endmill, short edge type, with coolant hole | I119 |
| MTECS□□□□□□□□UN | ISO small diameter solid carbide threading endmill, short edge type | I114 |
| MTECS□□□□□□□□UNJ | MJ small diameter solid carbide threading endmill, short edge type, with coolant hole | I119 |
| MTECS□□□□□□□□W | Whitworth solid carbide thread mill for threading, short edge type | I117 |
| MTECS06047C1920UN-L | ISO small diameter solid carbide threading endmill, short edge type | I114 |
| MTECSH□□□□□□□□.□ISO | ISO solid carbide thread mill for machining, short edge type, left hand | I112 |
| MTECSH□□□□□□□□.□ISO | ISO solid carbide thread mill for machining, short edge type, left hand | I115 |
| MTECZ□□□□□□□□.□ISO | ISO solid carbide threading endmill, with coolant hole | I110 |
| MTECZ□□□□□□□□.□ISO | ISO solid carbide threading endmill, with coolant hole | I114 |
| MTECZ□□□□□□□□W | NPT solid carbide threading endmill, with coolant hole | I116 |

| Designation | Product name | Page |
|---------------------|--|------|
| MTECZ08076C1027NPTF | NPT solid carbide threading endmill, with coolant hole | I118 |
| MTECZ1010D1618NPTF | NPT solid carbide threading endmill, with coolant hole | I118 |
| N | | |
| NMS09□□□R | NMS09 cutter body | H232 |
| O | | |
| ON□U0507ANEN-MJ | DoTriple-Mill insert | H086 |
| ON□U0705AN□N-ML | DoOcto insert | H090 |
| ON□U0705ANPN-MJ | DoOcto insert | H090 |
| ONGU0507ANEN-W | DoTriple-Mill insert | H086 |
| ONHU0705ANPR-W | DoOcto insert | H090 |
| OWHT05T3C07AFER-MM | TungEight-Mill insert | H083 |
| OWHT05T3C07AFER-MW | TungEight-Mill insert | H083 |
| OWMT05T3AFER-MM | TungEight-Mill insert | H083 |
| OWMT0807AAER-ML | DoOcto insert | H090 |
| OWMT0807ZNER-HJ | DoOcto insert | H090 |

| P | | |
|-----------------|---------------|------|
| PN□U0905GNE□-MJ | DoPent insert | H072 |
| PNCU0905GNEN-ML | DoPent insert | H072 |
| PNCU0905GNER-W | DoPent insert | H072 |
| PNCU0905GNFR-AJ | DoPent insert | H072 |

| Q | | |
|-------------|--|------|
| QA□□K/M | Adapter for TAC mill/QC system | H117 |
| QACB-□□MR/L | A-type set bolt for TAC mill/QC system | H118 |

| R | | |
|-----------------|--|------|
| R1.□□-... | TungMini-Slit drive flange set for side cutter | H183 |
| RCMT□□□□EN-MJ | RoundSplit insert | H076 |
| RCMT□□□□EN-NMJ | RoundSplit insert | H076 |
| RCMT□□□□FN-NAJ | RoundSplit insert | H076 |
| RDMW□□□□M0 | Insert for EWD/HWD | H204 |
| RNGN120700... | CeramicSpeed-Mill insert | H102 |
| RNMU1307ZNER-MJ | DoTriple-Mill insert | H086 |
| RPMT□□□□EN-MJ | FixRMill insert | H081 |
| RPMT□□□□EN-ML | FixRMill insert | H081 |
| RQMT1204ENC□-MM | FixRMill -New design- insert | H079 |

| S | | |
|-------------------|--|------------|
| SCMT□□□□08-23 | EBD insert | H209 |
| SD□□42Z... | TMD4400R/LI, EMD4400RI insert | H107, H111 |
| SD□□42Z□N... | TGD4400-A, EGD4400 insert | H107, H111 |
| SD□N42ZTNCR | TGD4400-A, EGD4400 insert | H107, H111 |
| SD□N53Z□N... | TMD5401RI insert | H109 |
| SD□R1203AETN-MJ | TMD4400R/LI, EMD4400RI, TGD4400-A,EGD4400 insert | H107, H111 |
| SD□R42ZSR-MJ | TMD4400R/LI, EMD4400RI, TGD4400-A,EGD4400 insert | H107, H111 |
| SDCN42ZFN-DIA | TMD4400R/LI, EMD4400RI insert | H107, H111 |
| SDHT050204FN-AJ | TungQuad insert | H149, H210 |
| SDKR42ZPN-MS | TMD4400R/LI, EMD4400RI, TGD4400-A,EGD4400 insert | H107, H111 |
| SDKR53ZSR-MJ | TMD5401RI insert | H109 |
| SDMT050204PN-MJ | TungQuad insert | H149, H210 |
| SE□N1203AG□N | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SE□N1203AG□N-T | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SE□N1203AGTNCR | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SE□N1504AG□N | TME5400RI insert | H105 |
| SE□N42ZFR | THE4000RIA insert | H172 |
| SECN42ZFR-DIA | THE4000RIA insert | H172 |
| SEEN1203AGTNCR-14 | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SEGT12X4ZEFR-AJ | TFE insert | H098 |
| SEGW12X4ZE□R | TFE insert | H098 |
| SEGW12X4ZEFR-BD | TFE insert | H098 |
| SEGW12X4ZEFR-D | TFE insert | H098 |
| SEGW12X4ZEFR-WD | TFE insert | H098 |
| SEKN1504AGTN-T | TME5400RI insert | H105 |
| SEKR1203AGPN-MS | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SEKR1203AGSR-MJ | TME4400R/LI, TME4400RB, EME4400 insert | H104 |
| SEKR1504AGSR-MJ | TME5400RI insert | H105 |
| SFP40□□R | SFP4000R cutter body | H235 |
| SM□□-L... | TungFlex Steel modular shank | H036 |
| SM□□-L□□□□□-H | TungFlex carbide modular shank | H037 |
| SM□□-L□□□□□-H-N | TungFlex carbide modular shank | H037 |
| SNAA56FTR | MS insert | H234 |

Alphanumeric Index

| Designation | Product name | Page |
|-----------------------|---|------------|
| SN□U1307ANEN-MJ | DoTriple-Mill insert | H086 |
| SN□U1706ANPR-MJ | DoOcto insert | H090 |
| SN□U1706ANTR-ML | DoOcto insert | H090 |
| SNGU1307ANEN-MH | DoTriple-Mill insert | H086 |
| SNGU1307ANEN-W | DoTriple-Mill insert | H086 |
| SNHU1706ANFN-W | DoOcto insert | H090 |
| SNMU1206□□EN-MM | DoQuad-Mill insert | H159 |
| SNMU120608HNEN-MM | DoQuad-Mill insert | H159 |
| SP□N423□N | TGP4200R-A insert | H112, H113 |
| SP□N42S... | TGP4100RIA/BA insert | H112 |
| SP□N42Z... | TGP4200R-A insert | H113 |
| SP□N53S... | TGP5100RIA insert | H114 |
| SPGN120312TN | TGP4100RIA/BA insert | H112 |
| SPHA431FNW | TFP4000IA insert | H178 |
| SPHA435FNW | SFP4000R, EFP4000R insert | H237 |
| SPKN53STR20 | TGP5100RIA insert | H114 |
| SPKR42SSR-MJ | TGP4100RIA/BA insert | H112 |
| SPKR53SSR-MJ | TGP5100RIA insert | H114 |
| SPMA422□N | ECP insert | H213 |
| SPMM□□□ERD | TCB insert | H219 |
| SPMP□□□-CG | TCB insert | H219 |
| SPMP□□□ER-CG | TCB insert | H219 |
| SPMP□□□ERD | TCB insert | H219 |
| SPMP831DS | TCB insert | H219 |
| SQMU1206ZSR-MJ | DoFeedQuad insert | H063 |
| SSG□□R... | TungMini-Slit side cutter | H181 |
| SSM□□N | TungMini-Slit insert | H182 |
| SSS□□N | TungMini-Slit insert | H182 |
| SW□□-... | TungMini-Slit drive shank for side cutter | H183 |
| SW□T1304PDR-MJ | TungMill insert | H169 |
| SW□T13T3AFPR-MJ | TungMill insert | H069 |
| SW1.□□-... | TungMini-Slit drive shank for side cutter | H183 |
| SWG1304PDR-AJ | TungMill insert | H169 |
| SWG13T3AFPR-AJ | TungMill insert | H069 |
| SWMT0904□ER-MM | MillQuadFeed insert | H059 |
| SWMT1304PDR-ML | TungMill insert | H169 |
| SWMT1304PDR-MS | TungMill insert | H169 |
| SWMT13T3AFER-ML | TungMill insert | H069 |
| SWMT13T3AFPR-HJ | TungMill insert | H069 |
| SWMT13T3AFPR-MS | TungMill insert | H069 |
| SWMT1506□ER-MM | MillQuadFeed insert | H059 |
| SWMT1506ZER-MJ | MillQuadFeed insert | H059 |
| SWMT1506ZER-MT | MillQuadFeed insert | H059 |
| SWMW13T3AFTR | TungMill insert | H069 |
| T | | |
| T□-R... | Insert for threading cutter | H128 |
| TAOW05M□□□B... | TungEight-Mill cutter body | H083 |
| TAN07R□□□M... | DoOcto cutter body | H088, H089 |
| TASN13M□□□B... | DoTriple-Mill cutter body | H085 |
| TASN13J□□□B... | DoTriple-Mill cutter body | H085 |
| TAW13R□□□M... | TungMill cutter body | H068 |
| TBN□□□□S | TBN1000 endmill | H205 |
| TCB-... | Boring cutter | H216 |
| TCB□□□-□□□F32 | Boring cutter, cartridge type | H217 |
| TCB□□□F... | Boring cutter | H216 |
| TCFF□□□A3-... | FeedMeister 3 flute high feed endmill | I055 |
| TCGT1606□□PDER-MJ | TungTri-Shred insert | H171 |
| TCGT1606□□PDER-NMJ | TungTri-Shred insert | H171 |
| TE□N32Z□R | TSE3000R, ESE3000R insert | H174 |
| TE□N43Z□R | TSE4000RIA, ESE4000R insert | H176 |
| TEAP□□□H3-... | ShredMeister 3 flute solid endmill | I031 |
| TEB□□□A2-□□□□□□□□M... | SolidMeister 2flute solid endmill | I051 |
| TEB□□□A2-□□□□□□□□H... | SolidMeister 2flute solid endmill | I050 |
| TEB□□□A2-□□□□□□□□M... | SolidMeister 2flute solid endmill | I050 |
| TEB□□□A2-□□□□□□□□M... | SolidMeister 2flute solid endmill | I049 |
| TEB□□□A2-□□□□□□□□-... | SolidMeister 2flute solid endmill | I051 |
| TEB□□□A2-□□□□□□-E... | EcoMeister 2flute solid endmill | I052 |
| TEB□□□A2-□□□□□□M... | SolidMeister 2flute solid endmill | I050 |
| TEB□□□A2-□□□□□□-E... | EcoMeister 2flute solid endmill | I052 |
| TEB□□□A3-□□□□□□-... | SolidMeister 3flute solid endmill | I051 |
| TEB□□□A4-□□□□□□-... | SolidMeister 4flute solid endmill | I052 |
| TEB□□□E4L-... | VariableMeister 4flute solid endmill | I048 |
| TEBRF□□□T3-... | ShredMeister 3 - 4flute solid endmill | I048 |
| TEBRF□□□T4-... | ShredMeister 3 - 4flute solid endmill | I048 |
| TEC□□□A2-□□□□□□C4M... | SolidMeister 2flute solid endmill | I038 |
| TEC□□□A2-□□□□□□C6M... | SolidMeister 2flute solid endmill | I038, I039 |

| Designation | Product name | Page |
|----------------------------|--|------------|
| TEC□□□A2-□□□□□□C4M... | SolidMeister 2flute solid endmill | I038 |
| TEC□□□A2-□□□□□□-E... | EcoMeister 2flute solid endmill | I043 |
| TEC□□□A2-□□□□□□-E... | EcoMeister 3flute solid endmill | I043 |
| TEC□□□A3-□□□□□□-E... | EcoMeister 3flute solid endmill | I044 |
| TEC□□□A4-□□□□□□-... | EcoMeister 4flute solid endmill | I039 |
| TEC□□□A4-□□□□□□-E... | EcoMeister 4flute solid endmill | I045, I046 |
| TEC□□□A4-□□□□□□-E... | EcoMeister 4flute solid endmill | I045 |
| TEC□□□B3-□□□□□□-... | SolidMeister 3flute solid endmill | I036 |
| TEC□□□B3-□□□□□□-... | EcoMeister 3flute solid endmill | I045 |
| TEC□□□B4-□□□□□□-... | SolidMeister 4flute solid endmill | I037 |
| TEC□□□B4-□□□□□□-... | SolidMeister 4flute solid endmill | I037 |
| TEC□□□B4-□□□□□□R□□-... | SolidMeister 4flute solid endmill | I037 |
| TEC□□□B4L-... | SolidMeister 4flute - 6flute solid endmill | I034 |
| TEC□□□B4X-... | SolidMeister 4flute - 6flute solid endmill | I034 |
| TEC□□□B6-... | SolidMeister 6flute solid endmill | I040 |
| TEC□□□B6L-... | SolidMeister 4flute - 6flute solid endmill | I034 |
| TEC□□□B6X-... | SolidMeister 4flute - 6flute solid endmill | I034 |
| TEC□□□D6-... | SolidMeister 6flute solid endmill | I041 |
| TEC□□□E3-□□□□□□-E... | EcoMeister 3flute solid endmill | I044 |
| TEC□□□E4L-... | VariableMeister 4flute solid endmill | I017 |
| TEC□□□E5L-□□□□□□CF... | VariableMeister 5flute solid endmill | I017 |
| TEC□□□H□-□□□□□□CF-H... | VariableMeister 6 - 20flute solid endmill | I019 |
| TEC□□□H□□-□□□□□□CF-H... | VariableMeister 6 - 20flute solid endmill | I019 |
| TEC□□□H□□-□□□□□□CFH... | VariableMeister 6 - 20flute solid endmill | I019 |
| TEC□□□H4M-□□□□□□CF-E... | VariableMeister 4flute solid endmill | I016 |
| TEC□□□H4M-□□□□□□CF-R... | VariableMeister 4flute solid endmill | I020 |
| TEC□□□H4M-□□□□□□CFR... | VariableMeister 4flute solid endmill | I020 |
| TEC□□□H4S-... | VariableMeister 4flute solid endmill | I016 |
| TEC□□□H4X-□□□□□□CF-R... | VariableMeister 4flute solid endmill | I021 |
| TEC□□□H7-□□□□□□CF-... | VariableMeister 7flute solid endmill | I018 |
| TECA□□□B2-... | SolidMeister 2flute solid endmill | I041 |
| TECA□□□B3-... | SolidMeister 3flute solid endmill | I042 |
| TECA□□□F2-... | SolidMeister 2flute solid endmill | I042 |
| TECA□□□H3-□□□□□□CF-R... | VariableMeister 3flute solid endmill | I023 |
| TECA□□□H3-□□□□□□CF-R... | VariableMeister 3flute solid endmill | I022 |
| TECA□□□H3-□□□□□□CF-R□□C | VariableMeister 3flute solid endmill | I024 |
| TECA□□□H4-... | VariableMeister 4flute solid endmill | I024 |
| TECC□□□A2-□□□□□□-... | SolidMeister 2flute solid endmill | I035 |
| TECC□□□A4-□□□□□□-... | SolidMeister 4flute solid endmill | I036 |
| TECC□□□E3-□□□□□□-... | SolidMeister 3flute solid endmill | I036 |
| TECC020B2-07C03-38 | SolidMeister 2flute solid endmill | I035 |
| TECC020B4-07C03-38 | SolidMeister 4flute solid endmill | I036 |
| TECCS□□□E3-□□□□□□-... | SolidMeister 3flute solid endmill | I035 |
| TECH□□□B6-... | SolidMeister 6flute solid endmill | I040 |
| TECK□□□H4M-□□□□□□CF-R... | VariableMeister 4flute solid endmill | I019 |
| TECK□□□H7-□□□□□□CF-R□□T... | VariableMeister 7 - 9flute solid endmill | I020 |
| TECK□□□H9-□□□□□□CF-R□□T... | VariableMeister 7 - 9flute solid endmill | I020 |
| TECN32ZFR-DIA | TSE3000R, ESE3000R insert | H174 |
| TECN43ZFR-DIA | TSE4000RIA, ESE4000R insert | H176 |
| TECP□□□E3L-... | ShredMeister solid endmill | I030 |
| TECP□□□E4L-... | ShredMeister solid endmill | I030 |
| TECR□□□B□L-... | ShredMeister 4 - 7flute solid endmill | I029 |
| TECR□□□B□M-... | ShredMeister 4 - 7flute solid endmill | I028 |
| TECR□□□B□MF-... | ShredMeister 4 - 6flute solid endmill | I028 |
| TECR□□□B□S-□□□□□□-... | ShredMeister 4 - 7flute solid endmill | I027 |
| TECR□□□B□X-... | ShredMeister 4 - 5flute solid endmill | I029 |
| TECR□□□B3-... | ShredMeister 3 flute solid endmill | I032 |
| TECR□□□T4M-... | ShredMeister 4flute solid endmill | I030 |
| TECS□□□E3-□□□□□□-... | SolidMeister 3flute solid endmill | I035 |
| TEFF□□□N4-... | FeedMeister 4flute solid endmill | I055 |
| TEFS□□□B44-□□□□□□-... | FinishMeister 4flute solid endmill | I027 |
| TEFS□□□B44-□□□□□□-... | FinishMeister 4flute solid endmill | I027 |
| TEFS□□□E44-□□□□□□CF... | FinishMeister 4flute solid endmill | I026 |
| TEKR1603PEPR-MS | TSE3000R, ESE3000R insert | H174 |
| TEKR2204PEPR-MS | TSE4000RIA, ESE4000R insert | H176 |
| TEN09R/L□□□M... | DoPent cutter body | H071 |
| TERC□□□E3-... | ShredMeister 3 flute solid endmill | I031 |
| TERF□□□A4-... | ShredMeister 3 - 4flute solid endmill | I029 |
| TERF□□□E3-... | ShredMeister 3 - 4flute solid endmill | I029 |
| TETR□□□A2-... | SolidMeister 2flute solid endmill | I056 |
| TFE12□□□R | TFE cutter body | H096 |
| TFE12R□□□M... | TFE cutter body | H096 |
| TFMRN□□□-□□R-12FL | CeramicSpeed-Mill cutter body | H102 |
| TFP40□□□RIA | TFP4000IA cutter body | H177 |
| TGD44□□□R-A | TGD4400-A cutter body | H110 |
| TGM16R□□□M□□□□□□SA | TecMill 60° face mill | H164 |
| TGM16R□□□M□□□□□□SA | TecMill 60° face mill | H164 |

| Designation | Product name | Page |
|-----------------------|---|------|
| TGP41□□RBA | TGP4100RIA/RBA/RBAE cutter body | H112 |
| TGP41□□RBAE | TGP4100RIA/RBA/BAE cutter body | H112 |
| TGP41□□RIA | TGP4100RIA/RBA/RBAE cutter body | H112 |
| TGP42□□R-A | TGP4200R-A cutter body | H113 |
| TGP51□□RIA | TGP5100RIA cutter body | H114 |
| THE400□RIA | THE4000RIA cutter body | H172 |
| THSN12J□□□B... | DoQuad-Mill cutter body | H158 |
| THSN12M□□□B... | DoQuad-Mill cutter body | H158 |
| TL25D... | Insert for threading cutter | I124 |
| TL25SEIR... | Insert for threading cutter | I125 |
| TLA10R□□□L054M... | Tung-Tri roughing cutter | H133 |
| TLA15R□□□L□□□-□□S | Tung-Tri roughing cutter, subunit | H133 |
| TLA15R□□□L□□□BT50-0□M | Tung-Tri roughing cutter with BT shank | H134 |
| TLA15R□□□L□□□M... | Tung-Tri roughing cutter, main unit | H133 |
| TLM11R□□□M... | TecMill roughing cutter | H165 |
| TLS11R050M22.0E04 | TungRec roughing cutter | H143 |
| TMD44□□R... | TMD4400R/LI cutter body | H106 |
| TMD54□□RI... | TMD5400RI cutter body | H108 |
| TME44□□R... | TME4400R/LI cutter body | H103 |
| TME54□□RI | TME5400RI cutter body | H105 |
| TN□U□□□□□□PER-MJ | DoForce-Tri insert | H152 |
| TNMU120708PER-NMJ | DoForce-Tri insert | H152 |
| TNMU1207R□□PER-MJ | DoForce-Tri insert | H152 |
| TO□T□□□□□□PDER-MJ | Tung-Tri insert | H136 |
| TOGT□□□□□□PDR-AJ | Tung-Tri insert | H136 |
| TOMT□□□□□□PXER-MM | Tung-Tri insert | H136 |
| TOMT150604PDER-NMJ | Tung-Tri insert | H136 |
| TP□N43Z... | TFP4000IA insert | H178 |
| TPA□□□□□□M... | Tung-Tri cutter body | H132 |
| TPAV□□□□□□B... | TungForce-Rec cutter body | H125 |
| TPD05R□□□□M... | TungQuad cutter body | H148 |
| TPKR43ZSR-MJ | TFP4000IA insert | H178 |
| TPM□□□□□□□M... | TecMill square cutter body | H163 |
| TPM16R□□□□□□□□□□SA | TecMill square cutter body with shims | H164 |
| TPM16R□□□□□□□□□□SA | TecMill square cutter body with shims | H164 |
| TPMR2204PDSR-MJ | TFP4000IA insert | H178 |
| TPO□□□□□□□M... | TungRec cutter body | H142 |
| TPQ□□□□□□□M... | DoRec cutter body | H154 |
| TPTC16M□□□□B... | TungTri-Shred cutter body | H170 |
| TPTN□□□□□□□B... | DoForce-Tri cutter body | H151 |
| TPTN□□□□□□□B... | DoForce-Tri cutter body | H151 |
| TPV16R□□□□M... | Tung-AluMill cutter body | H160 |
| TPW13R□□□□M... | TungMill cutter body | H168 |
| TPYD06J□□□□B... | TungSpeed-Mill cutter body | H092 |
| TPYD06M□□□□B... | TungSpeed-Mill cutter body | H092 |
| TPYP12J□□□□B... | TungSpeed-Mill cutter body | H094 |
| TPYP12M□□□□B... | TungSpeed-Mill cutter body | H094 |
| TRC□□□□□□□M... | RoundSplit cutter body | H075 |
| TRP□□□□□□□M... | FixRMill cutter body | H081 |
| TRRQ12M□□□□B... | FixRMill -New design- cutter body | H078 |
| TSE30□□□R | TSE3000R cutter body | H173 |
| TSE30□□□R-E | TSE3000R cutter body | H173 |
| TSE30□□□RIA | TSE3000R cutter body | H173 |
| TSE40□□□RIA | TSE4000RIA cutter body | H175 |
| TSN□□□□□□□M... | TecTangential-Slot radial drive slot mill | H190 |
| TSP40□□□RIA | TSP4000IA cutter body | H177 |
| TSW□□□□... | TungUniversalSlot radial drive slot mill | H188 |
| TVKX□□□□□□□TN-MJ | TungThinSlit insert | H186 |
| TXLN□□□□□□□B... | DoTwistBall cutter body | H047 |
| TXN03R□□□□M... | DoFeed cutter body | H026 |
| TXN06R□□□□M... | DoFeed cutter body | H027 |
| TXP□□□□□□□R... | MillFeed cutter body | H052 |
| TXQ12R□□□□M... | DoFeedQuad cutter body | H063 |
| TXSW□□□□□□□B... | MillQuadFeed cutter body | H058 |
| TXWX03M□□□□B... | DoFeedTri cutter body | H043 |
| TZF110... | TZF11 cutter body | H230 |
| TZP120... | TZP12 cutter body | H226 |
| TZP19□□□□R | TZP19 cutter body | H228 |
| V | | |
| VAD□□□□□□□S08-S-M... | TungMeister adapter for TungFlex connection | I104 |
| VBB□□□□□□□-BG-02S... | TungMeister head | I078 |
| VBB□□□□□□□-BM-02S... | TungMeister head | I078 |
| VBB□□□□□□□-SG-02S... | TungMeister head | I079 |
| VBD□□□□□□□-BG-02S... | TungMeister head | I078 |
| VBD□□□□□□□-BG-04S... | TungMeister head | I079 |
| VBE□□□□□□□-BG-04S... | TungMeister head | I079 |

| Designation | Product name | Page |
|-------------------------|--|------------|
| VBE□□□□□□□-BGA02S... | TungMeister head | I079 |
| VBL□□□□□□□□□□-6S... | TungMeister head | I084 |
| VBN□□□□□□□□□□-6S... | TungMeister head | I083 |
| VBO□□□□□□□□□□-4S... | TungMeister head | I083 |
| VBO□□□□□□□□□□-5S... | TungMeister head | I083 |
| VCR□□□□□□□□□□-02S... | TungMeister head | I086 |
| VCA□□□□□□□□□□A45-04S... | TungMeister head | I086 |
| VCA□□□□□□□□□□A45-06S... | TungMeister head | I086 |
| VCP□□□□□□□□□□-02S... | TungMeister head | I088 |
| VCW118L05.0A45-02S06 | TungMeister head | I086 |
| VDP□□□□□□□□□□A30-02S... | TungMeister head | I090 |
| VDP□□□□□□□□□□A30-02S... | TungMeister head | I090 |
| VDP□□□□□□□□□□B30-02S... | TungMeister head | I090 |
| VDS□□□□□□□□□□A45-02S... | TungMeister head | I088 |
| VED□□□□□□□□□□R04S... | TungMeister head | I070 |
| VED□□□□□□□□□□R05S... | TungMeister head | I070 |
| VED□□□□□□□□□□R06S... | TungMeister head | I070 |
| VED□□□□□□□□□□R04S... | TungMeister head | I067 |
| VED□□□□□□□□□□R06S... | TungMeister head | I071 |
| VED□□□□□□□□□□R08S... | TungMeister head | I072 |
| VED□□□□□□□□□□R10S... | TungMeister head | I072 |
| VED□□□□□□□□□□R10S... | TungMeister head | I072 |
| VED□□□□□□□□□□R10S... | TungMeister head | I072 |
| VED□□□□□□□□□□R10S... | TungMeister head | I072 |
| VED250L37.0C50106S15 | TungMeister head | I070 |
| VEE□□□□□□□□□□C00-06S... | TungMeister head | I071 |
| VEE□□□□□□□□□□C00-08S... | TungMeister head | I072 |
| VEE□□□□□□□□□□C00-10S... | TungMeister head | I072 |
| VEE□□□□□□□□□□C04S... | TungMeister head | I071 |
| VEE□□□□□□□□□□C04S... | TungMeister head | I068 |
| VEE□□□□□□□□□□C04S... | TungMeister head | I070 |
| VEE□□□□□□□□□□C05S... | TungMeister head | I070 |
| VEE□□□□□□□□□□C06S... | TungMeister head | I070 |
| VEE□□□□□□□□□□C03S... | TungMeister head | I068 |
| VEE□□□□□□□□□□C04S... | TungMeister head | I067 |
| VEE□□□□□□□□□□C06S... | TungMeister head | I071 |
| VEE□□□□□□□□□□C03S... | TungMeister head | I069 |
| VEE□□□□□□□□□□C03S... | TungMeister head | I069 |
| VEE□□□□□□□□□□C04S... | TungMeister head | I068 |
| VEH□□□□□□□□□□C04S... | TungMeister head | I066 |
| VER□□□□□□□□□□S□-S | TungMeister adapter for ER collet connection | I104 |
| VFM□□□□□□□□□□C06S... | TungMeister head | I075 |
| VFX□□□□□□□□□□E04S... | TungMeister head | I076 |
| VFX□□□□□□□□□□E06S... | TungMeister head | I076 |
| VFX□□□□□□□□□□H04S... | TungMeister head | I076 |
| VFX□□□□□□□□□□H04S... | TungMeister head | I076 |
| VGC□□□□□□□□□□C03S... | TungMeister head | I091 |
| VMT□□□□□□□□□□IS□□-... | TungMeister head | I096 |
| VMT□□□□□□□□□□UN□□-... | TungMeister head | I096 |
| VMT□□□□□□□□□□W□□-... | TungMeister head | I097 |
| VRB□□□□□□□□□□C02S... | TungMeister head | I081 |
| VRC□□□□□□□□□□C02S... | TungMeister head | I081 |
| VRD□□□□□□□□□□C06S... | TungMeister head | I081 |
| VSC□□□□□□□□□□□-... | TungMeister shank | I103 |
| VSSD□□□□□□□□□□C-A | TungMeister shank | I101 |
| VSSD□□□□□□□□□□S-A | TungMeister shank | I101 |
| VSSD□□□□□□□□□□C | TungMeister shank | I100, I101 |
| VSSD□□□□□□□□□□C-A | TungMeister shank | I101 |
| VSSD□□□□□□□□□□S | TungMeister shank | I100, I101 |
| VSSD□□□□□□□□□□S-A | TungMeister shank | I101 |
| VSSD□□□□□□□□□□W-A | TungMeister shank | I100 |
| VSSD□□□□□□□□□□W | TungMeister shank | I100 |
| VSTD□□□□□□□□□□S | TungMeister shank | I103 |
| VST□□□□□□□□□□A45-□S... | TungMeister head | I093 |
| VST□□□□□□□□□□3S06 | TungMeister head | I092 |
| VST□□□□□□□□□□4S08 | TungMeister head | I093 |
| VST□□□□□□□□□□6S10 | TungMeister head | I093 |
| VTB□□□□□□□□□□R04-06S... | TungMeister head | I094 |
| VTB135W2.00C15-06S05 | TungMeister head | I094 |
| VTR□□□□□□□□□□IS□□-□S... | TungMeister head | I097 |
| VTR220L24W14-4S08 | TungMeister head | I097 |
| VTSD□□□□□□□□□□C | TungMeister shank | I102 |
| VTSD□□□□□□□□□□S | TungMeister shank | I102 |
| VTSD□□□□□□□□□□W-A | TungMeister shank | I103 |
| W | | |
| WCMT□□□□□□□□-D4 | EVX insert | H225 |

Alphanumeric Index

| Designation | Product name | Page |
|-------------------|---|------------|
| WDCN42ZFR-DIA | TMD4400R/LI, EMD4400RI, TGD4400-A, EGD4400 insert | H107, H111 |
| WECN42ZFR-DIA | THE4000RIA insert | H172 |
| WNGU□□□□□□TN-MJ | TungUniversalSlot insert | H188 |
| WPAN42SFR | TGP4100RIA/BA insert | H112 |
| WPAN42SFRS | TGP4100RIA/BA insert | H112 |
| WPAN42ZFR | TGP4200R-A insert | H113 |
| WPMT□□□□□□ZPR-DML | MillFeed insert | H053 |
| WPMT□□□□□□ZPR-MH | MillFeed insert | H053 |
| WPMT□□□□□□ZPR-ML | MillFeed insert | H053 |
| WPMW□□□□□□ZPR | MillFeed insert | H053 |
| WPMT080615ZSR | MillFeed insert | H053 |
| WPMT090725ZSR | MillFeed insert | H053 |
| WWCW13T3AF□R-WS | TungMill insert | H069 |
| WWCW13T3AFFR-WD | TungMill insert | H069 |
| WXHU0403□□R-MJ | DoMini-Mill insert | H200 |
| WXMU0303ZER-MM | DoFeedTri insert | H043 |

X

| | | |
|----------------|---------------------|------|
| XCET310404ER | ECC insert | H214 |
| XVCT16□□□□R-AJ | Tung-AluMill insert | H161 |
| XXMU□□□□PR-MJ | EVX insert | H225 |

Y

| | | |
|------------------|-----------------------|------|
| YDEN0603□□PDFR-D | TungSpeed-Mill insert | H093 |
| YDEN0603PD□R-D | TungSpeed-Mill insert | H093 |
| YDEN0603PDCR-LD | TungSpeed-Mill insert | H093 |
| YDEN0603PDFR-BD | TungSpeed-Mill insert | H093 |
| YDEN0603PDFR-WD | TungSpeed-Mill insert | H093 |
| YDEN0905PDFR-BD | DPD09 / EDPD09 insert | H101 |
| YDEN0905PDFR-D | DPD09 / EDPD09 insert | H101 |
| YDEN0905PDFR-WD | DPD09 / EDPD09 insert | H101 |
| YPEB12X3-□□□□R-D | TungSpeed-Mill insert | H095 |

Z

| | | |
|------------------|-----------------------|------|
| ZDMT□□□□-MJ | EBD insert | H209 |
| ZFBM□□□□R□□-MJ | BallFinishNose insert | H195 |
| ZFCBM□□□□R□□□-MM | BallFinishNose insert | H195 |
| ZFRM□□□□R□□-MJ | BallFinishNose insert | H195 |
| ZNCA□□□□FN | TBN1000 insert | H205 |
| ZNCA1002FN2 | TBN1000 insert | H205 |
| ZNHU1003R□0-MM | AddForceBarrel insert | H198 |
| ZNMM□□□□EN | TBN1000 insert | H205 |
| ZPCW□□□□-QBN | EBB insert | H208 |
| ZPET□□□□-MJ | EBP insert | H207 |
| ZRBM□□□□-MM | BallRoughNose insert | H202 |

Worldwide Network



Tungaloy Corporation Head Office

11-1 Yoshima Kogyodanchi
Iwaki 970-1144 Japan
Phone: +81-246-36-8501
Fax: +81-246-36-8542
tungaloy.com/jp

Iwaki Plant

Products: Cutting Tools

Nagoya Plant

Products: Cutting Tools

Kyushu Plant

Products: CBN
PCD Tools
Deep Hole Drills

Nirasaki Plant

Products: Cutting Tools
Friction Materials (TungFric)
Wear Resistant Tools
Civil Engineering Tools



Tungaloy-NTK America Inc.

3726 N. Ventura Drive
Arlington Heights
IL 60004, U.S.A.
Phone: +1-888-554-8394
Fax: +1-888-554-8392
tungaloy.com/us

Tungaloy Canada

432 Elgin St. Unit 3, Brantford
Ontario N3S 7P7, Canada
Phone: +1-519-758-5779
Fax: +1-519-758-5791
tungaloy.com/ca

Tungaloy-NTK De Mexico S.A.

C/ Los Arellano 113
Parque Industrial Siglo XXI
Aguascalientes, AGS
Mexico 20290
Phone: +52-449-929-5410
Fax: +52-449-929-5411
tungaloy.com/mx

Tungaloy-NTK do Brasil Ltda.

Avd. Independencia N4158
Residencial Flora
13280-000 Vinhedo
São Paulo, Brazil
Phone: +55-19-38262757
Fax: +55-19-38262757
tungaloy.com/br

Tungaloy-NTK Germany GmbH.

Katzbergstr. 3a
D-40764 Langenfeld, Germany
Phone: +49-2173-90420-0
Fax: +49-2173-90420-19
tungaloy.com/de

Tungaloy France s.a.s

Les Fjords
19 avenue de Norvège
91140 Villebon Sur Yvette, France
Phone: +33-1-6486-4300
Fax: +33-1-6907-7817
tungaloy.com/fr

Tungaloy Italia S.r.l.

Via E. Andolfato 10
I-20126 Milano, Italy
Phone: +39-02-252012-1
Fax: +39-02-252012-65
tungaloy.com/it

Tungaloy Czech s.r.o

Turanka 115
CZ-627 00 Brno, Czech Republic
Phone: +420-532 123 391
Fax: +420-532 123 392
tungaloy.com/cz

Tungaloy Ibérica S.L.

C/Miquel Servet, 43B, Nau 7
Pol. Ind. Bufalvent
ES-08243 Manresa (BCN), Spain
Phone: +34 93 113 1360
tungaloy.com/es

Tungaloy Scandinavia AB

Bultgatan 38, 442 40
Kungälv, Sweden
Phone: +46-462119200
Fax: +46-462119207
tungaloy.com/se

Tungaloy Rus, LLC

Andropova avenue, h.18/7,
11 fl oor, office3, 115432,
Moscow, Russia
Phone: +7-499-683-01-80
Fax: +7-499-683-01-81
tungaloy.com/ru

Tungaloy Polska Sp. z o.o.

ul. Irysowa 1, 55-040 Bielany
Wroclawskie, Poland
Phone: +48 607 907 237
tungaloy.com/pl

Tungaloy-NTK UK Ltd.

Gallan Park, Watling Street,
Cannock, WS110XG, UK
Phone: +44 121 4000 231
Fax: +44 121 270 9694
tungaloy.com/uk

Tungaloy Hungary Kft

Erzsébet királyné útja 125
H-1142 Budapest, Hungary
Phone: +36 1 781-6846
Fax: +36 1 781-6866
tungaloy.com/hu

Tungaloy Turkey

Serifali Mah.bayraktar
Bulvari Kule Sk. No:26
34775 Umraniye / Istanbul / Turkey
Phone: +90 216 540 04 67
Fax: +90 216 540 04 87
tungaloy.com/tr

Tungaloy Benelux b.v.

Tjalk 70
NL-2411 NZ Bodegraven Netherlands
Phone: +31 172 630 420
Fax: +31 172 630 429
tungaloy.com/nl

Tungaloy Croatia

Ulica bana Josipa Jelačića 87,
10430 Samobor, Croatia
Phone: +385 1 3326 604
Fax: +385 1 3327 683
tungaloy.com/hr

Tungaloy Cutting Tool (Shanghai) Co. Ltd.

Rm No 401 No.88 Zhabei
Jiangchang No.3 Rd
Shanghai 200436, China
Phone: +86-21-3632-1880
Fax: +86-21-3621-1918
tungaloy.com/cn

Tungaloy-NTK Cutting Tool (Thailand) Co.,Ltd.

Interlink tower 4th Fl.
1858/5-7 Bangna-Trad Road
km.5 Bangna, Bangna, Bangkok
10260
Thailand
Phone: +66-2-751-5711
Fax: +66-2-751-5715
tungaloy.com/th

Tungaloy Cutting Tools Taiwan Co. Ltd.

9F. No.293, Zhongyang Rd,
Xinzhuang Dist, New Taipei City,
24251 Taiwan
Phone: +886-2-8521-9986
Fax: +886-2-8521-8935
tungaloy.com/tw

Tungaloy Singapore (Pte.), Ltd.

62 Ubi Road 1
#06-11 Oxley BizHub 2
Singapore 408734
Phone: +65-6391-1833
Fax: +65-6299-4557
tungaloy.com/sg

Tungaloy Vietnam

LE04.38, Lexington Residence
67 Mai Chi Tho, Dist. 2,
Ho Chi Minh City, Vietnam
Phone: +84-2837406660
tungaloy.com/vn

Tungaloy India Pvt. Ltd.

One International Center,
Unit # 902-A, 9th Floor,
Tower 1, Senapati Bapat Marg,
Elphinstone Road (West),
Mumbai -400013, India
Phone: +91-22-6124-8803
Fax: +91-22-6124-8899
tungaloy.com/in

Tungaloy Korea Co., Ltd

#1312, Byucksan Digital Valley 5-cha
Beotkot-ro 244, Geumcheon-gu
153-788 Seoul, Korea
Phone: +82-2-2621-6161
Fax: +82-2-6393-8952
tungaloy.com/kr

Tungaloy Malaysia Sdn Bhd

50 K-2, Kelana Mall, Jalan
SS6/14, Kelana Jaya, 47301
Petaling Jaya, Selangor Darul Ehsan
Malaysia
Phone: +603-7805-3222
Fax: +603-7804-8563
tungaloy.com/my

Tungaloy Australia Pty Ltd

Unit 68 1470 Ferntree Gully Road
Knoxfield 3180 Victoria, Australia
Phone: +61-3-9755-8147
Fax: +61-3-9755-6070
tungaloy.com/au

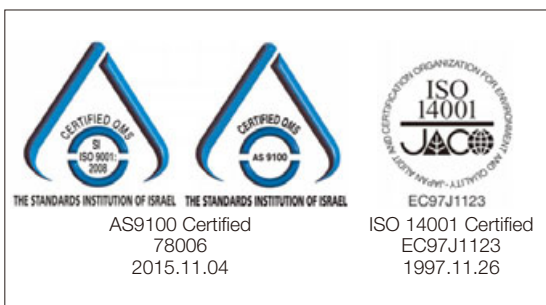
PT. Tungaloy Indonesia

Kompleks Grand Wisata Block AA-10
No.3-5 Cibitung
Bekasi 17510, Indonesia
Phone: +62-21-8261-5808
Fax: +62-21-8261-5809
tungaloy.com/id





11-1 Yoshima Kogyodanchi
Iwaki 970-1144 Japan
tungaloy.com



DISTRIBUTED BY: