



GENERAL CATALOG - VOL. 2

# MILLING

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

2025/2026









## *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

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



# About Tungaloy Cutting Tool Catalog

## ■ Note in using this catalog:

- ★ 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 inch (in) and millimeters (mm) where applicable.
- ★ For indexable tools, such as toolholders, cutters, drill bodies, applicable inserts or heads need to be ordered separately.

## ■ How to use this catalog:

The image shows a three-page spread of the Tungaloy catalog.   
**Page 1 (Left):** A navigation menu for 'VOL. 2 MILLING'. A red box labeled '1' highlights the 'Milling Cutter' and 'Endmill' categories. A red box labeled '3' highlights the 'Alphanumeric Index' section.   
**Page 2 (Middle):** A detailed product page for a '4-flute endmill, shank type, for 4-corner double sided inserts'. A red box labeled '2' highlights the top section containing technical drawings and a table of specifications.   
**Page 3 (Right):** An 'INSERT' section for 'ENMU2-MM'. It includes a table of specifications and a diagram of the insert. A red box labeled '1' highlights the 'INSERT' title, and a red box labeled '3' highlights the alphanumeric index at the bottom right.

- 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.

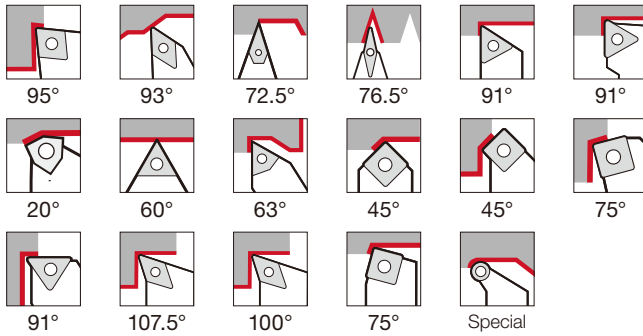
## ■ How to read the list for the standard items:

- ★ 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**400U0150A05  
 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.

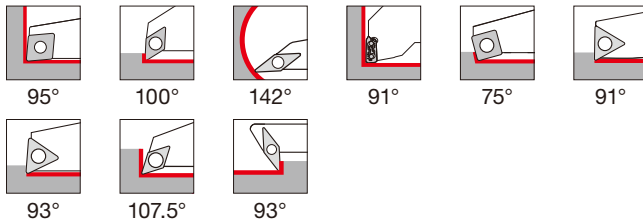
# About Tungaloy Cutting Tool Catalog

## Icons at the left side of each page

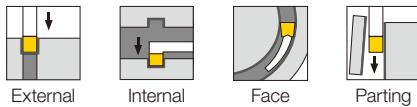
### External toolholder (cutting edge shape / angle)



### Internal toolholder (cutting edge shape / angle)



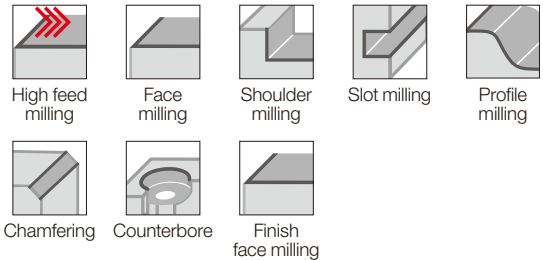
### Parting, Grooving



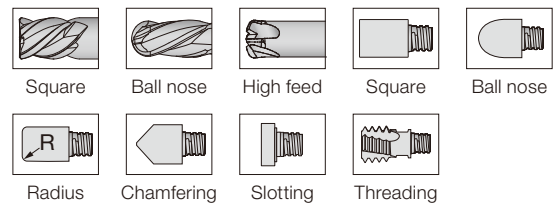
### Miniature machining



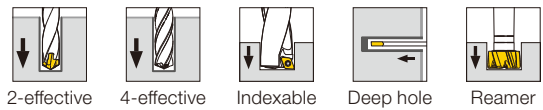
### Mill



### Endmill

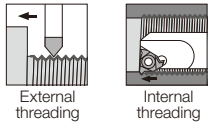


### Drill

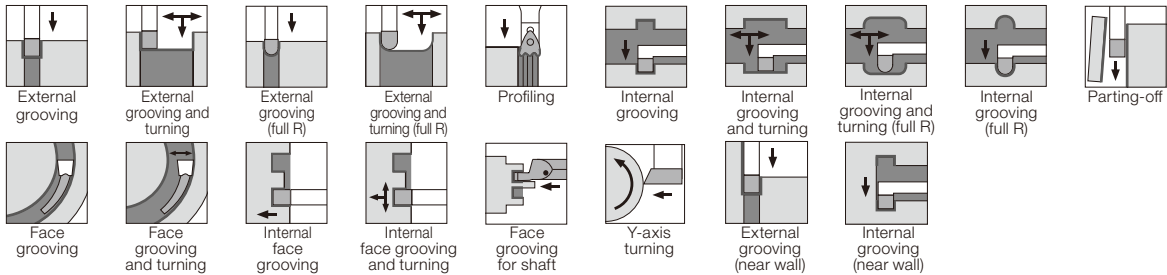


## Icons for applications of each product

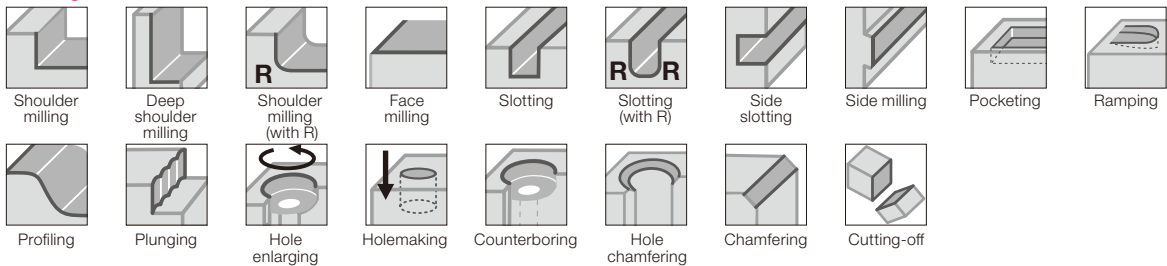
### Threading



### 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	$\alpha$	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	$\kappa$	Cutting edge angle
LB	L2, L3	Body length
LF	L	Standard length
LPR	L1	Parting length
LS	$\ell s$	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
DSCFMS	$\varnothing D$	Connecting part diameter
KAPR	$\kappa$	Cutting edge angle
LCF	$\ell$	Flute length
LF	Lf	Standard length (from the drill shoulder)
LPR	-	Parting length (from flange to tip)
LS	$\ell s$	Shank length
LU	$\ell$	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	$\alpha$	Neck taper angle (half of nose angle)
CBDP	$\ell$	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
DSCFMS	$\varnothing Db$	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	$\kappa$	Cutting edge angle
KWW	a	Drive key width
LF	Lf	Standard length
LH	Lf	Neck length
LS	$\ell s$	Shank length
NOF	z	Number of flutes
OAL	L, L6	Overall length
PDX	t	Thread position (X direction)
PNA	$\theta$	Cutting edge angle
PSIR	$\beta$	Lead angle
RMPX	$\theta$	Maximum ramping angle
THUB	T	Hub height (slot mill)
WT	Kg	Weight
ZEFP	Z eff	Number of effective cutting edges on the periphery

Note:

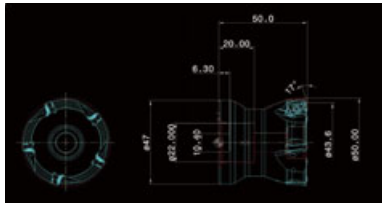
- Symbols unspecified in ISO13399 standard and Tungaloy's original symbols are not included.
- The symbols still under discussion are included. Please note any change or addition may occur.

## ■ 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.

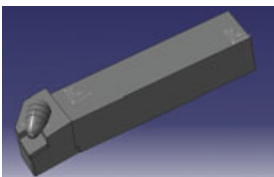


**Milling:** A rotating body model of an actual cutting edge curve and a body cross section.




### ● 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

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# 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 (③).

The screenshot shows the ADDFEED XN02 product page. On the left, there are navigation icons for application (①) and approach angle (②). The main content area features a dimension table (④) with columns for APMX, DCX, CICT, DC, LF, LH, LS, KAPR, WTR, Air hole, and Insert. Below the table, there are icons for applicable inserts (③). The page title is 'ADD FEED XN02 high feed endmill, shank type, for 4-corner double sided inserts'.

### Method ②

Select the tool series name on **H004 - H005** and check the details on the product page.

The Application Overview page lists several milling applications with their respective tool series and page references:

- Face Milling** (H070 page):
  - DOTMILL**: Three times the selection, more than a triple advantage (H025 page)
  - DOCPENT**: Face milling cutter with low cutting force and low cost per edge (H075 page)
  - TUNGE MILL**: Economical 8 edged inserts with tight cutting face milling cutter (H022 page)
- For aluminum milling**:
  - TUNGE MILL**: High speed face milling cutter for finishing aluminum (H105 page)
  - TUNGE-ALUMILL**: Shoulder mill that enables high speed machining of aluminum and non-ferrous materials (H102 page)
- High-Feed Milling** (H018 page):
  - ADDFEED**: Ultimate high feed milling cutter for maximum productivity (H022 page)
  - DOFEED**: High functional HFM cutter demonstrating ultimate versatility in a broad range of applications (H024 page)
  - DOCFRI**: High feed milling cutters with six cutting edge inserts, featuring retail cutter design for high productivity (H044 page)
  - MILLOFEED**: General-purpose high feed milling cutter providing optimal depth-of-cut in all groups (H022 page)
- Profile Milling** (H024 page):
  - FIXRMILL**: Unique anti-rotation insert locking for maximum process security (H005 page)
  - ADDFBÄRREL**: Highly efficient profile milling cutter for maximum productivity (H021 page)
  - TUNGE MASTER**: Exchangeable head and mill series with a full lineup of milling heads (H012 page)
  - BALLFINOSE**: Indentable end mill for high-precision finishing (H025 page)

### Method ③

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

The High-Feed Milling - Quick Guide table provides a comparison of tool series across various applications:

	TUNGE	ADDFEED	DOFEED	DOCFRI	DOTMILL
Cutting edge angle	10°	10°	10° / 10° / 10° / 10°	10°	10° / 10°
Depth of cut (mm)	0.175" (4.4 mm)	0.175" (4.4 mm)	0.105" (2.67 mm) / 0.095" (2.41 mm) / 1.2 mm	0.035" (0.89 mm)	0.075" (1.91 mm) / 0.075" (1.91 mm) / 2 mm
Tool diameter	Ø0.375" - Ø1.000" (9.52 mm - 25.4 mm)	Ø0.375" - Ø1.000" (9.52 mm - 25.4 mm)	Ø0.375" - Ø1.000" (9.52 mm - 25.4 mm)	Ø0.375" - Ø1.000" (9.52 mm - 25.4 mm)	Ø0.375" - Ø1.000" (9.52 mm - 25.4 mm)
Workpiece material	Al, Ti, Inconel, Steel	Al, Ti, Inconel, Steel	Al, Ti, Inconel, Steel	Al, Ti, Inconel, Steel	Al, Ti, Inconel, Steel
Face milling	★	★	★	★	★
Shoulder milling	★	★	★	★	★
Profile milling	★	★	★	★	★
Slot milling	★	★	★	★	★
Other applications	★	★	★	★	★
Reference	H040 - H043	H020 - H023	H024 - H037	H044 - H047	H048 - H052

Legend: ★ Most suitable, ☆ Suitable, ✖ Unusable

## 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 ADDFEED EXN02**  
High feed endmill, shank type, for 4-corner double sided inserts

Inch	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	KAPR	WT(1b)	Air hole	Insert
ENXN2R27U0037-01	0.020	0.375	1	0.212	0.375	3.000	0.750	2.250	17°	0.09	With	LNMU02...
ENXN2R27U0037-01L	0.020	0.375	1	0.212	0.375	3.500	1.250	2.250	17°	0.09	With	LNMAL02...
ENXN2R20U0050-02	0.020	0.500	2	0.335	0.500	3.000	0.750	2.250	17°	0.15	With	LNMU02...
ENXN2R20U0050-02L	0.020	0.500	2	0.335	0.500	4.250	2.000	2.250	17°	0.15	With	LNMAL02...
ENXN2R20U0062-04	0.020	0.625	3	0.460	0.625	4.500	2.000	2.500	17°	0	With	LNMU02...
ENXN2R20U0062-04L	0.020	0.625	3	0.460	0.625	4.000	1.500	2.500	17°	0	With	LNMAL02...
ENXN2R27U0075-04L	0.020	0.750	4	0.585	0.750	6.500	3.500	3.000	17°	0.64	With	LNMAL02...
ENXN2R27U0075-05	0.020	0.750	5	0.585	0.750	5.000	2.000	3.000	17°	0.51	With	LNMAL02...
ENXN2R100U100-04L	0.020	1.000	6	0.835	1.000	7.500	4.500	3.000	17°	1.28	With	LNMAL02...
ENXN2R100U100-07	0.020	1.000	7	0.835	1.000	5.500	2.500	3.000	17°	1.04	With	LNMAL02...

**5**

**6**

**4**

**8**

**7**

**8**

**10**

**9 STANDARD CUTTING CONDITIONS**

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipf)
P	Carbon steels 1045, 1055, etc.	- 300HB	First choice	AH3225	330 - 980	0.008 - 0.047
		- 300HB	For wear resistance	AH8015	330 - 980	0.008 - 0.047
	Alloy steels 4140, etc.	- 300HB	First choice	AH3225	330 - 980	0.008 - 0.047
M	Prehardened steels NAN60, F05, etc.	30 - 49HRC	First choice	AH8015	350 - 660	0.008 - 0.031
		30 - 49HRC	For impact resistance	AH3225	330 - 660	0.008 - 0.031
	Stainless steels 304SS, etc.	- 200HB	First choice	AH130	330 - 490	0.008 - 0.031
K	Gray cast irons class25, etc.	150 - 250HB	First choice	AH8015	330 - 980	0.008 - 0.047
		150 - 250HB	For impact resistance	AH3225	330 - 980	0.008 - 0.047
	Ductile cast irons 80-90-01, etc.	150 - 250HB	First choice	AH8015	260 - 660	0.008 - 0.047
S	Titanium alloy Ti-6Al-4V, etc.	- 49HRC	First choice	AH130	100 - 200	0.008 - 0.028
		- 49HRC	For wear resistance	AH8015	100 - 200	0.008 - 0.028
	Heat resistant alloy Inconel, Hastelloy, etc.	- 49HRC	First choice	AH8015	70 - 160	0.004 - 0.012
H	Hardened steel H13, etc.	40 - 50HRC	First choice	AH8015	260 - 490	0.004 - 0.020
		40 - 50HRC	For impact resistance	AH3225	260 - 490	0.004 - 0.020
	D2, etc.	50 - 62HRC	First choice	AH8015	160 - 230	0.004 - 0.012

**APPLICATION RANGE**

Inch	DCX	APMX	Max. ramping angle	Max. plunging depth	Max. cutting width in plunging	Min. machinable hole dia.	Max. machinable hole dia.	Max. cutting width in enlarged hole
ENXN2R27U0037...	0.375	0.020	2.1	0.006	0.079	0.509	0.855	0.289
ENXN2R20U0050...	0.500	0.020	1.78	0.006	0.079	0.760	0.886	0.413
ENXN2R20U0062...	0.625	0.020	1.23	0.006	0.079	1.011	1.137	0.539
ENXN2R27U0075...	0.750	0.020	0.95	0.006	0.079	1.262	1.388	0.664
ENXN2R100U100...	1.000	0.020	0.64	0.006	0.079	1.766	1.882	0.913

Please reference the Metric General catalog (H022 page)

**10**

Reference page: Standard cutting conditions → H022 - H023, TungFlex Shanks → H036 - H037

H020 tungaloy.com/us

- 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. **TPW13R200U0075A03** ... 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.

Tungaloy H003

# Application Overview

## Face Milling

H070 page



For general face milling

**DOT<sup>TRIPLE</sup>MILL**

Three times the selection, more than a triple advantage

H095 page

**DOPENT**

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

H076 page

**TUNG<sup>EIGHT</sup>MILL**

Economical 8 edged inserts with light cutting face milling cutter

H092 page



For aluminum milling

**TUNG<sup>SPEED</sup>MILL**

High speed face milling cutter for finishing aluminum

H105 page

**TUNG-ALUMILL**

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

H183 page

## High-Feed Milling

H018 page



**ADD<sup>D</sup>FEED**

Ultimate high feed milling cutter for maximum productivity

H020 page

**DOFEED**

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

H024 page

**DO<sup>TRIP</sup>TRI**

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

H044 page

**MILL<sup>QUAD</sup>FEED**

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

H060 page

## Profile Milling

H224 page



**FIX<sup>R</sup>MILL**

Unique anti-rotation insert locking for maximum process security

H086 page

**ADD<sup>FORCE</sup>BARREL**

Highly efficient profile milling cutter for maximum productivity

H231 page

**TUNGMEISTER**

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

I012 page

**BALL<sup>FINISH</sup>NOSE**

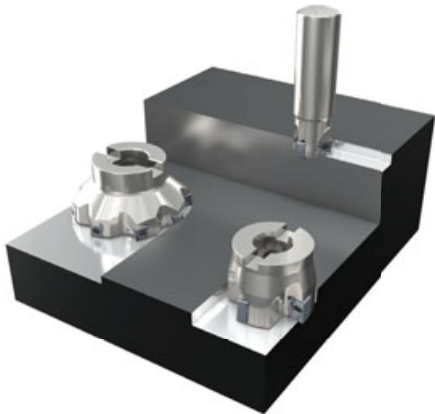
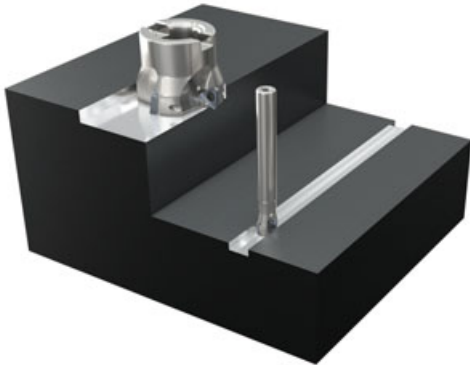
Indexable end mill for high-precision finishing

H225 page



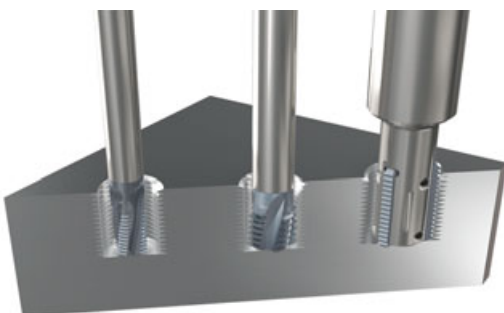
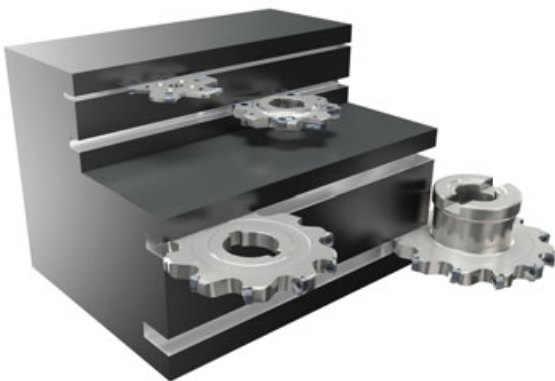
## Shoulder Milling

H134 page



## Other Applications

H210 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

H146 page

### TUNG<sup>ORCE</sup>FREC

Unique V shape inserts allow extremely aggressive cutting parameters

H136 page

## Shoulder milling cutters (with double-sided inserts)

### DO<sup>ORCE</sup>FTRI

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

H171 page

### DOREC

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

H175 page

### TECMILL

Exceptionally reliable tangential inserts for aggressive machining

H189 page

## Slot Milling

### TUNG<sup>M</sup>SLIT

Provides stable slot milling operation with excellent chip control

H211 page

### TUNG<sup>THIN</sup>SLIT

Enables deep slot milling with excellent tool economy

H215 page

### TUNG<sup>UNIVERSAL</sup>USLOT

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

H217 page

### TEC<sup>TANGENTIAL</sup>SLOT

Incorporates tangential inserts for excellent tool reliability

H220 page

## Thread Milling

### THREADMILLING

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

I074 page

### TUNGMEISTER

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

I012 page

## Thread milling cutter SOLIDTHREAD

Economical indexable thread milling cutter series

I057 page

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index



# High-Feed Milling - Quick Guide

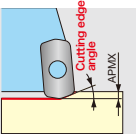











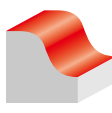







High Feed Milling  
Face Milling  
Shoulder Milling  
Slot Milling  
Profile Milling  
Chamfering, Counterbore  
Finish Face Milling

	TUNGF <sup>FEED</sup>	ADD <sup>D</sup> F <sup>EED</sup>	DO <sup>F</sup> EED	DO <sup>F</sup> TRI	DO <sup>T</sup> BALL
	Inch  Metric	Inch  Metric	Inch  Metric	Inch  Metric	Inch  Metric
Cutting edge angle	12°	17°	10° / 12° / 15° / 17°	12°	20° / 25°
Depth of cut (APMX)	0.019" (0.5 mm)	0.019" (0.5 mm)	0.035"/0.039"/0.059" (0.9 mm / 1 mm / 1.5 mm)	0.039" (1 mm)	0.051" / 0.079" (1.3 mm / 2 mm)
Tool diameter	ø0.375" - ø1.000" (ø8 mm - ø25 mm)	ø0.375" - ø1.000" (ø8 mm - ø25 mm)	ø0.625" - ø6.000" (ø16 mm - ø200 mm)	ø0.625" - ø2.000" (ø16 mm - ø50 mm)	ø1.000" - ø1.500" (ø20 mm - ø63 mm)
Workpiece material	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>
No. of corners (insert)	2	4	4	6	4
Face milling					
Shoulder milling					
Profile milling					
Slot milling					
Other applications					
Reference pages	H040 - H043	H020 - H023	H024 - H037	H044 - H047	H048 - H052

★ : Most suitable  
☆ : Suitable  
★ : Usable

## Icon
























	<b>MILLFEED TXP</b>	<b>MILLQ<sup>MAX</sup> FEED</b>	<b>DOFEEDQUAD</b>
	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	10° / 15° / 20°	7° / 10° / 12° / 14°	13°
Depth of cut (APMX)	0.060" / 0.118" (1.5 mm / 3 mm)	0.039" / 0.059" / 0.079" / 0.098" (1 mm / 1.5 mm / 2 mm / 2.5 mm)	0.079" (2 mm)
Tool diameter	ø0.750" - ø2.000" (ø20 mm - ø160 mm)	ø1.000" - ø6.000" (ø25 mm - ø160 mm)	ø2.000" - ø6.000" (ø50 mm - ø125 mm)
Workpiece material	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>
No. of corners (insert)	3	4	8
 Face milling			
 Shoulder milling			
 Profile milling			
 Slot milling			
Other applications			
Reference pages	<b>H053 - H059</b>	<b>H060 - H066</b>	<b>H067 - H069</b>

★ : Most suitable

☆ : Suitable

★ : Usable

## Icon



High Feed Milling

# Face Milling - Quick Guide



Face Milling



Shoulder Milling



Slot Milling



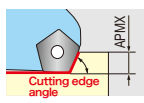



















Profile Milling



Chamfering, Counterbore



Finish Face Milling

	TUNG MILL	DOPENT	ROUND SPLIT	FIX R MILL	TUNG E MILL
					
	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	45°	70°			41°
Depth of cut (APMX)	0.197" / 0.098" / 0.079" (5 mm / 4 mm / 2 mm)	0.252" (6.4 mm)	0.236" / 0.315" (6 mm / 8 mm)	0.197" / 0.236" / 0.315" (5 mm / 6 mm / 8 mm)	0.118" (3 mm)
Tool diameter	ø2.000" - ø6.000" (ø25 mm - ø200 mm)	ø1.250" - ø10.000" (ø32 mm - ø315 mm)	ø1.250" - ø5.000" (ø32 mm - ø125 mm)	ø1.000" - ø2.500" (ø20 mm - ø80 mm)	ø2.000" - ø6.000" (ø50 mm - ø160 mm)
Workpiece material	<b>P M K N</b>	<b>P M K N S H</b>	<b>P M K N S</b>	<b>P M K S H</b>	<b>P M K S H</b>
No. of corners (insert)	4	10	4 / 8	6 / 8	8
Face milling					
Shoulder milling					
Profile milling					
Slot milling					
Other applications					
Reference pages	H071 - H075	H076 - H080	H081 - H085	H086 - H091	H092 - H094





















★ : Most suitable  
☆ : Suitable  
★ : Usable

### Icon


	DO TMILL		DOOCTO		TUNGSMILL TPYP		T/EPYD		TFE	
										
	Inch ✓	Metric ✓	Inch ✓	Metric ✓	Inch □	Metric ✓	Inch ✓	Metric ✓	Inch ✓	Metric ✓
Cutting edge angle	45°		45° / 15°		90°		90°		85.5°	
Depth of cut (APMX)	0.134" / 0.236" (6 mm / 3.4 mm)		0.059" / 0.138" / 0.187" / 0.295" (4.75 mm / 7.5 mm / 3.5 mm / 1.5 mm)		4 mm / 11 mm		0.177" / 0.295" (4.5 mm / 7.5 mm)		0.315" / 0.138" / 0.059" (8 mm / 3.5 mm / 1.5 mm)	
Tool diameter	ø2.000" - ø6.000" (ø50 mm - ø160 mm)		ø2.300" - ø8.000" (ø63 mm - ø315 mm)		ø50 mm - ø125 mm		ø2.000" - ø6.000" (ø50 mm - ø160 mm)		ø2.000" - ø4.000" (ø50 mm - ø25 mm)	
Workpiece material	<b>P M K S H</b>		<b>P M K S H</b>		<b>N</b>		<b>N</b>		<b>P M K N</b>	
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	H095 - H098		H099 - H104		H108 - H109		H105 - H107		H110 - H113	

★ : 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	





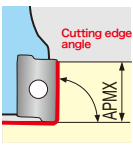









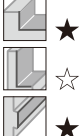









# Shoulder milling - Quick Guide

	TUNGFR <span style="color:red">EC</span>	TUNG-TRI		TUNGREC	
	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	<b>Roughing</b>  Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	 Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	<b>Roughing</b>  Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	90°	90°	90°	90°	90°
Depth of cut (APMX)	0.016" / 0.031" / 0.079" (4 mm / 6 mm / 11.5 mm)	0.236" / 0.394" / 0.590" (3.5 mm / 6 mm / 10 mm / 15 mm)	2.126" - 3.268" (54 mm - 97 mm (-139 mm))	0.276" / 0.657" / 0.417" (7 mm / 10.6 mm / 16.7 mm)	1.197" - 1.921" (30.4 mm - 48.8 mm)
Tool diameter	ø0.313" - ø2.000" (ø6 mm - ø63 mm)	ø0.500" - ø6.000" (ø8 mm - ø160 mm)	ø2.000" - ø4.000" (ø50 mm - ø100 mm)	ø0.500" - ø6.000" (ø12 mm - ø160 mm)	ø1.000" - ø2.000" (ø25 mm - ø50 mm)
Workpiece material	<b>P M K N S H</b>	<b>P M K N S H</b>	<b>P M K N S</b>	<b>P M K N S H</b>	<b>P M K N S H</b>
No. of corners (insert)	2	3	3	2	2
 Face milling					
 Shoulder milling					
 Profile milling					
 Slot milling					
Other applications					
Reference pages	<b>H136 - H144</b>	<b>H146 - H156</b>		<b>H157 - H168</b>	

★ : 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	
								
	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>		Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>		Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>		Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	
Cutting edge angle	90°		90°		90°		90°	
Depth of cut (APMX)	0.157" (4 mm)		0.799" - 0.953" (20.3 mm - 24.2 mm)		0.256" / 0.433" (6.5 mm / 11 mm)		0.345" / 0.630" (9 mm / 16 mm)	
Tool diameter	ø0.500" - ø1.000" (ø12 mm - ø40 mm)		ø0.750" - ø1.000" (ø20 mm - ø25 mm)		ø0.750" - ø1.500" (ø18 mm - ø160 mm)		ø1.000" - ø6.000" (ø25 mm - ø160 mm)	
Workpiece material	P M K N S H		P M K N S H		P M K S		P M K S H	
No. of corners (insert)	4		4		6		4	
Face milling								
Shoulder milling								
Profile milling								
Slot milling								
Other applications								
Reference pages	H169 - H170		H171 - H174		H175 - H179		H180	

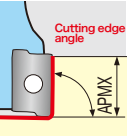












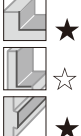
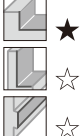

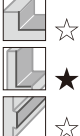





★ : Most suitable  
☆ : Suitable  
☆ : Usable

## 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

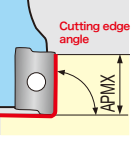





	<b>DOQ<sup>®</sup>MILL</b>	<b>TECMILL</b>		<b>TUNG<sup>®</sup>TSHRED</b>	
					
	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	88°	90° / 60°	90°	90°	90°
Depth of cut (APMX)	0.375" (9.5 mm)	0.381" / 0.594" (9.7 mm / 15.1 mm / 12.4 mm)	2.303" / 2.634" (58.5 mm / 66.9 mm)	0.630" (16 mm)	2.402" / 2.992" (61 mm / 76 mm)
Tool diameter	ø2.000" - ø4.000" (ø50 mm - ø100 mm)	ø2.000" - ø5.000" (ø32 mm - ø250 mm)	ø2.000" - ø2.500" (ø50 mm - ø63 mm)	ø2.000" - ø4.000" (ø50 mm - ø100 mm)	ø2.500" - ø3.000" (ø63 mm - ø80 mm)
Workpiece material	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>	<b>P M K S H</b>
No. of corners (insert)	8	4	4	3	3
 Face milling					
 Shoulder milling					
 Profile milling					
 Slot milling					
Other applications					
Reference pages	<b>H181 - H182</b>	<b>H189 - H196</b>		<b>H197 - H200</b>	

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

## Icon





















						
						
						



<b>TUNG-ALUMILL</b>	
	
	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	90°
Depth of cut (APMX)	0.630" / 0.571" (13 mm / 16 mm)
Tool diameter	ø1.000" - ø5.000" (ø25 mm - ø125 mm)
Workpiece material	<b>N</b>
No. of corners (insert)	2
 Face milling	
 Shoulder milling	
 Profile milling	
 Slot milling	
Other applications	
Reference pages	<b>H183 - H188</b>

★ : 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

	TUNGMSLIT	TUNG <sup>MIN</sup> SLIT	TUNG <sup>UNIVERSAL</sup> SLOT	TECT <sup>ESSENTIAL</sup> SLOT
	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>
Depth of cut (APMX)	1.6 mm - 4.1 mm	0.250" - 0.313" (4 mm - 8 mm)	0.375" - 0.625" (9 mm - 16 mm)	16 mm - 25 mm
Tool diameter	ø63 mm - ø12 mm	ø3.000" - ø8.000" (ø80 mm - ø200 mm)	ø3.000" - ø6.000" (ø80 mm - ø160 mm)	ø100 mm - ø250 mm
Workpiece material	<b>P M K</b>	<b>P M K S</b>	<b>P M K S</b>	<b>P M K S</b>
No. of corners (insert)	1	6	6	4
 Face milling				
 Shoulder milling				
 Profile milling				
 Slot milling				
Other applications				
Reference pages	H211 - H214	H215 - H216	H217 - H219	H220 - H222

★ : Most suitable  
☆ : Suitable  
★ : Usable

## Icon


# Profile milling - Quick Guide

	<b>BALL FNÖSE</b>	<b>ADD FBÄRREL</b>	<b>DOM<sup>INI</sup> MILL</b>	<b>BALL RNÖSE</b>	<b>DO T<sup>WIST</sup> BALL</b>
	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Depth of cut (APMX)	0.492" (12.5 mm)	-	1	0.470" / 0.510" / 0.690" (11.8 mm / 13.6 mm / 17.7 mm)	0.157" / 0.236" (4 mm / 5 mm / 6 mm)
Tool diameter	ø0.375" - ø1.250" (ø8 mm - ø32 mm)	ø16 mm - ø40 mm	ø16 mm - ø25 mm	ø0.625" - ø1.000" (ø16 mm - ø25 mm)	ø1.000" - ø1.500" (ø20 mm - ø38 mm)
Workpiece material	<b>P M K S H</b>	<b>P M K S H</b>	<b>P H</b>	<b>P M K S H</b>	<b>P M K S H</b>
No. of corners (insert)	1	4	6	2	4
 Face milling					
 Shoulder milling					
 Profile milling					
 Slot milling					
Other applications					
Reference pages	<b>H225 - H230</b>	<b>H231 - H232</b>	<b>H233</b>	<b>H234 - H235</b>	<b>H048 - H052</b>

★ : Most suitable  
☆ : Suitable  
★ : Usable

## Icon




# Chamfering and Counterboring - Quick Guide

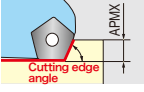
















- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

	Chamfering cutter <b>TUNGQUAD</b>	Chamfering cutter <b>ECP</b>	Chamfering cutter <b>ECC</b>	Counterboring endmill <b>TCB</b>	<b>DOM<sup>MULTI</sup>REC</b>
	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input checked="" type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	45°	45°	30°, 45°, 60°	90°	90°
Depth of cut (APMX)	3 mm	0.236" (6 mm)	0.571" / 0.807" / 1.004" (14.5 mm / 20.5 mm / 25.5 mm)	4 mm / 5 mm / 6 mm / 8 mm / 10 mm	0.197" / 0.276" / 0.354" / 0.433" / 0.571" / 0.709" (5 mm / 7 mm / 9 mm / 11 mm / 14.5 mm / 18 mm)
Tool diameter	ø12 mm - ø22 mm	ø0.394" - ø1.417" (ø27.5 mm - ø36 mm)	ø1.338" - ø2.204" (ø34 mm - ø55 mm)	ø10 mm - ø59 mm	ø0.500" - ø1.500" (ø16 mm - ø26 mm)
Workpiece material	<b>P M K N S</b>	<b>P K</b>	<b>P M K</b>	<b>P M K N S H</b>	<b>P M K S H</b>
No. of corners (insert)	4	4	2	4	4
Other applications					
Reference pages	<b>H244 - H247</b>	<b>H247</b>	<b>H248 - H249</b>	<b>H250 - H254</b>	<b>H255 - H258</b>

★ : Most suitable  
☆ : Suitable  
★ : Usable


## Icon


# Face Milling - Quick Guide

	NMS	MS	SFP
			
	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>
Cutting edge angle	-	-	-
Depth of cut (APMX)	0.2 mm	0.1 mm	0.1 mm
Tool diameter	ø80 mm - ø200 mm	ø100 mm - ø300 mm	ø100 mm - ø200 mm
Workpiece material	<b>P M K</b>	<b>P H</b>	<b>P M K N</b>
No. of corners (insert)	4		
 Face milling	 ★  ☆  ☆  ☆	 ★  ☆  ☆  ☆	 ★  ☆  ☆  ☆
Reference pages	H264 - H265	H266 - H267	H267 - H268





















★ : Most suitable  
☆ : Suitable  
☆ : Usable

# Thread milling - Quick Guide

	SOLIDTHREAD	TUNGMEISTER	THREADMILLING E TTL	THREADMILLING Thread milling cutter
				
	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>	Inch <input type="checkbox"/> Metric <input checked="" type="checkbox"/>
Pitch	0.25 mm - 3.5 mm	0.5 mm - 4.5 mm	1.5 mm - 3 mm	1.5 mm - 6 mm
Tool diameter	ø0.7 mm - ø20 mm	ø10 mm - ø21.7 mm	ø17 mm - ø30 mm	ø23 mm - ø80 mm
Workpiece material	<b>P M K S</b>	<b>P M K S</b>	<b>P M K S</b>	<b>P M K</b>
No. of corners (insert)	-	-	2	2
Thread milling	 ★  ★	 ★  ★	 ★  ★	 ★  ★
Reference pages	I057 - I073	I012 - I055	I074 - I077	I078 - I079

★ : Most suitable  
☆ : Suitable  
☆ : Usable

## Icon



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

# ADD<sup>D</sup>FEED / DOFEED



## Ultimate high feed milling cutter series for maximum productivity

### ADD<sup>D</sup>FEED

Insert size 02



Max. depth of cut: 0.020" (0.5 mm)  
Tool diameter: ø0.375" - ø1.000", ø8 - ø25 mm

- ✓ Tool diameters as small as **8 mm (0.315")**
- ✓ **Highly reliable design**
- ✓ Perfect option for **replacing solid end mills**

### DOFEED

Insert size 03



Max. depth of cut: 0.035" (0.9 mm) (UER),  
0.039" (1 mm) (ZER)  
Tool diameter: ø0.625" - ø2.000", ø16 - ø50 mm

- ✓ **Close pitch cutter design** for high productivity
- ✓ **Extensive lineup** for various applications
- ✓ **New UER inserts with lower approach angle** for longer tool life and reduced chatter

### DOFEED

Insert size 06



Max. depth of cut: 0.059" (1.5 mm)  
Tool diameter: ø1.250" - ø6.000", ø32 - ø200 mm

- ✓ **Close pitch cutter design** for high productivity
- ✓ Tool diameters available for up to 200 mm (7.874"), ideal for **rough milling of medium- and large-sized components**
- ✓ **Wiper inserts** for improved surface roughness

### Inch

Tool diameters and number of teeth for each insert size

Insert size	Max. depth of cut (in)	Workpiece material	Tool diameter (in), Number of teeth															
			ø0.375"	ø0.500"	ø0.625"	ø0.688"	ø0.750"	ø0.875"	ø1.000"	ø1.125"	ø1.250"	ø1.500"	ø2.000"	ø2.500"	ø3.000"	ø4.000"	ø5.000"	ø6.000"
02	0.020"	P M K S H	1	2	3, 4		4, 5		6, 7									
03	0.035" (UER) 0.039" (ZER)	P M K S H			2	2	2, 3	2, 3	4, 5	4, 5	5, 6	5, 6	5, 8, 10					
06	0.059"	P M K S H									2	3	4, 5	4, 6	5, 7	6, 10	8, 12	10, 14

## Metric

### 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	3	5	4	7	6																		
03	0.9 (UER) 1 (ZER)	P M K S H				2	2	4	3	4	3	5	4	5	4	5	6	6	5	8									
06	1.5	P M K S H												2	2	3	4	5	4	5	6	4	6	5	8	6	8	10	12

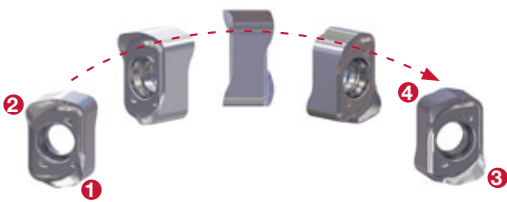
## Cutter body design for maximum productivity

Extremely stiff body design with a large core

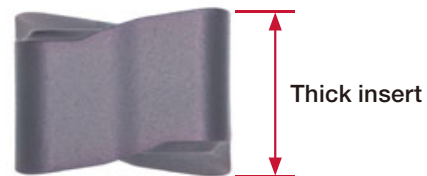


## Reliable and economical inserts

Economical double-sided inserts with four cutting edges

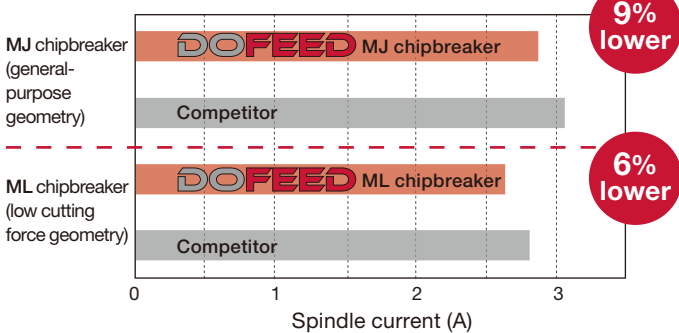


Thick insert design for increased reliability



## Soft cutting geometry with superior chip control

### Comparison of spindle load



Provides stable, high productivity due to the excellent chip evacuation

Forms compact chips



**P** Cutter : EXN03R100U0100-05 (ø1.000", z = 5)  
 Insert : LNMU0303ZER-MJ / ML AH725  
 Workpiece material : Carbon steels (1055)  
 Cutting speed : Vc = 820 sfm  
 Feed per tooth : fz = 0.020 ipt (1 insert)  
 Depth of cut : ap = 0.020"  
 Width of cut : ae = 1.000" (Slot milling)  
 Coolant : Dry  
 Machine : Vertical M/C, CAT40

Note: Test cut using a single insert

	DOFEED	Competitor
Chip shapes		
Shoulder surfaces after grooving operations		

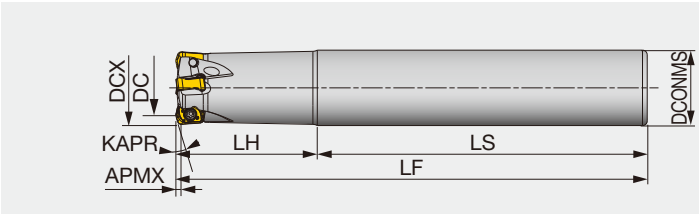
Reference pages: **H020 - H037**





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

GAMP = +6°, GAMF = +5° ~ +11°



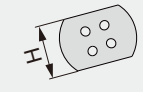
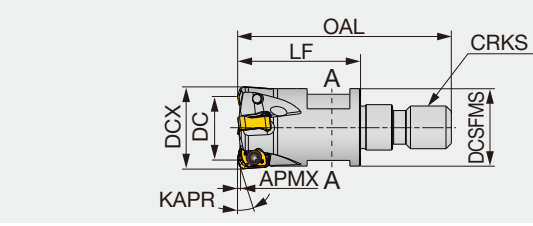
Inch	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	KAPR	WT(lb)	Air hole	Insert
EXN02R037U0037-01	0.020	0.375	1	0.212	0.375	3.000	0.750	2.250	17°	0.09	With	LNMU02...
EXN02R037U0037-01L	0.020	0.375	1	0.212	0.375	3.500	1.250	2.250	17°	0.09	With	LNMU02...
EXN02R050U0050-02	0.020	0.500	2	0.335	0.500	3.000	0.750	2.250	17°	0.15	With	LNMU02...
EXN02R050U0050-02L	0.020	0.500	2	0.335	0.500	4.250	2.000	2.250	17°	0.20	With	LNMU02...
EXN02R062U0062-03L	0.020	0.625	3	0.460	0.625	4.500	2.000	2.500	17°	0.33	With	LNMU02...
EXN02R062U0062-04	0.020	0.625	4	0.460	0.625	4.000	1.500	2.500	17°	0.31	With	LNMU02...
EXN02R075U0075-04L	0.020	0.750	4	0.585	0.750	6.500	3.500	3.000	17°	0.64	With	LNMU02...
EXN02R075U0075-05	0.020	0.750	5	0.585	0.750	5.000	2.000	3.000	17°	0.51	With	LNMU02...
EXN02R100U0100-06L	0.020	1.000	6	0.835	1.000	7.000	4.000	3.000	17°	1.28	With	LNMU02...
EXN02R100U0100-07	0.020	1.000	7	0.835	1.000	5.500	2.500	3.000	17°	1.04	With	LNMU02...

Metric	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



Metric	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...

**SPARE PARTS**

Designation	Clamping screw	Wrench
EXN02R**U...	CSPB-1.8FL4.3	IP-6DB
EXN02R008..., HXN02R008...	CSPB-1.8FL3.6	IP-6DB
EXN02R010... - EXN02R025... HXN02R010... - HXN02R025...	CSPB-1.8FL4.3	IP-6DB

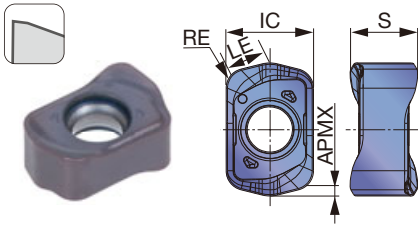
Tool diameter tolerance	
Tool diameter	0 / -0.016"

Recommended clamping torque: 0.37 lbs-ft, 0.5 N-m

Reference pages: Standard cutting conditions → **H022 - H023**, TungFlex Shanks → **H038 - H039**

# INSERT

**LNMU02-MM** (for general purpose)



<b>P</b>	Steel		★	☆					
<b>M</b>	Stainless	★	☆						
<b>K</b>	Cast iron		☆	★					
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloy	★		★					
<b>H</b>	Hard materials		☆	★					

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated								LE	IC	S	
			AH130	AH3225	AH8015									
LNMU0202ZER-MM	0.035	0.020	●	●	●							0.070	0.157	0.122

● : Line up

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

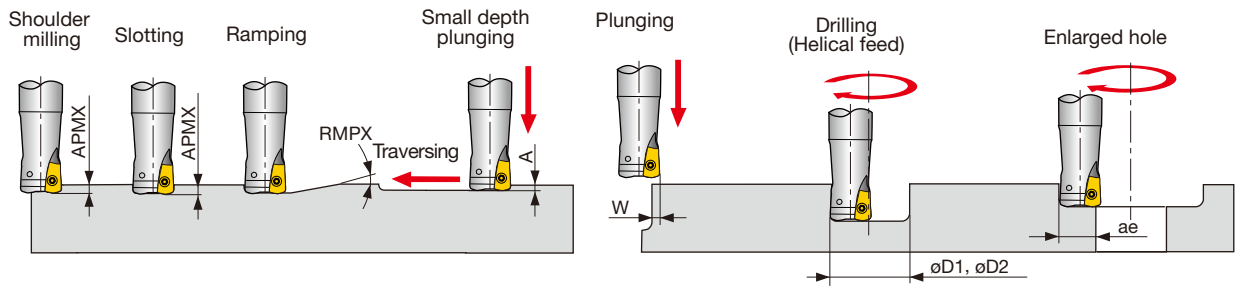
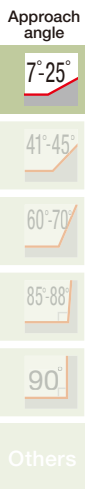




# STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	
<b>P</b>	Carbon steels 1045, 1055, etc.	- 300HB	First choice	AH3225	330 - 980	0.008 - 0.047	
		- 300HB	For wear resistance	AH8015	330 - 980	0.008 - 0.047	
	Alloy steels 4140, etc.	- 300HB	First choice	AH3225	330 - 980	0.008 - 0.047	
		- 300HB	For wear resistance	AH8015	330 - 980	0.008 - 0.047	
	Prehardened steels NAK80, PX5, etc.	30 - 40HRC	First choice	AH8015	330 - 660	0.008 - 0.031	
30 - 40HRC		For impact resistance	AH3225	330 - 660	0.008 - 0.031		
<b>M</b>	Stainless steels 304SS, etc.	- 200HB	First choice	AH130	330 - 490	0.008 - 0.031	
<b>K</b>	Gray cast irons class25, etc.	150 - 250HB	First choice	AH8015	330 - 980	0.008 - 0.047	
		150 - 250HB	For impact resistance	AH3225	330 - 980	0.008 - 0.047	
	Ductile cast irons 80-50-06, etc.	150 - 250HB	First choice	AH8015	260 - 660	0.008 - 0.047	
		150 - 250HB	For impact resistance	AH3225	260 - 660	0.008 - 0.047	
<b>S</b>	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH130	100 - 200	0.008 - 0.028	
		- 40HRC	For wear resistance	AH8015	100 - 200	0.008 - 0.028	
	Heat resistant alloy Inconel, Hastelloy, etc.	- 40HRC	First choice	AH8015	70 - 160	0.004 - 0.012	
		- 40HRC	For impact resistance	AH3225	70 - 160	0.004 - 0.012	
		- 40HRC	For impact resistance	AH3225	70 - 160	0.004 - 0.012	
<b>H</b>	Hardened steel	H13, etc.	40 - 50HRC	First choice	AH8015	260 - 490	0.004 - 0.020
		H13, etc.	40 - 50HRC	For impact resistance	AH3225	260 - 490	0.004 - 0.020
	D2, etc.	50 - 60HRC	First choice	AH8015	160 - 230	0.004 - 0.012	

# APPLICATION RANGE



Inch	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
EXN02R037U...	0.375	0.020	3.1	0.006	0.079	0.509	0.635	0.289
EXN02R050U...	0.500	0.020	1.78	0.006	0.079	0.760	0.886	0.413
EXN02R062U...	0.625	0.020	1.23	0.006	0.079	1.011	1.137	0.539
EXN02R075U...	0.750	0.020	0.95	0.006	0.079	1.262	1.388	0.664
EXN02R100U...	1.000	0.020	0.64	0.006	0.079	1.756	1.882	0.913

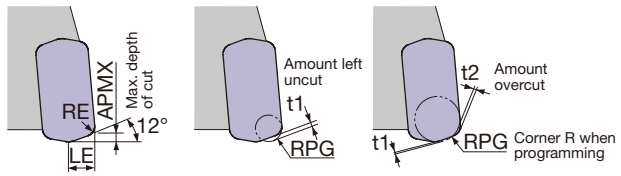
Please reference the Metric General catalog (H022 page)

**Tool dia.: DCX (in), Number of revolutions: n (rpm), Feed speed: Vf (ipm), Max. depth of cut: ap = 0.002", Number of teeth: CICT**

ø0.375", CICT = 1		ø0.500", CICT = 2		ø0.625"		ø0.750"		ø1.000"				
n	Vf	n	Vf	n	Vf		n	Vf		n	Vf	
					CICT = 3	CICT = 4		CICT = 4	CICT = 5		CICT = 6	CICT = 7
6,720	190	5,040	290	4,030	340	460	3,360	380	480	2,520	430	500
Vc = 660 sfm, fz = 0.028 ipt												
6,720	190	5,040	290	4,030	340	460	3,360	380	480	2,520	430	500
Vc = 660 sfm, fz = 0.028 ipt												
4,990	100	3,740	150	3,000	180	240	2,500	200	250	1,870	230	270
Vc = 490 sfm, fz = 0.020 ipt												
4,180	90	3,130	130	2,510	160	210	2,090	170	210	1,570	190	220
Vc = 410 sfm, fz = 0.020 ipt												
6,720	190	5,040	290	4,030	340	460	3,360	380	480	2,520	430	500
Vc = 660 sfm, fz = 0.028 ipt												
4,990	140	3,740	210	3,000	260	340	2,500	280	350	1,870	320	370
Vc = 490 sfm, fz = 0.028 ipt												
1,530	40	1,150	50	920	60	80	760	70	80	570	70	80
Vc = 150 sfm, fz = 0.020 ipt												
1,220	10	920	20	730	20	30	610	20	30	460	30	30
Vc = 120 sfm, fz = 0.008 ipt												
3,870	50	2,900	70	2,320	90	120	1,940	100	120	1,450	110	130
Vc = 380 sfm, fz = 0.012 ipt												
2,040	20	1,530	30	1,220	30	40	1,020	40	50	760	40	50
Vc = 200 sfm, fz = 0.008 ipt												

## 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 = 0.030". If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.020	0.035	0.079	0.030	0.014	0
0.020	0.035	0.079	0.050	0.008	0.001
0.020	0.035	0.079	0.075	0.001	0.010

\*Recommended





Metric	APMX	APMX2	APMX3	DCX	CICT	DC	DC2	DC3	DCONMS	LF	LH	LS	KAPR*	KAPR2*	KAPR3*	WT(kg)	Air hole	Insert	Fig.
EXN03R030M32.0-04L <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(1)</sup>	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 <sup>(1)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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

\*APMX, DC, KAPR: with LNMU0303ZER

\*APMX2, KAPR2 : with LNMU0303UER

\*APMX3, KAPR3 : with Lngu0303ZER

Clamping screws used for (1) and (2) above are different. See below for the part codes.

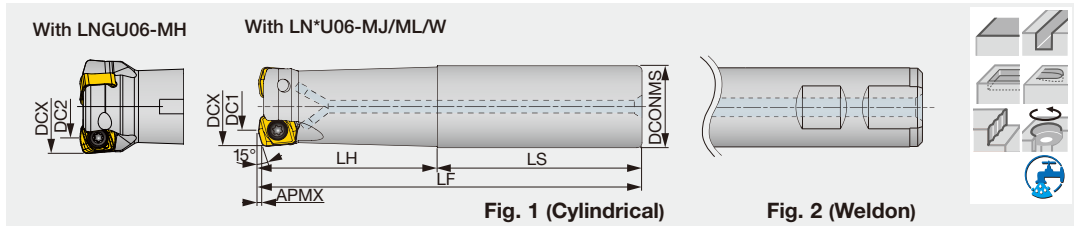
### SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Tool diameter tolerance	
EXN03...	(1) CSPB-2.5 (2) CSPB-2.5L080	M-1000	IP-8D	Tool diameter	0 / -0.018"

Recommended clamping torque: 0.96 lbs-ft, 1.3 N-m

## DOFEED EXN06

High feed mill shank type cutter, with screw clamp system



Inch	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	WT(lb)	Air hole	Insert	Fig.
EXN06R125U0125W02	0.059	1.250	2	0.766	0.745	1.250	5.281	3.000	2.281	1.540	With	LN*U06...	2
EXN06R125U0125-02L	0.059	1.250	2	0.766	0.745	1.250	8.000	5.000	3.000	2.360	With	LN*U06...	1
EXN06R150U0125W03	0.059	1.500	3	1.014	0.989	1.250	5.781	3.500	2.281	1.830	With	LN*U06...	2
EXN06R150U0125-03L	0.059	1.500	3	1.014	0.989	1.250	10.000	2.000	8.000	3.310	With	LN*U06...	1

Metric	APMX	DCX	CICT	DC1	DC2	DCONMS	LF	LH	LS	WT (kg)	Air hole	Insert	Fig.
EXN06R032M32.0-02	1.5	32	2	19.7	19.1	32	150	70	80	0.8	With	LN*U06...	1
EXN06R032M32.0-02L	1.5	32	2	19.7	19.1	32	200	120	80	1.1	With	LN*U06...	1
EXN06R035M32.0-02	1.5	35	2	22.7	22	32	150	45	105	0.9	With	LN*U06...	1
EXN06R035M32.0-02L	1.5	35	2	22.7	22	32	200	45	155	1.2	With	LN*U06...	1
EXN06R040M32.0-03	1.5	40	3	27.7	27	32	150	45	105	0.9	With	LN*U06...	1
EXN06R040M32.0-03L	1.5	40	3	27.7	27	32	220	45	175	1.3	With	LN*U06...	1

### SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Tool diameter tolerance	
EXN06...	CSPB-5	M-1000	IP-20D	Tool diameter	0 / -0.022"

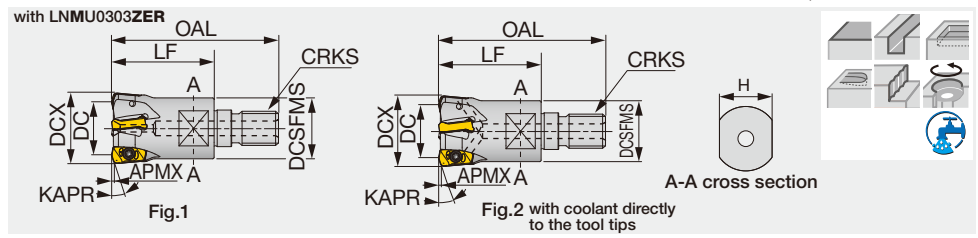
Recommended clamping torque: 3.69 lbs-ft, 5 N-m

Reference pages: Inserts → **H030 - H031**, Standard cutting conditions → **H032 - H037**

High feed endmill, modular type (TungFlex)

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



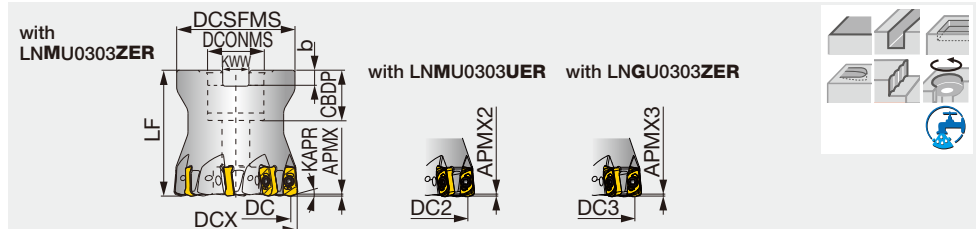
Metric	APMX	APMX2	APMX3	DCX	CICT	DC	DC2	DC3	OAL	LF	H	DCSFMS	KAPR+	KAPR2+	KAPR3+	CRKS	WT(kg)	Air hole	Insert	Fig.
HXN03R016MM08-02 <sup>(1)</sup>	1	0.9	1	16	2	9.6	8.8	9.8	42	25	10	12.8	15°	10°	15°	M8	0.03	With LN*U03...	1	
HXN03R016MM08-02-C <sup>(1)</sup>	1	0.9	1	16	2	9.6	8.8	9.8	42	25	10	12.8	15°	10°	15°	M8	0.03	With LN*U03...	2	
HXN03R018MM08-02 <sup>(1)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(1)</sup>	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 <sup>(1)</sup>	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 <sup>(2)</sup>	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 <sup>(1)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(1)</sup>	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 <sup>(1)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(2)</sup>	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 <sup>(1)</sup>	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 <sup>(1)</sup>	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 <sup>(2)</sup>	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	

\*APMX, KAPR: with LNMU0303ZER  
 \*APMX2, KAPR2 : with LNMU0303UER  
 \*APMX3, KAPR3 : with LNGU0303ZER  
 Clamping screws used for (1) and (2) above are different. See below for the part codes.

**SPARE PARTS**

Designation	Clamping screw	Lubricant	Wrench	Tool diameter tolerance	
HXN03...	(1) CSPB-2.5 (2) CSPB-2.5L080	M-1000	IP-8D	Tool diameter	0 / -0.018"

Recommended clamping torque: 1.3 N·m



Inch	APMX	APMX2	APMX3	DCX	CICT	DC	DC2	DC3	DCSFMS	DCONMS	CBDP	LF	b	KWW	KAPR	KAPR2*	KAPR3*	WT(lb)	Air hole	Insert
TXN03R150U0050A05	0.039	0.035	0.039	1.500	5	1.323	1.291	1.327	1.460	0.500	0.750	1.575	0.160	0.252	17°	12°	17°	0.530	With	LN*U03...
TXN03R150U0050A06	0.039	0.035	0.039	1.500	6	1.323	1.291	1.327	1.380	0.500	0.600	1.575	0.160	0.252	17°	12°	17°	0.510	With	LN*U03...
TXN03R200U0075A05	0.039	0.035	0.039	2.000	5	1.717	1.685	1.720	1.693	0.750	0.750	1.969	0.197	0.315	17°	12°	17°	1.100	With	LN*U03...
TXN03R200U0075A08	0.039	0.035	0.039	2.000	8	1.717	1.685	1.720	1.693	0.750	0.750	1.969	0.197	0.315	17°	12°	17°	1.100	With	LN*U03...
TXN03R200U0075A10	0.039	0.035	0.039	2.000	10	1.717	1.685	1.720	1.693	0.750	0.750	1.969	0.197	0.315	17°	12°	17°	1.100	With	LN*U03...

Metric	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...

\*APMX2, KAPR2 : with LNMU0303UER  
 \*APMX3, KAPR3 : with LNGU0303ZER  
 Clamping screws used for (1) and (2) above are different. See below for the part codes.

**SPARE PARTS**



Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
TXN03R150U0050A05	CSPB-2.5L080	M-1000	(SR UNF 1/4X3/4 B18.3)	IP-8D
TXN03R150U0050A06	CSPB-2.5	M-1000	(SR UNF 1/4X3/4 B18.3)	IP-8D
TXN03R200U...	CSPB-2.5L080	M-1000	(C0.375X1.125H)	IP-8D
TXN03R040M	CSPB-2.5L080	M-1000	CM8X30H	IP-8D
TXN03R050M	CSPB-2.5L080	M-1000	CM10X30H	IP-8D

Tool diameter tolerance	
Tool diameter	0 / -0.018"

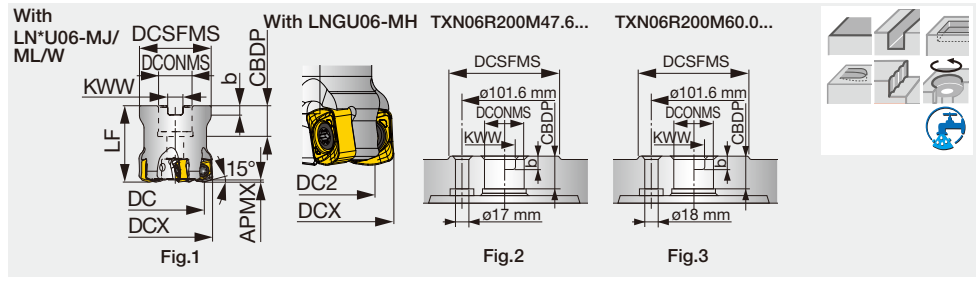
Recommended clamping torque: 0.96 lbs-ft, 1.3 N-m





High feed mill bore type cutter, with screw clamp system

GAMP = +10°, GAMF = +2° ~ +6°



Inch	APMX	DCX	CICT	DC1	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT (lb)	Air hole	Insert	Fig.
TXN06R200U0075A04	0.059	2.000	4	1.513	1.485	1.850	1.969	0.750	0.750	0.315	0.197	0.970	With	LN*U06...	1
TXN06R200U0075A05	0.059	2.000	5	1.513	1.485	1.850	1.969	0.750	0.750	0.315	0.197	0.990	With	LN*U06...	1
TXN06R250U0075A04	0.059	2.500	4	2.012	1.983	2.323	1.969	0.750	0.750	0.315	0.197	1.740	With	LN*U06...	1
TXN06R250U0075A06	0.059	2.500	6	2.012	1.983	2.323	1.969	0.750	0.750	0.315	0.197	1.760	With	LN*U06...	1
TXN06R300U0100A05	0.059	3.000	5	2.512	2.481	2.835	2.480	1.000	1.049	0.374	0.236	3.130	With	LN*U06...	1
TXN06R300U0100A07	0.059	3.000	7	2.512	2.481	2.835	2.480	1.000	1.049	0.374	0.236	3.280	With	LN*U06...	1
TXN06R400U0150A06	0.059	4.000	6	3.512	3.481	3.819	2.480	1.500	1.610	0.626	0.394	4.850	With	LN*U06...	1
TXN06R400U0150A10	0.059	4.000	10	3.512	3.481	3.819	2.480	1.500	1.610	0.626	0.394	4.850	With	LN*U06...	1
TXN06R500U0150A08	0.059	5.000	8	4.512	4.481	3.819	2.480	1.500	1.610	0.626	0.394	7.050	With	LN*U06...	1
TXN06R500U0150A12	0.059	5.000	12	4.512	4.481	3.819	2.480	1.500	1.610	0.626	0.394	7.280	With	LN*U06...	1
TXN06R600U0200A10	0.059	6.000	10	5.512	5.480	4.331	2.480	2.000	1.496	0.748	0.433	9.480	With	LN*U06...	1
TXN06R600U0200A14	0.059	6.000	14	5.512	5.480	4.331	2.480	2.000	1.496	0.748	0.433	9.260	With	LN*U06...	1
Metric	APMX	DCX	CICT	DC1	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT (kg)	Air hole	Insert	Fig.
TXN06R050M22.0E04 <sup>(1)</sup>	1.5	50	4	37.6	36.9	47	50	22	20	10.4	6.3	0.4	With	LN*U06...	1
TXN06R050M22.0E05 <sup>(1)</sup>	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 <sup>(2)</sup>	1.5	50	4	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R050M22.2-05 <sup>(1)</sup>	1.5	50	5	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R052M22.0E04 <sup>(1)</sup>	1.5	52	4	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R052M22.0E05 <sup>(1)</sup>	1.5	52	5	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R063M22.0E04 <sup>(2)</sup>	1.5	63	4	50.6	49.8	59	50	22	20	10.4	6.3	0.8	With	LN*U06...	1
TXN06R063M22.0E06 <sup>(2)</sup>	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 <sup>(2)</sup>	1.5	63	4	50.6	49.8	59	50	22.225	20	8	5	0.8	With	LN*U06...	1
TXN06R063M22.2-06 <sup>(2)</sup>	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
TXN06R080M27.0EE05	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 next page for the part codes.

Tool diameter tolerance	
Tool diameter	0 / -0.022"

Reference pages: Inserts → **H030 - H031**, Standard cutting conditions → **H032 - H037**

**SPARE PARTS**



Designation	Clamping screw	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Grip	Torx bit
TXN06R200U..., 250U...	CSPB-5	M-1000	-	(C0.375X1.125H)	H-TB2W	BLDIP20/S7
TXN06R300U...	CSPB-5	M-1000	-	(C0.500X1.375H)	H-TB2W	BLDIP20/S7
TXN06R400U..., 500U...	CSPB-5	M-1000	(TMBA-0.750H)	-	H-TB2W	BLDIP20/S7
TXN06R600U...	CSPB-5	M-1000	-	-	H-TB2W	BLDIP20/M7
TXN06R050, 052, 063M...	CSPB-5	M-1000	-	(1) FSHM10-40H (2) CM10-30H	H-TB2W	BLDIP20/S7
TXN06R066,080M27.0...	CSPB-5	M-1000	-	CM12X30H	H-TB2W	BLDIP20/S7
TXN06R080,100M31.7...	CSPB-5	M-1000	-	CM16X40H	H-TB2W	BLDIP20/S7
TXN06R125M...	CSPB-5	M-1000	TMBA-M20H	-	H-TB2W	BLDIP20/S7
TXN06R160M40.0...	CSPB-5	M-1000	TMBA-M20H	-	H-TB2W	BLDIP20/M7
TXN06R160M50.8...	CSPB-5	M-1000	TMBA-M24H	-	H-TB2W	BLDIP20/M7
TXN06R200M...	CSPB-5	M-1000	-	-	H-TB2W	BLDIP20/M7

Recommended clamping torque: 3.69 lbs-ft, 5 N-m

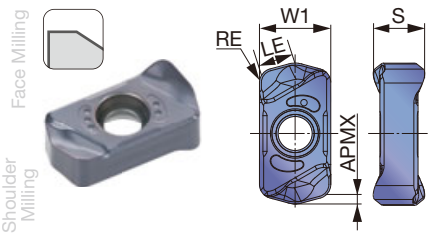
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Insert	B
Ext. Toolholder	C
Int. Toolholder	D
Threading	E
Grooving	F
Miniature tool	G
Milling cutter	H
Endmill	I
Drilling tool	J
Tooling System	K
User's Guide	L
Index	M



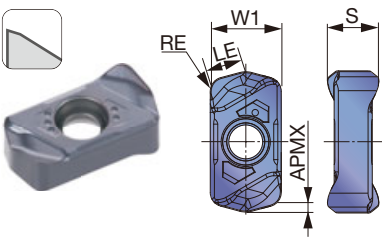
High Feed Milling

# INSERT

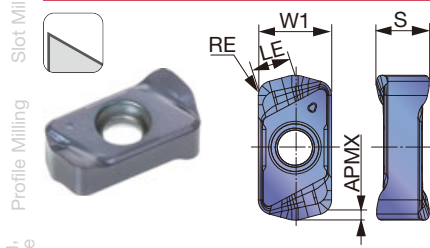
## LNMU03ZER-MJ (for general purpose)



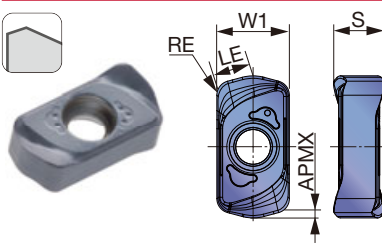
## LNMU03ZER-ML (for low cutting force)



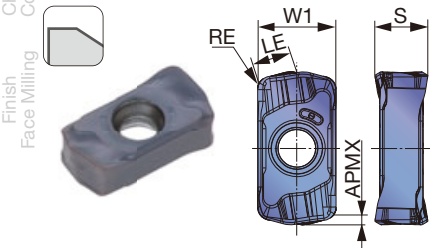
## LNMU03ZER-MS (for stainless steel)



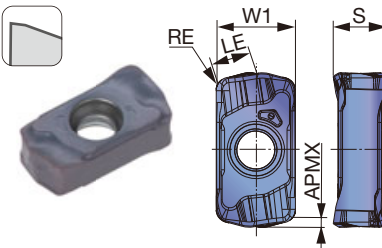
## LNGU03ZER-MH (Robust cutting edges)



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

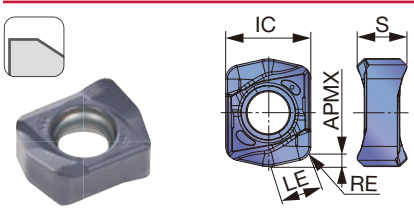


## LNMU03UER-ML (for low cutting force, low approach angle)

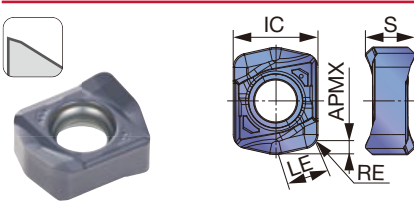


- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

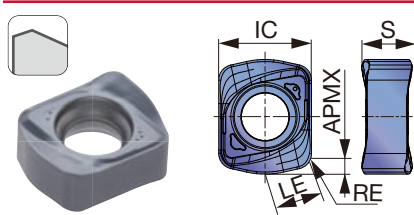
## LNMU06-MJ (for general purpose)



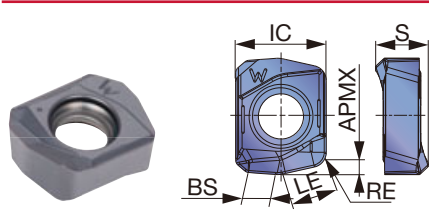
## LNMU06-ML (for low cutting force)



## LNGU06-MH (Robust cutting edges)



## LNMU06-W (Wiper, 2 cutting edge)



Reference pages: Standard cutting conditions → [H032](#) - [H037](#)

<b>P</b>	Steel		★																	
<b>M</b>	Stainless	★	☆																	
<b>K</b>	Cast iron		☆	☆	★															
<b>N</b>	Non-ferrous																			
<b>S</b>	Superalloys	★	☆	☆			★													
<b>H</b>	Hard materials			☆			★	☆												

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated						LE	W1	IC	S	BS
			AH130	AH3225	AH725	AH120	AH8015	AH8005					
LNMU0303ZER-MJ	0.047	0.039	●	●	●	●	●		0.126	0.236	-	0.169	-
LNMU0303ZER-ML	0.047	0.039	●	●	●	●	●		0.126	0.236	-	0.169	-
LNMU0303ZER-MS	0.047	0.039	●	●					0.126	0.236	-	0.169	-
LNGU0303ZER-MH	0.047	0.039					●	●	0.126	0.236	-	0.169	-
LNMU0303UER-MJ	0.039	0.035	●	●			●		0.122	0.236	-	0.161	-
LNMU0303UER-ML	0.039	0.035	●	●			●		0.122	0.236	-	0.161	-
LNMU06X5ZER-MJ	0.079	0.059	●	●	●	●	●		0.236	-	0.472	0.276	-
LNMU06X5ZER-ML	0.079	0.059	●	●	●	●	●		0.236	-	0.472	0.276	-
LNGU06X5ZER-MH	0.079	0.059					●	●	0.236	-	0.472	0.276	-
LNGU06X5ZER-W*	0.079	0.059		●					0.236	-	0.472	0.276	0.142

\* Wiper insert, see note below

- When wiper insert (-W) is used, the value of feed per rev. (ipr) must be less than  $0.142" \times n$ . for keeping this value, the number of wiper insert (n) and feed per tooth (in/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

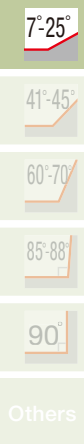
ZER type

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)			ø0.625", CICT = 2		ø0.688", CICT = 2		ø0.75", CICT = 2		ø0.75", CICT = 3	
							Tool dia.: DCX (in)		Plunging	n	Vf	n	Vf	n	Vf	n	Vf
							ø0.625~ø0.875	ø1.000~ø2.000									
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	330 - 980	0.020 - 0.047	0.020 - 0.059	0.004	4,030	250	3,660	227	3,360	208	312	
	Alloy steels (SCM440 / 42CrMo4, etc.)	- 300HB	First choice	AH3225	MJ	330 - 980	0.020 - 0.047	0.020 - 0.059	0.004	4,030	250	3,660	227	3,360	208	312	
	Prehardened steels (NAK80, PX5, etc.)	30 - 40HRC	First choice	AH3225	MJ	330 - 660	0.020 - 0.039	0.020 - 0.039	0.004	2,990	167	2,720	152	2,500	140	210	
M	Austenitic stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	MS	260 - 490	0.012 - 0.031	0.012 - 0.031	0.004	2,380	95	2,170	87	1,990	80	119	
	Precipitation hardening stainless steels (SUS630 / X5CrNiCuNb16-4)	28HRC - (H1150)	First choice for wear resistance	AH130	MS	260 - 490	0.008 - 0.020	0.008 - 0.020	0.004	2,380	57	2,170	52	1,990	48	72	
		40HRC - (H900)	First choice for impact resistance	AH3225	ML	260 - 390	0.004 - 0.012	0.004 - 0.012	0.004	2,020	32	1,830	29	1,680	27	40	
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150 - 250HB	First choice	AH725	MJ	330 - 980	0.020 - 0.047	0.020 - 0.059	0.004	4,030	250	3,660	227	3,360	208	312	
	Ductile cast irons (FCD400, etc.)	150 - 250HB	First choice	AH725	MJ	260 - 660	0.020 - 0.047	0.020 - 0.059	0.004	2,990	185	2,720	169	2,500	155	233	
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice for impact resistance	AH130	ML	100 - 200	0.012 - 0.028	0.012 - 0.028	0.003	790	25	720	23	660	21	32	
	Heat-resistant alloy (Inconel, Hastelloy, etc.)	- 40HRC	First choice for impact resistance	AH8015	ML	70 - 160	0.004 - 0.012	0.004 - 0.012	0.002	610	10	560	9	510	8	12	
				AH725	ML												
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	260 - 490	0.004 - 0.020	0.004 - 0.020	0.002	2,390	57	2,170	52	1,990	48	72	
	Hot mold steel of D.T.C materials (DAC*, DH**, DIEVER, etc.)	40 - 55HRC	First choice for impact resistance	AH8015	MJ	160 - 330	0.004 - 0.012	0.004 - 0.012	0.002	1,590	25	1,440	23	1,320	21	32	
				AH8015	MH												
				AH8015	MH												
	Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice for impact resistance	AH8005	MH	160 - 230	0.002 - 0.008	0.001 - 0.004	0.001	1,220	12	1,110	11	1,020	10	15	
				AH8015	MH	160 - 230	0.002 - 0.004	0.002 - 0.008	0.001	1,220	5	1,110	4	1,005	4	6	

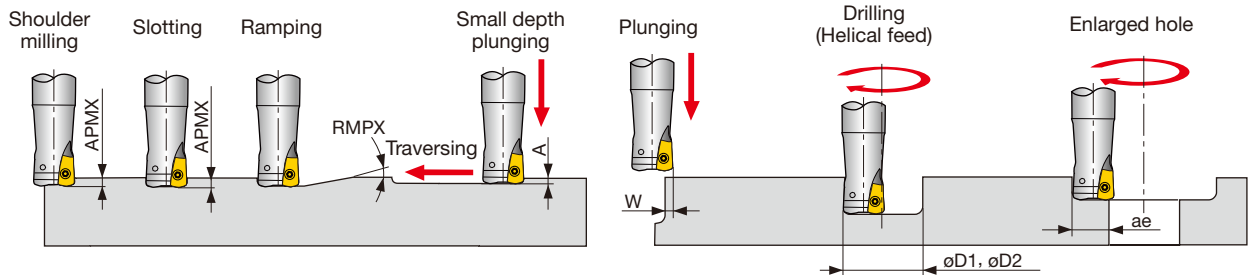
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

- 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



## APPLICATION RANGE



Inch	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/MS	MH		MJ/ML/MS	MH	MJ/ML/MS	MH		
EXN03R062U0062-...	0.625	0.039	2.100	1.700	0.012	0.138	0.118	0.856	0.896	1.181	0.492
EXN03R068U0062-...	0.688	0.039	1.700	1.700	0.012	0.138	0.118	0.982	1.022	1.339	0.571
EXN03R075U0075-...	0.750	0.039	1.400	1.200	0.012	0.138	0.118	1.106	1.146	1.496	0.650
EXN03R087U0075-...	0.875	0.039	1.200	1.000	0.012	0.138	0.118	1.356	1.396	1.654	0.728
EXN03R100U0100-...	1.000	0.039	1.000	0.900	0.012	0.138	0.118	1.606	1.646	1.890	0.846
EXN03R112U0100-...	1.125	0.039	0.800	0.800	0.012	0.138	0.118	1.856	1.856	2.126	0.965
EXN03R125U0125-...	1.250	0.039	0.700	0.700	0.012	0.138	0.118	2.106	2.106	2.441	1.122
TXN03R150U0075...	1.500	0.039	0.500	0.500	0.012	0.138	0.118	2.606	2.606	3.070	1.437
TXN03R200U0075...	2.000	0.039	0.400	0.400	0.012	0.138	0.118	3.606	3.606	3.858	1.830

For DCX above ø0.051", slot milling, ramping or contouring is not recommended as chips may be re-cut





Tool dia.: DCX (in), Number of revolutions: n (rpm), Feed speed: Vf (ipm), Max. depth of cut: ap = 0.004"

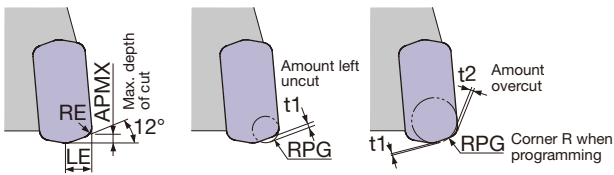
ø0.875			ø1			ø1.125			ø1.25			ø1.5			ø2			
n	Vf	CICT=2	n	Vf	CICT=3	n	Vf	CICT=4	n	Vf	CICT=5	n	Vf	CICT=6	n	Vf	CICT=8	
2,880	230	346	2,520	403	504	2,240	358	448	2,020	404	485	1,680	336	403	1,260	252	403	504
Vc = 660 sfm, fz = 0.04 ipt																		
2,880	230	346	2,520	403	504	2,240	358	448	2,020	404	485	1,680	336	403	1,260	252	403	504
Vc = 660 sfm, fz = 0.04 ipt																		
2,140	120	180	1,870	209	262	1,660	186	232	1,500	210	252	1,250	175	210	940	132	211	263
Vc = 490 sfm, fz = 0.028 ipt																		
2,140	120	180	1,870	209	262	1,660	186	232	1,500	210	252	1,250	175	210	940	132	211	263
Vc = 490 sfm, fz = 0.028 ipt																		
1,700	68	102	1,490	119	149	1,320	106	132	1,190	119	143	990	99	119	740	74	118	148
Vc = 390 sfm, fz = 0.02 ipt																		
1,700	41	61	1,490	72	89	1,320	63	79	1,190	71	86	990	59	71	740	44	71	89
Vc = 390 sfm, fz = 0.012 ipt																		
1,440	23	35	1,260	40	50	1,120	36	45	1,010	40	48	840	34	40	630	25	40	50
Vc = 330 sfm, fz = 0.008 ipt																		
2,880	230	346	2,520	403	504	2,240	358	448	2,020	404	485	1,680	336	403	1,260	252	403	504
Vc = 660 sfm, fz = 0.04 ipt																		
2,140	171	257	1,870	299	374	1,660	266	332	1,500	300	360	1,250	250	300	940	188	301	376
Vc = 490 sfm, fz = 0.04 ipt																		
570	23	34	500	40	50	440	35	44	400	40	48	330	33	40	250	25	40	50
Vc = 130 sfm, fz = 0.02 ipt																		
440	7	11	380	12	15	340	11	14	310	12	15	250	10	12	190	8	12	15
Vc = 100 sfm, fz = 0.008 ipt																		
1,700	41	61	1,490	72	89	1,320	63	79	1,190	71	86	990	59	71	740	44	71	89
Vc = 390 sfm, fz = 0.012 ipt																		
1,140	18	27	990	32	40	880	28	35	790	32	38	660	26	32	500	20	32	40
Vc = 260 sfm, fz = 0.008 ipt																		
870	7	10	760	12	15	680	11	14	610	12	15	510	10	12	380	8	12	15
Vc = 200 sfm, fz = 0.004 ipt																		
870	3	5	760	6	8	680	5	7	610	6	7	510	5	6	380	4	6	8
Vc = 200 sfm, fz = 0.002 ipt																		

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

- 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 = 0.060". 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 (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.039	0.047	0.118	0.039	0.018	-
0.039	0.047	0.118	0.060	0.014	-
0.039	0.047	0.118	0.079	0.008	0.004
0.039	0.047	0.118	0.098	0.003	0.011

LNGU0303ZER...

Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.039	0.047	0.118	0.039	0.018	-
0.039	0.047	0.118	0.060	0.014	-
0.039	0.047	0.118	0.079	0.008	0.004
0.039	0.047	0.118	0.098	0.003	0.011

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

\*Recommended



# STANDARD CUTTING CONDITIONS

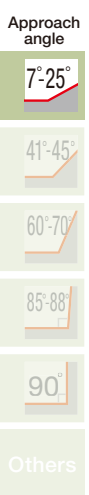
EXN03, HXN03, TXN03

UER type

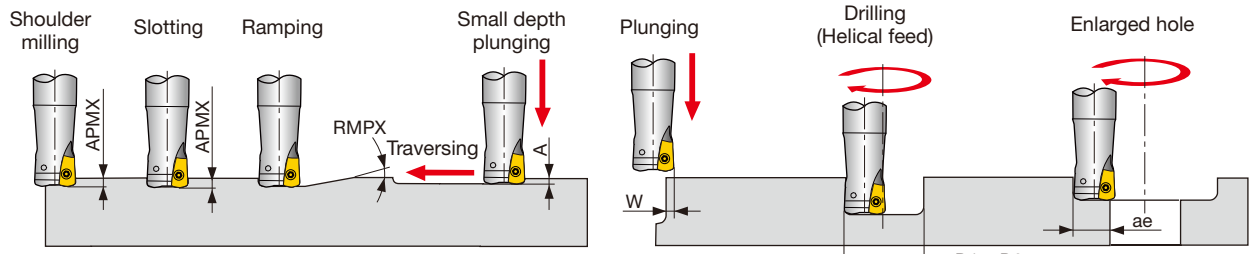
ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)			ø0.625", CICT = 2		ø0.709", CICT = 2		ø0.787"		
							Tool dia.: DCX (in)		Plunging	n	Vf	n	Vf	n	Vf	
							ø0.630 ~ ø0.875	ø1.000 ~ ø2.000								CICT = 3
P	Carbon steels 1045, 1055, etc.	- 300HB	First choice Low resistance	AH3225	MJ	330 - 980	0.020 - 0.046	0.020 - 0.060	0.004	4030	330	3670	300	3360	270	410
	Alloy steels 4140, etc.	- 300HB	First choice Low resistance	AH3225	ML	330 - 980	0.020 - 0.046	0.020 - 0.060	0.004	4030	330	3670	300	3360	270	410
M	Prehardened steels NAK80, PX5, etc.	30 - 40HRC	First choice for impact resistance	AH8015	MJ	330 - 660	0.020 - 0.040	0.020 - 0.040	0.004	3060	190	2780	170	2550	160	230
	Austenitic stainless steels 304SS, etc.	- 200HB	First choice for impact resistance	AH130	MJ	260 - 490	0.012 - 0.040	0.012 - 0.040	0.004	2320	130	2110	110	1940	110	160
M	Precipitation hardening stainless steels 17-4 PH, etc.	28HRC -	First choice for impact resistance	AH130	ML	260 - 490	0.012 - 0.030	0.012 - 0.030	0.004	2320	100	2110	90	1940	80	120
		40HRC -	First choice for impact resistance	AH130	MJ	260 - 390	0.012 - 0.020	0.012 - 0.020	0.004	2020	70	1830	60	1680	60	90
		40HRC -	First choice for impact resistance	AH130	MJ	260 - 390	0.012 - 0.020	0.012 - 0.020	0.004	2020	70	1830	60	1680	60	90
K	Gray cast irons Class 25, etc.	150 - 250HB	First choice for impact resistance	AH8015	MJ	330 - 980	0.012 - 0.046	0.020 - 0.060	0.004	4030	330	3670	300	3360	270	410
	Ductile cast irons 60-40-18, etc.	150 - 250HB	First choice for impact resistance	AH8015	MJ	260 - 660	0.012 - 0.046	0.020 - 0.060	0.004	4030	330	3670	300	3360	190	290
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice for wear resistance	AH130	MJ	100 - 200	0.012 - 0.030	0.012 - 0.030	0.003	920	40	830	40	760	40	50
	Heat-resistant alloy Inconel, Hastelloy, etc.	- 40HRC	First choice for impact resistance	AH8015	MJ	70 - 160	0.012 - 0.020	0.012 - 0.020	0.002	730	30	670	30	610	20	30
H	Hot mold steel H-13, etc.	40-50HRC	First choice for impact resistance	AH8015	MJ	260 - 490	0.004 - 0.020	0.004 - 0.020	0.002	2320	60	2110	60	1940	50	70
	Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc.	40-50HRC	First choice for impact resistance	AH8015	MJ	160 - 330	0.004 - 0.020	0.004 - 0.020	0.002	1530	40	1390	40	1270	40	50
H	Cold mold steels D2, etc.	50-60HRC	First choice	AH8005	MJ	160 - 230	0.004 - 0.012	0.004 - 0.012	0.001	1220	20	1110	20	1020	20	30
				AH8005	MJ	160 - 230	0.004 - 0.012	0.004 - 0.012	0.001	1220	20	1110	20	1020	20	30

- 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



# APPLICATION RANGE



Inch	DCX	Max. depth of cut	Max. ramping angle	Max. plunging depth	Max. cutting width in plunging	Min. machinable hole dia.	Max. machinable hole dia.	Max. cutting width in enlarged hole
		APMX	RMPX	A	W	øD1	øD2	ae
EXN03R062U0062...	0.625	0.035	Not possible	Not possible	0.15	Not possible	Not possible	0.480
EXN03R068U0062...	0.688	0.035	1.7°	0.011	0.15	0.991	1.339	0.560
EXN03R075U0075...	0.750	0.035	1.4°	0.011	0.15	1.132	1.496	0.638
EXN03R087U0075...	0.875	0.035	1.2°	0.011	0.15	1.371	1.654	0.716
EXN03R100U0100...	1.000	0.035	1°	0.011	0.15	1.610	1.890	0.835
EXN03R112U0100...	1.125	0.035	0.7°	0.011	0.15	1.857	2.126	0.953
EXN03R125U0125...	1.250	0.035	0.7°	0.011	0.15	2.104	2.441	1.110
TXN03R150U0075...	1.500	0.035	0.5°	0.011	0.15	2.750	3.070	1.425
TXN03R200U0075...	2.000	0.035	0.4°	0.011	0.15	3.540	3.858	1.819

For DCX above ø1.300", slot milling, ramping or contouring is not recommended as chips may be re-cut.



Tool dia.: DCX (in), Number of revolutions: n (rpm), Feed speed: Vf (ipm), Max. depth of cut: ap = 0.020"

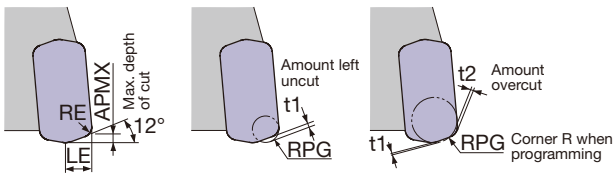
ø0.875"			ø1.000"			ø1.125"			ø1.250"			ø1.500"			ø2.000"			
n	Vf		n	Vf		n	Vf		n	Vf		n	Vf		n	Vf		
	CICT=2	CICT=3		CICT=4	CICT=5		CICT=4	CICT=5		CICT=5	CICT=6		CICT=5	CICT=6		CICT=5	CICT=8	CICT=10
2880	240	350	2520	410	510	2240	360	450	2020	410	490	1680	340	410	1260	260	410	510
Vc = 660 sfm, fz = 0.040 ipt																		
2880	240	350	2520	410	510	2240	360	450	2020	410	490	1680	340	410	1260	260	410	510
Vc = 660 sfm, fz = 0.040 ipt																		
2180	140	200	1910	230	290	1700	210	260	1530	230	280	1270	200	230	960	150	240	290
Vc = 500 sfm, fz = 0.030 ipt																		
1660	90	130	1450	160	190	1290	140	170	1160	160	190	970	130	160	730	100	160	190
Vc = 380 sfm, fz = 0.026 ipt																		
1660	70	100	1450	120	150	1290	110	130	1160	120	140	970	100	120	730	80	120	150
Vc = 380 sfm, fz = 0.020 ipt																		
1440	50	70	1260	90	110	1120	80	90	1010	90	100	840	70	90	630	60	90	110
Vc = 330 sfm, fz = .0016 ipt																		
2880	240	350	2520	410	510	2240	360	450	2020	410	490	1680	340	410	1260	260	410	510
Vc = 660 sfm, fz = 0.040 ipt																		
2010	170	250	1760	290	360	1560	250	320	1410	290	340	1170	240	290	880	180	290	360
Vc = 460 sfm, fz = 0.040 ipt																		
650	30	40	570	50	60	510	50	60	460	50	60	380	40	50	290	30	50	60
Vc = 150 sfm, fz = 0.020 ipt																		
520	20	30	460	30	40	410	30	40	370	30	40	310	30	30	230	20	30	40
Vc = 120 sfm, fz = 0.016 ipt																		
1660	40	60	1450	70	90	1290	70	80	1160	70	90	970	60	70	730	50	80	90
Vc = 380 sfm, fz = 0.012 ipt																		
1090	30	40	960	50	60	850	50	60	760	50	60	640	40	50	480	30	50	60
Vc = 250 sfm, fz = 0.012 ipt																		
870	20	30	760	30	40	680	30	30	610	30	30	510	30	30	380	20	30	40
Vc = 200 sfm, fz = 0.008 ipt																		

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page

- 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 = 0.059". If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU0303UER...

Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.035	0.039	0.138	0.039	0.019	-
<b>0.035</b>	<b>0.039</b>	<b>0.138</b>	<b>0.059</b>	<b>0.015</b>	-
0.035	0.039	0.138	0.079	0.012	0.005
0.035	0.039	0.138	0.098	0.008	0.012

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

\*Recommended



# STANDARD CUTTING CONDITIONS

EXN06, TXN06

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)			ø1.25", CICT = 2		ø1.5", CICT = 3	
							Tool dia.: DCX (in)		Plunging	n	Vf	n	Vf
							ø1.25" ~ ø6"						
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	330 - 980	0.020 - 0.059	0.006	2,020	162	1,680	202	
	Alloy steels (SCM440 / 42CrMo4, etc.) Prehardened steels (NAK80, PX5, etc.)	- 300HB	First choice	AH3225	MJ	330 - 660	0.020 - 0.059	0.006	2,020	162	1,680	202	
		30 - 40HRC	First choice	AH3225	MJ	330 - 660	0.020 - 0.047	0.006	1,500	93	1,250	116	
		30 - 40HRC	for wear resistance	AH8015	MJ	330 - 660	0.020 - 0.060	0.006	1,500	120	1,250	150	
M	Stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	ML	260 - 490	0.012 - 0.031	0.004	1,190	57	990	71	
	Precipitation hardening stainless steels (SUS630 / X5CrNi-CuNb16-4)	28HRC - (H1150)	First choice	AH130	ML	260 - 490	0.008 - 0.020	0.004	1,190	29	990	36	
		40HRC - (H900)	for impact resistance	AH130	MJ	260 - 490	0.008 - 0.020	0.004	1,190	29	990	36	
		40HRC - (H900)	for impact resistance	AH130	MJ	260 - 390	0.004 - 0.012	0.004	1,010	16	840	20	
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150 - 250HB	First choice	AH120	MJ	330 - 980	0.020 - 0.059	0.006	2,020	162	1,680	202	
		150 - 250HB	First choice	AH120	MJ	260 - 660	0.020 - 0.059	0.006	1,500	120	1,250	150	
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH130	ML	100 - 200	0.012 - 0.028	0.003	400	16	330	20	
	Heat-resistant alloy (Inconel, Hastelloy, etc.)	- 40HRC	for impact resistance	AH130	MJ	100 - 200	0.012 - 0.028	0.003	400	16	330	20	
		- 40HRC	for impact resistance	AH725	ML	70 - 160	0.004 - 0.012	0.002	310	5	250	6	
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	260 - 490	0.004 - 0.020	0.002	1,190	29	990	36	
	Hot mold steel of D.T.C materials (DAC**, DH**, DIEVER, etc.)	40 - 55HRC	Low resistance	AH8015	MJ	260 - 490	0.004 - 0.012	0.002	1,190	29	990	36	
		40 - 55HRC	First choice	AH8015	MJ	160 - 330	0.004 - 0.012	0.002	790	13	660	16	
		40 - 55HRC	for impact resistance	AH8015	MH	160 - 330	0.004 - 0.020	0.002	790	13	660	16	
Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice	AH8005	MH	160 - 230	0.002 - 0.012	0.001	610	5	510	6		
	55 - 60HRC	for impact resistance	AH8015	MH	160 - 230	0.002 - 0.012	0.001	610	2	510	3		

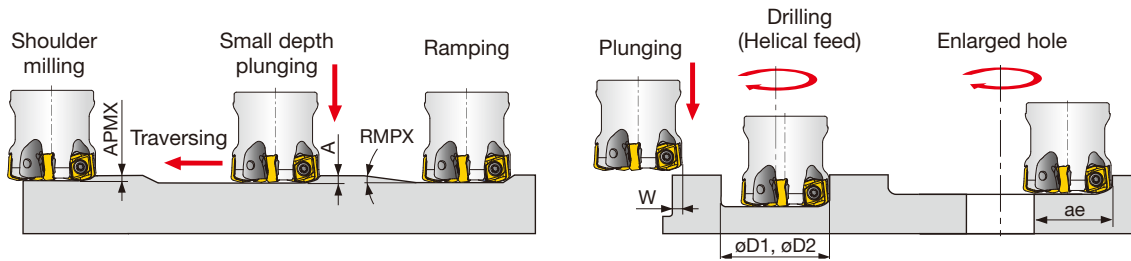
- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

- 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

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

## APPLICATION RANGE



Inch	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
EXN06R125U...	ø1.250	0.059	2°	0.020	0.236	1.830	2.300	0.970
EXN06R150U...	ø1.500	0.059	1.5°	0.020	0.236	2.330	2.800	1.220
TXN06R200U...	ø2.000	0.059	0.9°	0.020	0.236	3.330	3.800	1.720
TXN06R250U...	ø2.500	0.059	0.6°	0.020	0.236	4.330	4.800	2.220
TXN06R300U...	ø3.000	0.059	0.5°	0.020	0.236	5.330	5.800	2.720

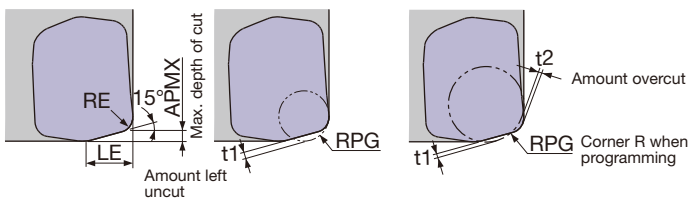
Note: For DCX above 4.000", slot milling, ramping or contouring is not recommended as chips may be re-cut.

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

ø2"			ø2.5"			ø3"			ø4"			ø5"			ø6"		
$n$	$V_f$ CICT = 4 CICT = 5		$n$	$V_f$ CICT = 4 CICT = 6		$n$	$V_f$ CICT = 5 CICT = 7		$n$	$V_f$ CICT = 6 CICT = 10		$n$	$V_f$ CICT = 8 CICT = 12		$n$	$V_f$ CICT = 10 CICT = 14	
1,260	202	252	1,010	162	242	840	168	235	630	151	252	500	160	240	420	168	235
$V_c = 660$ sfm, $f_z = 0.040$ ipt																	
1,260	202	252	1,010	162	242	840	168	235	630	151	252	500	160	240	420	168	235
$V_c = 660$ sfm, $f_z = 0.040$ ipt																	
940	117	146	750	93	140	620	96	135	470	87	146	370	92	138	310	96	135
$V_c = 490$ sfm, $f_z = 0.031$ ipt																	
940	150	188	750	120	180	620	124	174	470	113	188	370	118	178	310	124	174
$V_c = 490$ sfm, $f_z = 0.040$ ipt																	
740	71	89	600	58	86	500	60	84	370	53	89	300	58	86	250	60	84
$V_c = 390$ sfm, $f_z = 0.024$ ipt																	
740	36	44	600	29	43	500	30	42	370	27	44	300	29	43	250	30	42
$V_c = 390$ sfm, $f_z = 0.012$ ipt																	
630	20	25	500	16	24	420	17	24	320	15	26	250	16	24	210	17	24
$V_c = 330$ sfm, $f_z = 0.008$ ipt																	
1,260	202	252	1,010	162	242	840	168	235	630	151	252	500	160	240	420	168	235
$V_c = 660$ sfm, $f_z = 0.040$ ipt																	
940	150	188	750	120	180	620	124	174	470	113	188	370	118	178	310	124	174
$V_c = 490$ sfm, $f_z = 0.040$ ipt																	
250	20	25	200	16	24	170	17	24	120	14	24	100	16	24	80	16	22
$V_c = 130$ sfm, $f_z = 0.020$ ipt																	
190	6	8	150	5	7	130	5	7	100	5	8	80	5	8	60	5	7
$V_c = 100$ sfm, $f_z = 0.008$ ipt																	
740	36	44	600	29	43	500	30	42	370	27	44	300	29	43	250	30	42
$V_c = 390$ sfm, $f_z = 0.012$ ipt																	
500	16	20	400	13	19	330	13	18	250	12	20	200	13	19	170	14	19
$V_c = 260$ sfm, $f_z = 0.008$ ipt																	
380	6	8	310	5	7	250	5	7	190	5	8	150	5	7	130	5	7
$V_c = 200$ sfm, $f_z = 0.004$ ipt																	
380	3	4	310	2	4	250	3	4	190	2	4	150	2	4	130	3	4
$V_c = 200$ sfm, $f_z = 0.002$ ipt																	

## 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  $R = 0.118''$ . 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 (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut $t_1$ (in)	Amount overcut $t_2$ (in)
0.059	0.079	0.236	0.079	0.039	-
			0.118	0.030	-
			0.157	0.021	0.010

LNGU06...MH

Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut $t_1$ (in)	Amount overcut $t_2$ (in)
0.059	0.079	0.236	0.079	0.035	-
			0.118	0.026	-
			0.157	0.016	0.010

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

\*Recommended





High Feed  
Milling

# TUNGFLEX

## SM

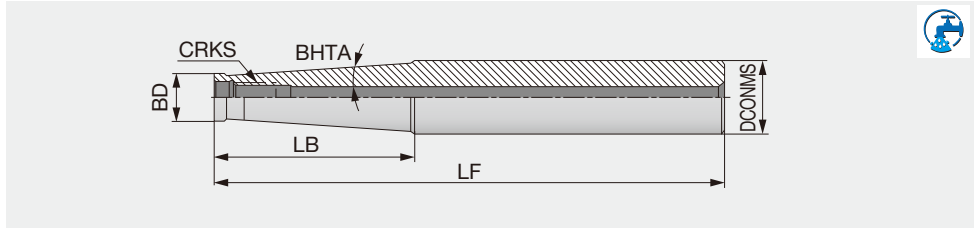
Steel modular shank



Face Milling



Shoulder  
Milling



Slot Milling



Profile Milling



Chamfering,  
Counterbore



Finish  
Face Milling

Metric	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

7°-25°

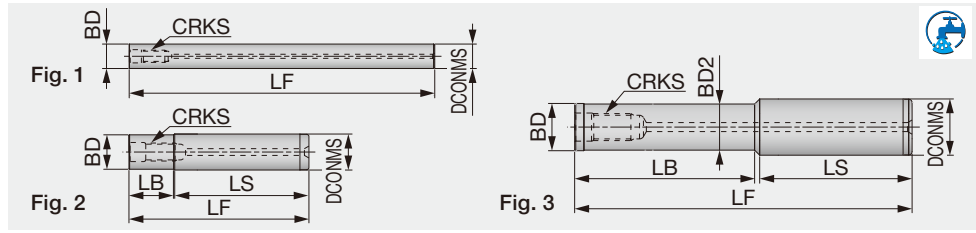
41°-45°

60°-70°

85°-88°

90°

Others

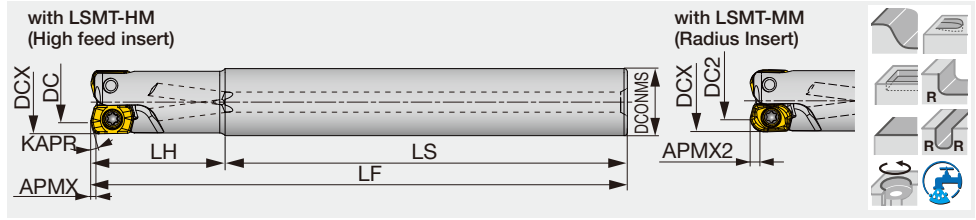


Metric	CRKS	DCONMS	LF	LB	LS	BD	BD2	Fig.
SM06-L100-C10-C-H	M6	10	100	-	-	10	-	1
SM06-L150-C10-C-H	M6	10	150	-	-	10	-	1
SM06-L100-C12-C-H	M6	12	100	-	-	12	-	1
SM06-L150-C12-C-H	M6	12	150	-	-	12	-	1
SM08-L80-20-C16-C-H	M8	16	80	20	59.6	15.3	-	2
SM08-L100-40-C16-C-H	M8	16	100	40	59.6	15.3	-	2
SM08-L150-80-C16-C-H	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°



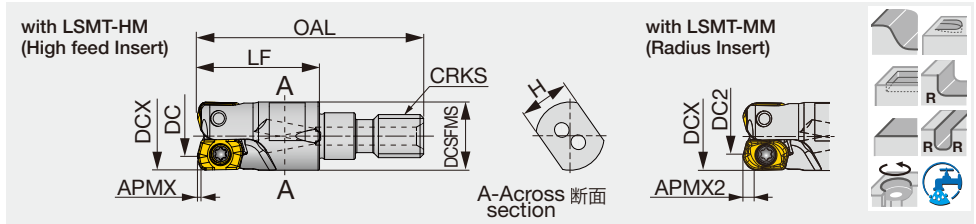
Inch	APMX	APMX2	DCX	CICT	DC	DC2	DCONMS	LS	LH	LF	KAPR	WT (lbs)	Air hole	Insert
EXLS02U0.37C0.31LH0.75R01	0.019	0.079	0.375	1	0.228	0.218	0.312	2.250	0.750	3.000	12°	0.066	With	LSMT02...
EXLS02U0.37C0.37LH0.75R01	0.019	0.079	0.375	1	0.228	0.218	0.375	2.250	0.750	3.000	12°	0.088	With	LSMT02...
EXLS02U0.37C0.37LH1.25R01	0.019	0.079	0.375	1	0.228	0.218	0.375	2.250	1.250	3.500	12°	0.110	With	LSMT02...
EXLS02U0.50C0.37LH0.75R03	0.019	0.079	0.500	3	0.354	0.343	0.375	2.250	0.750	3.000	12°	0.088	With	LSMT02...
EXLS02U0.50C0.50LH0.75R03	0.019	0.079	0.500	3	0.354	0.343	0.500	2.250	0.750	3.000	12°	0.132	With	LSMT02...
EXLS02U0.50C0.50LH2.00R02	0.019	0.079	0.500	2	0.354	0.343	0.500	2.250	2.000	4.250	12°	0.176	With	LSMT02...
EXLS02U0.62C0.62LH1.50R05	0.019	0.079	0.625	5	0.479	0.468	0.625	2.500	1.500	4.000	12°	0.308	With	LSMT02...
EXLS02U0.62C0.62LH2.00R03	0.019	0.079	0.625	3	0.479	0.468	0.625	2.500	2.000	4.500	12°	0.375	With	LSMT02...
EXLS02U0.75C0.75LH2.00R05	0.019	0.079	0.750	5	0.602	0.593	0.750	3.000	2.000	5.000	12°	0.529	With	LSMT02...
EXLS02U0.75C0.75LH2.00R06	0.019	0.079	0.750	6	0.602	0.593	0.750	3.000	2.000	5.000	12°	0.529	With	LSMT02...
EXLS02U0.75C0.75LH3.50R05	0.019	0.079	0.750	5	0.602	0.593	0.750	3.000	3.500	6.500	12°	0.683	With	LSMT02...
EXLS02U1.00C1.00LH2.50R06	0.019	0.079	1.000	6	0.850	0.843	1.000	3.000	2.500	5.500	12°	1.036	With	LSMT02...
EXLS02U1.00C1.00LH2.50R08	0.019	0.079	1.000	8	0.850	0.843	1.000	3.000	2.500	5.500	12°	1.036	With	LSMT02...
EXLS02U1.00C1.00LH4.00R06	0.019	0.079	1.000	6	0.850	0.843	1.000	3.000	4.000	7.000	12°	1.279	With	LSMT02...

Metric	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°



Metric	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	16.29	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**

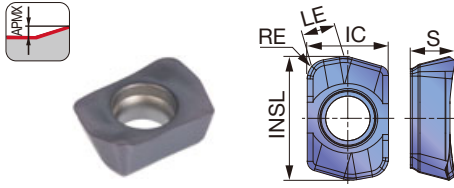
Designation	Clamping screw	Lubricant	Wrench
EXLS02U..., EXLS02M..., HXLS02M...	CSPB-2H	M-1000	IP-6DB

Recommended clamping torque: 0.52 lbs-ft, 0.7 N-m

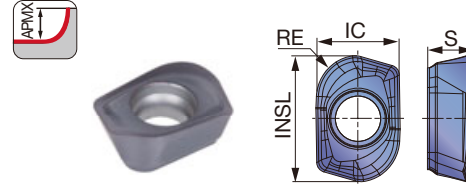
Reference pages: Standard cutting conditions → **H042 - H043**, TungFlex → **H038 - H039**

# INSERT

## LSMT-HM (High feed)



## LSMT-MM (Radius)



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

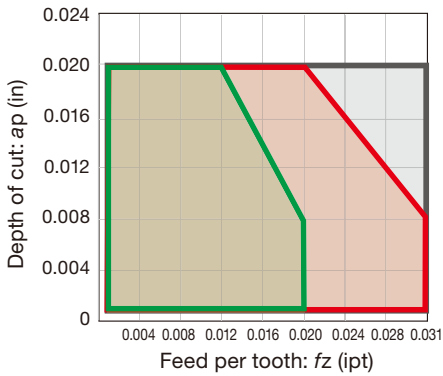
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated							LE	INSL	IC	S
			AH3225	AH8015									
LSMT020ZER-HM	0.039	0.019	●	●						0.067	0.252	0.165	0.091
LSMT020R2-MM	0.079	0.079	●	●						-	0.252	0.169	0.091

● : 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  $\geq 7xD$

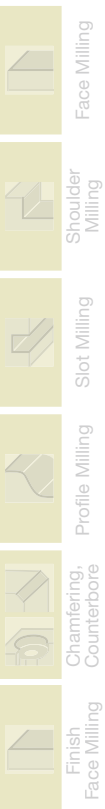
\* When the DOC is 0.020" or more, the feed less than 0.006 ipt is recommended.

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

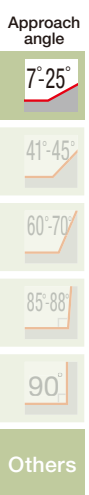




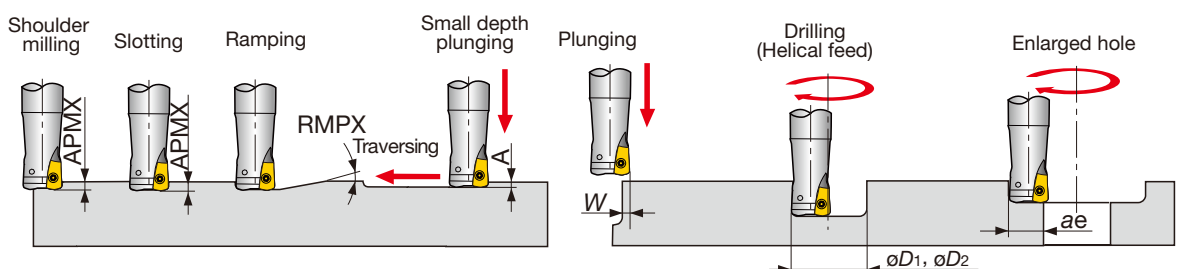
# STANDARD CUTTING CONDITIONS



ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steels 1045, 1055, etc.	- 300HB	First choice	AH3225	330 - 990	0.008 - 0.031
		- 300HB	For wear resistance	AH8015	330 - 990	0.008 - 0.031
	Alloy steels 4140, etc.	- 300HB	First choice	AH3225	330 - 990	0.008 - 0.031
		- 300HB	For wear resistance	AH8015	330 - 990	0.008 - 0.031
	Prehardened steels NAK80, PX5, etc.	30 - 40HRC	First choice	AH8015	330 - 660	0.008 - 0.020
		30 - 40HRC	For impact resistance	AH3225	330 - 660	0.008 - 0.020
<b>M</b>	Stainless steels 304, 316, etc.	- 200HB	First choice	AH3225	330 - 660	0.008 - 0.020
<b>K</b>	Gray cast irons No.250B, etc.	150 - 250HB	First choice	AH8015	330 - 990	0.008 - 0.031
		150 - 250HB	For impact resistance	AH3225	330 - 990	0.008 - 0.031
	Ductile cast irons 65-45-12, etc.	150 - 250HB	First choice	AH8015	260 - 660	0.008 - 0.031
		150 - 250HB	For impact resistance	AH3225	260 - 660	0.008 - 0.031
<b>S</b>	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3225	100 - 200	0.004 - 0.012
		- 40HRC	For wear resistance	AH8015	100 - 200	0.004 - 0.012
	Heat resistant alloy Inconel, Hastelloy, etc.	- 40HRC	First choice	AH8015	70 - 170	0.004 - 0.012
		- 40HRC	For impact resistance	AH3225	70 - 170	0.004 - 0.012
<b>H</b>	Hardened steel	H13, etc.	First choice	AH8015	260 - 490	0.004 - 0.020
		D2, D3, etc.	First choice	AH8015	160 - 230	0.004 - 0.012



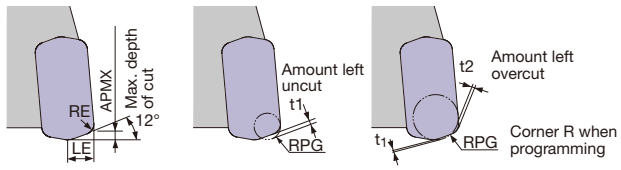
## APPLICATION RANGE



Inch	DC	Max. depth of cut		Max. ramping angle	Max. plunging depth	Max. cutting width in plunging	Min. machining	Max. machining	Max. cutting width in enlarged hole
		APMX	APMX2						
EXLS02U0.37...	0.375	0.019	0.079	3.6°	0.007	0.078	0.513	0.730	0.292
EXLS02U0.50...	0.500	0.019	0.079	1.8°	0.007	0.078	0.763	0.980	0.417
EXLS02U0.62...	0.625	0.019	0.079	1.3°	0.007	0.078	1.013	1.230	0.542
EXLS02U0.75...	0.750	0.019	0.079	1.2°	0.007	0.078	1.260	1.460	0.660
EXLS02U1.00...	1.000	0.019	0.079	1.0°	0.007	0.078	1.760	1.960	0.910

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

### Tool geometry on programming



### LSMT\*\*-HM

Corner R when programming: RPG	Amount left uncut t1 (in)	Amount left overcut t2 (in)
0.039	0.006	0
0.059	0.003	0.006
0.079	0	0.013

\*Recommended



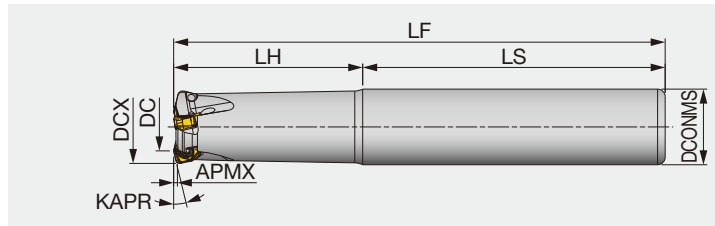
Tool dia.: (in), Number of revolutions: <i>n</i> (rpm), Feed speed: <i>Vf</i> (ipm), Max. depth of cut: <i>ap</i> = 0.020", Number of teeth: CICT													
ø0.375", CICT = 1		ø0.5"			ø0.625"			ø0.750"			ø1.000"		
<i>n</i>	<i>Vf</i>	<i>n</i>	<i>Vf</i>		<i>n</i>	<i>Vf</i>		<i>n</i>	<i>Vf</i>		<i>n</i>	<i>Vf</i>	
			CICT = 2	CICT = 3		CICT = 3	CICT = 5		CICT = 5	CICT = 6		CICT = 5	CICT = 8
6682	134	5011	200	301	4009	241	401	3341	334	401	2506	301	401
Vc = 656 sfm, fz = 0.020 ipt													
6682	134	5011	200	301	4009	241	401	3341	334	401	2506	301	401
Vc = 656 sfm, fz = 0.020 ipt													
5011	80	3759	120	180	3007	144	241	2506	200	241	1879	180	241
Vc = 492 sfm, fz = 0.016 ipt													
4013	64	3010	96	144	2408	116	193	2007	161	193	1505	144	193
Vc = 394 sfm, fz = 0.016 ipt													
6682	134	5011	200	301	4009	241	401	3341	334	401	2506	301	401
Vc = 656 sfm, fz = 0.020 ipt													
5011	100	3759	150	226	3007	180	301	2506	251	301	1879	225	301
Vc = 492 sfm, fz = 0.020 ipt													
1334	11	1001	16	24	801	19	32	667	27	32	500	24	32
Vc = 131 sfm, fz = 0.008 ipt													
998	8	749	12	18	599	14	24	499	20	24	374	18	24
Vc = 98 sfm, fz = 0.008 ipt													
4013	48	3010	72	108	2408	87	144	2007	120	145	1505	108	144
Vc = 394 sfm, fz = 0.012 ipt													
2007	16	1505	24	36	1204	29	48	1003	40	48	752	36	48
Vc = 197 sfm, fz = 0.008 ipt													

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°



Inch	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	KAPR	WT(lb)	Air hole	Insert
EXWX03U0.62C0.62R02	0.039	0.625	2	0.3448	0.625	2.750	1.250	4.000	12°	0.31	With	WXMU03...
EXWX03U0.62C0.62R02L	0.039	0.625	2	0.3448	0.625	4.000	2.000	6.000	12°	0.46	With	WXMU03...
EXWX03U0.75C0.75R03	0.039	0.750	3	0.4645	0.750	3.000	2.000	5.000	12°	0.50	With	WXMU03...
EXWX03U0.75C0.75R03L	0.039	0.750	3	0.4645	0.750	3.000	3.500	6.500	12°	0.63	With	WXMU03...
EXWX03U1.00C1.00R04	0.039	1.000	4	0.7125	1.000	3.000	2.500	5.500	12°	1.05	With	WXMU03...
EXWX03U1.00C1.00R04L	0.039	1.000	4	0.7125	1.000	3.000	4.000	7.000	12°	1.31	With	WXMU03...
EXWX03U1.25C1.25R05	0.039	1.250	5	0.9606	1.250	3.000	3.000	6.000	12°	1.85	With	WXMU03...
EXWX03U1.25C1.25R05L	0.039	1.250	5	0.9606	1.250	3.000	5.000	8.000	12°	2.44	With	WXMU03...

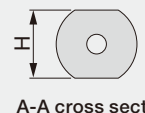
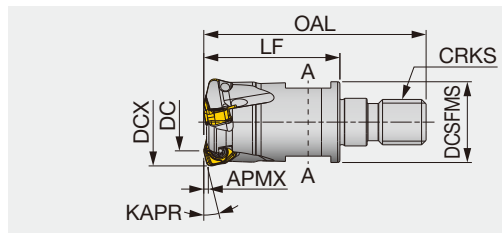
  

Metric	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	KAPR	WT(kg)	Air hole	Insert
EXWX03M016C16.0R02	1	16	2	8.9	16	70	30	100	12°	0.14	With	WXMU03...
EXWX03M016C16.0R02L	1	16	2	8.9	16	100	50	150	12°	0.21	With	WXMU03...
EXWX03M020C20.0R03	1	20	3	12.8	20	80	50	130	12°	0.26	With	WXMU03...
EXWX03M020C20.0R03L	1	20	3	12.8	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°



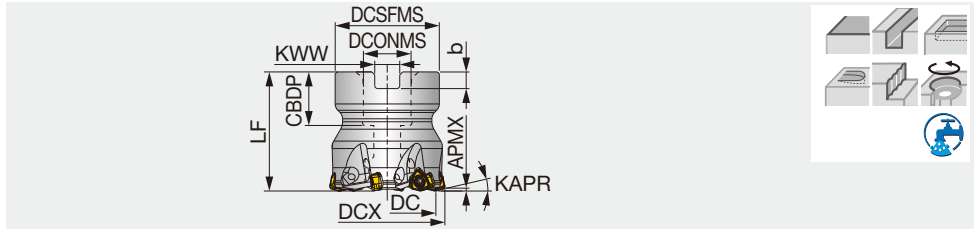
Metric	APMX	DCX	CICT	DC	OAL	LF	H	DCSFMS	KAPR	CRKS	WT(kg)	Air hole	Insert
HXWX03M016M08R02	1	16	2	8.9	42	25	10	12.8	12°	M8	0.03	With	WXMU03...
HXWX03M020M10R03	1	20	3	12.8	49	30	15	17.8	12°	M10	0.06	With	WXMU03...
HXWX03M025M12R04	1	25	4	17.8	57	35	17	20.8	12°	M12	0.1	With	WXMU03...
HXWX03M032M16R05	1	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: 0.81 lbs-ft, 1.1 N·m

Reference pages: Standard cutting conditions → **H046 - H047**, TungFlex → **H038 - H039**



Inch	APMX	DCX	CICT	DC	DCSFMS	DCONMS	CBDP	LF	b	KWW	KAPR	WT(lb)	Air hole	Insert
TXWX03U1.50B0.50R05	0.039	1.500	6	1.217	1.457	0.500	0.630	1.575	0.157	0.258	12°	0.53	With	WXMU03...
TXWX03U2.00B0.75R08	0.039	2.000	8	1.713	1.693	0.750	0.750	1.969	0.197	0.315	12°	0.96	With	WXMU03...

Metric	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**

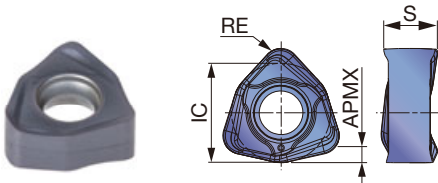


Designation	Clamping screw	Shell locking bolt	Wrench
TXWX03U1.50...	CSPB-2.5SH	(SR UNF 1/4X3/4 B18.3)	IP-7D
TXWX03U2.00...	CSPB-2.5SH	(C0.375X1.125H)	IP-7D
TXWX03M040...	CSPB-2.5SH	CM8X30H	IP-7D
TXWX03M050...	CSPB-2.5SH	CM10X30H	IP-7D

Recommended clamping torque: 0.81 lbs-ft, 1.1 N·m

**INSERT**

**WXMU0303-MM**



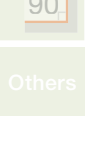
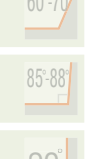
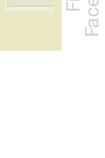
P	Steel	★	☆											
M	Stainless	★												
K	Cast iron	☆	★											
N	Non-ferrous													
S	Superalloy	☆	★											
H	Hard materials		★											

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		IC	S
			AH3225	AH8015		
WXMU0303ZER-MM	0.047	0.039	●	●	0.250	0.143

● : Line up

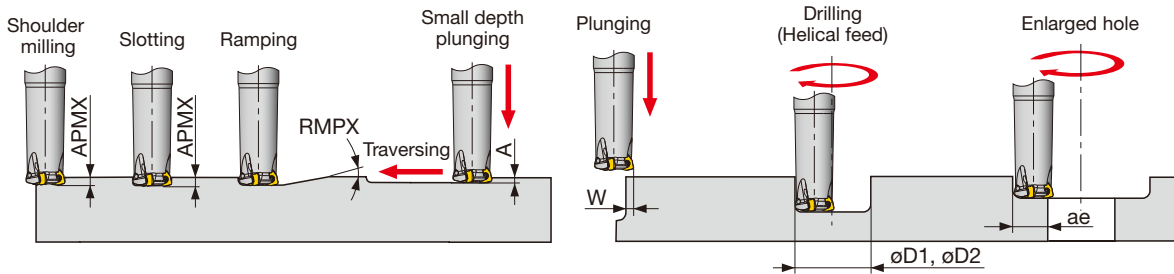




# STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Chipbreaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1018, 1020, etc.	- 300HB	First choice	AH3225	MM	328 - 984	0.020 - 0.059
			For wear resistance	AH8015			
P	Carbon steel, Alloy steel 1045, 1055, etc.	- 300HB	First choice	AH3225	MM	328 - 820	0.020 - 0.059
			For wear resistance	AH8015			
M	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	MM	328 - 656	0.020 - 0.047
			For wear resistance	AH8015			
M	Austenitic Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3225	MM	262 - 492	0.020 - 0.039
			For wear resistance	AH8015			
K	Martensitic Stainless steel S41000, 420SS, etc.	- 200HB	First choice	AH3225	MM	164 - 394	0.012 - 0.039
			For wear resistance	AH8015			
K	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	AH8015	MM	328 - 984	0.020 - 0.059
			For impact resistance	AH3225			
S	Ductile cast iron 60-40-18, etc.	150 - 250HB	First choice	AH8015	MM	262 - 656	0.020 - 0.059
			For impact resistance	AH3225			
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3225	MM	98 - 197	0.012 - 0.028
			For wear resistance	AH8015			
H	Superalloys Inconel718, etc.	- 40HRC	First choice	AH8015	MM	66 - 164	0.004 - 0.012
			For wear resistance	AH3225			
H	H-13, etc.	40 - 50HRC	First choice	AH8015	MM	262 - 492	0.004 - 0.020
			For impact resistance	AH3225			
H	Hardened steel D2, etc.	50 - 60HRC	First choice	AH8015	MM	164 - 230	0.001 - 0.004
			For wear resistance	AH3225			

# APPLICATION RANGE



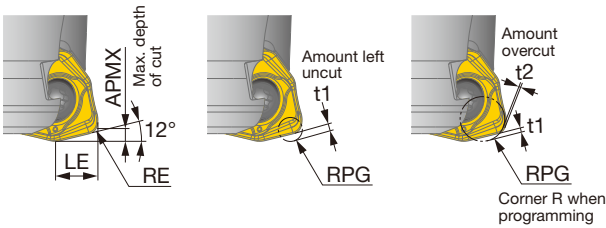
Inch	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Max. cutting width in plunging W	Min. machinable hole dia. øD1	Max. machinable hole dia. øD2	Max. cutting width in enlarged hole ae
EXWX03U0.62C0.62R02	0.625	0.039	3.6°	0.012	0.157	0.979	1.176	0.468
EXWX03U0.62C0.62R02L	0.625	0.039	3.6°	0.012	0.157	0.979	1.176	0.468
EXWX03U0.75C0.75R03	0.750	0.039	2.3°	0.012	0.157	1.196	1.511	0.593
EXWX03U0.75C0.75R03L	0.750	0.039	2.3°	0.012	0.157	1.196	1.511	0.593
EXWX03U1.00C1.00R04	1.000	0.039	1.4°	0.012	0.157	1.630	1.898	0.843
EXWX03U1.00C1.00R04L	1.000	0.039	1.4°	0.012	0.157	1.630	1.898	0.843
EXWX03U1.25C1.25R05	1.250	0.039	1°	0.012	0.157	2.116	2.392	1.093
EXWX03U1.25C1.25R05L	1.250	0.039	1°	0.012	0.157	2.116	2.392	1.093
TXWS03U150W0.75R06	1.500	0.039	0.7°	0.012	0.157	2.666	2.902	1.343
TXWS03U2.00W0.75R08	2.000	0.039	0.5°	0.012	0.157	3.457	3.850	1.843

**Tool dia: DCX (in), Number of revolution:  $n$  (min<sup>-1</sup>), Feed speed: Vf (ipm), Max. depth of cut: APMX = 0.039", Number of teeth: CICT**

ø0.625", CICT = 2		ø0.750", CICT = 3		ø1.000", CICT = 4		ø1.250", CICT = 5		ø1.500", CICT = 6		ø2.000", CICT = 8	
$n$	Vf	$n$	Vf	$n$	Vf	$n$	Vf	$n$	Vf	$n$	Vf
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
Vc = 660 sfm, fz = 0.039 ipt											
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
Vc = 660 sfm, fz = 0.039 ipt											
2995	168	2496	210	1872	210	1497	210	1248	210	936	210
Vc = 490 sfm, fz = 0.028 ipt											
2384	95	1986	119	1490	119	1192	119	993	119	745	119
Vc = 390 sfm, fz = 0.020 ipt											
2017	48	1681	61	1261	61	1008	60	840	60	630	60
Vc = 330 sfm, fz = 0.012 ipt											
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
Vc = 660 sfm, fz = 0.039 ipt											
2995	234	2496	292	1872	292	1497	292	1248	292	936	292
Vc = 490 sfm, fz = 0.039 ipt											
801	26	667	32	500	32	400	32	334	32	250	32
Vc = 131 sfm, fz = 0.016 ipt											
599	10	499	12	374	12	299	12	250	12	187	12
Vc = 98 sfm, fz = 0.008 ipt											
2384	57	1986	71	1490	72	1192	72	993	71	745	72
Vc = 390 sfm, fz = 0.012 ipt											
1204	10	1003	12	752	12	602	12	502	12	376	12
Vc = 197 sfm, fz = 0.004 ipt											

## 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  $R = 0.059"$ . If a larger radius is used, overcutting will occur. The following table shows the amount left uncut ( $t1$ ) and overcut ( $t2$ ).

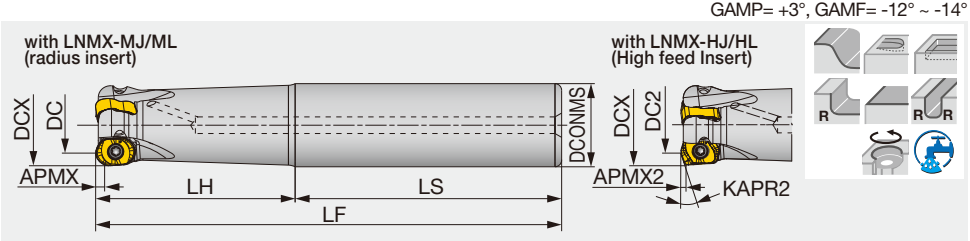


Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.039	0.047	0.138	0.039	0.022	-
<b>0.039</b>	<b>0.047</b>	<b>0.138</b>	<b>0.059</b>	<b>0.018</b>	-
0.039	0.047	0.138	0.079	0.014	0.006
0.039	0.047	0.138	0.098	0.008	0.020

\*Recommended



Radius endmill, shank type cutter

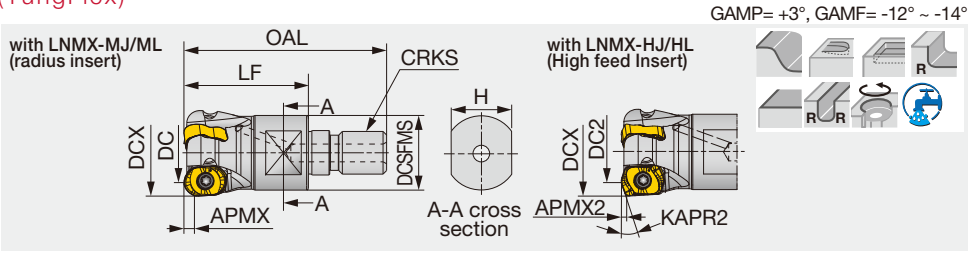


Inch	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EXLN04U1.00C1.00R03	0.157	0.051	1.000	3	0.693	0.669	20°	1.000	3.000	2.500	5.500	1.00	With	LNMX04...
EXLN04U1.00C1.00R03L	0.157	0.051	1.000	3	0.693	0.669	20°	1.000	3.000	4.000	7.000	1.32	With	LNMX04...
EXLN04U1.25C1.25R04	0.157	0.051	1.250	4	0.941	0.917	20°	1.250	3.000	3.000	6.000	1.80	With	LNMX04...
EXLN04U1.25C1.25R05	0.157	0.051	1.250	5	0.941	0.917	20°	1.250	3.000	3.000	6.000	1.80	With	LNMX04...
EXLN04U1.25C1.25R05L	0.157	0.051	1.250	5	0.941	0.917	20°	1.250	3.000	5.000	8.000	2.38	With	LNMX04...
EXLN06U1.25C1.25R02	0.236	0.079	1.250	2	0.758	0.746	25°	1.250	3.000	3.000	6.000	1.90	With	LNMX06...
EXLN06U1.50C1.25R03	0.236	0.079	1.500	3	1.012	1.000	25°	1.250	4.000	2.000	6.000	2.06	With	LNMX06...

Metric	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)



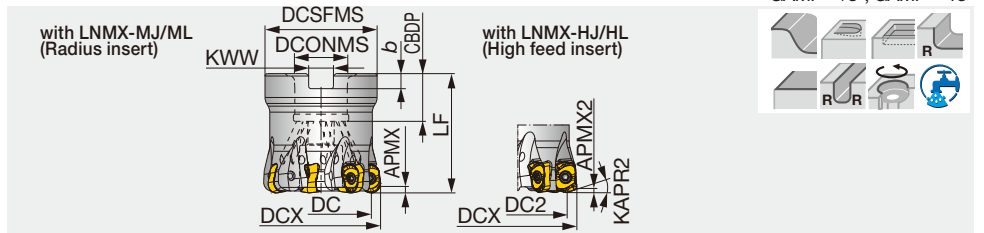
Metric	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HXLN04M020M10R02	4	1.3	20	2	12.2	11.6	20°	49	30	15	18	M10	0.07	With	LNMX04...
HXLN04M025M12R03	4	1.3	25	3	17.2	16.6	20°	57	35	17	21	M12	0.16	With	LNMX04...
HXLN05M025M12R02	5	-	25	2	15	-	-	57	35	17	21	M12	0.1	With	LNMX05...
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	Grip
EXLN04..., HXLN04...	CSPD-3	IP-10D	-	-
EXLN05..., HXLN05...	CSPB-4S	-	BLDIP15/S7	H-TB2W
EXLN06..., HXLN06...	CSPB-5	-	BLDIP20/S7	H-TB2W

Recommended clamping torque: CSPD-3 = 1.84 lbs-ft, 2.5 N·m, CSPB-4S = 2.58 lbs-ft, 3.5 N·m, CSPB-5 = 3.69 lbs-ft, 5 N·m

Reference pages: Inserts → **H050**, Standard cutting conditions → **H050 - H051**, TungFlex → **H038 - H039**



Inch	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TXLN04U1.50B0.50R06	0.157	0.051	1.500	6	1.193	1.169	20°	1.378	1.574	0.500	0.610	0.258	0.157	0.84	With	LNMX04...
TXLN04U2.00B0.75R07	0.157	0.051	2.000	7	1.693	1.669	20°	1.850	1.969	0.750	0.750	0.315	0.197	1.10	With	LNMX04...
TXLN06U2.00B0.75R05	0.236	0.079	2.000	5	1.511	1.499	25°	1.850	1.969	0.750	0.750	0.315	0.197	1.17	With	LNMX06...
TXLN06U2.50B0.75R06	0.236	0.079	2.500	6	2.009	1.997	25°	2.323	1.969	0.750	0.750	0.315	0.197	1.90	With	LNMX06...
TXLN06U3.00B1.00R07	0.236	0.079	3.000	7	2.510	2.498	25°	2.835	2.480	1.000	1.024	0.374	0.236	3.47	With	LNMX06...

Metric	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...

**INCH SPARE PARTS**

Designation	Clamping screw	Torx bit	Grip	Lubricant	Shell locking bolt
TXLN04U1.50B0.50R06	CSPD-3	BLD IP10/S7	H-TB2W	M-1000	(SR UNF 1/4X3/4 B18.3)
TXLN04U2.00B0.75R07	CSPD-3	BLD IP10/S7	H-TB2W	M-1000	(C0.375X1.125H)
TXLN06U2...	CSPD-5	BLD IP20/S7	H-TB2W	M-1000	(C0.375X1.125H)
TXLN06U3.00B1.00R07	CSPD-5	BLD IP20/S7	H-TB2W	M-1000	(C0.500X1.375H)

Recommended clamping torque: CSPD-3 = 1.84 lbs-ft, CSPB-5 = 3.69 lbs-ft

**METRIC SPARE PARTS**

Designation	Clamping screw	Torx bit	Grip	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	BLDIP15/S7	H-TB2W	FSHM8-30H
TXLN05M050B22.0R06	CSPB-4S	BLDIP15/S7	H-TB2W	CM10X30H
TXLN06M050B22.0R05	CSPB-5	BLDIP20/S7	H-TB2W	FSHM10-40H
TXLN06M052..., TXLN06M063...	CSPB-5	BLDIP20/S7	H-TB2W	CM10X30H

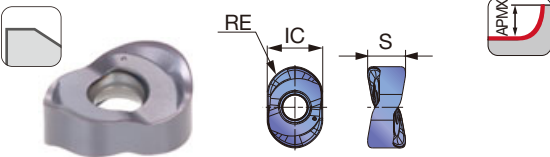
Recommended clamping torque: CSPD-3 = 2.5 N·m, CSPB-4S = 3.5 N·m, CSPB-5 = 5 N·m



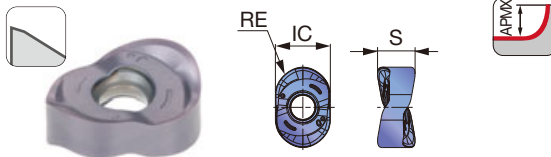


# INSERT

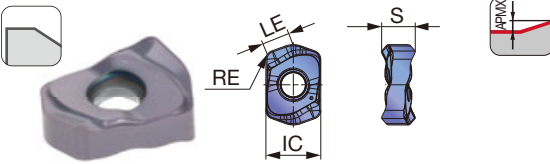
## LNMX-MJ (Radius, for general purpose)



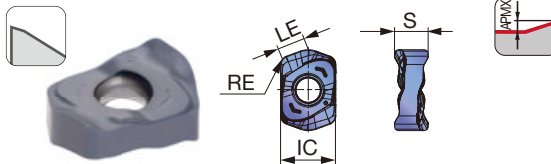
## LNMX-ML (Radius, for low cutting force)



## LNMX-HJ (High feed, for general purpose)



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

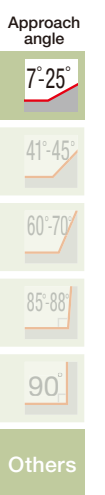


<b>P</b> Steel	☆	★	☆	★						
<b>M</b> Stainless		★		★						
<b>K</b> Cast iron	★	☆	★	☆						
<b>N</b> Non-ferrous										
<b>S</b> Superalloys	★	☆	★	☆						
<b>H</b> Hard materials	★	☆	☆	☆						

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated				LE	IC	S
			AH8015	AH3225	AH120	AH3135			
LNMX0405R4-MJ	0.157	0.157	●	●	●	●	-	0.323	0.220
LNMX0405R4-ML	0.157	0.157			●	●	-	0.323	0.220
LNMX0405ZER-HJ	0.051	0.051	●	●	●	●	0.169	0.323	0.197
LNMX0405ZER-HL	0.051	0.051	●	●		●	0.169	0.323	0.197
LNMX0506R5-MJ	0.197	0.197	●	●	●	●	-	0.409	0.240
LNMX0607R6-MJ	0.236	0.236	●	●	●	●	-	0.496	0.291
LNMX0607ZER-HJ	0.079	0.079	●	●	●	●	0.264	0.500	0.283

● : Line up



# STANDARD CUTTING CONDITIONS

## FOR RADIUS (MJ, ML)

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel 1015, 1020, etc.	- 200HB	First choice	AH3225	MJ	328 - 984	0.008 - 0.024
			Low cutting force	AH3135	ML	328 - 984	0.008 - 0.024
	Carbon steel, Alloy steel 1055, 4140, etc.	- 300HB	First choice	AH3225	MJ	328 - 820	0.008 - 0.024
			Low cutting force	AH3135	ML	328 - 820	0.008 - 0.024
<b>M</b>	Austenitic Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3135	MJ	328 - 656	0.008 - 0.024
			Low cutting force	AH3135	ML	328 - 656	0.008 - 0.024
	Martensitic Stainless steel 420SS etc.	- 200HB	First choice	AH3135	ML	328 - 984	0.008 - 0.024
			Fracture resistance	AH3135	MJ	328 - 984	0.008 - 0.024
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	AH120	MJ	328 - 984	0.008 - 0.024
			Fracture resistance	AH3225	MJ	328 - 984	0.008 - 0.024
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH120	MJ	262 - 820	0.008 - 0.024
			Fracture resistance	AH3225	MJ	262 - 820	0.008 - 0.024
<b>S</b>	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	ML	98 - 197	0.006 - 0.024
			Fracture resistance	AH3135	MJ	98 - 197	0.006 - 0.024
	Superalloys Inconel718, etc.	- 40HRC	First choice	AH8015	MJ	66 - 164	0.002 - 0.012
			Low cutting force	AH120	ML	66 - 164	0.002 - 0.012
<b>H</b>	Hardened steel	40 - 50HRC	First choice	AH3225	MJ	164 - 492	0.004 - 0.012
			Wear resistance	AH8015	MJ	164 - 492	0.004 - 0.012
		D2, etc.	50 - 60HRC	First choice	AH8015	MJ	164 - 230

· 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

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	
P	Low carbon steel 1015, 1020, etc.	- 300HB	First choice	AH3225	HJ	328 - 984	0.020 - 0.051	
			Wear resistance	AH8015	HJ			
			Low cutting force	AH3225	HL			
	Carbon steel, Alloy steel 1055, 4140, etc.	- 300HB	First choice	AH3225	HJ	328 - 820	0.020 - 0.051	
			Wear resistance	AH8015	HJ			
			Low cutting force	AH3225	HL			
Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	HJ	328 - 656	0.016 - 0.039		
		Wear resistance	AH8015	HJ				
		Low cutting force	AH3225	HL				
M	Austenitic Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3135	HL	328 - 656	0.012 - 0.035	
	Martensitic Stainless steel 420SS, etc.	- 200HB	Fracture resistance	AH3135	HJ			
K			Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	AH120	HJ	328 - 984
	Fracture resistance	AH3225						
K	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH120	HJ	262 - 820	0.020 - 0.051	
			Fracture resistance	AH3225				
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	HL	98 - 197	0.012 - 0.028	
			Fracture resistance	AH3135	HJ			
	Superalloys Inconel718, etc.	- 40HRC	First choice	AH8015	HL	66 - 164	0.004 - 0.012	
Fracture resistance			AH8015	HJ				
H	Hardened steel	H13, etc.	40 - 50HRC	First choice	AH3225	HJ	164 - 492	0.004 - 0.020
			Wear resistance	AH8015				
		D2, etc.	50 - 60HRC	First choice	AH8015	HJ	164 - 230	0.002 - 0.008

HIGH FEED (HJ, HL)  
LNMX06-HJ

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	
P	Low carbon steel 1015, 1020, etc.	- 300HB	First choice	AH3225	HJ	328 - 984	0.012 - 0.043	
			Wear resistance	AH8015				
			First choice	AH3225				
	Carbon steel, Alloy steel 1055, 4140, etc.	- 300HB	Wear resistance	AH8015	HJ	328 - 820	0.012 - 0.043	
			First choice	AH3225				
			Wear resistance	AH8015				
M	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	HJ	328 - 656	0.008 - 0.028	
			Wear resistance	AH8015				
M	Austenitic Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3135	HJ	328 - 656	0.008 - 0.028	
	Martensitic Stainless steel 420SS, etc.	- 200HB	First choice	AH3135	HJ			
K	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	AH120	HJ	328 - 984	0.012 - 0.043	
			Fracture resistance	AH3225				
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH120	HJ	262 - 820	0.012 - 0.043	
Fracture resistance			AH3225					
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	HJ	98 - 197	0.006 - 0.024	
			Fracture resistance	AH3135				
S	Superalloys Inconel718, etc.	- 40HRC	First choice	AH8015	HJ	66 - 164	0.002 - 0.012	
			Fracture resistance	AH8015				
H	Hardened steel	H13, etc.	40 - 50HRC	First choice	AH3225	HJ	164 - 492	0.004 - 0.012
			Wear resistance	AH8015				
		D2, etc.	50 - 60HRC	First choice	AH8015	HJ	164 - 230	0.002 - 0.006

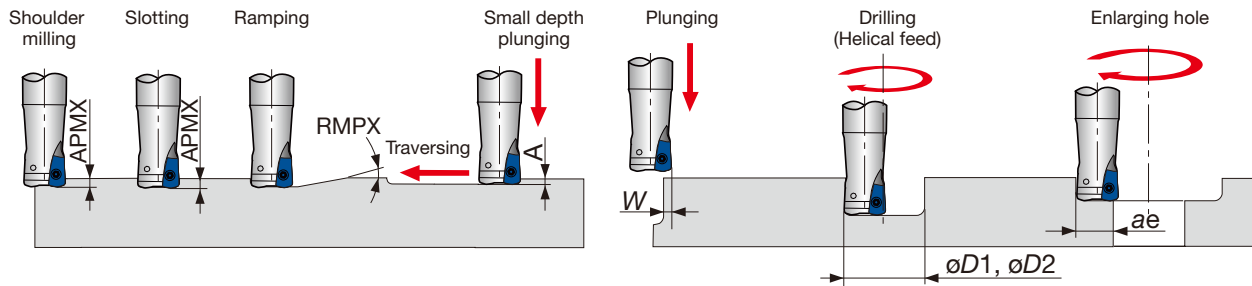
· When using a long shank or modular head with long overhang, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

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)

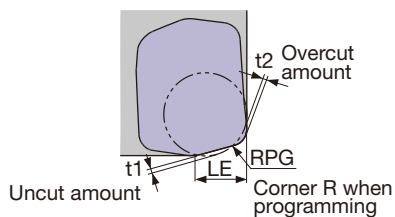
Inch	DCX	Max. depth of cut		Max. plunging	Max. cutting width in plunging	Min. machining dia.	Max. machining dia.	Max. cutting width in enlarging
		APMX	RMPX					
EXLN04U1.00...	1.000	0.157	3°	0.031	0.157	1.535	1.929	0.803
EXLN04U1.25...	1.250	0.157	1.9°	0.031	0.157	2.047	2.402	1.053
EXLN04U1.25C1.25R05	1.250	0.157	1.9°	0.031	0.157	2.047	2.402	1.053
TXLN04U1.50B0.50R06	1.500	0.157	1.2°	0.024	0.157	2.511	2.905	1.342
TXLN04U2.00B0.75R07	2.000	0.157	1°	0.027	0.157	3.496	3.889	1.842
EXLN06U1.25C01.25R02	1.250	0.236	3.7°	0.039	0.394	1.732	2.421	0.827
EXLN06U1.50C01.25R03	1.500	0.236	4°	0.067	0.394	2.165	2.921	1.063
TXLN06U2.00B0.75R05	2.000	0.236	2.7°	0.067	0.394	3.150	3.921	1.575
TXLN06U2.50B0.75R06	2.500	0.236	2.3°	0.079	0.394	4.134	4.921	2.047
TXLN06U3.00B1.00R07	3.000	0.236	1.6°	0.071	0.394	5.157	5.921	2.559

### HIGH FEED (HJ, HL)

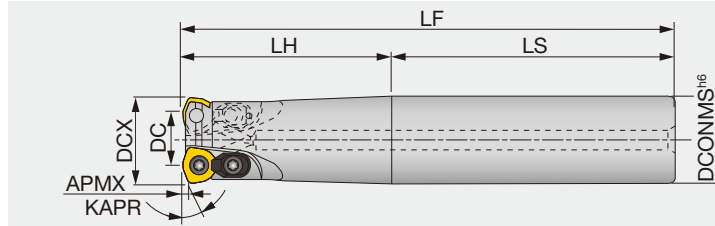
Inch	DCX	Max. depth of cut		Max. plunging	Max. cutting width in plunging	Min. machining	Max. machining	Max. cutting width in enlarging
		APMX	RMPX					
EXLN04U1.00C1.00R03	1.000	0.051	3°	0.030	0.161	1.496	1.929	0.803
EXLN04U1.25C1.25R04	1.250	0.051	2°	0.030	0.161	2.008	2.441	1.053
EXLN04U1.25C1.25R05	1.250	0.051	2°	0.030	0.161	2.008	2.441	1.053
TXLN04U1.50B0.50R06	1.500	0.157	1.3°	0.024	0.161	2.456	2.905	1.342
TXLN04U2.00B0.75R07	2.000	0.157	1°	0.027	0.161	3.456	3.889	1.842
EXLN06U1.25C01.25R02	1.250	0.079	5.7°	0.055	0.433	1.614	2.421	0.787
EXLN06U1.50C01.25R03	1.500	0.079	4.3°	0.059	0.433	2.087	2.921	1.024
TXLN06U2.00B0.75R05	2.000	0.079	2.7°	0.063	0.433	3.110	4.000	1.535
TXLN06U2.50B0.75R06	2.500	0.079	2°	0.067	0.433	4.094	4.921	2.008
TXLN06U3.00B1.00R07	3.000	0.079	1.4°	0.067	0.433	5.079	5.921	2.520

## 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 (in)	LE (in)	Programmed corner R (in)	Amount left uncut t1 (in)	Amount left overcut t2 (in)
LNMX04-HJ LNMX04-HL	0.051	0.161	R0.059	0.031	-
	0.051	0.161	R0.079	0.026	-
	0.051	0.161	R0.098	0.020	0.002
LNMX06-HJ	0.051	0.161	R0.118	0.014	0.008
	0.079	0.236	R0.079	0.055	-
	0.079	0.236	R0.118	0.043	-
	0.079	0.236	R0.138	0.036	-
	0.079	0.236	R0.157	0.029	0.002
	0.079	0.236	R0.197	0.016	0.014



Inch	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	KAPR	Air hole	Insert	Shank
EXP05075RSU	0.060	0.750	2	0.480	0.750	4.031	2.000	2.031	15°	With	WPM*05...	Cylindrical
EXP05075RLU	0.060	0.750	2	0.480	0.750	7.000	2.000	2.031	15°	With	WPM*05...	Cylindrical
EXP05075RLLU	0.060	0.750	2	0.480	0.750	10.000	4.000	3.000	15°	With	WPM*05...	Cylindrical
EXP06100RSU	0.060	1.000	2	0.697	1.000	4.781	5.000	3.000	15°	With	WPM*06...	Cylindrical
EXP06100RLU	0.060	1.000	2	0.697	1.000	8.000	5.000	3.000	15°	With	WPM*06...	Cylindrical
EXP06100RLLU	0.060	1.000	2	0.697	1.000	12.000	7.000	5.000	15°	With	WPM*06...	Cylindrical
EXP06125RSBU	0.060	1.250	3	0.929	1.250	5.281	3.000	2.281	20°	With	WPM*06...	Cylindrical
EXP06125RLBU	0.060	1.250	3	0.929	1.250	8.000	5.000	3.000	20°	With	WPM*06...	Cylindrical
EXP06125RLLBU	0.060	1.250	3	0.929	1.250	12.000	7.000	5.000	20°	With	WPM*06...	Cylindrical
EXP06150RSU	0.060	1.500	3	1.169	1.250	5.781	3.500	2.281	20°	With	WPM*06...	Cylindrical
EXP06150RLU	0.060	1.500	3	1.169	1.250	10.000	2.000	8.000	20°	With	WPM*06...	Cylindrical
EXP06150RLLU	0.060	1.500	3	1.169	1.250	12.000	2.000	10.000	20°	With	WPM*06...	Cylindrical
EXP09200RU	0.118	2.000	2	1.477	1.250	4.781	2.500	2.281	20°	With	WPMT09...	Cylindrical
EXP09200RLU	0.118	2.000	2	1.477	1.250	9.750	2.000	7.750	20°	With	WPMT09...	Cylindrical

Metric	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	Wrench 1	Wrench 2
EXP05...	-	CSPB-3.5S	M-1000	IP-15D	-
EXP06...	CSY-15	CSPB-4S	M-1000	IP-15D	-
EXP08...	CSX20	CSTB-5	M-1000	-	T-20T
EXP09...	CSY-20	CSPB-5	M-1000	-	IP-20T

Recommended clamping torque: CSPB-3.5S/CSPB-4S = 2.58 lbs·ft, 3.5 N·m, CSTB-5/CSPB-5 = 3.69 lbs·ft, 5 N·m

Reference pages: Inserts → **H056**, Standard cutting conditions → **H057 - H058**



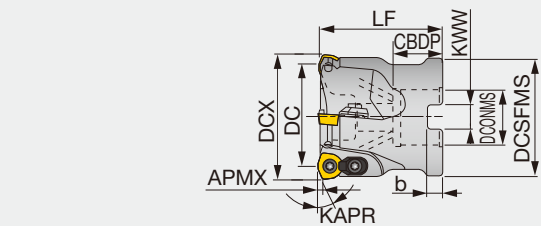


# MILLFEED

## TXP05/06/08/09

### High feed bore type cutter with double clamp system

GAMP = +5°, GAMF = -4° - -6°



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

Inch	APMX	DCX	CICT	DC	DCSFMS	LF	DCONMS	CBDP	KWW	b	KAPR	WT(lb)	Air hole	Insert
TXP06200RBU	0.060	2.000	4	1.650	1.850	1.969	0.750	0.750	0.315	0.197	20°	1.10	With	WPM*06...
TXP08050RU	0.060	2.000	3	1.547	1.850	1.969	0.750	0.750	0.315	0.197	10°	0.87	Without	WPMT08...
TXP08200RU-A	0.060	2.000	3	1.547	1.850	1.969	0.750	0.750	0.315	0.197	10°	0.87	With	WPMT08...
TXP05250RBU	0.060	2.500	6	2.190	2.323	1.969	0.750	0.750	0.315	0.197	15°	1.76	With	WPM*05...
TXP06250RBU	0.060	2.500	5	2.150	2.323	1.969	0.750	0.750	0.315	0.197	20°	1.76	With	WPM*06...
TXP09250RU	0.118	2.500	3	1.971	2.323	1.969	0.750	0.750	0.315	0.197	20°	1.54	With	WPMT09...
TXP05300RBU	0.060	3.000	7	2.690	2.835	2.480	1.000	1.024	0.374	0.236	20°	3.31	With	WPM*05...
TXP06300RBU	0.060	3.000	6	2.650	2.835	2.480	1.000	1.024	0.374	0.236	20°	3.09	With	WPM*06...
TXP08300RU-A	0.060	3.000	5	2.547	2.835	2.480	1.000	1.024	0.375	0.236	10°	3.20	With	WPMT08...
TXP09300RU	0.118	3.000	4	2.470	2.835	2.480	1.000	1.024	0.374	0.236	20°	2.65	With	WPMT09...
TXP08400RU-A	0.060	4.000	6	3.547	3.819	2.480	1.500	1.260	0.625	0.394	10°	5.80	With	WPMT08...
TXP09400RU	0.118	4.000	5	3.471	3.780	2.480	1.500	1.457	0.626	0.394	20°	4.41	With	WPMT09...
TXP09500RU	0.118	5.000	6	4.471	3.780	2.480	1.500	1.457	0.626	0.394	20°	6.83	With	WPMT09...
TXP09600RU	0.118	6.000	7	5.471	4.331	2.480	2.000	1.496	0.748	0.433	20°	9.48	Without	WPMT09...

Metric	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...

Reference pages: Inserts → **H056**, Standard cutting conditions → **H057 - H058**

## INCH SPARE PARTS



Designation	Clamp set	Clamping screw	Lubricant	Wrench	Wrench 1	Shell locking bolt (Optional parts)
TXP05250RBU	-	CSPB-3.5S	M-1000	IP-15D	-	(C0.375X1.125H)
TXP05300RBU	-	CSPB-3.5S	M-1000	IP-15D	-	(C0.500X1.375H)
TXP06200RBU, TXP06250RBU	CSY-15	CSPB-4S	M-1000	IP-15D	-	(C0.375X1.125H)
TXP06300RBU	CSY-15	CSPB-4S	M-1000	IP-15D	-	(C0.500X1.375H)
TXP08050RU, TXP08200RU-A	CSX20	CSTB-5	M-1000	-	T-20T	(C0.375X1.125H)
TXP08300RU-A	CSX20	CSTB-5	M-1000	-	T-20T	(C0.500X1.375H)
TXP08400RU-A	CSX20	CSTB-5	M-1000	-	T-20T	(TMBA-0.750H)
TXP09250RU	CSY-20	CSPB-5	M-1000	-	IP-20T	(C0.375X1.125H)
TXP09300RU	CSY-20	CSPB-5	M-1000	-	IP-20T	(C0.500X1.375H)
TXP09400RU, TXP09500RU	CSY-20	CSPB-5	M-1000	-	IP-20T	(TMBA-0.750H)
TXP09600RU	CSY-20	CSPB-5	M-1000	-	IP-20T	-

Recommended clamping torque: CSPB-3.5S/CSPB-4S = 2.58 lbs·ft, CSTB-5/CSPB-5 = 3.69 lbs·ft

## METRIC SPARE PARTS



Designation	Clamp set	Clamping screw	Lubricant	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 TXP06063RB-E	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06080RB-E	CSY-15	CSPB-4S	M-1000	-	CM12X30H	-	IP-15D	-
TXP08050R TXP0805*R-E	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08050R*	CSX20	CSTB-5	M-1000	-	FSHM10-40H	-	-	T-20T
TXP08063R	CSX20	CSTB-5	M-1000	-	-	CAP-CM10X1.5X30	-	T-20T
TXP08063R2 TXP08063RA	CSX20	CSTB-5	M-1000	-	CM10X30H	-	-	T-20T
TXP08063, 066R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08080R TXP08100R	CSX20	CSTB-5	M-1000	-	-	CAP-CM16X2.0X40	-	T-20T
TXP08080RA TXP08100RA	CSX20	CSTB-5	M-1000	-	CM16X40H	-	-	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 TXP09080R-E TXP09100R-E TXP09125R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09080R TXP09100R	CSY-20	CSPB-5	M-1000	-	CM16X40H	-	-	IP-20T
TXP09125R	CSY-20	CSPB-5	M-1000	TMBA-M20H	-	-	-	IP-20T
TXP09160R	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

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

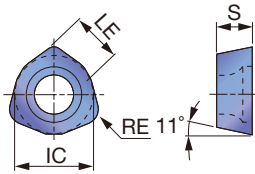
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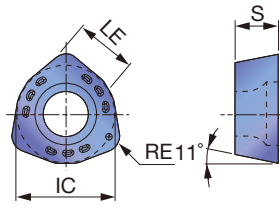


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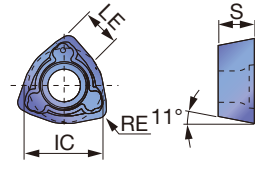
## WPMW05/06



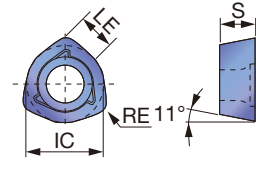
## WPMT08/09



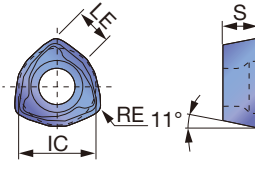
## WPMT05/06/08/09-ML



## 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	0.059	0.060	●	●	●	●				0.197	0.3130	0.138
WPMT05H315ZPR-ML	0.059	0.060	●	●	●	●				0.197	0.3130	0.138
WPMT05H315ZPR-MH	0.059	0.060	●	●		●				0.197	0.3134	0.138
WPMT05H315ZPR-DML	0.059	0.060				●				0.197	0.3130	0.138
WPMW06X415ZPR	0.059	0.060	●	●	●	●				0.236	0.3750	0.165
WPMT06X415ZPR-ML	0.059	0.060	●	●	●	●				0.236	0.3750	0.165
WPMT06X415ZPR-MH	0.059	0.060	●	●		●				0.236	0.3755	0.165
WPMT06X415ZPR-DML	0.059	0.060				●				0.236	0.3750	0.165
WPMT080615ZSR	0.059	0.060	●	●	●		●	●		0.315	0.507	0.250
WPMT080615ZPR-ML	0.059	0.060	●	●	●		●	●		0.315	0.507	0.250
WPMT080615ZSR-MH	0.059	0.060	●	●			●			0.315	0.507	0.250
WPMT080615ZPR-DML	0.059	0.060				●				0.315	0.507	0.250
WPMT090725ZSR	0.098	0.118	●	●			●	●		0.354	0.591	0.276
WPMT090725ZPR-ML	0.098	0.118	●	●	●		●	●		0.354	0.591	0.276
WPMT090725ZSR-MH	0.098	0.118	●	●	●		●			0.354	0.591	0.276
WPMT090725ZPR-DML	0.098	0.118				●				0.354	0.591	0.276

●: Line up

Reference pages: Standard cutting conditions → **H057 - H058**

# STANDARD CUTTING CONDITIONS

## 05-06 type

ISO	Workpiece material	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	ø0.787", 0.827" (CICT = 2)	ø0.984", 1.024" (CICT = 2)	ø1.260", 1.299" (CICT = 2, 3)	ø1.575" (CICT = 3)	ø1.969" (CICT = 4)	ø2.480" (CICT = 5, 6)	
<b>P</b>	Carbon Steels 1055, etc. < 300HB	AH3135	330 - 820	0.020 - 0.078	Vc = 500 sfm, fz = 0.031 ipt ap = 0.039", ae (in) = 1×DCX	Vc = 500 sfm, fz = 0.039 ipt ap = 0.039", ae (in) = 1×DCX					
	When plunging in small depth: fz = 0.008"										
	Alloy steels 4140, etc. < 300 HB	AH3135	330 - 650	0.020 - 0.078	Vc = 425 sfm, fz = 0.031 ipt ap = 0.039", ae (in) = 1×DCX	Vc = 425 sfm, fz = 0.039 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008"											
<b>M</b>	Prehardened steels P20, H13, etc. 30 - 40HRC	AH3135	260 - 500	0.020 - 0.039	Vc = 330 sfm, fz = 0.020 ipt ap = 0.039", ae (in) = 1×DCX	Vc = 330 sfm, fz = 0.020 ipt ap = 0.039", ae (in) = 1×DCX					
					When plunging in small depth: fz = 0.004 ipt						
<b>K</b>	Stainless steels S30400, etc. - 200HB	AH130 (AH3135)	330 - 650	0.020 - 0.078	Vc = 425 sfm, fz = 0.031 ipt ap = 0.039", ae (in) = 1×DCX	Vc = 425 sfm, fz = 0.039 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008 ipt											
<b>K</b>	Cast irons 250, etc. 150 - 250HB	AH120	330 - 820	0.032 - 0.098	Vc = 500 sfm, fz = 0.039 ipt ap = 0.039", ae (in) = 1×DCX	Vc = 590 sfm, fz = 0.059 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008 ipt											
<b>S</b>	Titanium alloys Ti-6Al-4V, etc. - 40HRC	AH130	98 - 197	0.012 - 0.028	Vc = 164 sfm, fz = 0.020 ipt, ap = 0.028", ae (in) = 0.5×DCX						
	When plunging in small depth: fz = 0.004 ipt										
<b>S</b>	Heat-resistant alloys Inconel 718, etc. - 40HRC	AH120	33 - 131	0.004 - 0.012	Vc = 98 sfm, fz = 0.008 ipt, ap = 0.028", ae (in) = 0.5×DCX						
	When plunging in small depth: fz = 0.004 ipt										
<b>H</b>	Hard materials D2, etc. 40 - 50HRC	AH730	200 - 330	0.020 - 0.078	Vc = 230 sfm, fz = 0.028 ipt, ap = 0.028", ae (in) = 1×DCX						
When plunging in small depth: fz = 0.004 ipt											

## 08 type

ISO	Workpiece material	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	ø1.575" (CICT = 2)	ø1.969" (CICT = 3)	ø2.480" (CICT = 4)	ø3.150" (CICT = 5)	ø3.937" (CICT = 6)	ø4.921" (CICT = 7)	ø6.299" (CICT = 8)
<b>P</b>	Carbon Steels 1055, etc. < 300HB	AH3135	330 - 820	0.020 - 0.078	Vc = 591 sfm, fz = 0.039 ipt ap = 0.039", ae = 1.575"	Vc = 656 sfm, fz = 0.059 ipt ap = 0.039", ae (in) = 1×DCX					
	When plunging in small depth: fz = 0.008 ipt										
	Alloy steels 4140, etc. < 300 HB	AH3135	330 - 650	0.020 - 0.078	Vc = 427 sfm, fz = 0.039 ipt ap = 0.039", ae = 1.575"	Vc = 492 sfm, fz = 0.059 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008 ipt											
<b>M</b>	Prehardened steels P20, H13, etc. 30 - 40HRC	AH3135	260 - 500	0.020 - 0.039	Vc = 328 sfm, fz = 0.020 ipt ap = 0.039", ae = 1.575"	Vc = 394 sfm, fz = 0.031 ipt ap = 0.039", ae (in) = 1×DCX					
					When plunging in small depth: fz = 0.004 ipt						
<b>M</b>	Stainless steels S30400, etc. - 200HB	AH130 (AH3135)	330 - 650	0.020 - 0.078	Vc = 427 sfm, fz = 0.039 ipt ap = 0.039", ae = 1.575"	Vc = 492 sfm, fz = 0.059 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008 ipt											
<b>K</b>	Cast irons 250, etc. 150 - 250HB	AH120	500 - 820	0.032 - 0.098	Vc = 591 sfm, fz = 0.059 ipt ap = 0.039", ae = 1.575"	Vc = 656 sfm, fz = 0.079 ipt ap = 0.039", ae (in) = 1×DCX					
When plunging in small depth: fz = 0.008 ipt											
<b>S</b>	Titanium alloys Ti-6Al-4V, etc. - 40HRC	AH130	98 - 197	0.012 - 0.028	Vc = 164 sfm, fz = 0.020 ipt, ap = 0.028", ae (in) = 0.5×DCX						
	When plunging in small depth: fz = 0.004 ipt										
<b>S</b>	Heat-resistant alloys Inconel 718, etc. - 40HRC	AH120	33 - 131	0.004 - 0.012	Vc = 98 sfm, fz = 0.008 ipt, ap = 0.028", ae (in) = 0.5×DCX						
	When plunging in small depth: fz = 0.004 ipt										
<b>H</b>	Hard materials D2, etc. 40 - 50HRC	AH730	170 - 260	0.020 - 0.039	Vc = 230 sfm, fz = 0.028 ipt, ap = 0.028", ae (in) = 1×DCX						
When plunging in small depth: fz = 0.004 ipt											

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.

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





High Feed Milling

# 09 type



Face Milling



Shoulder Milling



Slot Milling



Profile Milling



Chamfering, Counterbore



Finish Face Milling

ISO	Workpiece material	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	ø2.000" (CICT = 2)	ø2.500" (CICT = 3)	ø3.000" (CICT = 4)	ø4.000" (CICT = 5)	ø5.000" (CICT = 6)	ø6.000" (CICT = 7)
P	Carbon Steels 1055, etc. < 300HB	AH3135	330 - 820	0.020 - 0.078	Vc = 650 sfm, fz = 0.059 ipt, ap = 0.079", ae (in) = 1×DCX When plunging in small depth: fz = 0.008 ipt					
	Alloy steels 4140, etc. < 300 HB	AH3135	330 - 650	0.020 - 0.078	Vc = 500 sfm, fz = 0.059 ipt, ap = 0.079", ae (in) = 1×DCX When plunging in small depth: fz = 0.008 ipt					
	Prehardened steels P20, H13, etc. 30 - 40HRC	AH3135	260 - 500	0.020 - 0.039	Vc = 3.94, fz = 0.031 ipt, ap = 0.079", ae (in) = 1×DCX When plunging in small depth: fz = 0.004 ipt					
M	Stainless steels S30400, etc. - 200HB	AH130 (AH3135)	330 - 650	0.020 - 0.078	Vc = 500 sfm, fz = 0.059 ipt, ap = 0.079", ae (in) = 1×DCX When plunging in small depth: fz = 0.008 ipt					
K	Cast irons 250, etc. 150 - 250HB	AH120	500 - 820	0.032 - 0.098	Vc = 650 sfm, fz = 0.078 ipt, ap = 0.079", ae (in) = 1×DCX When plunging in small depth: fz = 0.008 ipt					
S	Titanium alloys Ti-6Al-4V, etc. - 40HRC	AH130	98 - 197	0.012 - 0.028	Vc = 164 sfm, fz = 0.020 ipt, ap = 0.059", ae (in) = 0.5×DCX When plunging in small depth: fz = 0.039 ipt					
	Heat-resistant alloys Inconel 718, etc. - 40HRC	AH120	33 - 131	0.004 - 0.012	Vc = 98 sfm, fz = 0.008 ipt, ap = 0.039", ae (in) = 0.5×DCX When plunging in small depth: fz = 0.039 ipt					
H	Hard materials D2, etc. 40 - 50HRC	AH730	200 - 330	0.020 - 0.039	Vc = 230 sfm, fz = 0.028 ipt, ap = 0.027", ae (in) = 1×DCX When plunging in small depth: fz = 0.004 ipt					

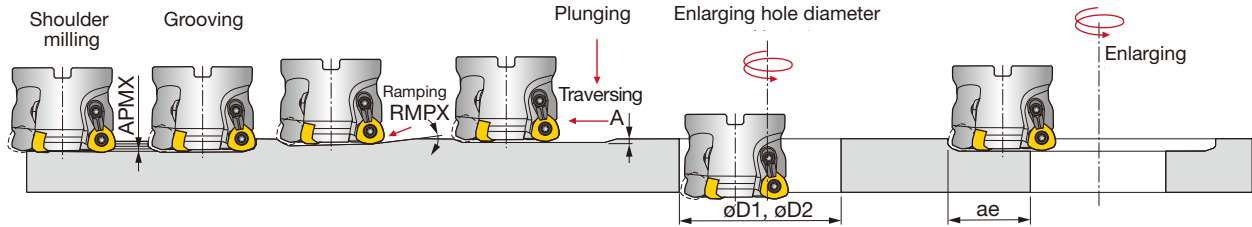
The cutting speed and feed should be set to 70 to 80 % of the value shown in the above table when overhang length of tool exceeds 3D.

## Approach angle



Others

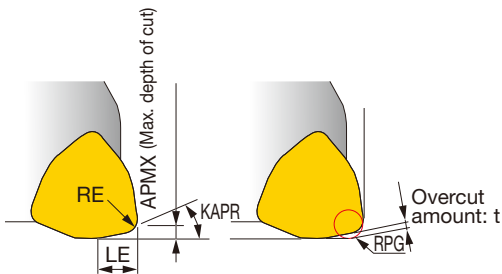
## APPLICATION RANGE



Inch	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
TXP05250RBU	2.500	0.060	2° 30'	0.020	3.860	4.840	2.240
TXP05300RBU	3.000	0.060	1° 30'	0.020	5.200	6.180	2.910
TXP06250RBU	2.500	0.060	2°	0.040	3.860	4.840	2.240
TXP06200RBU	2.000	0.060	1° 30'	0.040	3.270	3.820	1.770
TXP06300RBU	3.000	0.060	1° 30'	0.040	5.200	6.180	2.910
TXP08050RU	2.000	0.060	4°	0.040	2.830	3.820	1.730
TXP08300RU-A	3.000	0.060	1° 30'	0.040	5.200	6.180	2.910
TXP08400RU-A	4.000	0.060	1°	0.040	6.770	7.760	3.700
TXP09250RU	2.500	0.118	2°	0.060	3.860	4.840	2.200
TXP09300RU	3.000	0.118	1° 30'	0.060	5.200	6.180	2.870
TXP09400RU	4.000	0.118	1°	0.060	6.770	7.760	3.660
TXP09500RU	5.000	0.118	0° 45'	0.060	8.740	9.720	4.650
TXP09600RU	6.000	0.118	0° 30'	0.060	11.500	12.480	6.020
EXP05075...	0.750	0.060	3°	0.020	1.181	1.457	0.630
EXP06100...	1.000	0.060	5°	0.039	1.299	1.850	0.787
EXP06125...	1.250	0.060	3° 30'	0.039	1.850	2.402	1.063
EXP06150...	1.500	0.060	2°	0.039	2.480	2.874	1.299

## 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.

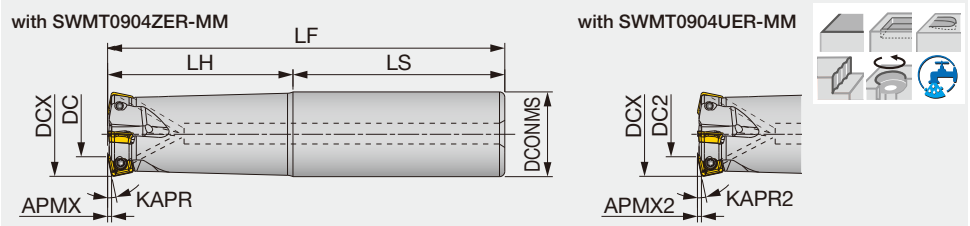


TXP	Max. depth of cut APMX	Corner of insert RE	Cutting edge angle KAPR	Corner R when programming LE	t	Corner R when programming RPG
05	0.060	0.059	20°	0.150	0.020	R.078
06	0.060	0.059	20°	0.169	0.028	R.078
08	0.060	0.059	20°	0.224	0.028	R.078
09	0.118	0.098	20°	0.268	0.055	R.118
09	0.118	0.098	20°	0.268	0.047	R.157





High feed mill



Inch	APMX	APMX2	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	KAPR2	WT(lb)	Air hole	Insert
EXSW09U1.00C1.00R03	0.059	0.039	1.000	3	0.409	0.370	1.000	5.500	2.500	3.000	12°	7°	1.014	With	SWMT09...
EXSW09U1.00C1.00R03L	0.059	0.039	1.000	3	0.409	0.370	1.000	7.000	4.000	3.000	12°	7°	1.279	With	SWMT09...
EXSW09U1.25C1.25R04	0.059	0.039	1.250	4	0.657	0.618	1.250	6.000	3.000	3.000	12°	7°	1.786	With	SWMT09...
EXSW09U1.25C1.25R04L	0.059	0.039	1.250	4	0.657	0.618	1.250	8.000	5.000	3.000	12°	7°	2.359	With	SWMT09...

Metric	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...

SPARE PARTS

Designation	Clamping screw	Mono block wrench	Lubricant
EXSW09...	CSPD-3	IP-10D	M-1000

Recommended clamping torque: 1.84 lbs-ft, 2.5 N·m

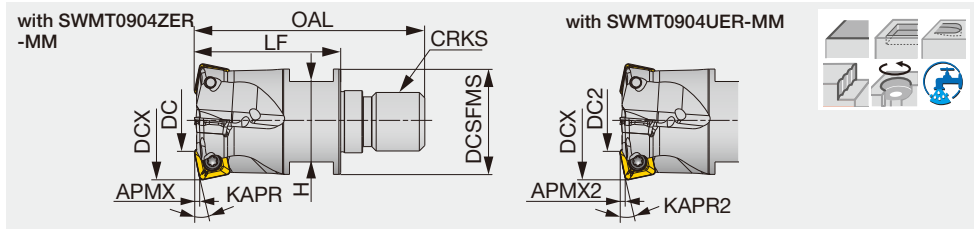
Approach angle

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

Reference pages: Inserts → **H063**, Standard cutting conditions → **H064 - H065**

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

GAMP = +3.8°, GAMF = -3.5°



Metric	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...

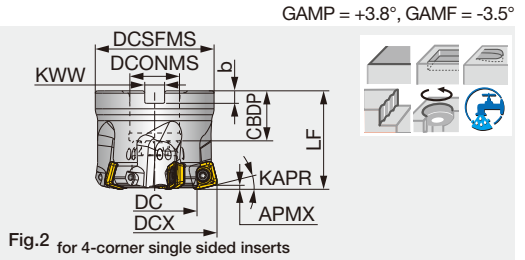
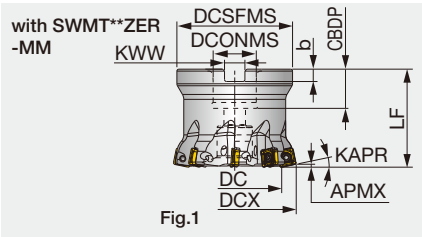
### SPARE PARTS

Designation	Clamping screw	Mono block wrench	Lubricant
HXSW09...	CSPD-3	IP-10D	M-1000

Recommended clamping torque: 2.5 N·m



### High feed mill



Inch	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	DCONMS	CDBP	LF	KWW	b	KAPR	KAPR2	WT(lb)	Air hole	Insert	Fig.
TXSW09U1.50B0.50R04	0.059	0.039	1.500	4	0.909	0.870	1.378	0.500	0.630	1.575	0.258	0.157	12°	7°	0.40	With	SWMT09...	1
TXSW09U1.50B0.50R05	0.059	0.039	1.500	5	0.909	0.870	1.378	0.500	0.630	1.575	0.258	0.157	12°	7°	0.40	With	SWMT09...	1
TXSW09U2.00B0.75R05	0.059	0.039	2.000	5	1.406	1.366	1.772	0.750	0.750	1.969	0.315	0.197	12°	7°	0.82	With	SWMT09...	1
TXSW09U2.00B0.75R07	0.059	0.039	2.000	7	1.406	1.366	1.772	0.750	0.750	1.969	0.315	0.197	12°	7°	0.84	With	SWMT09...	1
TXSW15U2.00B0.75R03	0.098	0.079	2.000	3	0.929	0.905	1.850	0.750	0.750	1.969	0.315	0.197	14°	10°	0.95	With	SWMT15...	2
TXSW09U2.50B0.75R06	0.059	0.039	2.500	6	1.906	1.866	2.323	0.750	0.750	1.969	0.315	0.197	12°	7°	1.59	With	SWMT09...	1
TXSW09U2.50B0.75R08	0.059	0.039	2.500	8	1.906	1.866	2.323	0.750	0.750	1.969	0.315	0.197	12°	7°	1.61	With	SWMT09...	1
TXSW15U2.50B0.75R04	0.098	0.079	2.500	4	1.480	1.405	2.323	0.750	0.750	1.969	0.315	0.197	14°	10°	1.52	With	SWMT15...	2
TXSW09U3.00B1.00R07	0.059	0.039	3.000	7	2.406	2.366	2.835	1.000	1.024	2.480	0.374	0.236	12°	7°	3.00	With	SWMT09...	1
TXSW09U3.00B1.00R10	0.059	0.039	3.000	10	2.406	2.366	2.835	1.000	1.024	2.480	0.374	0.236	12°	7°	3.06	With	SWMT09...	1
TXSW15U3.00B1.00R05	0.098	0.079	3.000	5	1.980	1.905	2.835	1.000	1.024	2.480	0.374	0.236	14°	10°	2.71	With	SWMT15...	2
TXSW09U4.00B1.50R08	0.059	0.039	4.000	8	3.406	3.366	3.819	1.500	1.181	2.480	0.626	0.394	12°	7°	4.67	With	SWMT09...	1
TXSW15U4.00B1.50R06	0.098	0.079	4.000	6	2.980	2.905	3.819	1.500	1.063	2.480	0.626	0.394	14°	10°	4.87	With	SWMT15...	2
TXSW15U5.00B1.50R07	0.098	0.079	5.000	7	3.980	3.905	3.819	1.500	1.614	2.480	0.626	0.394	14°	10°	6.37	With	SWMT15...	2
TXSW15U6.00B2.00R08	0.098	0.079	6.000	8	4.980	4.905	4.331	2.000	1.496	2.480	0.748	0.433	14°	10°	8.29	With	SWMT15...	2

Metric	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	DCONMS	CDBP	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

### INCH SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Torx bit
TXSW09U1.50...	CSPD-3	H-TB2W	M-1000	-	-	(SR UNF 1/4X3/4 B18.3)	BLDIP10/S7
TXSW09U2.00...	CSPD-3	H-TB2W	M-1000	-	(C0.375X1.125H)	-	BLDIP10/S7
TXSW09U2.50...	CSPD-3	H-TB2W	M-1000	-	(C0.375X1.125H)	-	BLDIP10/S7
TXSW09U3.00...	CSPD-3	H-TB2W	M-1000	-	(C0.500x1.375H)	-	BLDIP10/S7
TXSW09U4.00...	CSPD-3	H-TB2W	M-1000	(TMBA-0.750H)	-	-	BLDIP10/S7
TXSW15U2.00B0.75R03	TS50115I	H-TB2W	M-1000	-	-	SR 5/16-32UNEF_3/8-24UNF	BT20S
TXSW15U2.50B0.75R04	TS50115I	H-TB2W	M-1000	-	(SD-06-A6)	-	BT20S
TXSW15U3.00B1.00R05	TS50115I	H-TB2W	M-1000	-	(C0.500x1.375H)	-	BT20S
TXSW15U4.00B1.50R06	TS50115I	H-TB2W	M-1000	-	(SD-12-99)	-	BT20S
TXSW15U5.00B1.50R07	TS50115I	H-TB2W	M-1000	(TMBA-0.750H)	-	-	BT20M
TXSW15U6.00B2.00R08	TS50115I	H-TB2W	M-1000	-	-	-	BT20M

Recommended clamping torque: CSPD-3 = 1.84 lbs-ft, TS50115I = 3.69 lbs-ft

Reference pages: Inserts → **H063**, Standard cutting conditions → **H064 - H065**

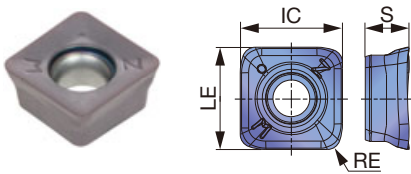
**METRIC SPARE PARTS**

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Torx bit
TXSW09M04...	CSPD-3	H-TB2W	M-1000	-	FSHM8-30H	-	BLDIP10/S7
TXSW09M05...	CSPD-3	H-TB2W	M-1000	-	FSHM10-40H	-	BLDIP10/S7
TXSW09M06...	CSPD-3	H-TB2W	M-1000	-	CM10X30H	-	BLDIP10/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

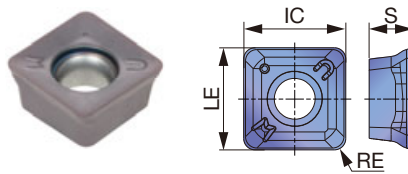
Recommended clamping torque: CSPD-3 = 2.5 N·m, TS50115I = 5 N·m

**INSERT**

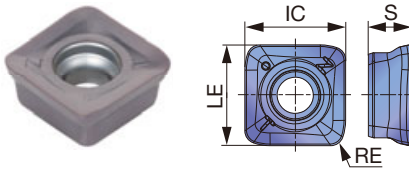
**SWMT09/15ZER-MM (for general purpose)**



**SWMT09/15UER-MM (for general purpose)**



**SWMT15ZER-MT (Robust cutting edges)**



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

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated					LE	IC	S
			AH130	AH3135	AH3225	AH120	AH8015			
SWMT0904ZER-MM	0.039	0.059	●	●	●	●	●	0.339	0.339	0.157
SWMT0904UER-MM	0.039	0.039	●	●	●	●	●	0.356	0.356	0.157
SWMT1506ZER-MM	0.079	0.098		●		●		0.630	0.630	0.268
SWMT1506UER-MM	0.079	0.079		●				0.641	0.641	0.268
SWMT1506ZER-MT	0.079	0.098		●		●		0.627	0.627	0.268

● : Line up

Reference pages: Standard cutting conditions → **H064 - H065**



High Feed Milling

# STANDARD CUTTING CONDITIONS

## 09 type

ISO	Workpiece material	Hardness	Priority	Insert type	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steel 1045, 1055, etc.	- 300HB	First choice	ZER	AH3225	MM	328 - 984	0.02 - 0.059
			Fracture resistance	ZER	AH3135	MM	328 - 984	0.02 - 0.059
			Wear resistance	UER	AH3225	MM	328 - 984	0.02 - 0.059
	Alloy steel 4140, etc.	- 300HB	First choice	ZER	AH3225	MM	328 - 656	0.02 - 0.059
			Fracture resistance	ZER	AH3135	MM	328 - 656	0.02 - 0.059
			Wear resistance	UER	AH3225	MM	328 - 656	0.02 - 0.059
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	ZER	AH3225	MM	328 - 656	0.02 - 0.047
			Fracture resistance	ZER	AH3135	MM	328 - 656	0.02 - 0.047
			Wear resistance	UER	AH3225	MM	328 - 656	0.02 - 0.047
<b>M</b>	Austenitic stainless steel 304SS, etc.	- 200HB	First choice	UER	AH3135	MM	328 - 492	0.02 - 0.047
			Fracture resistance	UER	AH130	MM	328 - 492	0.02 - 0.047
			Low cutting force	ZER	AH3135	MM	328 - 492	0.02 - 0.047
	Precipitation hardening stainless steel 17-4 PH, etc.	28HRC - (H1150)	First choice	UER	AH3135	MM	262 - 492	0.012 - 0.047
			Fracture resistance	UER	AH130	MM	262 - 492	0.012 - 0.047
		Low cutting force	ZER	AH3135	MM	262 - 492	0.012 - 0.047	
	40HRC - (H900)	First choice	UER	AH3135	MM	262 - 394	0.012 - 0.031	
		Fracture resistance	UER	AH130	MM	262 - 394	0.012 - 0.031	
		Low cutting force	ZER	AH3135	MM	262 - 394	0.012 - 0.031	
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	ZER	AH8015	MM	328 - 984	0.02 - 0.079
			Fracture resistance	ZER	AH120	MM	328 - 984	0.02 - 0.079
	Ductile cast iron 80-55-06, etc.	150 - 250HB	First choice	ZER	AH8015	MM	262 - 656	0.02 - 0.079
			Fracture resistance	ZER	AH120	MM	262 - 656	0.02 - 0.079
	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	First choice	UER	AH130	MM	98 - 197	0.012 - 0.028
			Wear resistance	UER	AH8015	MM	98 - 197	0.012 - 0.028
<b>S</b>	Heat-resistance alloys Inconel, Hastelloy, etc.	- 40HRC	First choice	UER	AH8015	MM	66 - 164	0.004 - 0.012
			Fracture resistance	UER	AH130	MM	66 - 164	0.004 - 0.012
			Low cutting force	ZER	AH8015	MM	66 - 164	0.004 - 0.012
<b>H</b>	Hardened steel	H13, etc. 40 - 50HRC	First choice	UER	AH8015	MM	262 - 427	0.004 - 0.012
			Fracture resistance	UER	AH130	MM	262 - 427	0.004 - 0.012
			Low cutting force	ZER	AH8015	MM	262 - 427	0.004 - 0.012

## 15 type

ISO	Workpiece material	Hardness	Priority	Insert type	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steel 1045, 1055, etc.	- 300HB	First choice	ZER	AH3135	MM	328 - 984	0.02 - 0.059
			Wear resistance	ZER	AH120	MM	328 - 984	0.02 - 0.059
			Fracture resistance	ZER	AH3135	MT	328 - 984	0.02 - 0.079
	Alloy steel 4140, etc.	- 300HB	First choice	ZER	AH3135	MM	328 - 656	0.02 - 0.059
			Wear resistance	ZER	AH120	MM	328 - 656	0.02 - 0.059
			Fracture resistance	ZER	AH3135	MT	328 - 656	0.02 - 0.079
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	ZER	AH3135	MM	328 - 656	0.02 - 0.047
			Wear resistance	ZER	AH120	MM	328 - 656	0.02 - 0.047
			Fracture resistance	ZER	AH3135	MT	328 - 656	0.02 - 0.059
<b>M</b>	Austenitic stainless steel 304SS, etc.	- 200HB	First choice	UER	AH3135	MM	328 - 492	0.02 - 0.047
			Low cutting force	ZER	AH3135	MM	328 - 492	0.02 - 0.047
			Fracture resistance	ZER	AH3135	MT	328 - 492	0.02 - 0.047
	Precipitation hardening stainless steel 17-4 PH, etc.	28HRC - (H1150)	First choice	UER	AH3135	MM	262 - 492	0.012 - 0.047
			Low cutting force	ZER	AH3135	MM	262 - 492	0.012 - 0.047
		Low cutting force	ZER	AH3135	MM	262 - 492	0.012 - 0.047	
	40HRC - (H900)	First choice	UER	AH3135	MM	262 - 394	0.012 - 0.031	
		Fracture resistance	ZER	AH3135	MM	262 - 394	0.012 - 0.031	
		Low cutting force	ZER	AH3135	MM	262 - 394	0.012 - 0.031	
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	ZER	AH120	MT	328 - 984	0.02 - 0.079
			Fracture resistance	ZER	AH3135	MT	328 - 984	0.02 - 0.079
	Ductile cast iron 80-55-06, etc.	150 - 250HB	Low cutting force	ZER	AH120	MM	328 - 984	0.02 - 0.059
			Fracture resistance	ZER	AH120	MT	262 - 656	0.02 - 0.079
	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	First choice	ZER	AH120	MT	262 - 656	0.02 - 0.079
			Low cutting force	ZER	AH3135	MT	262 - 656	0.02 - 0.079
<b>S</b>	Heat-resistance alloys Inconel, Hastelloy, etc.	- 40HRC	First choice	UER	AH3135	MM	98 - 197	0.012 - 0.028
			Fracture resistance	ZER	AH3135	MM	98 - 197	0.012 - 0.028
			Low cutting force	ZER	AH3135	MM	98 - 197	0.012 - 0.028
<b>H</b>	Hardened steel	H13, etc. 40 - 50HRC	First choice	UER	AH3135	MM	66 - 164	0.004 - 0.012
			Wear resistance	ZER	AH120	MM	66 - 164	0.004 - 0.012
		D2, etc. 50 - 60HRC	First choice	ZER	AH3135	MT	262 - 427	0.004 - 0.012
			Wear resistance	ZER	AH120	MT	262 - 427	0.004 - 0.012
			First choice	ZER	AH120	MT	164 - 230	0.002 - 0.008

Approach angle



Others

Tool dia.: DC (in), Number of revolutions:  $n$  (rpm), Feed speed:  $V_f$  (ipm), Number of inserts: CICT

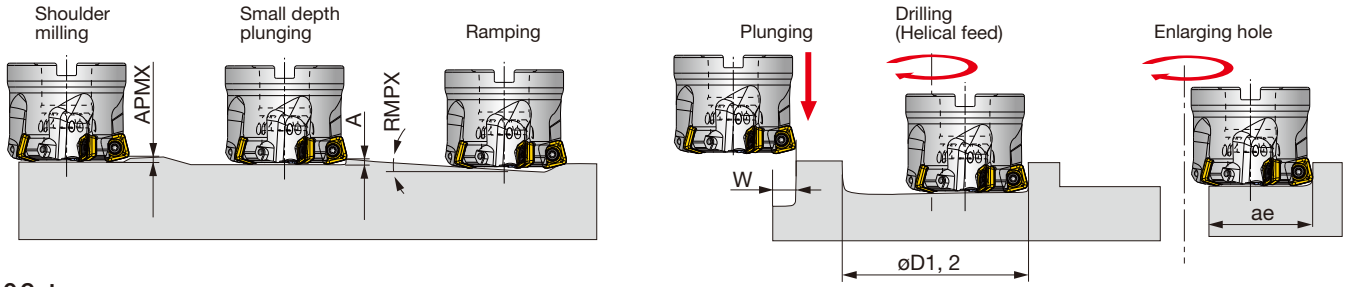
ø1.000", CICT = 3		ø1.250", CICT = 4		ø1.500", CICT = 5		ø2.000", CICT = 7	
$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$
2,550	301	1,990	313	1,590	313	1,270	350
Vc = 660 sfm, fz = 0.040 ipt							
1,910	226	1,490	235	1,190	234	960	265
Vc = 490 sfm, fz = 0.040 ipt							
1,910	180	1,490	188	1,190	187	960	212
Vc = 490 sfm, fz = 0.031 ipt							
1,530	144	1,190	150	960	151	760	168
Vc = 400 sfm, fz = 0.031 ipt							
1,530	144	1,190	150	960	151	760	168
Vc = 400 sfm, fz = 0.031 ipt							
1,270	90	1,000	94	800	94	640	106
Vc = 330 sfm, fz = 0.024 ipt							
2,550	361	1,990	376	1,590	376	1,270	420
Vc = 660 sfm, fz = 0.047 ipt							
1,910	271	1,490	281	1,190	281	1,270	420
Vc = 490 sfm, fz = 0.047 ipt							
510	30	400	31	320	31	250	35
Vc = 150 sfm, fz = 0.020 ipt							
380	9	300	9	240	9	190	11
Vc = 120 sfm, fz = 0.008 ipt							
1,270	30	1,000	31	800	31	640	35
Vc = 100 sfm, fz = 0.200 ipt							

Tool dia.: DC (in), Number of revolutions:  $n$  (rpm), Feed speed:  $V_f$  (ipm), Number of inserts: CICT

ø2.000", CICT = 3		ø2.500", CICT = 4		ø3.000", CICT = 5		ø4.000", CICT = 6		ø5.000", CICT = 7		ø6.000", CICT = 8	
$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$
1,270	150	1,010	159	800	157	640	151	510	141	400	126
Vc = 660 sfm, fz = 0.040 ipt											
1,270	180	1,010	191	800	189	640	181	510	169	400	151
Vc = 660 sfm, fz = 0.047 ipt											
960	113	760	120	600	118	480	113	380	105	300	94
Vc = 490 sfm, fz = 0.040 ipt											
960	136	760	144	600	142	480	136	380	126	300	113
Vc = 490 sfm, fz = 0.047 ipt											
960	91	760	96	600	94	480	91	380	84	300	76
Vc = 490 sfm, fz = 0.031 ipt											
960	113	760	120	600	118	480	113	380	105	300	94
Vc = 490 sfm, fz = 0.040 ipt											
760	72	610	77	480	76	380	72	310	69	240	61
Vc = 400 sfm, fz = 0.031 ipt											
760	72	610	77	480	76	380	72	310	69	240	61
Vc = 400 sfm, fz = 0.031 ipt											
640	45	510	48	400	47	320	45	250	41	200	38
Vc = 330 sfm, fz = 0.024 ipt											
1,270	180	1,010	191	800	189	640	181	510	169	400	151
Vc = 660 sfm, fz = 0.047 ipt											
1,270	150	1,010	159	800	157	640	151	510	141	400	126
Vc = 660 sfm, fz = 0.040 ipt											
960	136	760	144	600	142	480	136	380	126	300	113
Vc = 490 sfm, fz = 0.047 ipt											
960	113	760	120	600	118	480	113	380	105	300	94
Vc = 490 sfm, fz = 0.040 ipt											
250	15	200	16	160	16	130	15	100	14	80	13
Vc = 150 sfm, fz = 0.020 ipt											
200	5	150	5	120	5	100	5	80	4	60	4
Vc = 120 sfm, fz = 0.008 ipt											
640	15	510	16	400	16	320	15	250	14	200	13
Vc = 100 sfm, fz = 0.200 ipt											
380	6	300	6	240	6	190	6	150	5	120	5
Vc = 60 sfm, fz = 0.120 ipt											



# APPLICATION RANGE



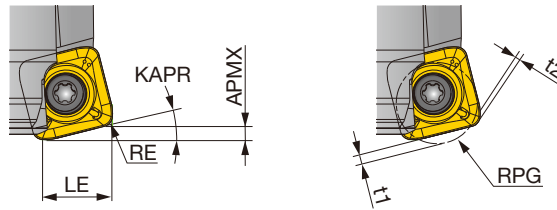
## 09 type

Inch	Tool dia. DCX	Max. depth of cut		Max. plunging depth	Max. ramping angle	Max. cutting width in plunging		Min. machining dia.		Max. machining dia.		Max. cutting width in enlarging		
		APMX		A	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	
EXSW09U1.00...	1.000	0.059	0.039	0.012	4.6°	5.8°	0.275	0.295	1.370	1.331	1.881	1.881	0.665	0.645
EXSW09U1.25...	1.250	0.059	0.039	0.012	2.7°	3.2°	0.275	0.295	1.870	1.831	2.381	2.381	0.914	0.894
TXSW09U1.50B0.50R04	1.500	0.059	0.039	0.012	1.9°	2.2°	0.276	0.295	2.370	2.331	2.882	2.882	1.165	1.146
TXSW09U2.00B0.75R05	2.000	0.059	0.039	0.012	1.2°	1.4°	0.276	0.295	3.370	3.331	3.882	3.882	1.665	1.646
TXSW09U2.50B0.75R06	2.500	0.059	0.039	0.012	0.9°	0.9°	0.276	0.295	4.370	4.331	4.882	4.882	2.165	2.146
TXSW09U2.50B0.75R08	2.500	0.059	0.039	0.012	0.9°	0.9°	0.276	0.295	4.370	4.331	4.882	4.882	2.165	2.146
TXSW09U3.00B1.00R07	3.000	0.059	0.039	0.012	0.7°	0.8°	0.276	0.295	5.370	5.331	5.882	5.882	2.665	2.646
TXSW09U3.00B1.00R10	3.000	0.059	0.039	0.012	0.4°	0.6°	0.276	0.295	5.370	5.331	5.882	5.882	2.665	2.646
TXSW09U4.00B1.50R08	4.000	0.059	0.039	0.012	0.5°	0.6°	0.276	0.295	7.370	7.331	7.882	7.882	3.665	3.646

## 15 type

Inch	Tool dia. DCX	Max. depth of cut		Max. plunging depth	Max. ramping angle	Max. cutting width in plunging		Min. machining dia.	Max. machining dia.	Max. cutting width in enlarging	
		APMX		A	RMPX	W		øD1	øD2	ae	
		SWMT 15**ZER	SWMT 15**UER			SWMT 15**ZER	SWMT 15**UER			SWMT 15**ZER	SWMT 15**UER
TXSW15U2.00B0.75R03	2.000	0.098	0.079	0.028	4.6°	5.91°	0.630	2.787	3.772	1.433	1.393
TXSW15U2.50B0.75R04	2.500	0.098	0.079	0.028	2.9°	0.591	0.630	3.819	4.803	1.949	1.909
TXSW15U3.00B1.00R05	3.000	0.098	0.079	0.028	2.1°	0.591	0.630	4.819	5.803	2.449	2.409
TXSW15U4.00B1.50R06	4.000	0.098	0.079	0.028	1.4°	0.591	0.630	6.819	7.803	3.449	3.409
TXSW15U5.00B1.50R07	5.000	0.098	0.079	0.028	1°	0.591	0.630	8.819	9.803	4.449	4.409
TXSW15U6.00B2.00R08	6.000	0.098	0.079	0.028	0.8°	0.591	0.630	10.819	11.803	5.449	5.409

# TOOL GEOMETRY FOR PROGRAMMING



## 09 type

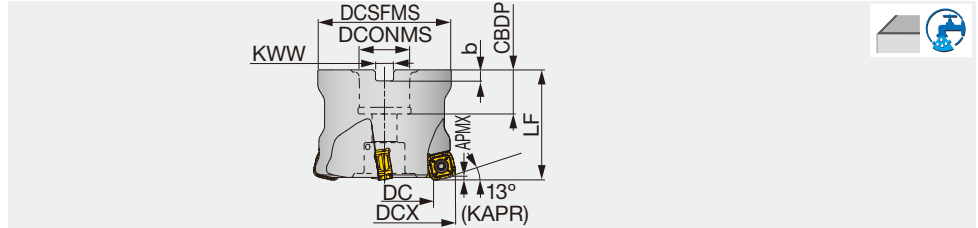
APMX (in)		Actual corner radius RE (in)	LE (in)		KAPR		Programmed corner radius RPG	Uncut amount: t1 (in)		Overcut amount: t2 (in)	
SWMT 09**ZER	SWMT 09**UER		SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER		SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER
0.059	0.039	0.039	0.291	0.311	12°	7°	0.025	0.054	0.033	-	-
0.059	0.039	0.039	0.291	0.311	12°	7°	0.050	0.049	0.031	-	-
0.059	0.039	0.039	0.291	0.311	12°	7°	0.075	0.045	0.028	-	0.0002
0.059	0.039	0.039	0.291	0.311	12°	7°	0.100	0.040	0.025	0.001	0.006
0.059	0.039	0.039	0.291	0.311	12°	7°	0.125	0.036	0.022	0.006	0.015

- 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 = 0.059". If a larger radius is used, overcutting may occur.

## 15 type

APMX (in)		Actual corner radius RE (in)	LE (in)		KAPR		Programmed corner radius RPG	Uncut amount: t1 (in)		Overcut amount: t2 (in)	
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
0.098	0.079	0.079	0.500	0.543	14°	10°	0.138	0.083	0.073	-	-
0.098	0.079	0.079	0.500	0.543	14°	10°	0.157	0.078	0.070	-	-
0.098	0.079	0.079	0.500	0.543	14°	10°	0.178	0.074	0.067	-	0.001
0.098	0.079	0.079	0.500	0.543	14°	10°	0.197	0.070	0.063	0.0003	0.005

- 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 = 0.177", SWMT\*\*UER insert: RPG = 0.157". 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.



Inch	APMX	DCX	CICT	DC	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TXQ12R200U0075A03	0.079	2.000	3	1.362	1.850	1.969	0.750	0.750	0.315	0.197	1.120	With	SQMU12...
TXQ12R200U0075A04	0.079	2.000	4	1.362	1.850	1.969	0.750	0.750	0.315	0.197	1.120	With	SQMU12...
TXQ12R250U0075A04	0.079	2.500	4	1.862	2.323	1.969	0.750	0.750	0.315	0.197	1.760	With	SQMU12...
TXQ12R300U0100A05	0.079	3.000	5	2.362	2.835	2.480	1.000	1.024	0.374	0.236	3.770	With	SQMU12...
TXQ12R400U0150A06	0.079	4.000	6	3.362	3.780	2.480	1.500	1.457	0.626	0.394	5.710	With	SQMU12...
TXQ12R500U0150A07	0.079	5.000	7	4.362	3.780	2.480	1.500	1.457	0.626	0.394	7.010	With	SQMU12...
TXQ12R600U0200AZ08	0.079	6.000	8	5.37	3.937	2.480	2.000	1.496	0.748	0.433	9.700	With	SQMU12...

Metric	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...

### INCH SPARE PARTS



Designation	Clamping screw	Grip	Lubricant	Torx bit	Shell locking bolt (Optional parts)
TXQ12R**U0075A...	CSPB-4	H-TBS	M-1000	BLDIP15/S7	(C0.375X1.125H)
TXQ12R300U0100A05	CSPB-4	H-TBS	M-1000	BLDIP15/S7	(C0.500X1.375H)
TXQ12R**U0150A...	CSPB-4	H-TBS	M-1000	BLDIP15/S7	(TMBA-0.750H)
TXQ12R600U0200AZ08	CSPB-4	H-TBS	M-1000	BLDIP15/S7	-

Recommended clamping torque: 2.58 lbs·ft

### METRIC SPARE PARTS



Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXQ12R050, 052M22.0...	CSPB-4	H-TBS	M-1000	-	FSHM10-40H	BLDIP15/S7
TXQ12R063M...	CSPB-4	H-TBS	M-1000	-	CM10X30H	BLDIP15/S7
TXQ12R066, 080M27.0...	CSPB-4	H-TBS	M-1000	-	CM12X30H	BLDIP15/S7
TXQ12R080, 100M31.7...	CSPB-4	H-TBS	M-1000	-	CM16X40H	BLDIP15/S7
TXQ12R100M32.0E06	CSPB-4	H-TBS	M-1000	-	CM16X40H	BLDIP15/S7
TXQ12R125M...	CSPB-4	H-TBS	M-1000	TMBA-M20H	-	BLDIP15/S7

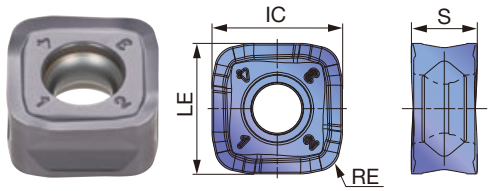
Recommended clamping torque: 3.5 N·m





## INSERT

### SQMU-MJ



<b>P</b>	Steel	☆	★	☆	
<b>M</b>	Stainless		★	☆	
<b>K</b>	Cast iron	★		☆	
<b>N</b>	Non-ferrous				
<b>S</b>	Superalloys	★	☆	★	
<b>H</b>	Hard materials			★	

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated				LE	S	IC
			AH120	AH130	AH725	T3130			
SQMU1206ZSR-MJ	0.079	0.079	●	●	●	●	0.461	0.236	0.461

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steels 1045, 1055, etc.	- 300HB	First choice	AH725	330 - 980	0.020 - 0.080
			Wear resistance	T3130	330 - 980	0.020 - 0.080
			Fracture resistance	AH130	330 - 980	0.020 - 0.080
	Alloy steels 4140, etc.	- 300HB	First choice	AH725	330 - 660	0.020 - 0.060
			Wear resistance	T3130	330 - 660	0.020 - 0.060
			Fracture resistance	AH130	330 - 660	0.020 - 0.060
	Prehardened steels NAK80, PX5, etc.	30 - 40HRC	-	AH725	330 - 660	0.020 - 0.040
<b>M</b>	Stainless steels 304, 316, etc.	- 200HB	-	AH130	330 - 500	0.012 - 0.030
<b>K</b>	Gray cast irons No.25, No.30, etc.	150 - 250HB	-	AH120	100 - 300	0.020 - 0.080
	Ductile cast irons 60-40-18, 65-45-12, etc.	150 - 250HB	-	AH120	260 - 660	0.020 - 0.080
<b>S</b>	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	-	AH725	100 - 200	0.012 - 0.028
<b>H</b>	Hardened steels H13, D2, etc.	40 - 50HRC	-	AH725	260 - 43	0.004 - 0.012
		50 - 60HRC	-	AH725	160 - 230	0.001 - 0.003

- 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.

**Tool dia: DCX (in), Number of revolution: *n* (rpm), Feed speed: *Vf* (ipm), Max. depth of cut: APMX = 0.079"**

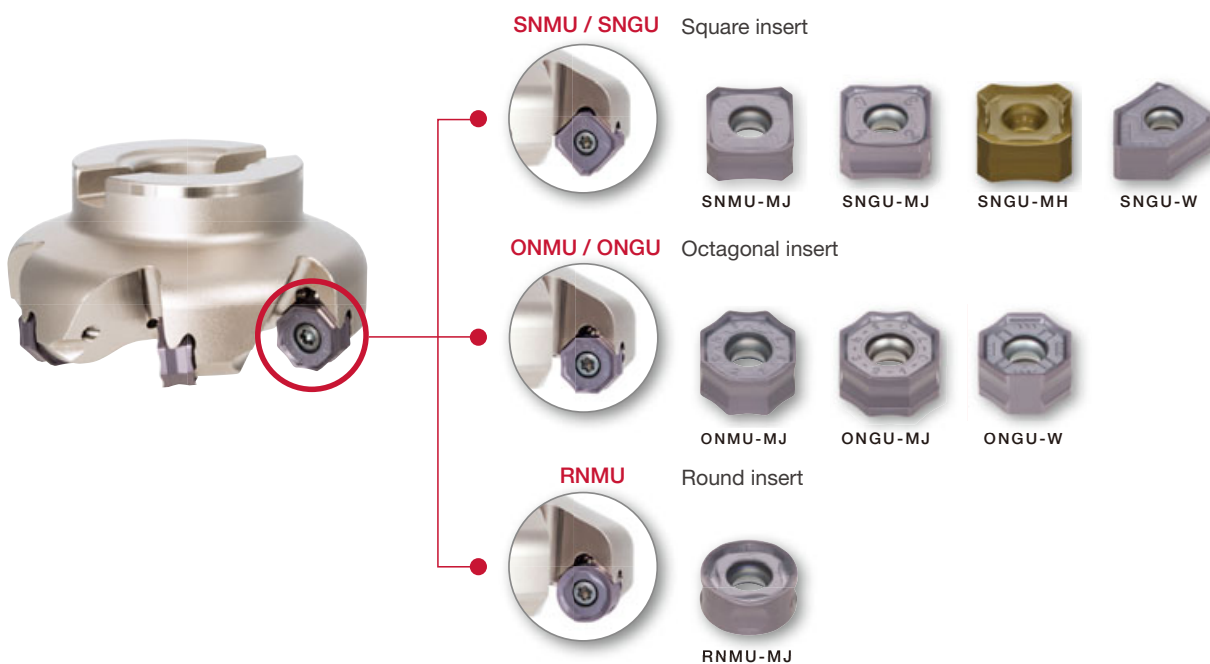
ø2.000"		ø2.500"		ø3.000"		ø4.000"		ø5.000"	
<i>n</i>	<i>Vf</i>	<i>n</i>	<i>Vf</i>	<i>n</i>	<i>Vf</i>	<i>n</i>	<i>Vf</i>	<i>n</i>	<i>Vf</i>
1,260	227	1,010	242	790	237	630	227	500	210
Vc = 660 sfm, fz = 0.060 ipt									
950	114	750	120	590	118	470	113	380	106
Vc = 500 sfm, fz = 0.040 ipt									
950	86	750	90	590	89	470	85	380	80
Vc = 490 sfm, fz = 0.030 ipt									
760	46	600	48	470	47	380	46	300	42
Vc = 400 sfm, fz = 0.020 ipt									
1,260	227	1,010	242	790	237	630	227	500	210
Vc = 660 sfm, fz = 0.060 ipt									
950	171	750	180	590	177	470	170	380	160
Vc = 500 sfm, fz = 0.060 ipt									
250	15	200	16	150	15	120	14	100	14
Vc = 130 sfm, fz = 0.020 ipt									
630	15	500	16	390	16	310	15	250	14
Vc = 330 sfm, fz = 0.008 ipt									
380	2	300	2	240	2	190	2	150	2
Vc = 200 sfm, fz = 0.002 ipt									



**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: **H095 - H098**



## Super high density PCD cutter for efficient finishing of aluminum

### Super high density cutter

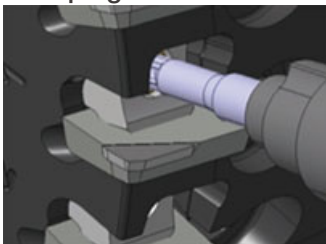


Super high density design  
High speed cutting more than  $V_c = 9843$  sfm is possible.

Cutter diameter (in)	Max num. of teeth	Max. rotation number (rpm)	Cutter weight (lb)
2	8	20,000	1.92
2.5	10	19,000	1.34
3	16	17,000	2.56
4	22	15,000	4.30
5	26	14,000	8.03
6	34	12,000	10.76

### CamAdjust - super simple adjusting mechanism

Clamping insert

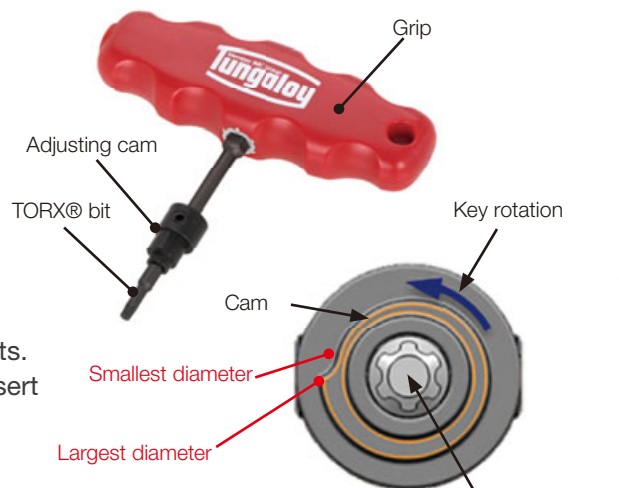


Adjusting axial runout



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: **H105 - H107**



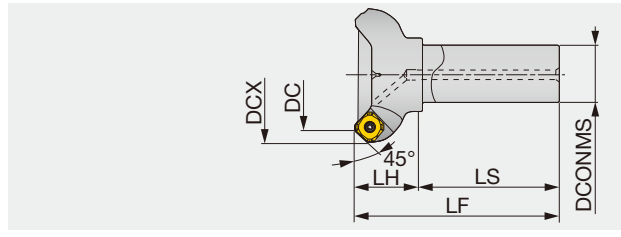


# TUNG MILL

## EAW13

Face endmill, shank type, with screw clamp system

GAMP=+17°~+20°,GAMF=-16°~-11°



Right hand (R) shown.

Metric	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...

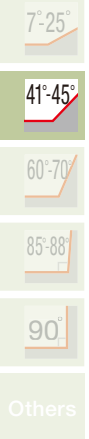
### SPARE PARTS



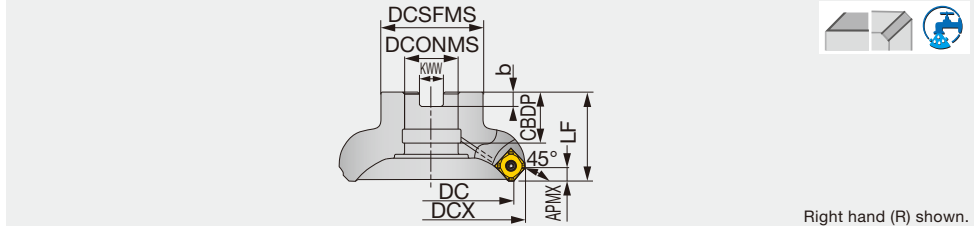
Designation	Clamping screw	Lubricant	Shim screw	Shim	Wrench	Wrench 1
EAW13R025 - 040...	CSPB-3.5	M-1000	-	-	IP-15D	-
EAW13R050 - 080...	CSPB-3.5	M-1000	DTS5-3.5SS	FSSA1102	IP-15D	P-3.5

Recommended clamping torque: 3.5 N·m

### Approach angle

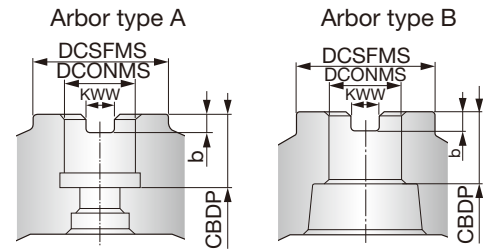


Reference pages: Inserts → [H075](#)



Inch	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT (lb)	Air hole	Insert	Arbor type
TAW13R200U0075A03	2.000	3	2.510	1.693	1.575	0.750	0.750	0.315	0.197	0.880	With	SW*T13...	A
TAW13R200U0075A04	2.000	4	2.510	1.693	1.575	0.750	0.750	0.315	0.197	0.880	With	SW*T13...	A
TAW13R200U0075A05	2.000	5	2.510	1.693	1.575	0.750	0.750	0.315	0.197	0.880	With	SW*T13...	A
TAW13R300U0100A04	3.000	4	3.510	1.969	1.969	1.000	1.020	0.374	0.236	1.980	With	SW*T13...	A
TAW13R300U0100A06	3.000	6	3.510	1.969	1.969	1.000	1.020	0.374	0.236	1.980	With	SW*T13...	A
TAW13R300U0100A08	3.000	8	3.510	1.969	1.969	1.000	1.020	0.374	0.236	1.980	With	SW*T13...	A
TAW13R400U0150A05	4.000	5	4.520	3.150	1.969	1.500	1.378	0.626	0.394	3.750	With	SW*T13...	B
TAW13R400U0150A07	4.000	7	4.520	3.150	1.969	1.500	1.378	0.626	0.394	3.530	With	SW*T13...	B
TAW13R400U0150A10	4.000	10	4.520	3.150	1.969	1.500	1.378	0.626	0.394	3.750	With	SW*T13...	B
TAW13R500U0150A06	5.000	6	5.510	3.150	2.480	1.500	1.457	0.626	0.394	6.170	With	SW*T13...	B
TAW13R500U0150A08	5.000	8	5.510	3.150	2.480	1.500	1.457	0.626	0.394	5.950	With	SW*T13...	B
TAW13R500U0150A12	5.000	12	5.510	3.150	2.480	1.500	1.457	0.626	0.394	6.170	With	SW*T13...	B
TAW13R600U0200A07	6.000	7	6.510	3.937	2.480	2.000	1.500	0.748	0.433	9.040	Without	SW*T13...	B
TAW13R600U0200A10	6.000	10	6.510	3.937	2.480	2.000	1.500	0.748	0.433	8.600	Without	SW*T13...	B
TAW13R600U0200A16	6.000	16	6.510	3.937	2.480	2.000	1.500	0.748	0.433	9.040	Without	SW*T13...	B

### Arbor type



### SPARE PARTS

Designation	Clamping screw	Lubricant	Shim screw	Shell locking bolt	Shim	Wrench	Wrench 1
TAW13R200...	CSPB-3.5	M-1000	DTS5-3.5SS	C0.375X1.125H	FSSA1102	IP-15D	P-3.5
TAW13R300...	CSPB-3.5	M-1000	DTS5-3.5SS	C0.500X1.375H	FSSA1102	IP-15D	P-3.5
TAW13R400, 500...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-0.750H	FSSA1102	IP-15D	P-3.5
TAW13R600...	CSPB-3.5	M-1000	DTS5-3.5SS	-	FSSA1102	IP-15D	P-3.5

Recommended clamping torque: 2.58 lbs·ft

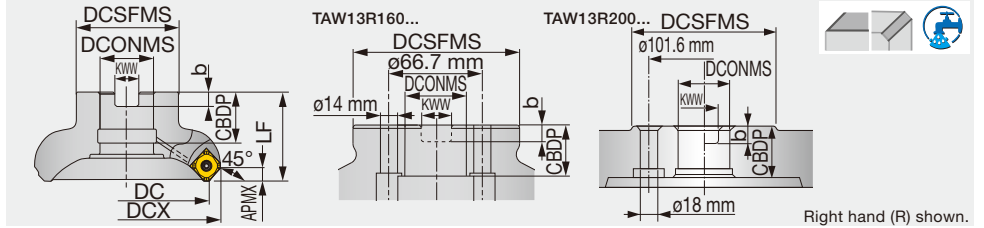




# TUNG MILL

## TAW13

Face mill, with screw clamp system



Metric	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	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...

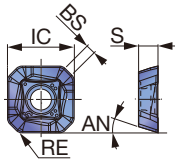
### SPARE PARTS

Designation	Clamping screw	Lubricant	Shim screw	Shell locking bolt 1	Shell locking bolt 2	Shim	Wrench	Wrench 1
TAW13R050 - 063...	CSPB-3.5	M-1000	DTSS-3.5SS	-	CM10X30H	FSSA1102	IP-15D	P-3.5
TAW13R080...	CSPB-3.5	M-1000	DTSS-3.5SS	-	CM12X30H	FSSA1102	IP-15D	P-3.5
TAW13R100...	CSPB-3.5	M-1000	DTSS-3.5SS	TMBA-M16H	-	FSSA1102	IP-15D	P-3.5
TAW13R125...	CSPB-3.5	M-1000	DTSS-3.5SS	TMBA-M20H	-	FSSA1102	IP-15D	P-3.5
TAW13R160... TAW13R200...	CSPB-3.5	M-1000	DTSS-3.5SS	-	-	FSSA1102	IP-15D	P-3.5

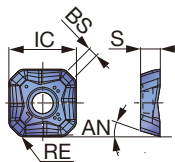
Recommended clamping torque: 3.5 N·m

## INSERT

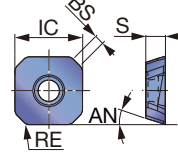
### SWMT13T3-MJ



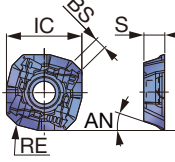
### SWMT13T3-ML



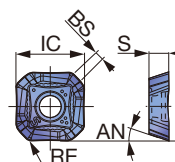
### SWMW13T3 (Flat)



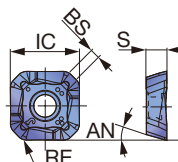
### SWMT13T3-HJ



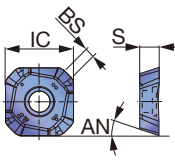
### SWMT13T3-MS



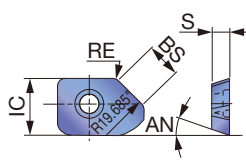
### SWG13T3-MJ



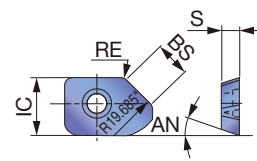
### SWG13T3-AJ



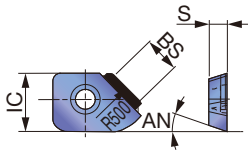
### WWCW13T3AFER-WS



### WWCW13T3AFFR-WS



### WWCW13T3AFFR-WD



	P	M	K	N	S	H
Steel	☆					
Stainless		★	☆	★		
Cast iron	★			★	★	★
Non-ferrous						★
Superalloys	★	☆	☆			
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	0.059	0.157	●	●	●	●		●				0.547	0.157	18.5°	0.079	
SWMT13T3AFER-ML	0.059	0.098	●			●						0.547	0.157	18.5°	0.079	
SWMW13T3AFTR	0.059	0.197	●			●				●		0.547	0.157	18.5°	0.079	
SWMT13T3AFPR-HJ	0.059	0.079	●	●	●	●		●				0.579	0.157	18.5°	0.091	
SWMT13T3AFPR-MS	0.039	0.157		●	●	●						0.555	0.157	18.5°	0.079	
SWG13T3AFPR-MJ	0.059	0.157	●			●				●		0.547	0.157	18.5°	0.079	
SWG13T3AFFR-AJ	-	0.157								●		0.555	0.157	18.5°	0.079	
WWCW13T3AFER-WS	0.059	-				●				●		0.504	0.157	18.5°	0.307	
WWCW13T3AFFR-WS	0.059	-								●		0.504	0.157	18.5°	0.307	
WWCW13T3AFFR-WD	-	-									●	0.504	0.157	18.5°	0.307	

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

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EAW13

e-catalog



TAW13

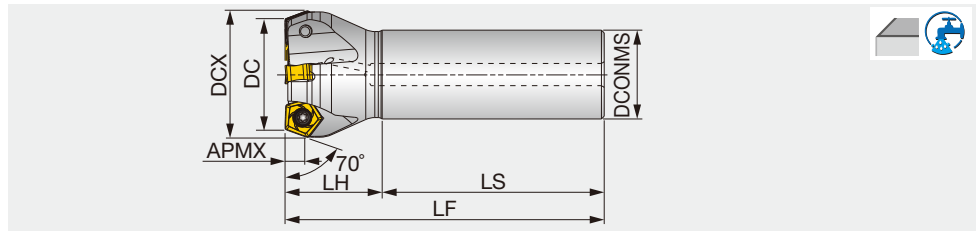


# DOPENT

## EEN09

Face endmill, shank type, with screw clamp system

GAMP=-6°, GAMF=-2°~-10°



Inch	APMX	DC	DCX	CICT	DCONMS	LS	LH	LF	WT (lb)	Air hole	Insert
EEN09R125U0125W03	0.252	1.250	1.49	3	1.250	2.280	1.500	3.780	0.700	With	PN*U0905...
EEN09R150U0125W04	0.252	1.500	1.74	4	1.250	2.280	2.000	4.280	0.700	With	PN*U0905...

Metric	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...

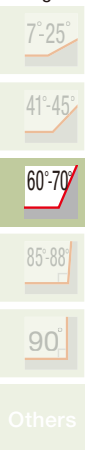
### SPARE PARTS



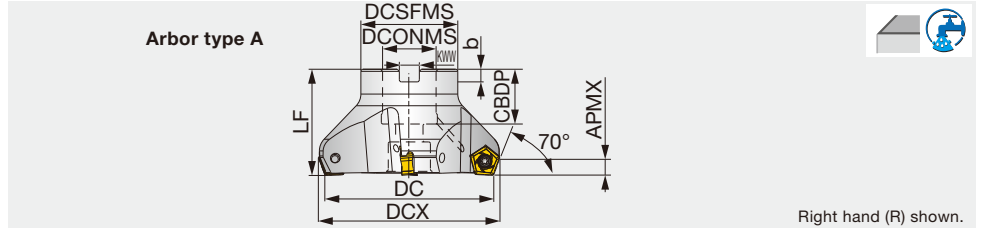
Designation	Clamping screw	Lubricant	Wrench
EEN09...	CSTR-4L100	M-1000	T-15D

Recommended clamping torque: 2.58 lbs·ft, 3.5 N·m

### Approach angle

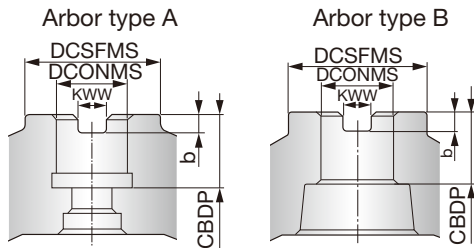


Reference pages: Inserts → **H079**, Standard cutting conditions → **H080**



Inch	APMX	DC	CICT	DCX	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TEN09R200U0075A03	0.250	2.000	3	2.240	1.690	1.570	0.750	0.750	0.310	0.200	0.9	With	PN*U0905...	A
TEN09R200U0075A04	0.250	2.000	4	2.240	1.690	1.570	0.750	0.750	0.310	0.200	0.9	With	PN*U0905...	A
TEN09R200U0075A06	0.250	2.000	6	2.240	1.690	1.570	0.750	0.750	0.310	0.200	0.9	With	PN*U0905...	A
TEN09R250U0075A04	0.250	2.500	4	2.740	1.690	1.570	0.750	0.750	0.310	0.200	1.3	With	PN*U0905...	A
TEN09R250U0075A06	0.250	2.500	6	2.740	1.690	1.570	0.750	0.750	0.310	0.200	1.3	With	PN*U0905...	A
TEN09R250U0075A08	0.250	2.500	8	2.740	1.690	1.570	0.750	0.750	0.310	0.200	1.3	With	PN*U0905...	A
TEN09R300U0100A04	0.250	3.000	4	3.240	1.970	1.970	1.000	1.020	0.370	0.240	2.0	With	PN*U0905...	A
TEN09R300U0100A07	0.250	3.000	7	3.240	1.970	1.970	1.000	1.020	0.370	0.240	2.0	With	PN*U0905...	A
TEN09R300U0100A10	0.250	3.000	10	3.240	1.969	1.970	1.000	1.020	0.370	0.240	2.2	With	PN*U0905...	A
TEN09R400U0150A05	0.250	4.000	5	4.240	3.150	1.970	1.500	1.380	0.630	0.390	3.5	With	PN*U0905...	B
TEN09R400U0150A08	0.250	4.000	8	4.240	3.150	1.970	1.500	1.380	0.630	0.390	3.7	With	PN*U0905...	B
TEN09R400U0150A12	0.250	4.000	12	4.240	3.150	1.970	1.500	1.380	0.630	0.390	4.0	With	PN*U0905...	B
TEN09R500U0150A06	0.250	5.000	6	5.240	3.150	2.480	1.500	1.460	0.630	0.390	6.0	With	PN*U0905...	B
TEN09R500U0150A10	0.250	5.000	10	5.240	3.150	2.480	1.500	1.460	0.630	0.390	6.4	With	PN*U0905...	B
TEN09R500U0150A16	0.250	5.000	16	5.240	3.150	2.480	1.500	1.460	0.630	0.390	6.8	With	PN*U0905...	B
TEN09R600U0200A07	0.250	6.000	7	6.240	3.940	2.480	2.000	1.500	0.750	0.430	8.6	Without	PN*U0905...	B
TEN09R600U0200A12	0.250	6.000	12	6.240	3.940	2.480	2.000	1.500	0.750	0.430	9.3	Without	PN*U0905...	B
TEN09R600U0200A20	0.250	6.000	20	6.240	3.940	2.480	2.000	1.500	0.750	0.430	10.0	Without	PN*U0905...	B
TEN09R800U0250A14	0.252	8.000	14	8.230	5.120	2.480	2.500	1.500	1.000	0.550	14.0	Without	PN*U0905...	B
TEN09R1000U0250A16	0.252	10.000	16	10.230	5.120	2.480	2.500	1.500	1.000	0.550	30.4	Without	PN*U0905...	B

## Arbor type



### SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt (Optional parts)	Torx bit
TEN09R200, 250...	CSTR-4L100	H-TBS	M-1000	(C0.375X1.125H)	BT15S
TEN09R300...	CSTR-4L100	H-TBS	M-1000	(C0.500X1.375H)	BT15S
TEN09R400, 500...	CSTR-4L100	H-TBS	M-1000	(TMBA-0.750H)	BT15S
TEN09R600, 800, 1000...	CSTR-4L100	H-TBS	M-1000	-	BT15M

Recommended clamping torque: 2.58 lbs·ft

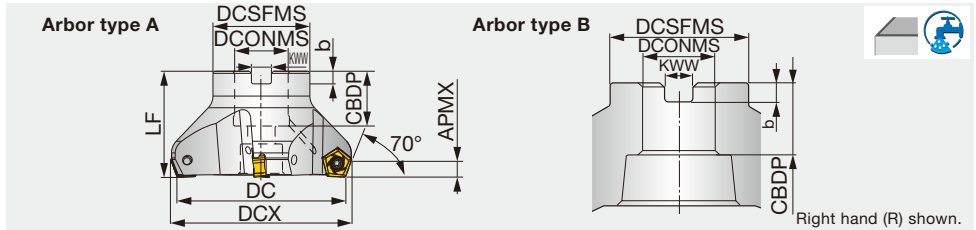






Face mill, with screw clamp system

GAMP=-6°, GAMF=-10°--2°

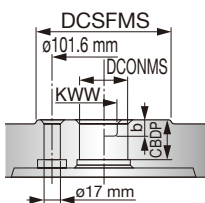


Metric	APMX	DC	CICT	DCX	DCSFMS	LF	DCONMS	CDBP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TEN09R050M22.0-03	6.4	50	3	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0-04	6.4	50	4	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0-06	6.4	50	6	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0E04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

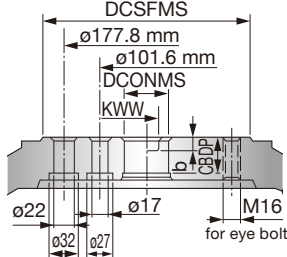
\*Please use neutral hand inserts for TEN09L (left hand cutter).

### Arbor type

Arbor type C



Arbor type D



### SPARE PARTS

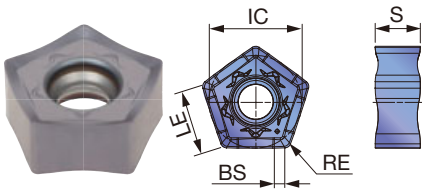
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TEN09R050 - 063...	CSTR-4L100	H-TBS	M-1000	-	CM10X30H	BT15S
TEN09R080...	CSTR-4L100	H-TBS	M-1000	-	CM12X30H	BT15S
TEN09R/L100...	CSTR-4L100	H-TBS	M-1000	TMBA-M16H	-	BT15S
TEN09R125...06, TEN09R/L125M...10	CSTR-4L100	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: 3.5 N·m

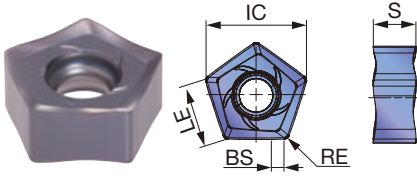
Reference pages: Inserts → **H079**, Standard cutting conditions → **H080**

# INSERT

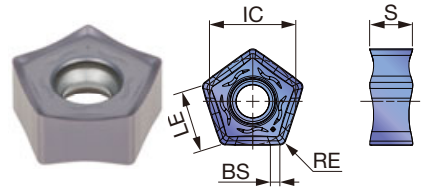
**PN\*U0905GNEN-MJ (Neutral)**



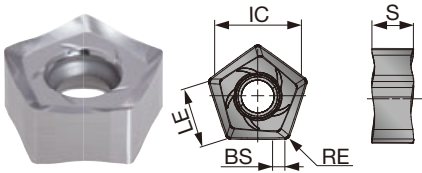
**PNCU0905GNER-MJ (Right hand)**



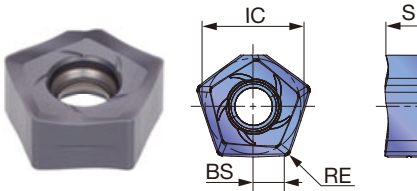
**PNCU0905-ML (Neutral)**



**PNCU0905-AJ (Right hand)**



**PNCU0905-W (Right hand)**



<b>P</b> Steel	★	☆	★	☆	★		☆	☆	★									
<b>M</b> Stainless			★	☆	☆		☆											
<b>K</b> Cast iron		☆		★	☆	★	★											
<b>N</b> Non-ferrous														★				
<b>S</b> Superalloys			☆	☆		★												
<b>H</b> 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	0.031	0.252	●	●	●	●				●		●							
PNCU0905GNEN-MJ	0.031	0.252	●	●	●	●				●		●							
PNCU0905GNER-MJ	0.031	0.252				●	●	●			●		●						
PNCU0905GNEN-ML	0.031	0.252	●	●	●														
PNCU0905GNFR-AJ	0.031	0.252										●							
PNCU0905GNFR-W	0.031	0.079							●										

● : Line up

Reference pages: Standard cutting conditions → **H080**



# STANDARD CUTTING CONDITIONS



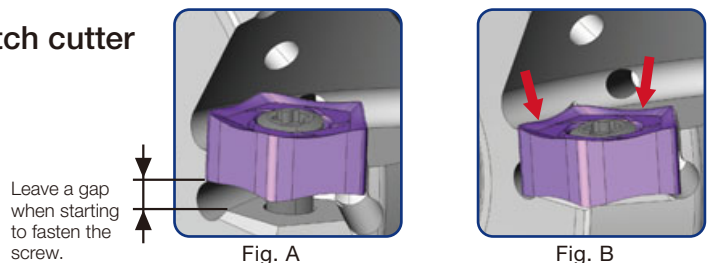
ISO	Workpiece materials	Hardness	Selection criteria	Recommended grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steels 1015, etc.	200 - 300 HB	First choice	AH3225	MJ	330 - 820	0.004 - 0.016
		200 - 300 HB	Low cutting force	AH3225	ML	330 - 820	0.004 - 0.012
		200 - 300 HB	Wear resistance	T3225	MJ	660 - 1150	0.004 - 0.012
		200 - 300 HB	Surface quality	NS740	MJ	330 - 820	0.004 - 0.012
	High carbon steels, alloyed steels 1045, etc.	150 - 300 HB	First choice	AH3225	MJ	330 - 820	0.004 - 0.014
		150 - 300 HB	Low cutting force	AH3225	ML	330 - 820	0.004 - 0.012
		150 - 300 HB	Wear resistance	T3225	MJ	59 - 990	0.004 - 0.012
		150 - 300 HB	Surface quality	NS740	MJ	330 - 820	0.004 - 0.012
		Prehardened steels NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3225	MJ	330 - 660
30 - 40 HRC	Low cutting force		AH3225	ML	330 - 660	0.004 - 0.010	
30 - 40 HRC	Wear resistance		T3225	MJ	490 - 820	0.004 - 0.010	
M	Stainless steel S30400, etc.	- 200 HB	First choice	AH3135	ML	330 - 660	0.004 - 0.012
		- 200 HB	Fracture resistance	AH3135	MJ	330 - 660	0.004 - 0.014
		- 200 HB	Wear resistance	T3225	MJ	330 - 820	0.004 - 0.012
K	Gray cast irons No.250B, No.300B, etc.	150 - 250 HB	First choice	T1215	MJ	330 - 980	0.004 - 0.014
		150 - 250 HB	Fracture resistance	AH120	MJ	330 - 820	0.004 - 0.016
	Ductile cast iron 60-40-18, etc.	150 - 250 HB	First choice	T1215	MJ	330 - 980	0.004 - 0.014
		150 - 250 HB	Fracture resistance	AH120	MJ	260 - 660	0.004 - 0.016
N	Aluminum alloys Si < 13%	-	First choice	TH10	AJ	1640 - 4920	0.004 - 0.020
	Aluminum alloys Si ≥ 13%	-	First choice	TH10	AJ	490 - 1640	0.004 - 0.020
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3135	ML	98 - 197	0.004 - 0.012
		- 40 HRC	Fracture resistance	AH3135	MJ	98 - 197	0.004 - 0.012
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	First choice	AH725	MJ	33 - 131	0.0004 - 0.004
H	Hardened materials H-13, etc.	- 45 HRC	First choice	AH8015	MJ	260 - 490	0.002 - 0.006
		- 45 HRC	Low cutting force	AH8015	ML	260 - 490	0.002 - 0.006

- 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. aluminum 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.

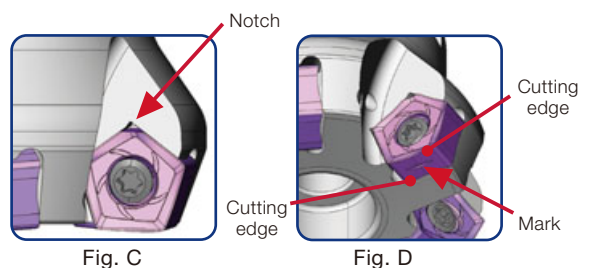
## Installation of inserts on an extra close-pitch cutter

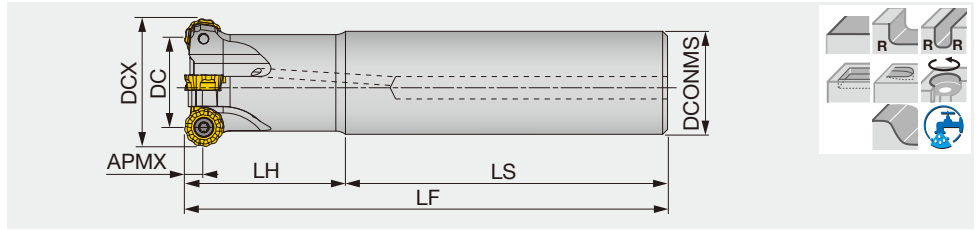
- On an extra close-pitch cutter, the screw hole of an insert pocket is placed at an angle.
- Leave a gap between the insert and pocket when starting to fasten the screw on the cutter body as shown in Fig. A.
- After fastening the screw, please ensure that there is no gap between the cutter body and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





Inch	APMX	DCX	DC	CICT	DCONMS	LF	LH	LS	WT(lb)	Air hole	Insert
ERC12R125U0125-03L	0.236	1.250	0.778	3	1.250	6.000	2.250	3.750	2.050	With	RCMT1204...
ERC12R125U0125-03LL	0.236	1.250	0.778	3	1.250	12.000	7.000	5.000	3.370	With	RCMT1204...
ERC12R125U0125-03LM	0.236	1.250	0.778	3	1.250	8.000	4.000	4.000	2.250	With	RCMT1204...
ERC12R125U0125W03	0.236	1.250	0.778	3	1.250	5.000	2.750	2.250	1.320	With	RCMT1204...
ERC12R125U150-03LL	0.236	1.250	0.778	3	1.500	12.000	7.000	5.000	4.190	With	RCMT1204...
ERC12R150U0125-04LM	0.236	1.500	1.028	4	1.250	8.000	4.000	4.000	2.360	With	RCMT1204...
ERC12R150U0125-04LX	0.236	1.500	1.028	4	1.250	12.000	7.000	5.000	3.550	With	RCMT1204...
ERC12R150U0125W04	0.236	1.500	1.028	4	1.250	5.000	2.340	2.660	1.430	With	RCMT1204...
ERC12R150U0150-04L	0.236	1.500	1.028	4	1.500	6.000	2.000	3.750	2.420	With	RCMT1204...
ERC12R150U0150-04LM	0.236	1.500	1.028	4	1.500	8.000	4.000	4.000	3.080	With	RCMT1204...
ERC12R150U0150-04LX	0.236	1.500	1.028	4	1.500	12.000	7.000	5.000	4.410	With	RCMT1204...
ERC12R150U0150W04	0.236	1.500	1.028	4	1.500	5.000	2.340	2.660	1.830	With	RCMT1204...
ERC12R150U150-04LL	0.236	1.500	1.028	4	1.500	12.000	2.000	10.000	5.290	With	RCMT1204...
ERC16R150U0125-02LL	0.315	1.500	0.870	2	1.250	12.000	2.000	10.000	3.810	With	RCMT1606...
ERC16R150U0125-02LM	0.315	1.500	0.870	2	1.250	8.000	2.000	6.000	2.470	With	RCMT1606...
ERC16R150U0125W02	0.315	1.500	0.870	2	1.250	5.000	2.340	2.660	1.430	With	RCMT1606...
ERC16R150U0150-02L	0.315	1.500	0.870	2	1.500	6.000	2.000	4.000	2.380	With	RCMT1606...
ERC16R150U0150-02LM	0.315	1.500	0.870	2	1.500	8.000	4.000	4.000	3.080	With	RCMT1606...
ERC16R150U0150-02LX	0.315	1.500	0.870	2	1.500	12.000	7.000	5.000	4.620	With	RCMT1606...
ERC16R150U0150W02	0.315	1.500	0.870	2	1.500	5.000	2.340	2.660	1.830	With	RCMT1606...
ERC16R150U150-02LL	0.315	1.500	0.870	2	1.500	12.000	2.000	10.000	5.290	Without	RCMT1606...

Metric	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 = 2.58 lbs·ft, 3.5 N·m, CSTB-5L105/CSTB-5L120 = 3.69 lbs·ft, 5 N·m



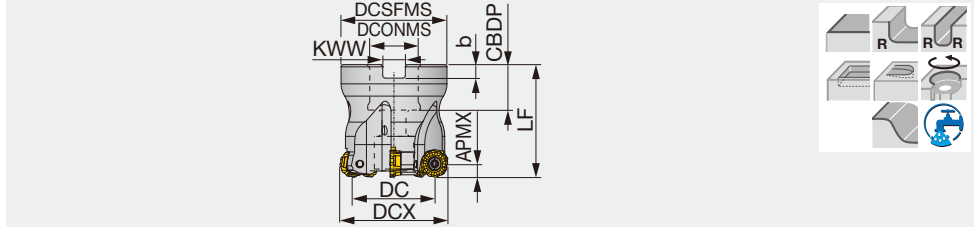


# ROUNDSPLIT

## TRC12/16

Face mill bore type cutter

GAMP = +0°, GAMF = -1° ~ -5°



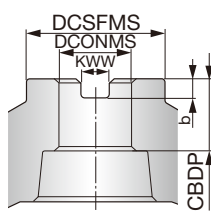
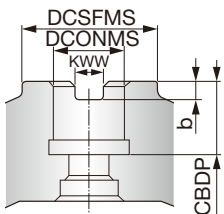
Inch	APMX	DCX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TRC12R200U0075A05	0.236	2.000	1.528	5	1.850	2.000	0.750	0.750	0.320	0.200	0.880	With	RCMT1204...	A
TRC12R250U0075A06	0.236	2.500	2.028	6	2.320	2.000	0.750	0.750	0.320	0.200	1.540	With	RCMT1204...	A
TRC12R300U0100A07	0.315	3.000	2.528	7	2.830	2.500	1.000	1.020	0.370	0.240	2.860	With	RCMT1204...	A
TRC16R200U0075A04	0.315	2.000	1.370	4	1.850	2.000	0.750	0.750	0.320	0.200	0.880	With	RCMT1606...	A
TRC16R250U0075A05	0.315	2.500	1.870	5	2.320	2.000	0.750	0.750	0.320	0.200	1.540	With	RCMT1606...	A
TRC16R300U0100A06	0.315	3.000	2.370	6	2.830	2.500	1.000	1.020	0.370	0.240	2.860	With	RCMT1606...	A
TRC16R400U0150A07	0.315	4.000	3.370	7	3.820	2.500	1.500	1.460	0.620	0.390	3.520	With	RCMT1606...	B
TRC16R500U0150A08	0.315	5.000	4.370	8	3.780	2.500	1.500	1.460	0.620	0.390	7.930	With	RCMT1606...	B

Metric	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...

### Arbor type

Arbor type A

Arbor type B



Reference pages: Inserts → **H084**

## INCH SPARE PARTS



Designation	Clamping screw	Grip	Shell locking bolt (Optional parts)	Torx bit
TRC12R...	CSTB-4L090	H-TBS	(C0.375X1.125H)	BT15S
TRC16R200, 250...	CSTB-5L120	H-TB	(C0.375X1.125H)	BT20S
TRC16R300...	CSTB-5L120	H-TB	(C0.500X1.375H)	BT20M
TRC16R400, 500...	CSTB-5L120	H-TB	(TMBA-0.750H)	BT20M

Recommended clamping torque: CSTB-4L090 = 2.58 lbs·ft, CSTB-5L120 = 3.69 lbs·ft

## METRIC 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

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

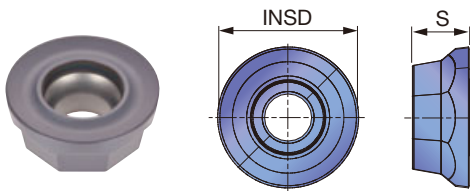




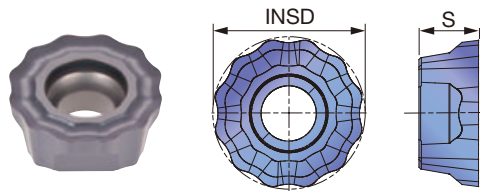
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

## INSERT

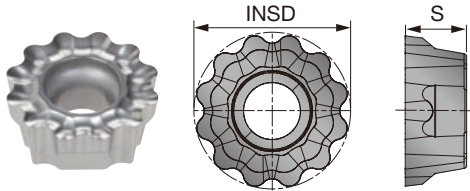
### RCMT-MJ



### 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	0.236	●	●	●		0.472	0.189
RCMT1204EN-NMJ	0.236	●	●	●		0.472	0.189
RCMT1204FN-NAJ	0.236				●	0.472	0.189
RCMT1606EN-MJ	0.315	●	●	●		0.630	0.256
RCMT1606EN-NMJ	0.315	●	●	●		0.630	0.256
RCMT1606FN-NAJ	0.315				●	0.630	0.256

●: Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



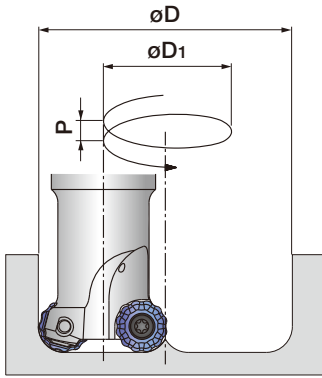
TRC12/16

e-catalog



ERC12/16

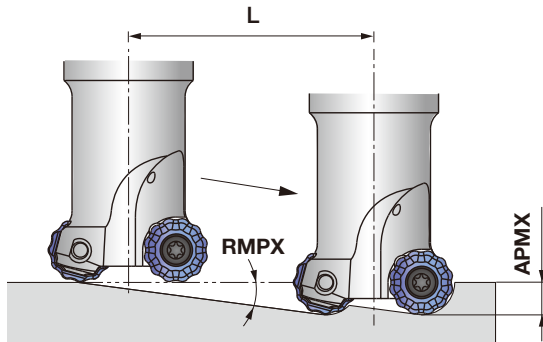
## Holemaking with helical feed



Inch	Tool $\phi$ DCX (in)	Min. machining diameter (in)		Max. machining diameter (in)		Pitch P (in)
		$\phi D$	$\phi D1$	$\phi D$	$\phi D1$	
ERC12R125U...	1.250	2.028	0.778	2.421	1.171	< 0.236
ERC12R150U...	1.500	2.528	1.028	2.921	1.421	< 0.236
TRC12R200U...	2.000	3.528	1.528	3.921	1.921	< 0.236
TRC12R250U...	2.500	4.528	2.028	4.921	2.421	< 0.236
TRC12R300U...	3.000	5.528	2.528	5.921	2.921	< 0.236
ERC16R150U...	1.500	2.370	0.870	2.921	1.421	< 0.315
TRC16R200U...	2.000	3.370	1.370	3.921	1.921	< 0.315
TRC16R250U...	2.500	4.370	1.870	4.921	2.421	< 0.315
TRC16R300U...	3.000	5.370	2.370	5.921	2.921	< 0.315
TRC16R400U...	4.000	7.370	3.370	7.921	3.921	< 0.315
TRC16R500U...	5.000	9.370	4.370	9.921	4.921	< 0.315

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

## Ramping



Inch	Tool $\phi$ DCX (in)	Max. ramping angle RMPX	L: tool pass length when ramping angle is 2° APMX (in)				
			0.079	0.118	0.158	0.236	0.315
ERC12R125U...	1.250	10°	2.244	3.346	4.488	6.732	-
ERC12R150U...	1.500	7°	2.244	3.346	4.488	6.732	-
TRC12R200U...	2.000	5.5°	2.244	3.346	4.488	6.732	-
TRC12R250U...	2.500	3.5°	2.244	3.346	4.488	6.732	-
TRC12R300U...	3.000	2.5°	2.244	3.346	4.488	6.732	-
ERC16R150U...	1.500	16°	2.244	3.346	4.488	6.732	-
TRC16R200U...	2.000	9.5°	2.244	3.346	4.488	6.732	9.016
TRC16R250U...	2.500	6.5°	2.244	3.346	4.488	6.732	9.016
TRC16R300U...	3.000	4.5°	2.244	3.346	4.488	6.732	9.016
TRC16R400U...	4.000	3°	2.244	3.346	4.488	6.732	9.016
TRC16R500U...	5.000	2.5°	2.244	3.346	4.488	6.732	9.016

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.

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

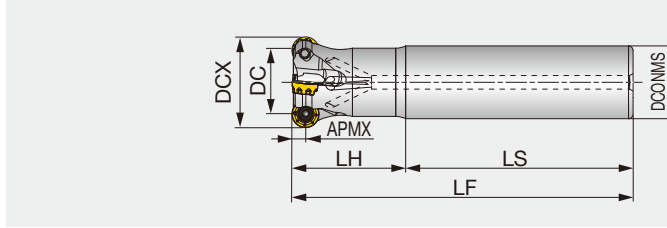
A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M



**New**  
**FIXRMILL**  
**ERRQ12**

Radius endmill with anti-rotation system, shank type

GAMP = +5°, GAMF = -3°

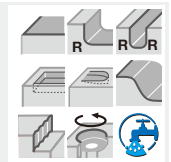
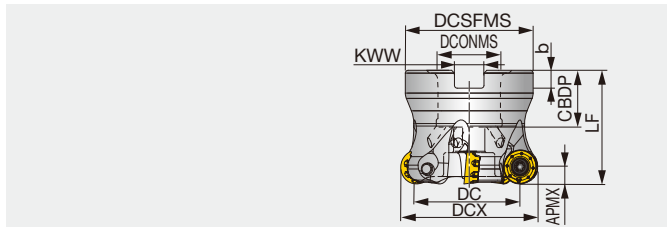


Metric	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	WT(kg)	Air hole	Insert
ERRQ12M040C32.0R04	6	40	4	28	32	150	50	100	0.84	With	RQMT12...

**New**  
**TRRQ12**

Radius mill with anti-rotation system

GAMP = +5°, GAMF = -3°



Metric	APMX	DCX	CICT	DC	DCSFMS	DCONMS	LF	CBDP	KWW	b	WT(kg)	Air hole	Insert
TRRQ12M040B16.0R04 <sup>(1)</sup>	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 H087 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**



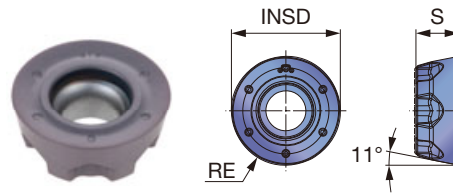
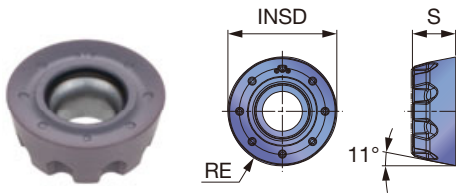
Designation	Clamping screw	Torx bit	Grip	Shell locking bolt 1	Shell locking bolt 2
ERRQ12M040C32.0R04	CSPB-4S	BLDIP15/S7	H-TB2W	-	-
TRRQ12M040B16.0R04	CSPB-4S	BLDIP15/S7	H-TB2W	-	SRPS118-0416
TRRQ12M050 - 063...	CSPB-4S	BLDIP15/S7	H-TB2W	CM10X30H	-
TRRQ12M080B27.0R06	CSPB-4S	BLDIP15/S7	H-TB2W	CM12X30H	-

Recommended clamping torque: 3.5 N·m

# INSERT

## RQMT1204ENC8-MM

## RQMT1204ENC6-MM



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

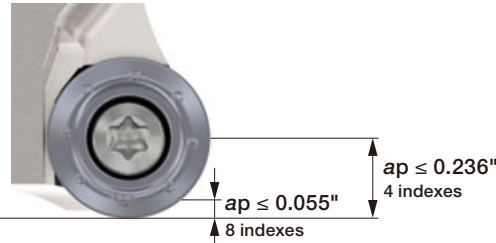
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		INSD	S
			AH3135	AH8015		
RQMT1204ENC8-MM	0.236	0.236	●	●	0.472	0.187
RQMT1204ENC6-MM	0.236	0.236	●	●	0.472	0.187

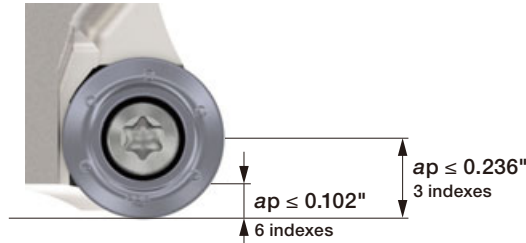
● : Line up

### 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 0.055" or smaller D.O.C. and up to 4 indexes for up to 0.236" D.O.C.

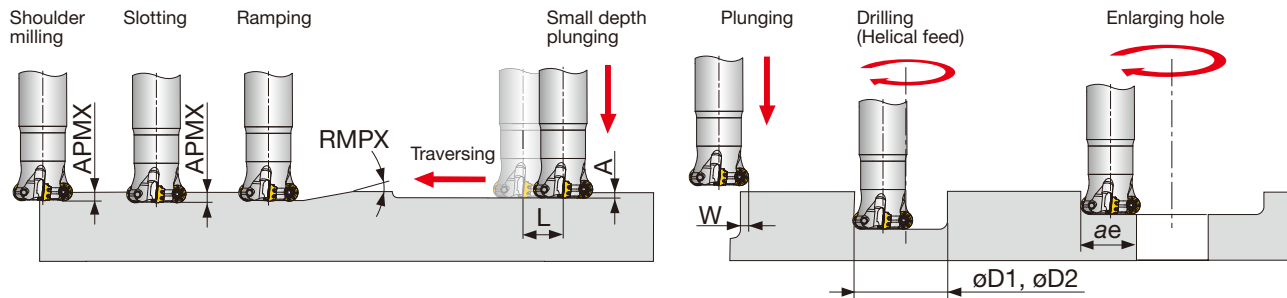


**RQMT1204ENC6-MM**  
Allows up to 6 indexes for 0.102" or smaller D.O.C. and up to 3 indexes for up to 0.236" D.O.C.

## STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Chipbreaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, etc.	- 200HB	First choice	AH3135	MM	328 - 984	
	Carbon steel and alloy steel 1055, etc.	- 300HB	First choice	AH3135	MM	328 - 820	ap = 0.236" : 0.004 - 0.012 ap = 0.079" : 0.006 - 0.024 ap = 0.039" : 0.008 - 0.031
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3135	MM	328 - 656	
M	Austenitic stainless steel 304, 316, etc.	- 200HB	First choice	AH3135	MM	328 - 656	ap = 0.236" : 0.004 - 0.010 ap = 0.079" : 0.006 - 0.020 ap = 0.039" : 0.008 - 0.026
	Martensitic stainless steel 420, etc.	- 200HB	First choice	AH3135	MM	328 - 984	
K	Gray cast iron No.250B, etc.	150 - 250HB	First choice	AH8015	MM	328 - 984	ap = 0.236" : 0.004 - 0.012 ap = 0.079" : 0.006 - 0.024 ap = 0.039" : 0.008 - 0.031
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH8015	MM	262 - 820	
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH3135	MM	98 - 197	ap = 0.236" : 0.003 - 0.008 ap = 0.079" : 0.005 - 0.016 ap = 0.039" : 0.006 - 0.024
	Heat-resistant alloys Inconel718, etc.	-	First choice	AH8015	MM	66 - 164	ap = 0.236" : 0.002 - 0.005 ap = 0.079" : 0.003 - 0.010 ap = 0.039" : 0.004 - 0.012
H	Hardened steel	H13, etc.	40 - 50HRC	First choice	AH3135	MM	164 - 492 ap = 0.236" : 0.002 - 0.005 ap = 0.079" : 0.003 - 0.010 ap = 0.039" : 0.004 - 0.012
		D2, etc.	50 - 60HRC	First choice	AH8015	MM	164 - 230 ap = 0.236" : 0.001 - 0.004 ap = 0.079" : 0.002 - 0.005 ap = 0.039" : 0.002 - 0.006

# APPLICATION RANGE

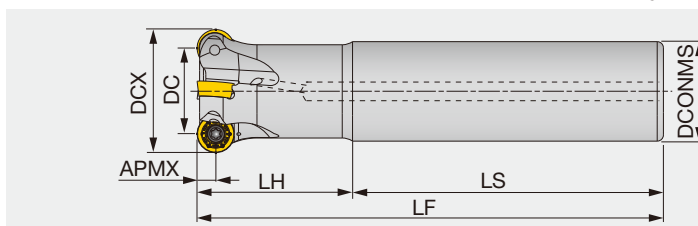


		Max. depth of cut	Max. ramping angle	Max. plunging depth	Max. cutting width in plunging	Machining length for removing uncut portion	Min. machining diameter	Max. machining diameter	Max. cutting width engagement	
	Metric	DCX	APMX	RMPX	A	W	L	øD1	øD2*	ae
	T/ERRQ12M040...	40	6	5.1°	2.4	6	29	59	79	32
	TRRQ12M050B22.0...	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

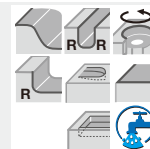
\* For flat bottom hole

## FIXRMILL ERP

Radius endmill with anti-rotation system, shank type



GAMP = +10°~ +4°, GAMF = -2°~ -8.5°



Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

90°

Others

	Inch	APMX	DCX	DC	CICT	DCONMS	LS	LH	LF	Air hole	Insert
	ERP10R100U0100-02	0.197	1.000	0.606	2	1.000	4.000	2.000	6.000	With	RPMT10T3...
	ERP10R125U0125-04	0.197	1.250	0.856	4	1.250	4.000	2.000	6.000	With	RPMT10T3...
	ERP10R150U0125-04	0.197	1.500	1.106	4	1.250	4.000	2.000	6.000	With	RPMT10T3...
	ERP12R125U0125-03	0.236	1.250	0.776	3	1.250	4.000	2.000	6.000	With	RPMT1204...
	ERP12R150U0125-04	0.236	1.500	1.034	4	1.250	4.000	2.000	6.000	With	RPMT1204...
	ERP16R150U0125-02	0.315	1.500	0.866	2	1.250	4.000	2.000	6.000	With	RPMT1606...
	Metric	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...

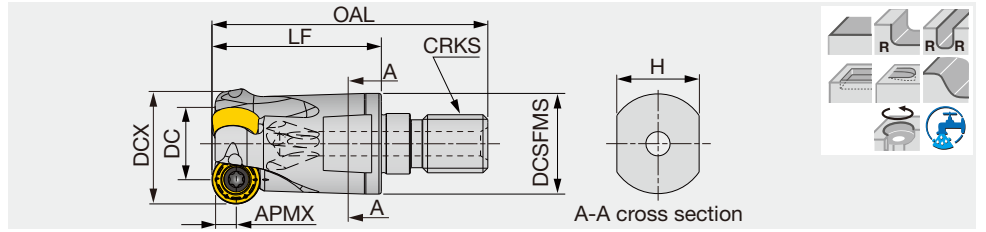
### SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
ERP10R...	CSPB-3.5S	M-1000	IP-15D
ERP12R...	CSTR-4L100	M-1000	T-15DB
ERP16R...	CSPB-5	M-1000	IP-20D

Recommended clamping torque: CSPB-3.5S/CSTR-4L100 = 2.58 lbs·ft, 3.5 N·m, CSPB-5 = 3.69 lbf·ft, 5 N·m

Reference pages: Inserts → **H090**

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

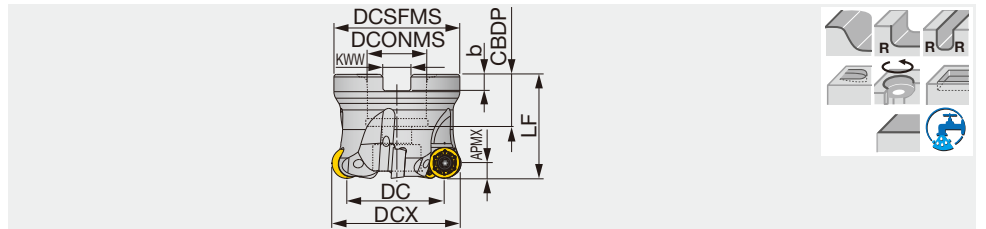


GAMP = 1°~ 4°, GAMF = -8.5°~ 2°

Metric	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...

### TRP10/12/16

### Radius mill with anti-rotation system



GAMP = +4°, GAMF = -4°

Inch	APMX	DCX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Insert
TRP12R200U0075A05	0.236	2.000	1.528	5	1.850	0.750	0.750	1.575	0.197	0.315	0.66	With	RPMT1204...
TRP12R250U0100A06	0.236	2.500	2.028	6	2.323	1.000	1.024	1.969	0.236	0.374	1.32	With	RPMT1204...
TRP16R250U0100A05	0.315	2.500	1.869	5	2.323	1.000	1.024	1.969	0.236	0.374	1.32	With	RPMT1606...

Metric	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...

### INCH SPARE PARTS



Designation	Clamping screw	Lubricant	Torx bit	Grip	Shell locking bolt (Optional parts)
TRP12R200U0075A05	CSTR-4L100	M-1000	BT15S	H-TBS	(C0.375X1.125H)
TRP12R250U0100A06	CSTR-4L100	M-1000	BT15S	H-TBS	(C0.500X1.375H)
TRP16R250U0100A05	CSPB-5	M-1000	BLDIP20/S7	H-TBS	(C0.500X1.375H)

Recommended clamping torque: CSTR-4L100 = 2.58 lbs·ft, CSPB-5 = 3.69 lbs·ft

### METRIC SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench		Torx bit	Grip	Shell locking bolt
			Bit	Grip			
HRP10R...	CSPB-3.5S	M-1000	BLD IP15/S7	H-TBS	-	-	-
HRP12R...	CSTR-4L100	M-1000	BT15S	H-TBS	-	-	-
TRP10R040M16.0E05	CSPB-3.5S	M-1000	-	-	BLDIP15/S7	H-TBS	FSHM8-30H
TRP12R050 - 063M22.0...	CSTR-4L100	M-1000	-	-	BT15S	H-TBS	CM10X30H
TRP12R066M27.0E06	CSTR-4L100	M-1000	-	-	BT15S	H-TBS	CM12X30H
TRP16R063M22.0E05	CSPB-5	M-1000	-	-	BLDIP20/S7	H-TBS	CM10X30H
TRP16R066M27.0E05	CSPB-5	M-1000	-	-	BLDIP20/S7	H-TBS	CM12X30H

Recommended clamping torque: CSPB-3.5S/CSTR-4L100 = 3.5 N·m, CSPB-5 = 5 N·m

Reference pages: Inserts → **H090**, TungFlex → **H038 - H039**



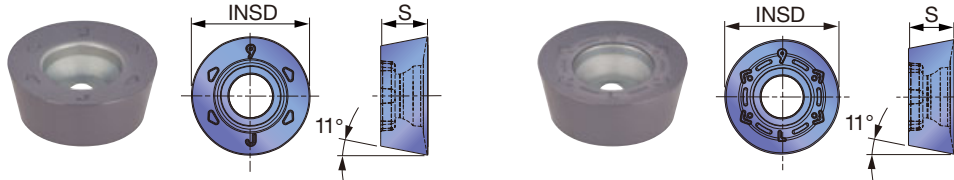




# INSERT

## RPMT-MJ

## RPMT-ML



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

★ : First choice  
☆ : Second choice

Designation	APMX	Coated			INSD	S
		AH130	AH725	AH4035		
RPMT10T3EN-MJ	0.197	●	●	●	0.394	0.156
RPMT10T3EN-ML	0.197	●	●	●	0.394	0.156
RPMT1204EN-MJ	0.236	●	●	●	0.472	0.187
RPMT1204EN-ML	0.236	●	●	●	0.472	0.187
RPMT1606EN-MJ	0.315	●	●	●	0.630	0.250
RPMT1606EN-ML	0.315	●	●	●	0.630	0.250

● : Line up

# STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



ERP

e-catalog



HRP-M

e-catalog



TRP10/12/16

Approach angle

7°-25°

41°-45°

60°-70°

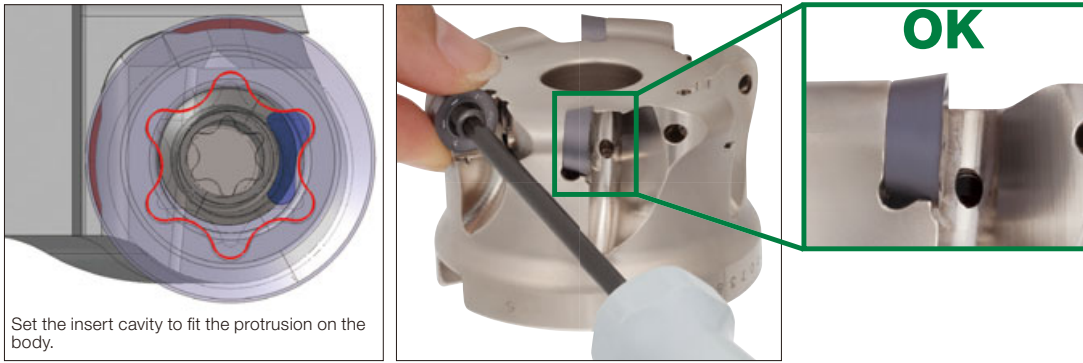
85°-88°

90°

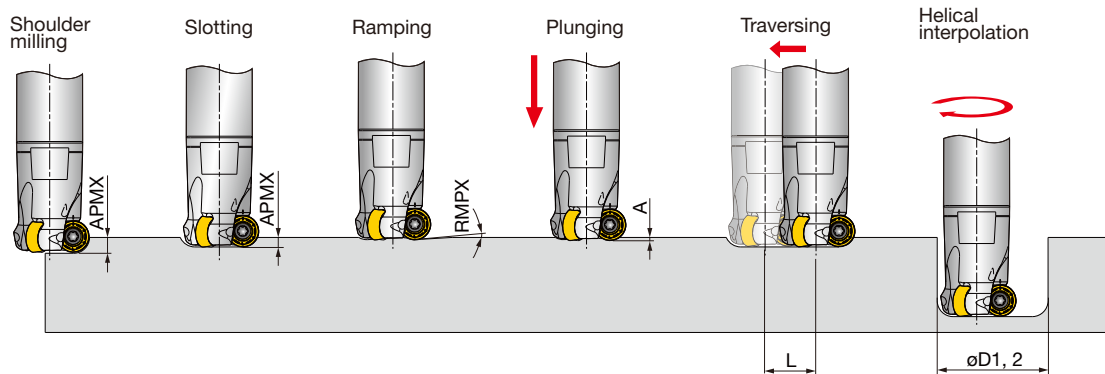
Others

## 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



Inch	Tool-ø DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Machining length for removing uncut portion L	Min. machining øD1, 2	*Max. machining øD2
ERP10R100U0100-02	1.000	0.197	3	0.0276	0.630	1.457	1.969
ERP10R125U0125-04	1.250	0.197	8	0.0984	0.866	1.811	2.441
ERP10R150U0125-04	1.500	0.197	6	0.0984	1.142	2.283	2.953
ERP12R125U0125-03	1.250	0.236	8.3	0.0906	0.787	1.693	2.441
ERP12R150U0125-04	1.500	0.236	4	0.0630	1.063	2.244	2.953
ERP16R150U0125-02	1.500	0.315	6	0.0709	0.906	2.008	2.953
TRP12R200U0075A05	2.000	0.236	4	0.0984	1.575	3.189	3.937
TRP12R250U0100A06	2.500	0.236	2.7	0.0906	2.047	4.213	4.921
TRP16R250U0100A05	2.500	0.315	3	0.0906	1.890	3.976	4.921

\*For flat bottom hole



# TUNGEMILL

## TAOW05



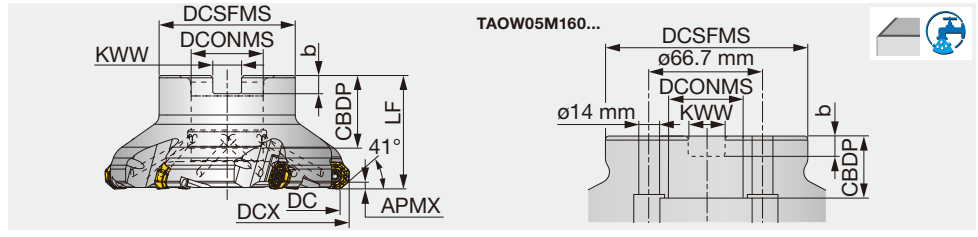
Face mill, with screw clamp system



Approach angle

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

GAMP = +23°, GAMF = -5°

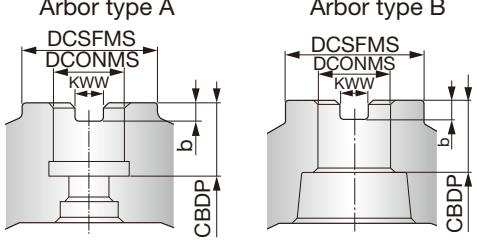


Inch	APMX	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TAOW05U2.00B0.75R04	0.118	2.000	2.310	4	1.850	1.575	0.750	0.750	0.315	0.197	0.970	With	OW*T05...	A
TAOW05U2.50B0.75R05	0.118	2.500	2.800	5	1.850	1.575	0.750	0.750	0.315	0.197	1.300	With	OW*T05...	A
TAOW05U3.00B1.00R07	0.118	3.000	3.300	7	1.969	1.969	1.000	1.020	0.374	0.236	1.960	With	OW*T05...	A
TAOW05U4.00B1.50R08	0.118	4.000	4.300	8	3.150	1.969	1.500	1.100	0.626	0.394	3.590	With	OW*T05...	B
TAOW05U5.00B1.50R10	0.118	5.000	5.300	10	3.150	2.480	1.500	1.300	0.626	0.394	6.190	With	OW*T05...	B
TAOW05U6.00B2.00R08	0.118	6.000	6.300	8	3.937	2.480	2.000	1.500	0.748	0.433	9.700	Without	OW*T05...	B

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

### Arbor type



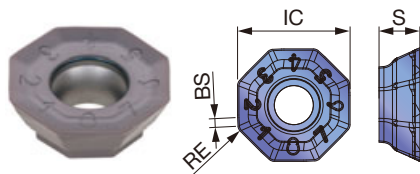
### SPARE PARTS

Designation	Clamping screw	Grip	Torx bit	Shell locking bolt	Shell locking bolt (Optional parts)
TAOW05U2.00... TAOW05U2.50...	CSPB-4S	SW6-SD	BLDIP15/S7	-	(C0.375X1.125H)
TAOW05U3.00...	CSPB-4S	SW6-SD	BLDIP15/S7	-	(C0.500X1.375H)
TAOW05U4.00... TAOW05U5.00...	CSPB-4S	SW6-SD	BLDIP15/S7	-	(TMBA-0.750H)
TAOW05U6.00...	CSPB-4S	SW6-SD	BLDIP15/S7	-	-
TAOW05**050... TAOW05**063...	CSPB-4S	SW6-SD	BLDIP15/S7	CM10X30H	-
TAOW05**080...	CSPB-4S	SW6-SD	BLDIP15/S7	CM12X30H	-
TAOW05**100...	CSPB-4S	SW6-SD	BLDIP15/S7	TMBA-M16H	-
TAOW05**125...	CSPB-4S	SW6-SD	BLDIP15/S7	TMBA-M20H	-
TAOW05**160...	CSPB-4S	SW6-SD	BLDIP15/S7	-	-

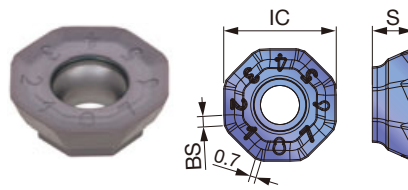
Recommended clamping torque: 2.58 lbs-ft, 3.5 N-m

## INSERT

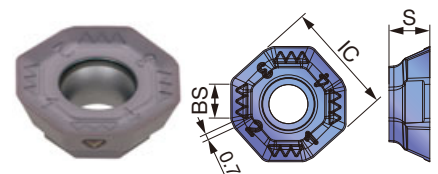
### OWMT05T3AFER-MM



### OWHT05T3C07AFER-MM



### OWHT05T3C07AFER-MW



<b>P</b>	Steel	☆	★						
<b>M</b>	Stainless		★						
<b>K</b>	Cast iron	★	☆						
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloys	★	☆						
<b>H</b>	Hard materials								

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		IC	S	BS
			AH120	AH3135			
OWMT05T3AFER-MM	0.031	0.118	●	●	0.489	0.177	0.039
OWHT05T3C07AFER-MM	-	0.118	●	●	0.488	0.177	0.045
OWHT05T3C07AFER-MW	-	0.118	●	●	0.488	0.177	0.146

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel 1015, 1020, etc.	- 200 HB	First choice	AH3135	MM	325 - 980	0.002 - 0.014
			Wear resistance	AH120	MM	325 - 980	0.002 - 0.014
	High carbon and alloy steel 1055, 4140, etc.	- 300 HB	First choice	AH3135	MM	325 - 820	0.002 - 0.012
			Wear resistance	AH120	MM	325 - 820	0.002 - 0.012
<b>M</b>	Austenitic stainless steel 304, 316, etc.	- 200 HB	First choice	AH3135	MM	325 - 655	0.002 - 0.014
			Wear resistance	AH120	MM	325 - 655	0.002 - 0.014
	Martensitic stainless steel 420, etc.	- 220 HB	First choice	AH3135	MM	325 - 980	0.002 - 0.012
			Wear resistance	AH120	MM	325 - 980	0.002 - 0.012
<b>K</b>	Gray cast iron No.250B, etc.	150 - 250 HB	First choice	AH120	MM	325 - 980	0.002 - 0.014
			Fracture resistance	AH3135	MM	325 - 980	0.002 - 0.014
	Ductile cast iron 80-55-06, etc.	150 - 250 HB	First choice	AH120	MM	260 - 820	0.002 - 0.012
			Fracture resistance	AH3135	MM	260 - 820	0.002 - 0.012
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3135	MM	95 - 195	0.002 - 0.008
			Wear resistance	AH120	MM	95 - 195	0.002 - 0.008
	Heat-resistant alloys Inconel718, etc.	- 40 HRC	First choice	AH120	MM	65 - 160	0.002 - 0.006
			Fracture resistance	AH3135	MM	65 - 160	0.002 - 0.006
<b>H</b>	Hardened steel H13, etc.	40 - 50 HRC	First choice	AH3135	MM	225 - 425	0.002 - 0.006
			Wear resistance	AH120	MM	225 - 425	0.002 - 0.006



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

## ■ 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.

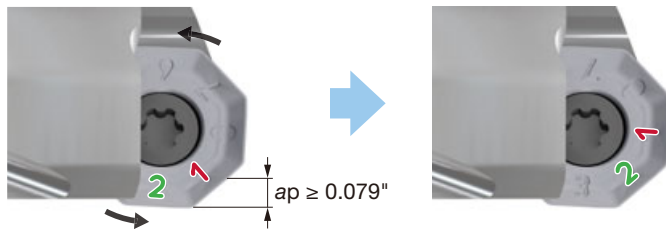
### ■ Installing MW (wiper) inserts

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 0.079" 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.



#### Approach angle

7°-25°

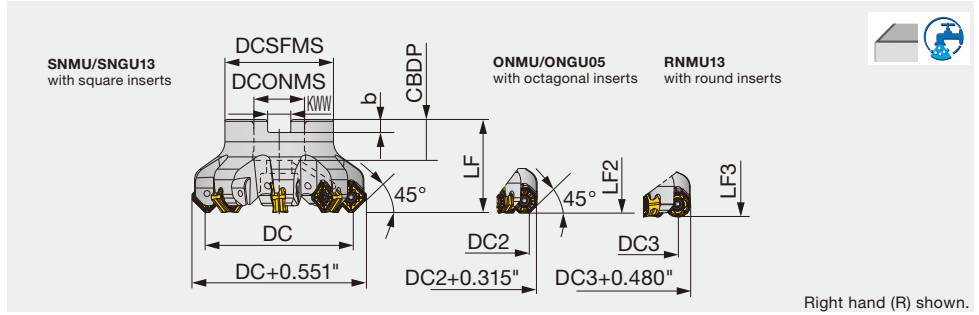
41°-45°

60°-70°

85°-88°

90°

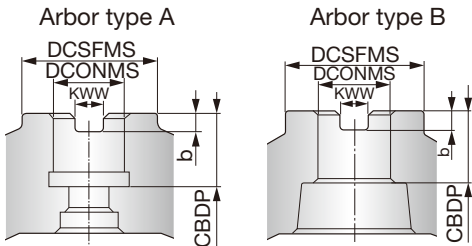
Others



Inch	DC	DC2	DC3	CICT	DCSFMS	LF	LF2	LF3	DCONMS	CBDDP	KWW	b	WT (lb)	Air hole	Arbor type
TASN13U2.00B0.75R05	2.000	2.118	1.949	5	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	0.900	With	A
TASN13U2.50B0.75R06	2.500	2.618	2.449	6	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	1.320	With	A
TASN13U2.50B0.75R08	2.500	2.618	2.449	8	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	1.540	With	A
TASN13U3.00B1.00R08	3.000	3.118	2.949	8	1.969	1.969	1.909	1.911	1.000	1.024	0.374	0.236	1.980	With	A
TASN13U3.00B1.00R10	3.000	3.118	2.949	10	1.969	1.969	1.909	1.911	1.000	1.024	0.374	0.236	2.200	With	A
TASN13U4.00B1.50R08 *	4.000	4.118	3.949	8	3.150	1.969	1.909	1.911	1.500	1.276	0.626	0.394	3.750	Without	B
TASN13U4.00B1.50R12 *	4.000	4.118	3.949	12	3.150	1.969	1.909	1.911	1.500	1.276	0.626	0.394	3.750	Without	B
TASN13U4.00B1.50R08LF2.5	4.000	4.118	3.949	8	3.150	2.480	2.421	2.422	1.500	1.496	0.626	0.394	4.410	Without	B
TASN13U4.00B1.50R12LF2.5	4.000	4.118	3.949	12	3.150	2.480	2.421	2.422	1.500	1.496	0.626	0.394	4.630	Without	B
TASN13U5.00B1.50R10	5.000	5.118	4.949	10	3.150	2.480	2.421	2.422	1.500	1.378	0.626	0.394	5.950	Without	B
TASN13U5.00B1.50R14	5.000	5.118	4.949	14	3.150	2.480	2.421	2.422	1.500	1.378	0.626	0.394	6.720	Without	B
TASN13U6.00B2.00R12	6.000	6.118	5.949	12	3.937	2.480	2.421	2.422	2.000	1.496	0.748	0.433	8.600	Without	B

\* Discontinued items

### Arbor type



### SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1 (Optional parts)	Shell locking bolt 2 (Optional parts)	Torx bit
TASN13... (DC ≤ 3.000")	CSPB-4	H-TB2W	M-1000	-	(C0.375X1.125H)	BLDIP15/S7
TASN13... (DC = 3.000")	CSPB-4	H-TB2W	M-1000	-	(C0.500X1.375H)	BLDIP15/S7
TASN13... (DC = 4.000")	CSPB-4	H-TB2W	M-1000	(TMBA-0.750S.375H)	-	BLDIP15/S7
TASN13... (DC = 5.000")	CSPB-4	H-TB2W	M-1000	(TMBA-0.750S.375H)	-	BLDIP15/M7
TASN13... (DC = 6.000")	CSPB-4	H-TB2W	M-1000	-	-	BLDIP15/M7

Recommended clamping torque: 2.58 lbs·ft

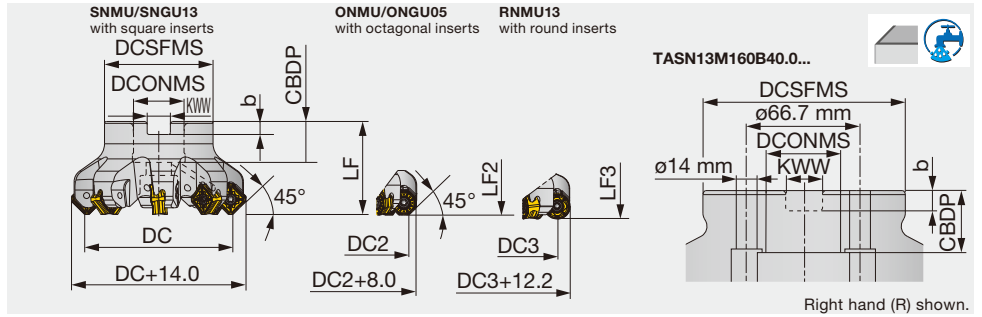






## Face mill, with screw clamp system

GAMP=+6.0°, GAMF=-6.8°~-6.3°



Metric	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

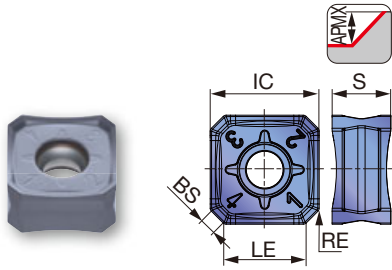
SPARE PARTS						
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TASN13M0**B22.0R0*	CSPB-4	H-TB2W	M-1000	-	CM10X30H	BLDIP15/S7
TASN13*080B2**R0*	CSPB-4	H-TB2W	M-1000	-	CM12X30H	BLDIP15/S7
TASN13*100B3**R0*	CSPB-4	H-TB2W	M-1000	TMBA-M16H	-	BLDIP15/S7
TASN13*125B**R**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

Recommended clamping torque: 3.5 N·m

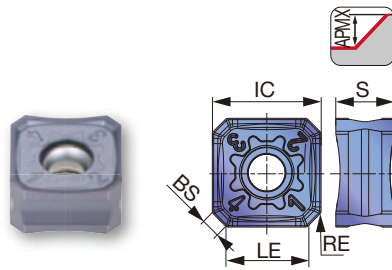
Reference pages: Standard cutting conditions → **H098**

# INSERTS

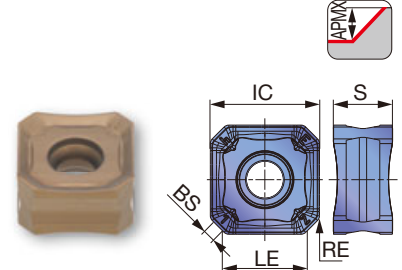
## SNMU-MJ



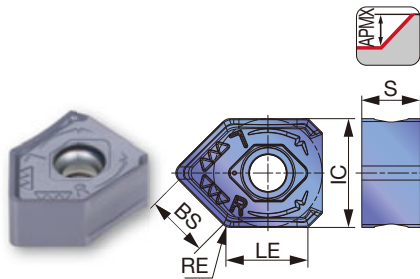
## SNGU-MJ



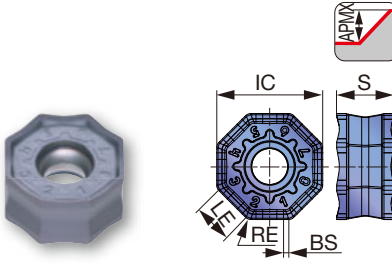
## SNGU-MH



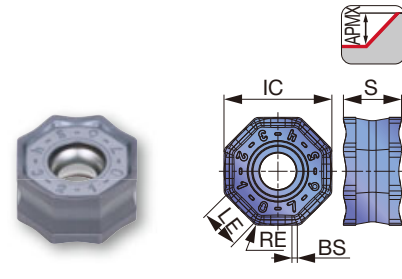
## SNGU-W



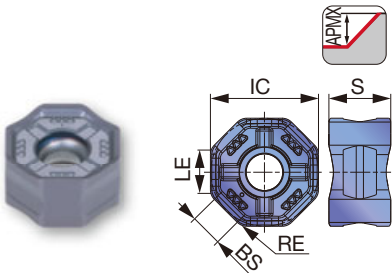
## ONMU-MJ



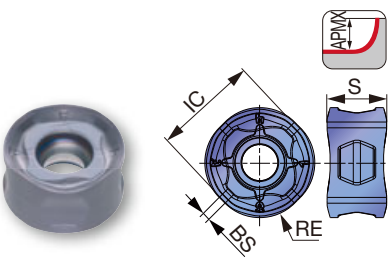
## ONGU-MJ



## ONGU-W



## RNMU-MJ



<b>P</b> Steel	☆	★	☆	★	
<b>M</b> Stainless		☆	★	★	
<b>K</b> Cast iron	★	☆			★
<b>N</b> Non-ferrous					
<b>S</b> Superalloys	★		☆		
<b>H</b> Hard materials					

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated					LE	IC	S	BS
			AH120	AH3225	AH3135	T3225	T1215				
SNMU1307ANEN-MJ	0.020	0.236	●	●	●	●	●	0.370	0.512	0.276	0.079
SNGU1307ANEN-MJ	0.020	0.236	●	●	●	●	●	0.370	0.512	0.276	0.079
SNGU1307ANEN-MH	0.031	0.236				●		0.354	0.512	0.276	0.079
SNGU1307ANEN-W	0.047	0.236	●	●	●			0.378	0.512	0.276	0.295
ONMU0507ANEN-MJ	0.031	0.134	●	●	●	●	●	0.193	0.512	0.276	0.028
ONGU0507ANEN-MJ	0.031	0.134	●	●	●	●	●	0.193	0.512	0.276	0.028
ONGU0507ANEN-W	0.063	0.134	●	●	●			0.197	0.512	0.293	0.154
RNMU1307ZNER-MJ	0.236	0.236	●	●	●	●	●	-	0.512	0.286	0.039

● : Line up

Reference pages: Standard cutting conditions → **H098**



# STANDARD CUTTING CONDITIONS

## SNMU / SNGU / ONMU / ONGU

High Feed Milling

Face Milling

Shoulder Milling

Slot Milling

Profile Milling

Chamfering, Counterbore

Finish Face Milling

ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, 1020, etc.	200 - 300HB	First choice	AH3225	MJ	330 - 820	0.004 - 0.020
			For wear resistance	T3225	MJ	660 - 1150	0.004 - 0.016
P	High carbon and alloy steel 1055, 4140, etc.	150 - 300HB	First choice	AH3225	MJ	330 - 820	0.004 - 0.016
			For wear resistance	T3225	MJ	590 - 980	0.004 - 0.016
M	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	MJ	330 - 660	0.004 - 0.016
			For wear resistance	T3225	MJ	490 - 820	0.004 - 0.016
M	Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3135	MJ	330 - 660	0.004 - 0.014
			For wear resistance	T3225	MJ	330 - 820	0.004 - 0.012
M	Cast stainless steel 1.4849, etc.	-	First choice	T3225	MH	200 - 390	0.004 - 0.012
			For low cutting force	AH3135	MJ	200 - 390	0.004 - 0.012
K	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	T1215	MJ	330 - 980	0.004 - 0.016
				AH120	MJ	330 - 820	0.004 - 0.020
K	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	T1215	MJ	330 - 980	0.004 - 0.016
				AH120	MJ	260 - 660	0.004 - 0.020
S	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	MJ	100 - 200	0.004 - 0.012
				AH120	MJ	30 - 130	0.002 - 0.006
H	Hardened steel	H13, etc.	First choice	AH3225	MJ	260 - 430	0.004 - 0.008
		D2, etc.	First choice	AH120	MJ	160 - 230	0.001 - 0.004

## RNMU

ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, 1020, etc.	200 - 300HB	First choice	AH3225	MJ	330 - 820	
			For wear resistance	T3225	MJ	660 - 1150	
P	High carbon and alloy steel 1055, 4140, etc.	150 - 300HB	First choice	AH3225	MJ	330 - 820	*ap = 0.236": 0.004 - 0.012
			For wear resistance	T3225	MJ	590 - 980	*ap = 0.078": 0.016 - 0.031
P	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	MJ	330 - 660	*ap = 0.039": 0.031 - 0.059
			For wear resistance	T3225	MJ	490 - 820	
M	Stainless steel 304SS, 316SS, etc.	- 200HB	First choice	AH3135	MJ	330 - 660	*ap = 0.236": 0.004 - 0.010
			For wear resistance	T3225	MJ	330 - 820	*ap = 0.078": 0.012 - 0.027
M	Cast stainless steel 1.4849, etc.	-	First choice	T3225	MJ	200 - 390	*ap = 0.039": 0.024 - 0.051
			For fracture resistance	AH3135	MJ	200 - 390	*ap = 0.078": 0.008 - 0.016
K	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	First choice	AH120	MJ	330 - 980	*ap = 0.039": 0.012 - 0.031
				T1215	MJ	330 - 820	*ap = 0.236": 0.004 - 0.012
K	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH120	MJ	330 - 980	*ap = 0.078": 0.016 - 0.031
				T1215	MJ	260 - 660	*ap = 0.039": 0.031 - 0.059
S	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	MJ	100 - 200	ap = 0.039": 0.006 - 0.031
				AH120	MJ	30 - 130	ap = 0.039": 0.002 - 0.012
H	Hardened steel	H13, etc.	First choice	AH3225	MJ	260 - 430	ap = 0.039": 0.004 - 0.010
		D2, etc.	First choice	AH120	MJ	160 - 230	ap = 0.020": 0.001 - 0.004

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

Approach angle

7°-25°

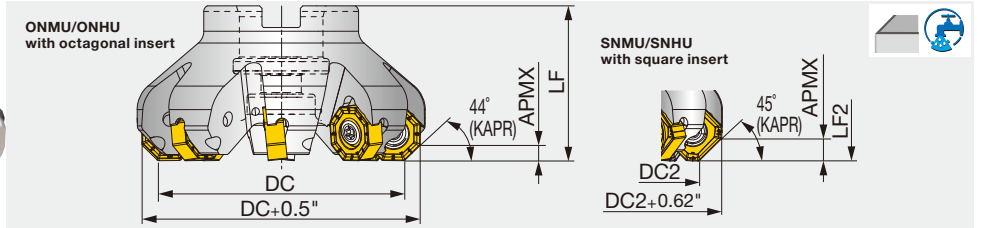
41°-45°

60°-70°

85°-88°

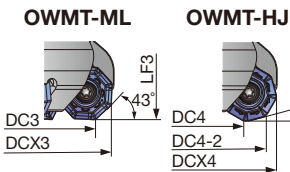
90°

Others



Inch	DC	DC2	CICT	DCSFMS	LF	LF2	DCONMS	CBDP	KWW	b	WT (lb)	Air hole	Insert	Arbor type
TAN07R250U0075A05	2.500	2.394	5	1.750	1.750	1.805	0.750	0.750	0.313	0.188	1.000	With	SN*U/ON*U/OWMT...	A
TAN07R250U0075A06	2.500	2.394	6	1.750	1.750	1.805	0.750	0.750	0.313	0.188	1.000	With	SN*U/ON*U/OWMT...	A
TAN07R300U0100A06	3.000	2.894	6	2.000	2.000	2.055	1.000	0.750	0.375	0.219	2.000	With	SN*U/ON*U/OWMT...	A
TAN07R300U0100A08	3.000	2.894	8	2.000	2.000	2.055	1.000	0.750	0.375	0.219	2.000	With	SN*U/ON*U/OWMT...	A
TAN07R400U0150A07	4.000	3.894	7	2.400	2.000	2.055	1.500	1.000	0.625	0.375	3.000	With	SN*U/ON*U/OWMT...	B
TAN07R400U0150A10	4.000	3.894	10	2.400	2.000	2.055	1.500	1.000	0.625	0.375	3.000	With	SN*U/ON*U/OWMT...	B
TAN07R500U0150A08	5.000	4.894	8	2.400	2.500	2.555	1.500	1.000	0.625	0.375	5.000	With	SN*U/ON*U/OWMT...	B
TAN07R500U0150A12	5.000	4.894	12	2.400	2.500	2.555	1.500	1.000	0.625	0.375	5.000	With	SN*U/ON*U/OWMT...	B
TAN07R600U0200A10	6.000	5.894	10	4.000	2.500	2.555	2.000	1.000	0.750	0.438	7.000	Without	SN*U/ON*U/OWMT...	B
TAN07R600U0200A15	6.000	5.894	15	4.000	2.500	2.555	2.000	1.000	0.750	0.438	7.000	Without	SN*U/ON*U/OWMT...	B
TAN07R800U0250A12	8.000	7.894	12	5.300	2.500	2.555	2.500	1.400	1.000	0.531	13.000	Without	SN*U/ON*U/OWMT...	C
TAN07R800U0250A18	8.000	7.894	18	5.300	2.500	2.555	2.500	1.400	1.000	0.531	13.000	Without	SN*U/ON*U/OWMT...	C

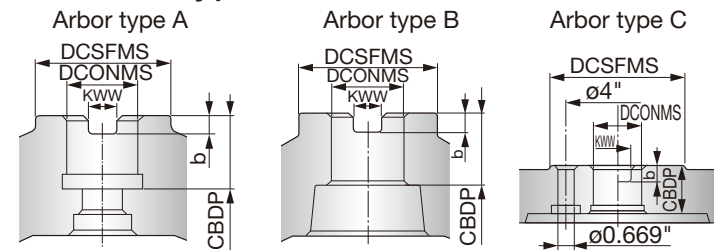
**Dimension when using positive type inserts (OWMT)**



Inch	OWMT-ML			OWMT-HJ			
	DC3	DCX3	LF3	DC4	DC4-2	DCX4	LF4
TAN07R250U0075A...	2.520	2.213	1.789	3.000	2.665	3.028	1.805
TAN07R300U0100A...	3.020	2.713	2.039	3.500	3.165	3.528	2.055
TAN07R400U0150A...	4.020	3.713	2.039	4.500	4.165	4.528	2.055
TAN07R500U0150A...	5.020	4.713	2.539	5.500	5.165	5.528	2.555
TAN07R600U0200A...	6.020	5.713	2.539	6.500	6.165	6.528	2.555
TAN07R800U0250A...	8.020	7.713	2.539	8.500	8.165	8.528	2.555

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

**Arbor type**



**SPARE PARTS**

Designation	Clamping screw	Grip	Torx bit	Shell locking bolt (Optional parts)
TAN07R250...	SRM5X0.8IP20X+ACROLYTE	H-TB	BLDIP20/S7	(C0.375X1.125H)
TAN07R300...	SRM5X0.8IP20X+ACROLYTE	H-TB	BLDIP20/S7	(C0.500X1.375H)
TAN07R400, 500...	SRM5X0.8IP20X+ACROLYTE	H-TB	BLDIP20/S7	(TMBA-0.750H)
TAN07R600, 800...	SRM5X0.8IP20X+ACROLYTE	H-TB	BLDIP20/S7	-

Recommended clamping torque: 5.53 lbs · ft

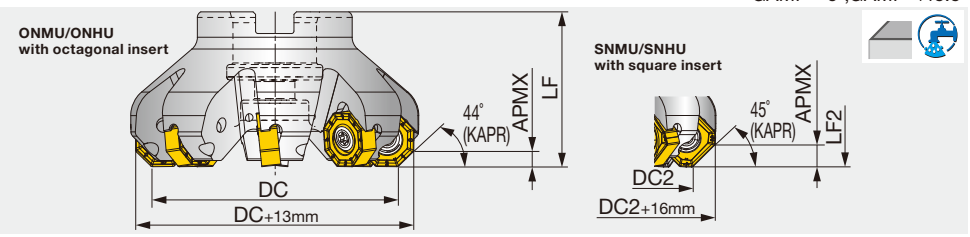


**TAN07**

Face mill, with screw clamp system

GAMP=-6°, GAMF=+15.5°

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



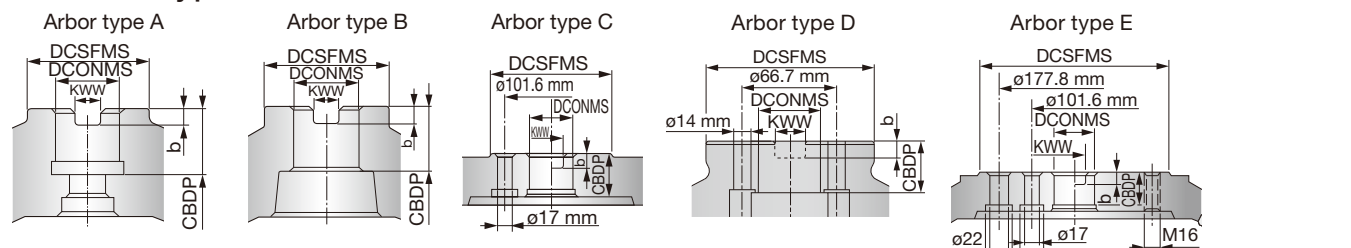
Metric	DC	DC2	CICT	DCSFMS	LF	LF2	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TAN07R063M22.0E05	63	60.3	5	41	40	41.4	22	20	10.4	6.3	0.5	With	SN*U/ON*U/OWMT...	A
TAN07R063M22.0E06	63	60.3	6	41	40	41.4	22	20	10.4	6.3	0.5	With	SN*U/ON*U/OWMT...	A
TAN07R080M25.4-06	80	77.3	6	50	50	51.4	25.4	26	9.5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

Dimension when using positive type inserts (OWMT)

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

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

**Arbor type**



**SPARE PARTS**

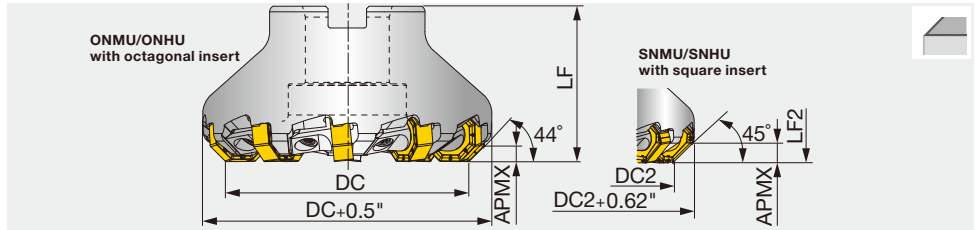
Designation	Clamping screw	Grip	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TAN07R063M22.0...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	CM10X30H	BLDIP20/S7
TAN07R080M25.4...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	CM12X30H	BLDIP20/S7
TAN07R100M31.7...	SRM5X0.8IP20X+ACROLYTE	H-TB	TMBA-M16H	-	BLDIP20/S7
TAN07R125M38.1...	SRM5X0.8IP20X+ACROLYTE	H-TB	TMBA-M20H	-	BLDIP20/S7
TAN07R160 - 315...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	-	BLDIP20/M7

Recommended clamping torque: 7.5 N·m

Reference pages: Inserts → **H103**, Standard cutting conditions → **H104**



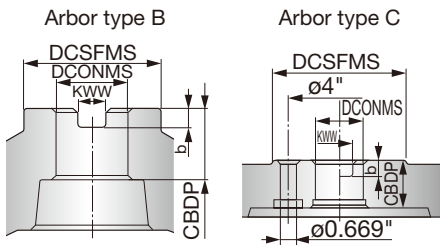
High density face mill, with wedge clamp system



Inch	DC	DC2	CICT	DCSFMS	LF	LF2	DCONMS	CBDP	KWW	b	WT (lb)	Air hole	Insert	Arbor type
TAN07R250U0075A08W	2.500	2.394	8	1.750	1.750	1.805	0.750	0.750	0.313	0.188	1.60	Without	SN*U/ON*U/OWMT...	B
TAN07R300U0100A10W	3.000	2.894	10	2.000	2.000	2.055	1.000	0.750	0.375	0.219	2.00	Without	SN*U/ON*U/OWMT...	B
TAN07R400U0150A14W	4.000	3.894	14	2.400	2.000	2.055	1.500	1.000	0.625	0.375	2.80	Without	SN*U/ON*U/OWMT...	B
TAN07R500U0150A18W	5.000	4.894	18	2.400	2.500	2.555	1.500	1.000	0.625	0.375	4.30	Without	SN*U/ON*U/OWMT...	B
TAN07R600U0200A22W	6.000	5.894	22	4.000	2.500	2.555	2.000	1.000	0.750	0.438	6.80	Without	SN*U/ON*U/OWMT...	B
TAN07R800U0250A28W	8.000	7.894	28	5.300	2.500	2.555	2.500	1.400	1.000	0.531	13.50	Without	SN*U/ON*U/OWMT...	C

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

### Arbor type



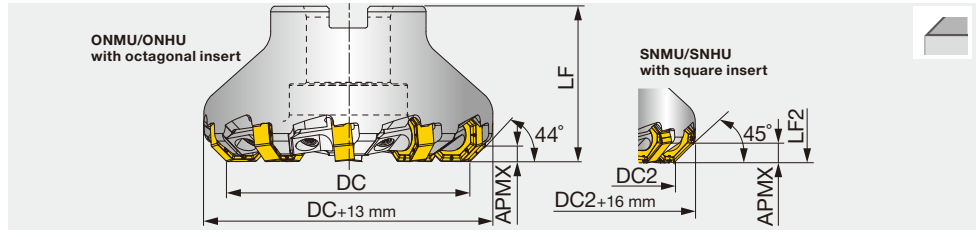
### SPARE PARTS

Designation	Grip	Torx bit	Wedge	Clamping screw	Shell locking bolt (Optional parts)
TAN07R250U**W	H-TBS	BLDIP15/S7	CL ARM-10-TUNG1	DS-6P	(C0.375X1.125H)
TAN07R300U**W	H-TBS	BLDIP15/S7	CL ARM-10-TUNG1	DS-6P	(C0.500X1.375H)
TAN07R400U**W, TAN07R500U**W	H-TBS	BLDIP15/S7	CL ARM-10-TUNG1	DS-6P	(TMBA-0.750H)
TAN07R600U**W, TAN07R800U**W	H-TBS	BLDIP15/S7	CL ARM-10-TUNG1	DS-6P	-





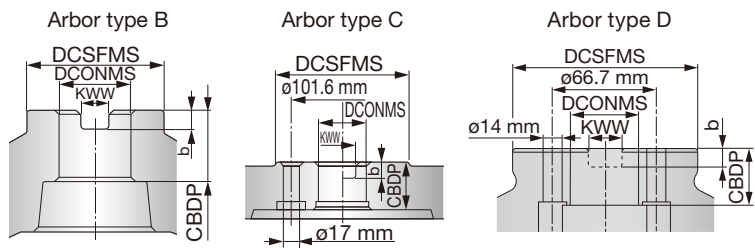
High density face mill, with wedge clamp system



Metric	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



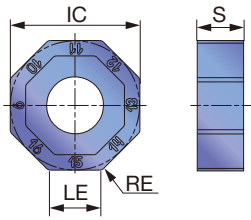
### SPARE PARTS

Designation	Grip	Wedge	Wedge fixing screw	Torx bit
TAN07-W	H-TBS	CLARM-10-TUNG1	DS-6P	BLDIP15/S7

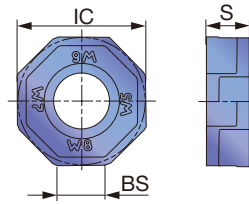
Reference pages: Standard cutting conditions → **H104**

# INSERT

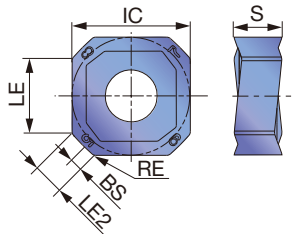
## ONMU/ONHU0705-MJ / -ML



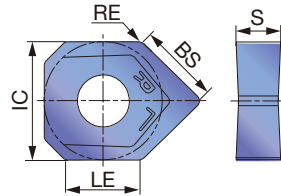
## ONHU0705-W



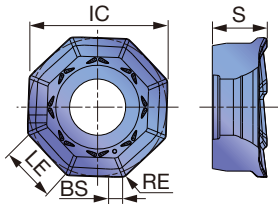
## SNMU/SNHU1706 -MJ / -ML



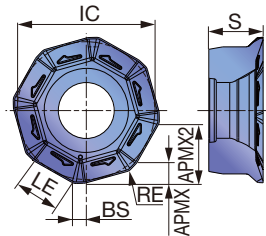
## SNHU1706-W



## 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	0.031	0.187			●	●	●	●	●				0.283	0.244	-	0.681	-	-
ONHU0705ANPN-MJ	0.031	0.187			●	●							0.283	0.244	-	0.681	-	-
ONMU0705ANPN-ML	0.031	0.187	●				●						0.283	0.244	-	0.681	-	-
ONHU0705ANTN-ML	0.031	0.187	●		●	●							0.283	0.244	-	0.681	-	-
ONHU0705ANPR-W *	-	0.187	●										0.283	0.228	-	0.689	0.252	-
OWMT0807ZNER-HJ	0.031	0.059					●						-	0.291	-	0.748	0.039	0.295
OWMT0807AAER-ML	0.047	0.138		●			●						0.205	0.291	-	-	0.047	-
SNMU1706ANPR-MJ	0.031	0.295			●	●	●			●	●		0.433	0.275	0.173	0.681	0.709	-
SNHU1706ANPR-MJ	0.031	0.295			●	●							0.433	0.275	0.173	0.681	0.709	-
SNMU1706ANTR-ML	0.031	0.295	●				●						0.433	0.275	0.173	0.681	0.709	-
SNHU1706ANTR-ML	0.031	0.295	●										0.433	0.275	0.173	0.681	0.709	-
SNHU1706ANFN-W *	0.016	0.295	●										0.681	0.256	-	0.681	0.433	-

\* Pay attention to the wiper insert installation procedure below.

●: Line up

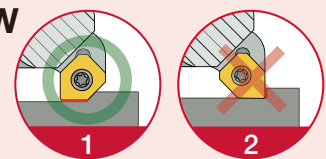
## Attention for wiper inserts

### ONHU0705ANPR-W



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.  
Feed rate:  $f < 0.217$  ipr

### SNHU1706ANFN-W



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.  
Feed rate:  $f < 0.374$  ipr

Reference pages: Standard cutting conditions → **H104**

# STANDARD CUTTING CONDITIONS

## Negative type



ISO	Workpiece material	Hardness	Priority	Recommendation		Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
				Grade	Chipbreaker		
P	Low carbon steel 1015, etc.	- 200 HB	First choice	AH3135	MJ	330 - 820	0.008 - 0.020
		- 200 HB	Wear resistance	T3225	MJ	660 - 1150	0.008 - 0.016
		- 200 HB	Low cutting force	AH3135	ML	330 - 820	0.008 - 0.016
	High carbon steel 1045, 1055, etc.	200 - 300 HB	First choice	AH3135	MJ	330 - 750	0.008 - 0.016
		200 - 300 HB	Wear resistance	T3225	MJ	590 - 660	0.008 - 0.016
		200 - 300 HB	Low cutting force	AH3135	ML	330 - 750	0.008 - 0.016
	Alloy steel 4140, etc.	150 - 330 HB	First choice	AH3135	MJ	330 - 660	0.008 - 0.016
		150 - 330 HB	Wear resistance	T3225	MJ	490 - 820	0.008 - 0.016
		150 - 330 HB	Low cutting force	AH3135	ML	330 - 660	0.008 - 0.016
M	Stainless steel S30400, etc.	- 200 HB	First choice	AH3135	MJ	330 - 660	0.004 - 0.012
		- 200 HB	Wear resistance	T3225	MJ	330 - 820	0.004 - 0.012
K	Gray cast iron No.35B, No.45B, etc.	150 - 250 HB	First choice	T1215	MJ	490 - 660	0.008 - 0.020
		150 - 250 HB	Fracture resistance	AH725	MJ	330 - 820	0.008 - 0.020
		150 - 250 HB	Low cutting force	AH120	ML	330 - 820	0.008 - 0.020
	Ductile cast iron 60-40-18, etc.	150 - 300 HB	First choice	T1215	MJ	330 - 660	0.008 - 0.020
		150 - 300 HB	Fracture resistance	AH725	MJ	260 - 660	0.008 - 0.020
		150 - 300 HB	Low cutting force	AH120	ML	260 - 660	0.008 - 0.020
H	Hardened steel	40 - 50 HRC	First choice	AH725	MJ	260 - 430	0.004 - 0.008
		50 - 60 HRC	First choice	AH725	MJ	160 - 230	0.002 - 0.004

## Positive type

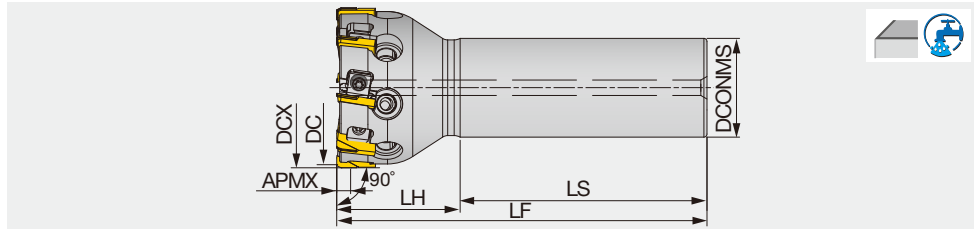


ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per tooth : fz (ipt)	
						ML	HJ*
P	Low carbon steel 1015, etc.	- 200 HB	First choice	AH3135	330 - 980	0.004 - 0.016	0.02 - 0.059
		- 200 HB	Fracture resistance	AH130	330 - 980	0.004 - 0.016	-
	High carbon steel 1045, 1055, etc.	200 - 300 HB	First choice	AH3135	330 - 750	0.004 - 0.010	0.02 - 0.059
		200 - 300 HB	Fracture resistance	AH130	330 - 750	0.004 - 0.010	-
	Alloy steel 4140, etc.	150 - 330 HB	First choice	AH3135	330 - 660	0.004 - 0.010	0.02 - 0.059
		150 - 330 HB	Fracture resistance	AH130	330 - 660	0.004 - 0.010	-
M	Stainless steel S30400, etc.	- 200 HB	First choice	AH3135	330 - 500	0.004 - 0.010	0.012 - 0.02
		- 200 HB	Fracture resistance	AH130	330 - 500	0.004 - 0.010	-
K	Gray cast iron No.35B, No.45B, etc.	150 - 250 HB	First choice	AH3135	330 - 830	0.004 - 0.016	0.02 - 0.059
		150 - 250 HB	Fracture resistance	AH130	330 - 830	0.004 - 0.016	-
	Ductile cast iron 60-40-18, etc.	150 - 250 HB	First choice	AH3135	260 - 660	0.004 - 0.010	0.02 - 0.059
		150 - 250 HB	Fracture resistance	AH130	260 - 660	0.004 - 0.010	-
S	Titanium alloy Ti-6Al-4V, etc.	- HRC 40	First choice	AH3135	100 - 200	0.004 - 0.010	0.012 - 0.02
		- HRC 40	Fracture resistance	AH130	100 - 200	0.004 - 0.010	-
	Heat resistant alloy Inconel718, etc.	- HRC 40	First choice	AH3135	30 - 130	0.002 - 0.006	0.004 - 0.012
		- HRC 40	Fracture resistance	AH130	30 - 130	0.002 - 0.006	-
H	Hardened steel	40 - 50 HRC	First choice	AH3135	260 - 420	-	0.004 - 0.012
		50 - 60 HRC	First choice	AH3135	160 - 230	-	0.001 - 0.003

\* Apply 20% of recommended feed when using HJ insert with ap over 0.059".

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

GAMP = +9°, GAMF = +4°



Inch	APMX	DC	DCX	CICT	DCONMS	LF	LH	LS	WT(lb)	Air hole	RPMX(min <sup>-1</sup> )	Insert
EPYD06U2.00C1.25R08	0.177	2.000	2.079	8	1.250	4.500	1.575	2.925	1.920	With	22,000	YDEN0603...

Metric	APMX	DC	DCX	CICT	DCONMS	LF	LH	LS	WT(kg)	Air hole	RPMX(min <sup>-1</sup> )	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...

### SPARE PARTS

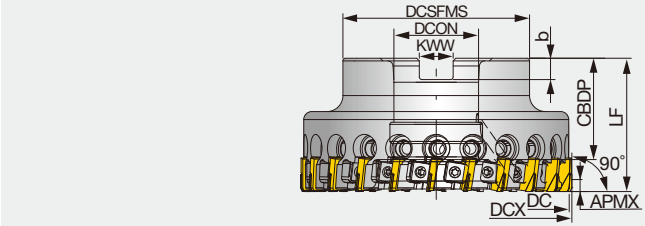
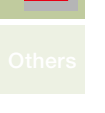
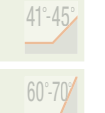
Designation	Insert locking wedge	Wedge fixing screw	Adjusting cam	Torx bit	Cam tightening screw	Wrench	Grip
EPYD06...	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W





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

GAMP = +9°, GAMF = +4°



Inch	APMX	DC	DCX	CICT	DCSFMS	LF	DCON	CBDP	KWW	b	WT(lb)	Air hole	RPMX(min <sup>-1</sup> )	Insert
TPYD06U2.50B0.75R10	0.177	2.500	2.579	10	1.772	1.575	0.750	0.750	0.315	0.197	1.340	With	19,000	YDEN0603...
TPYD06U3.00B1.00R16	0.177	3.000	3.079	16	2.362	1.969	1.000	1.024	0.374	0.236	2.560	With	17,000	YDEN0603...
TPYD06U4.00B1.25R22	0.177	4.000	4.079	22	2.756	1.969	1.250	0.827	0.500	0.315	4.300	With	15,000	YDEN0603...
TPYD06U5.00B1.50R26	0.177	5.000	5.079	26	3.543	2.362	1.500	1.299	0.626	0.394	8.030	With	14,000	YDEN0603...
TPYD06U6.00B1.50R34	0.177	6.000	6.079	34	3.543	2.362	1.500	1.299	0.626	0.394	10.760	With	12,000	YDEN0603...

Metric	APMX	DC	DCX	CICT	DCSFMS	LF	DCON	CBDP	KWW	b	WT(kg)	Air hole	RPMX(min <sup>-1</sup> )	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...

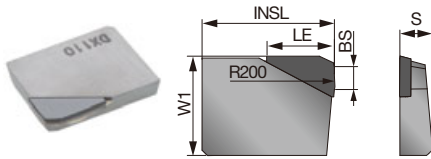
### SPARE PARTS



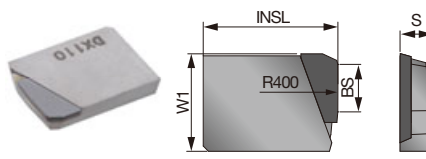
Designation	Insert locking wedge	Wedge fixing screw	Adjusting cam	Torx bit	Cam tightening screw	Wrench	Grip	Shell locking bolt	Shell locking bolt (Optional parts)
TPYD06U2.50B0.75R10	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	-	(C0.375X1.125H)
TPYD06U3.00B1.00R16	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	-	(C0.500X1.375H)
TPYD06U4.00B1.25R22	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	-	-
TPYD06U5.00..., 6.00...	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	-	(TMBA-0.750H)
TPYD06M063B22.0R**	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	CM10x30H	-
TPYD06*080B2*.R**	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*125B*.R**, TPYD06*160B*.R**	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	TMBA-M20H	-

## INSERT

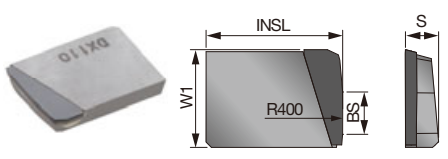
YDEN0603PD(F/S)R-D



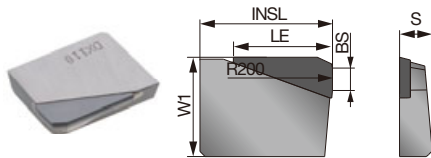
YDEN0603PDFR-WD



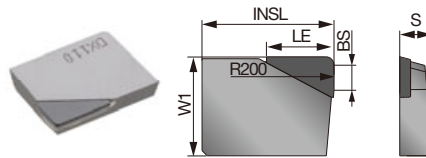
YDEN0603PDFR-BD



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					W1	INSL	S	BS	LE
			DX110									
YDEN0603PDFR-D	0.177	Without	●					0.375	0.500	0.122	0.087	0.256
YDEN0603PDSR-D	0.177	With	●					0.375	0.500	0.122	0.087	0.256
YDEN060304PDFR-D	0.177	Without	●					0.375	0.500	0.122	0.110	0.256
YDEN060308PDFR-D	0.177	Without	●					0.375	0.500	0.122	0.094	0.256
YDEN0603PDCR-LD	0.295	With*	●					0.375	0.500	0.122	0.087	0.375
YDEN0603PDFR-WD	-	Without	●					0.364	0.504	0.122	0.177	-
YDEN0603PDFR-BD	-	Without	●					0.364	0.508	0.122	0.157	-

\* 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 (sfm)	Feed per tooth fz (ipt)
N	Cast aluminum alloy / Die-cast (Si < 13%)	DX110	1640 - 13123	0.002 - 0.008
	Cast aluminum alloy / Die-cast (Si ≥ 13%)	DX110	656 - 2625	0.002 - 0.008
	Aluminum alloy (1000 - 7000 series)	DX110	1640 - 13123	0.002 - 0.008
	Copper alloy	DX110	656 - 1640	0.002 - 0.008

- 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.

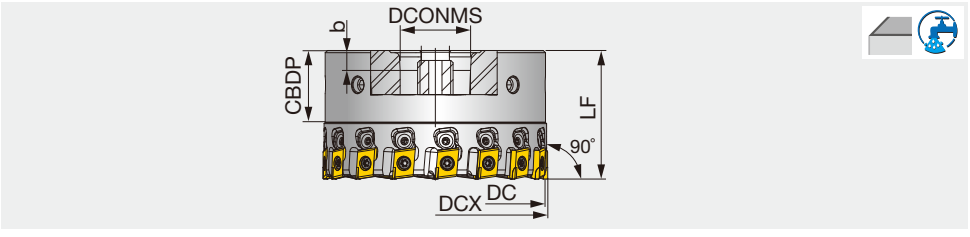






# TUNGSMILL TPYP12

High speed PCD mill for non ferrous metal



Metric	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	RSRGR5M40	RSFTC1008	T-8F	-	RSFTS-050M
TPYP12M063B22.0R10	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6063M	VC004762110035F
TPYP12M080B27.0R12, TPYP12J080B25.4R12	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6080	VC00TEDI12040F
TPYP12M100B32.0R16, TPYP12J100B31.7R16	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6100	VC00TANG16040F
TPYP12M125B40.0R20, TPYP12J125B38.1R20	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6125	VC00TEDI20040F

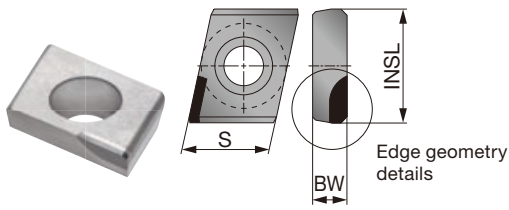
Recommended clamping torque: 4.5 N·m

### Approach angle

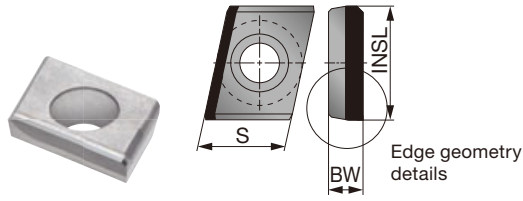
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

## INSERT

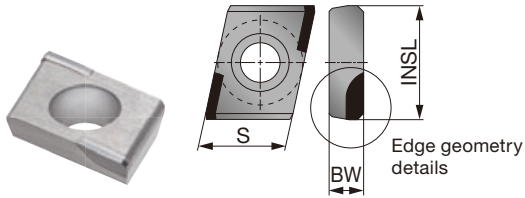
### YPEB12X3-1A



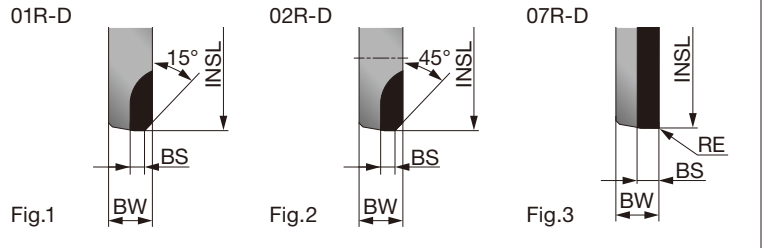
### YPEB12X-FP



### YPEB12X3-2A/P



### Edge geometry details



Note: Insert with -1/2A are suitable for diameter over D50mm only.

<b>P</b> Steel				
<b>M</b> Stainless				
<b>K</b> Cast iron				
<b>N</b> Non-ferrous	★			
<b>S</b> Superalloys				
<b>H</b> 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	-	0.157	●				0.503	0.375	0.152	0.063	DC > ø50 mm	1
YPEB12X3-1A02R-D	1	-	0.157	●				0.502	0.375	0.152	0.051	DC > ø50 mm	2
YPEB12X3-1A07R-D	1	0.016	0.157	●				0.502	0.375	0.152	0.053	DC > ø50 mm	3
YPEB12X3-1P02R-D	1	-	0.157	●				0.505	0.375	0.152	0.054	DC ≤ ø50 mm	2
YPEB12X3-1P07R-D	1	0.016	0.157	●				0.505	0.375	0.152	0.054	DC ≤ ø50 mm	3
YPEB12X3-FP02R-D	1	-	0.433	●				0.505	0.375	0.152	0.054	DC ≤ ø50 mm	2
YPEB12X3-FP07R-D	1	0.016	0.433	●				0.505	0.375	0.152	0.054	DC ≤ ø50 mm	3
YPEB12X3-2A01R-D	2	-	0.157	●				0.504	0.375	0.152	0.063	DC > ø50 mm	1
YPEB12X3-2A02R-D	2	-	0.157	●				0.504	0.375	0.152	0.081	DC > ø50 mm	2
YPEB12X3-2A07R-D	2	0.016	0.157	●				0.504	0.375	0.152	0.081	DC > ø50 mm	3
YPEB12X3-2P07R-D	2	0.016	0.157	●				0.507	0.375	0.152	0.081	DC ≤ ø50 mm	3

● : Line up  
2 pieces per package

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>N</b>	Aluminum cast Si < 13%	DX160	≤ 19685	0.002 - 0.010
	Aluminum cast Si ≥ 13%	DX160	≤ 4921	0.002 - 0.010
	Copper, brass, etc.	DX160	≤ 6562	0.002 - 0.010
	Non metallic material	DX160	≤ 9843	0.002 - 0.010

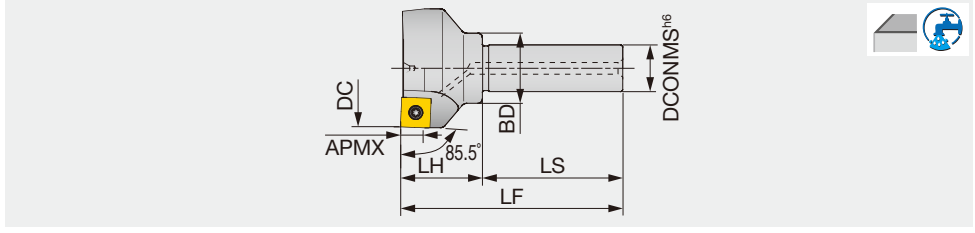
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

# EFE / TFE

## EFE12R

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

GAMP = +13°, GAMF = +7°

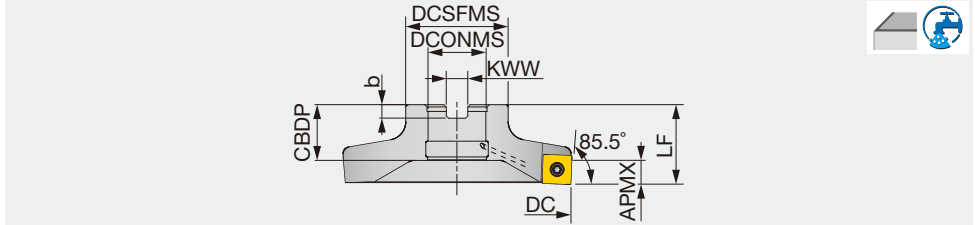


Inch	APMX	DC	CICT	DCONMS	BD	LS	LH	LF	WT (lb)	Air hole	Insert
EFE12200RU	0.315	2.000	3	0.750	1.180	2.362	1.375	3.406	0.77	With	SEG*12X4...
Metric	APMX	DC	CICT	DCONMS	BD	LS	LH	LF	WT(kg)	Air hole	Insert
EFE12050R	8	50	3	20	30	60	35	95	0.37	With	SEG*12X4...

## TFE12R

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

GAMP = +13°, GAMF = +7°



Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CDBP	KWW	b	WT (lb)	Air hole	Insert
TFE12300RU	0.315	3.000	4	1.970	1.380	1.000	0.964	0.375	0.236	0.880	With	SEG*12X4...
TFE12400RU	0.315	4.000	6	1.970	1.380	1.000	0.964	0.375	0.236	1.340	With	SEG*12X4...
Metric	APMX	DC	CICT	DCSFMS	LF	DCONMS	CDBP	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...

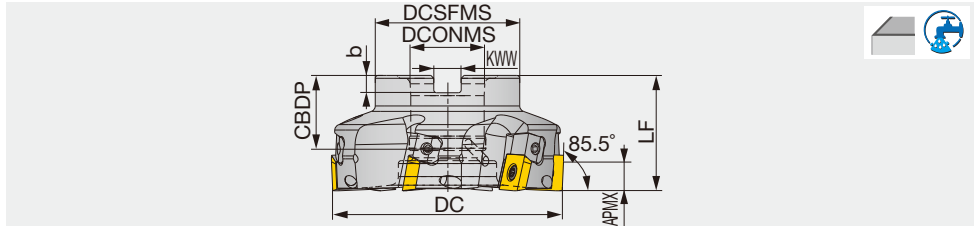
### SPARE PARTS



Designation	Clamping screw	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Wrench
EFE12...	CSPB-4S	M-1000	-	-	IP-15D
TFE12300RU, TFE12400RU	CSPB-4S	M-1000	-	TMBA-0.500H	IP-15D
TFE12063R	CSPB-4S	M-1000	-	CM10X30H	IP-15D
TFE12080R - TFE12125R	CSPB-4S	M-1000	TMBA-M12H	-	IP-15D

Recommended clamping torque: 2.58 lbs·ft, 3.5 N·m

Reference pages: Inserts → **H112**, Standard cutting conditions → **H113**



Metric	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	Shell locking bolt	Right-left screw	Wrench 1	Wrench 2
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

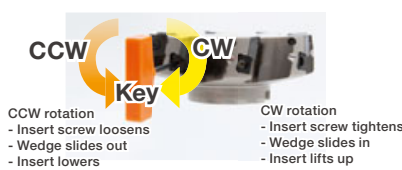
**INSERT SETTING PROCEDURE – ADJUSTABLE-TYPE TFE FACE MILLING CUTTER**

**1 Cleaning insert pockets**



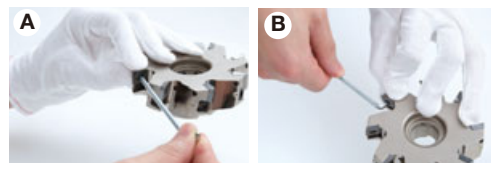
Remove all the inserts. Use air pressure to thoroughly clean the pockets of dust and chips.

**2 Loosening wedges**



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.

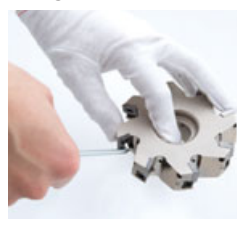
**4 Axial height adjustment of inserts**



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**

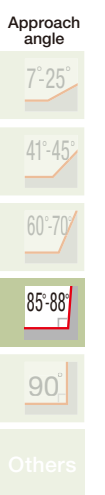


After final tightening of all insert screws, measure to ensure all inserts are at the desired axial heights. If necessary, further tighten any wedge screws in the CW direction for the final few microns. For inserts exceeding the required runout, re-start the adjustment procedure from Step ①.

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

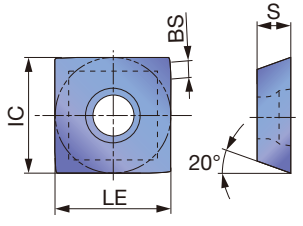
**Cautions:**

- 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.
- 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.
- 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.
- 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°.
- Do not exceed the recommended clamping torque when fixing the insert. This may damage or fracture the insert screw.

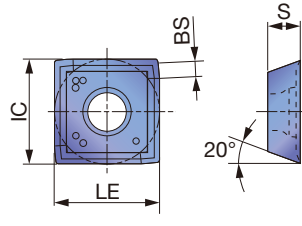


# INSERT

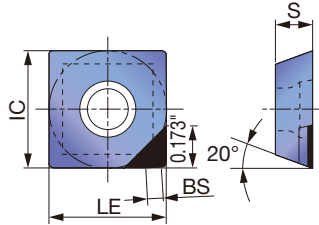
## SEGW12X4ZEPR / ZEFR



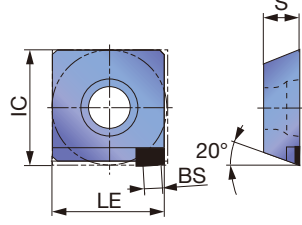
## SEGT12X4-AJ



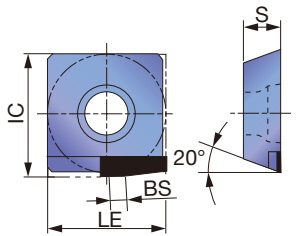
## SEGW12X4ZEFR-D



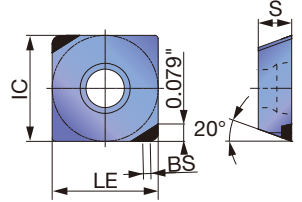
## SEGW12X4ZEFR-WD



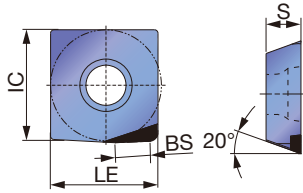
## SEGW12X4ZEFR-BD



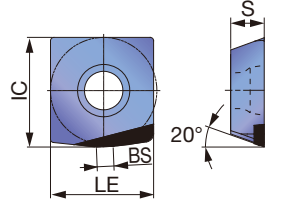
## 2QP-SECW12X412ZETR



## 1QP-SECW12X4ZETR-W



## 1QP-SECW12X4ZETR-B



<b>P</b> Steel	★			★									
<b>M</b> Stainless		★											
<b>K</b> Cast iron	★								★				
<b>N</b> Non-ferrous			★		★	★							
<b>S</b> Superalloys													
<b>H</b> Hard materials													

★ : First choice

Designation	APMX	Coated			Cermet	Uncoated	PCD	CBN	IC	LE	S	BS
		AH120	AH140	DS1100	NS740	KS05F	DX140	BX480				
SEGW12X4ZEFR	0.315					●			0.500	0.500	0.157	0.071
SEGW12X4ZEPR	0.315	●	●		●				0.500	0.500	0.157	0.055
SEGT12X4ZEFR-AJ	0.315			●		●			0.500	0.500	0.157	0.071
SEGW12X4ZEFR-D	0.138						●		0.500	0.500	0.157	0.071
SEGW12X4ZEFR-WD	-						●		0.504	0.488	0.157	0.079
SEGW12X4ZEFR-BD	-						●		0.516	0.488	0.157	0.071
2QP-SECW12X412ZETR	0.059							●	0.500	0.500	0.157	0.035
1QP-SECW12X4ZETR-W	-							●	0.508	0.484	0.157	0.157
1QP-SECW12X4ZETR-B	-							●	0.516	0.484	0.157	0.079

● : 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 (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steels and alloy steels	< 300HB	AH120	SEGW12X4ZEPR	330 - 590	0.001 - 0.006
		< 300HB	NS740	SEGW12X4ZEPR	330 - 590	0.001 - 0.006
<b>M</b>	Stainless steels	< 250HB	AH140	SEGW12X4ZEPR	260 - 590	0.001 - 0.006
<b>K</b>	Gray and ductile cast irons	150 - 250 HB	AH120	SEGW12X4ZEPR	330 - 650	0.001 - 0.006
	Gray cast iron	150 - 250 HB	BX480	2QP-SECW12X412ZETR	2625 - 4921	0.002 - 0.012
	Ductile cast irons	150 - 250 HB	BX480	2QP-SECW12X412ZETR	1640 - 2625	0.002 - 0.008
<b>N</b>	Cast aluminum alloy / Die-cast Si < 13%	-	KS05F	SEGT12X4ZEFR-AJ	650 - 4900	0.001 - 0.008
		-	DX140	SEGW12X4ZEFR-D	650 - 4900	0.001 - 0.008
	Cast aluminum alloy / Die-cast Si ≥ 13%	-	KS05F	SEGT12X4ZEFR-AJ	260 - 650	0.001 - 0.008
		-	DX140	SEGW12X4ZEFR-D	650 - 1650	0.001 - 0.008
	Aluminum alloy Tensile strength < 350 N/mm <sup>2</sup>	-	KS05F	SEGT12X4ZEFR-AJ	650 - 4900	0.001 - 0.008
		-	DX140	SEGW12X4ZEFR-D	650 - 4900	0.001 - 0.008
	Aluminum alloy Tensile strength > 350 N/mm <sup>2</sup>	-	KS05F	SEGW12X4ZEFR	650 - 4900	0.001 - 0.008
		-	DX140	SEGW12X4ZEFR-D	650 - 4900	0.001 - 0.008
Copper alloy	-	KS05F	SEGT12X4ZEFR-AJ	650 - 1640	0.001 - 0.008	
	-	DX140	SEGW12X4ZEFR-D	650 - 1640	0.001 - 0.008	

### Notes:

- In milling aluminum 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 aluminum 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.





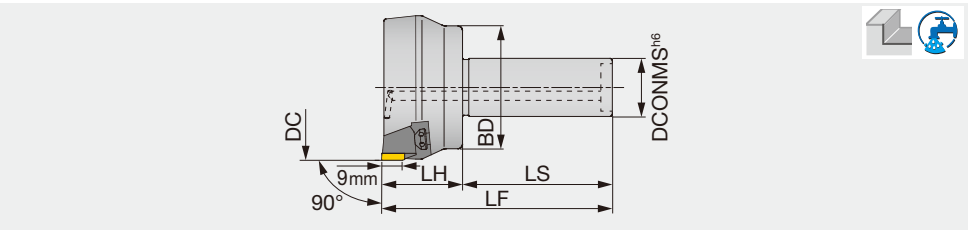


# EDPD / DPD

## EDPD09

Endmill for aluminum machining, shank type, for PCD inserts

GAMP = +8.5°, GAMF = +3°

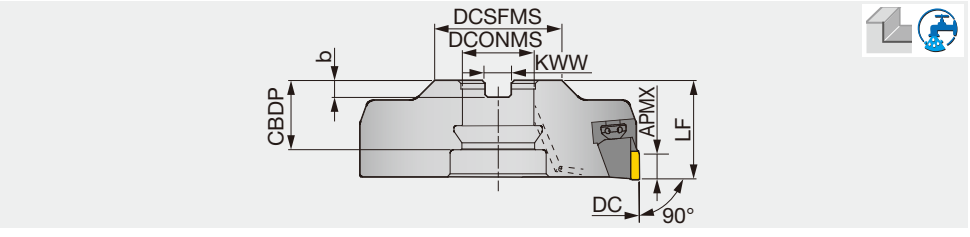


Metric	APMX	DC	CICT	DCONMS	BD	LS	LH	LF	WT(kg)	Air hole	Insert
EDPD09063R	7	63	3	25	37	60	40	100	0.75	With	YDEN0905...

## DPD09

Face mill for aluminum machining, for PCD inserts

GAMP = +8.5°, GAMF = +3° ~ +5°



Metric	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	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...

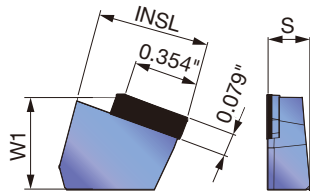
### SPARE PARTS

Designation	Wedge	Wedge fixing screw	Adjusting screw	Helisert	Shell locking bolt 1	Shell locking bolt 2	Wrench1	Wrench 2
EDPD09063R	FW-304R-T	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

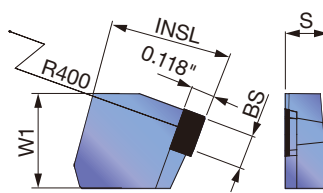
Recommended clamping torque: 10 N·m

# INSERT

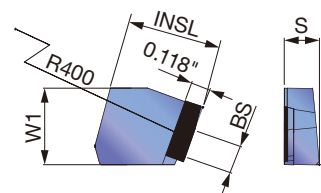
## YDEN0905PDFR-D



## 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	0.276	●								0.488	0.594	0.224	-
YDEN0905PDFR-WD	-	●								0.488	0.598	0.224	0.177
YDEN0905PDFR-BD	-	●								0.488	0.598	0.224	0.177

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 (sfm)	Feed per tooth fz (ipt)
N	Aluminum alloy castings & die castings Si < 13%	DX140	YDEN0905PDFR-D	500 ~ 4000	0.001 ~ 0.008
	Aluminum alloy castings & die castings Si ≥ 13%	DX140	YDEN0905PDFR-D	650 ~ 1650	0.001 ~ 0.008
	Rolled aluminum alloys	DX140	YDEN0905PDFR-D	1650 ~ 13000	0.001 ~ 0.008
	Copper alloys	DX140	YDEN0905PDFR-D	300 ~ 1650	0.001 ~ 0.008

### 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

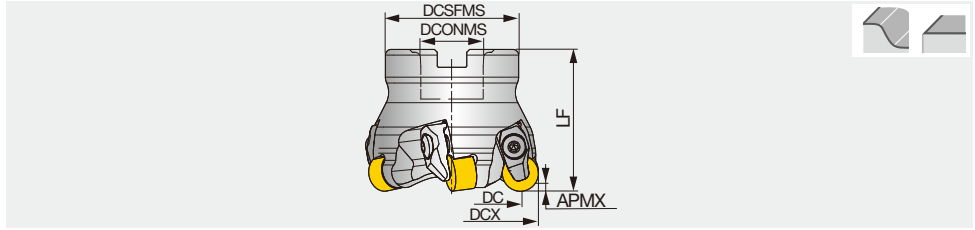
		For general	Accuracy of machining surface priority	Burr reduction priority
Applicable insert	General insert YDEN0905PDFR-D	◎	◎	◎
	Wiper insert YDEN0905PDFR-WD	-	◎	-
	Wiper insert for burr reduction YDEN0905PDFR-BD	-	-	◎
Number of Inserts by type		All general	1 or 2 wiper inserts in cutter body	General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



# CERAMIC<sup>S</sup> MILL TFMRN

Face milling cutter for high temperature alloy applications

GAMP = -7°, GAMF = +15°



Inch	APMX	DC	DCX	CICT	DCONMS	LF	DCSFMS	WT(lb)	Insert
TFMRND2.00-12-4Z-FL	0.080	1.528	2.000	4	0.750	2.000	1.770	0.88	RNGN120700...
TFMRND2.50-12-5Z-FL	0.080	2.000	2.500	5	1.570	1.969	0.750	0.99	RNGN120700...
TFMRND3.00-12-5Z-FL	0.080	2.500	3.000	5	1.750	1.969	1.000	2.07	RNGN120700...

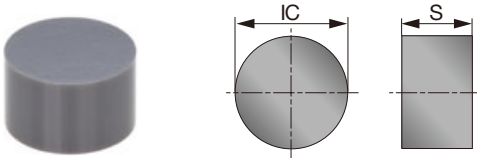
Metric	APMX	DC	DCX	CICT	DCONMS	LF	DCSFMS	WT(kg)	Insert
TFMRN563-22R-12FL	2	50.35	63	5	22	50	47	0.6	RNGN120700...
TFMRN580-27R-12FL	2	67.37	80	5	27	50	58	0.9	RNGN120700...

## SPARE PARTS

Designation	Clamp	Screw	Snap ring
TFMRND..., TFMRN...	CCL-5S-F	GLS3C	CSR2

## INSERT

### RNGN-E/T1



<b>P</b>	Steel								
<b>M</b>	Stainless								
<b>K</b>	Cast iron								
<b>N</b>	Non-ferrous								
<b>S</b>	Superalloys	★	★						
<b>H</b>	Hard materials								

★ : First choice

Designation	APMX	Edge prep.*	Ceramic								IC	S	
			TS200	TS300									
RNGN120700-E	0.080	E	●									0.500	0.3125
RNGN120700-T1	0.080	T1	●									0.500	0.3125
RNGN120700-E	0.080	E		●								0.500	0.3125
RNGN120700-T1	0.080	T1		●								0.500	0.3125

\* Types of cutting edge preparations

● : Line up

## Edge prep

**E**: Low cutting force

**T1**: Strong cutting edge



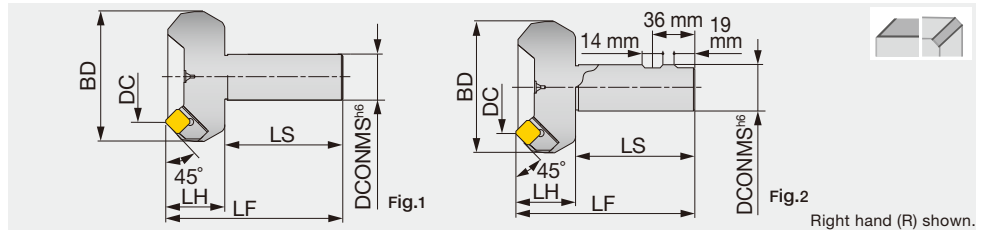
## STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Depth of cut ap (in)
<b>S</b>	Ni-based super alloys	Wear resistance	TS200	1804 - 4265	0.002 - 0.008	0.004 - 0.079
		First choice	TS300	886 - 1804	0.002 - 0.008	0.004 - 0.079
	Co-based super alloys	Wear resistance	TS200	1804 - 4921	0.002 - 0.008	0.004 - 0.079
		First choice	TS300	886 - 1804	0.002 - 0.008	0.004 - 0.079

# EME4400

Face endmill, shank type, with wedge clamp system

GAMP = +24°, GAMF = -13° ~ -8°

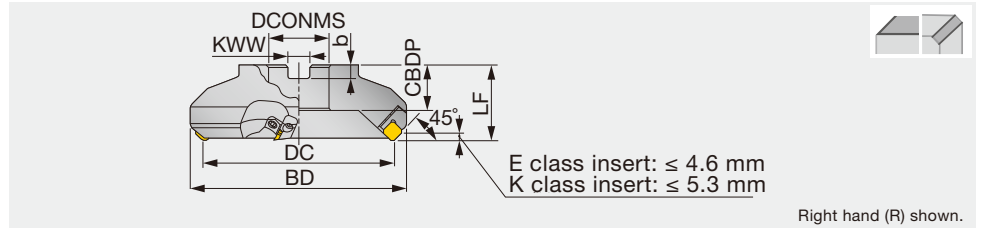


Metric	APMX	DC	CICT	BD	DCONMS	LS	LH	LF	Fig.	Insert
EME4450R	4	50	3	73.4	32	80	40	120	1	SE*N1203...
EME4463R	4	63	4	87.2	32	80	40	120	1	SE*N1203...
EME4403RI	4	80	5	101.5	32	80	40	120	2	SE*N1203...
EME4404RI	4	100	5	120.2	32	80	40	120	2	SE*N1203...

# TME4400R/LI/B

Face mill, with wedge clamp system

GAMP = +24°, GAMF = -8° ~ -6°

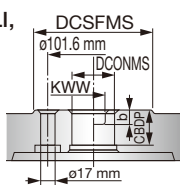


Metric	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TME4463RB-E	4	63	5	87.2	40	22	20	10.4	6.3	1.0	SE*N1203
TME4403R/LI	4	80	4	101.5	50	25.4	26	9.5	6	1.43	SE*N1203
TME4403RI-E	4	80	4	101.5	50	27	26	12.4	7	1.43	SE*N1203
TME4403RB	4	80	6	101.5	50	25.4	26	9.5	6	1.43	SE*N1203
TME4403RB-E	4	80	6	101.5	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

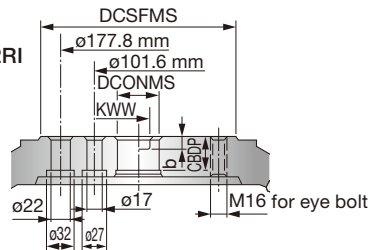
Cutting edge height (LF) is for when SEEN1203AG\*N type inserts are used.

## Arbor type

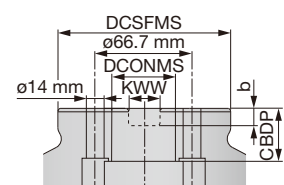
TME4408/10R/LI,  
TME4408RB



TME4412RI



TME4406RI-E,  
TME4406RB-E



## SPARE PARTS

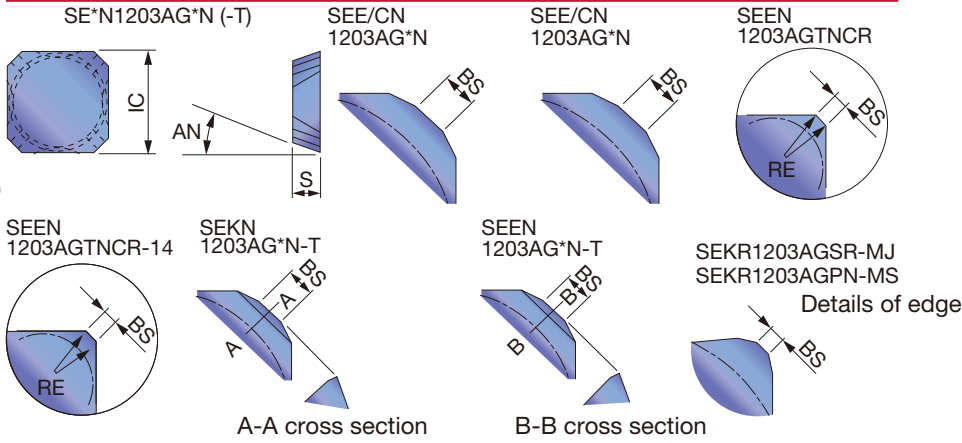
Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench
TME4463RB-E	LE444R	DS-8	CM4X0.7X14	WT402R	TP-4
EME4400..., TME4403R... - TME4405R... TME4403RB - TME4405RB	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4403L... - TME4405L...	LE444L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4406R... - TME4412R... 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 → **H118**

# INSERT

## SECN/SEEN/SEKN /SEKR 1203



<b>P</b> Steel	☆	☆	☆	★	☆	★	★	☆					
<b>M</b> Stainless		★	☆		☆								
<b>K</b> Cast iron	★					★							
<b>N</b> Non-ferrous									★				
<b>S</b> Superalloys	☆	☆											
<b>H</b> 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	0.157									●				0.500	0.125	20°	0.094
SEEN1203AGFN	0.157									●				0.500	0.125	20°	0.094
SEEN1203AGTN	0.157	●	●	●		●	●	●	●					0.500	0.125	20°	0.094
SEEN1203AGTN-T	0.157						●	●	●					0.500	0.125	20°	0.094
SEEN1203AGTNCR	0.157	●	●	●	●		●							0.500	0.125	20°	0.063
SEEN1203AGTNCR-14	0.157						●							0.500	0.125	20°	0.055
SEKN1203AGFN-T	0.157									●				0.500	0.125	20°	0.063
SEKN1203AGTN	0.157	●	●	●	●	●	●	●	●					0.500	0.125	20°	0.063
SEKN1203AGTN-T	0.157						●	●	●					0.500	0.125	20°	0.063
SEKN1203AGTNCR	0.157					●	●	●	●					0.500	0.125	20°	0.063
SEKR1203AGSR-MJ	0.157	●			●	●	●							0.500	0.125	20°	0.063
SEKR1203AGPN-MS	0.157		●	●										0.500	0.125	20°	0.063

●: Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EME4400

e-catalog



TME4400R/LI

e-catalog

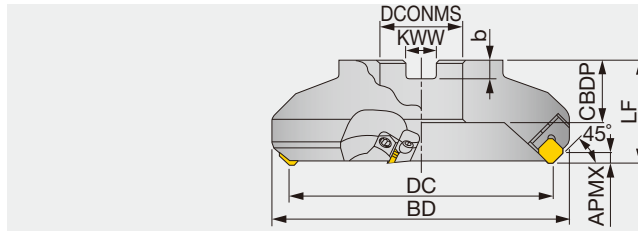


TME4400R/LB

# TME5400RI

45° face mill, with wedge clamp system

GAMP = +24°, GAMF = -8° ~ -6°



Right hand (R) shown.

Metric	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...

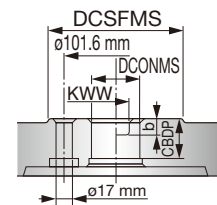
## SPARE PARTS

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

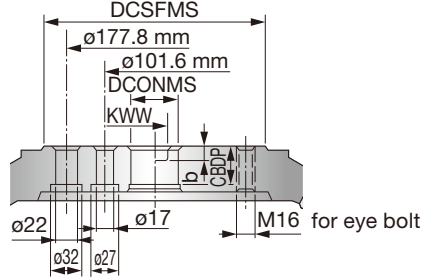
Recommended clamping torque: 8 N·m

## Arbor type

TME5408/10RI

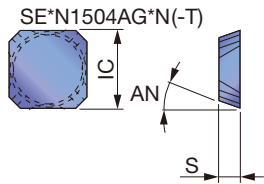


TME5412RI

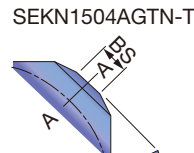
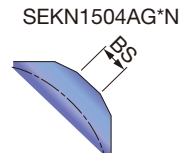


## INSERT

SECN/SEEN/SEKN 1504

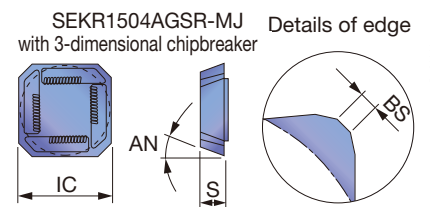


Details of edge



A-A cross section

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	0.236					●			0.625	0.187	20°	0.094
SEKN1504AGFN	0.236						●		0.625	0.187	20°	0.063
SEKN1504AGTN	0.236	●	●	●	●	●	●		0.625	0.187	20°	0.063
SEKN1504AGTN-T	0.236					●			0.625	0.187	20°	0.063
SEKR1504AGSR-MJ	0.236			●	●				0.625	0.187	20°	0.063

●: Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



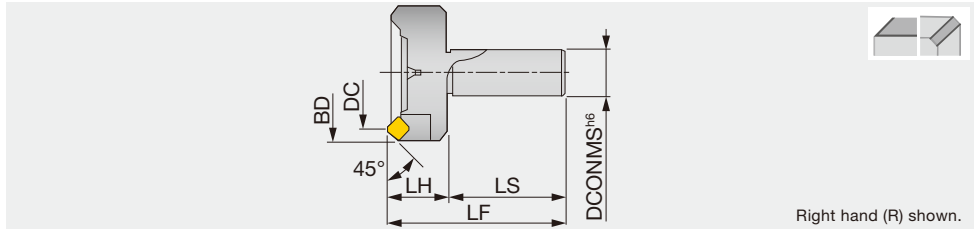


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

# EMD4400RI

Endmill, shank type, with wedge clamp system

GAMP = +15°, GAMF = -3°



Right hand (R) shown.

Metric	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

## SPARE PARTS

Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench
EMD4403RI-S32	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4

Recommended clamping torque: 8 N·m

## Approach angle

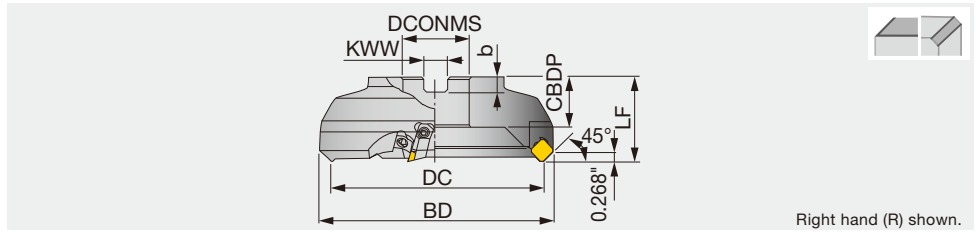
- 7°-25°
- 41°-45°
- 60°-70°
- 85-88°
- 90°
- Others

Reference pages: Inserts → [H122](#)

# TMD4400R/LI

Face mill, with wedge clamp system

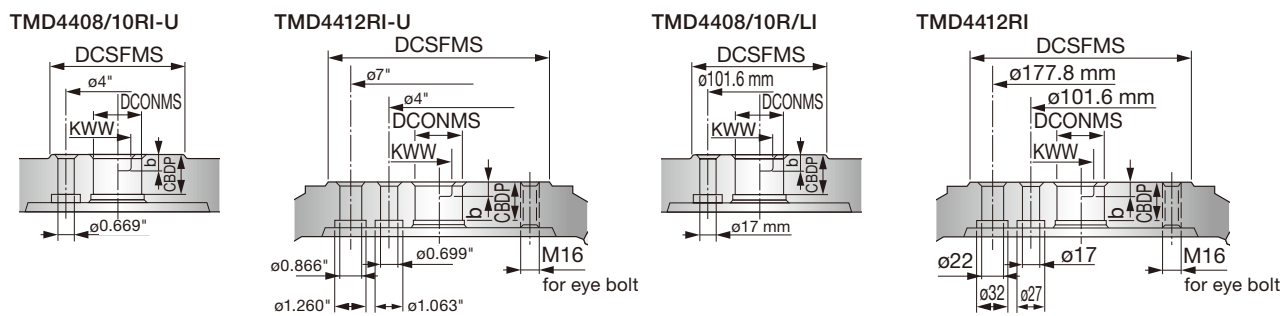
GAMP = +15°, GAMF = -3°



Inch	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT (lb)	Insert
TMD4403RI-U	0.157	3.150	4	3.780	1.970	1.000	1.020	0.375	0.236	3.100	SD*N42.../SD*R1203...
TMD4404RI-U	0.157	3.940	5	4.530	2.480	1.500	1.260	0.500	0.315	5.500	SD*N42.../SD*R1203...
TMD4405RI-U	0.157	4.920	6	5.470	2.480	1.500	1.500	0.625	0.394	7.900	SD*N42.../SD*R1203...
TMD4406RI-U	0.157	6.300	8	6.510	2.480	2.000	1.500	0.750	0.433	12.300	SD*N42.../SD*R1203...
TMD4408RI-U	0.157	7.870	10	8.390	2.480	2.500	1.500	1.000	0.551	19.100	SD*N42.../SD*R1203...
TMD4410RI-U	0.157	9.840	12	10.350	2.480	2.500	1.500	1.000	0.551	35.900	SD*N42.../SD*R1203...
TMD4412RI-U	0.157	12.400	14	12.870	2.480	2.500	1.500	1.000	0.551	55.400	SD*N42.../SD*R1203...

Metric	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

## Arbor type



### SPARE PARTS

Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench	Shell locking bolt (Optional parts)
TMD4403RI-U	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4	(TMBA-0.500H)
TMD4404RI-U, TMD4405RI-U	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4	(TMBA-0.750H)
TMD4406RI-U - TMD4412RI-U TMD4403RI - TMD4412RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4	-
TMD4403LI - TMD4410LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4	-

Recommended clamping torque: 5.9 lbs·ft, 8 N·m

Reference pages: Inserts → [H122](#)

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



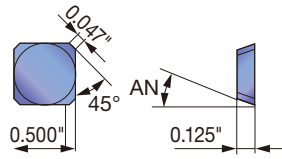


# INSERT

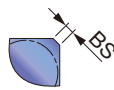
## SDCN/SDEN/SDKN 42Z

## SDCN42ZFN-DIA

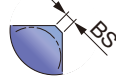
Regular edge  
SD\*N42Z\*N



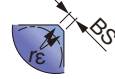
Details of edge  
SDKN42ZTN16



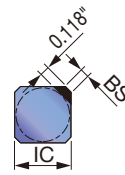
SD\*N42ZTN20



SDKN42ZTNCR  
SDEN42ZTNCR

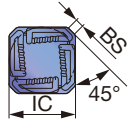


SDCN42ZFN-DIA

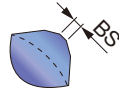


## SDKR42Z-MJ

SDKR42ZSR-MJ  
with 3-dimensional chipbreaker

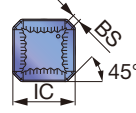


Details of edge

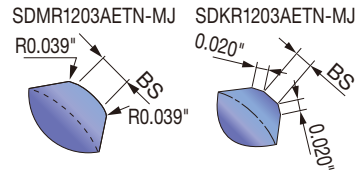


## SDMR/SDKR 1203-MJ

SD\*R1203AETN-MJ  
with 3-dimensional chipbreaker

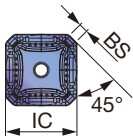


Details of edge

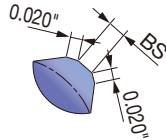


## SDKR42Z-MS

SDKR42ZPN-MS

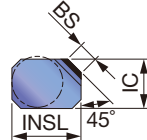


Details of edge



## WDCN42ZFR-DIA

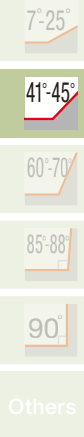
Wiper edge  
WDCN42ZFR-DIA



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

★ : First choice  
☆ : Second choice

Approach angle



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
SDCN42ZFN	0.157													●		0.500	-	0.125	15°	0.047
SDCN42ZTN	0.157										●	●		●		0.500	-	0.125	15°	0.047
SDCN42ZTN20	0.157										●					0.500	-	0.125	15°	0.079
SDEN42ZFN	0.157													●		0.500	-	0.125	15°	0.047
SDEN42ZTN	0.157	●	●		●	●	●			●	●		●			0.500	-	0.125	15°	0.047
SDEN42ZTNCR	0.157	●	●		●	●	●			●						0.500	-	0.125	15°	0.063
SDEN42ZTN20	0.157														●	0.500	-	0.125	15°	0.079
SDKN42ZFN	0.157													●		0.500	-	0.125	15°	0.047
SDKN42ZTN	0.157	●	●	●	●	●	●	●		●	●		●			0.500	-	0.125	15°	0.047
SDKN42ZTNCR	0.157									●						0.500	-	0.125	15°	0.063
SDKN42ZTN16	0.157														●	0.500	-	0.125	15°	0.063
SDCN42ZFN-DIA	0.079														●	0.500	-	0.125	15°	0.047
SDKR42ZSR-MJ	0.157	●	●		●	●										0.500	-	0.125	15°	0.063
SDMR1203AETN-MJ	0.157									●						0.500	-	0.125	15°	0.063
SDKR1203AETN-MJ	0.157									●						0.500	-	0.125	15°	0.063
SDKR42ZPN-MS	0.157	●		●	●											0.500	-	0.125	15°	0.063
WDCN42ZFR-DIA	0.020													●		0.480	0.616	0.125	15°	0.193

● : Line up

DX140: 1 piece per package

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



e-catalog

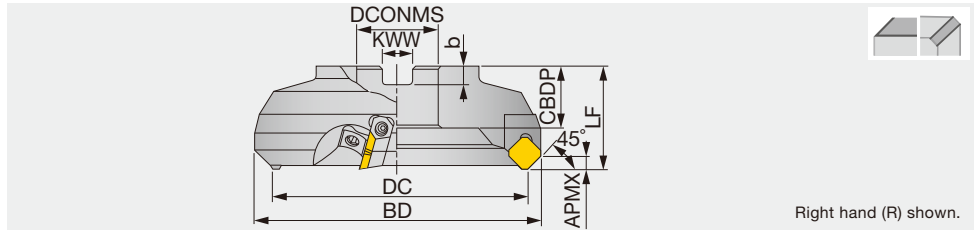


EMD4400RI TMD4400R/LI

# TMD5400RI

Face mill, with wedge clamp system

GAMP = +15°, GAMF = -3°



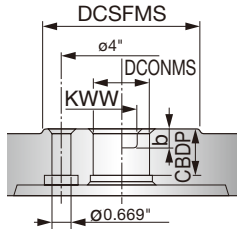
Right hand (R) shown.

Inch	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(lb)	Insert
TMD5404RI-U	0.236	3.940	4	4.650	2.480	1.500	1.260	0.625	0.394	5.510	SD*N53Z...
TMD5405RI-U	0.236	4.920	5	5.590	2.480	1.500	1.500	0.625	0.394	8.160	SD*N53Z...
TMD5406RI-U	0.236	6.300	5	6.930	2.480	2.000	1.500	0.750	0.433	12.790	SD*N53Z...
TMD5408RI-U	0.236	7.870	8	8.500	2.480	2.500	1.500	1.000	0.551	19.840	SD*N53Z...
TMD5410RI-U	0.236	9.840	10	10.430	2.480	2.500	1.500	1.000	0.551	35.930	SD*N53Z...
TMD5412RI-U	0.236	12.400	12	12.990	2.480	2.500	1.500	1.000	0.551	55.560	SD*N53Z...

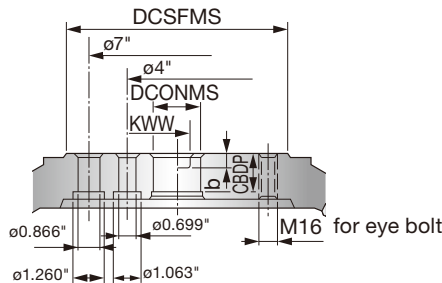
Metric	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TMD5404RI	6	100	4	118	63	31.75	32	12.7	8	2.5	SD*N53Z...
TMD5404RI-E	6	100	4	118	50	32	28.5	14.4	8	2.5	SD*N53Z...
TMD5405RI	6	125	6	142	63	38.1	38	15.9	10	2.5	SD*N53Z...
TMD5405RI-E	6	125	6	142	63	40	32	16.4	9	3.7	SD*N53Z...
TMD5406RI	6	160	6	176	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

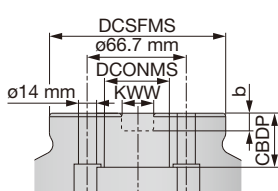
TMD5408RI-U...,  
TMD5410RI-U...



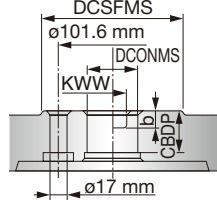
TMD5412RI-U



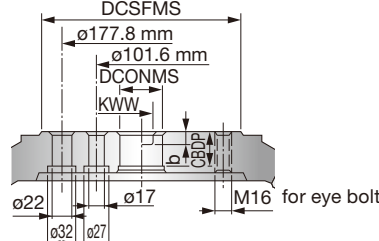
TMD5406RI-E



TMD5408/10...



TMD5412RI



## SPARE PARTS

Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench	Shell locking bolt (Optional parts)
TMD5404RI-U, TMD5405RI-U	LD540R	FDS-8S	CM4X0.7X20	WF500R	TP-4	(TMBA-0.750H)
TMD5406RI-U - TMD5412RI-U TMD54**RI (-E)	LD540R	FDS-8S	CM4X0.7X20	WF500R	TP-4	-

Recommended clamping torque: 5.9 lbs-ft, 8 N·m

Reference pages: Inserts → [H124](#)

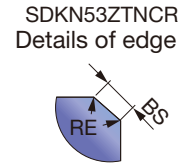
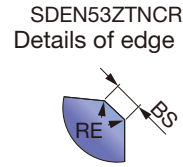
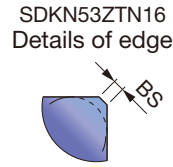
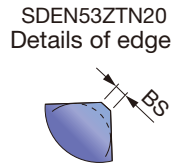
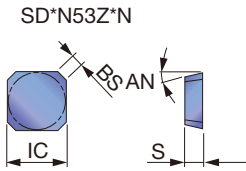
Grade  
Insert  
Ext. Toolholder  
Int. Toolholder  
Threading  
Grooving  
Miniature tool  
Milling cutter  
Endmill  
Drilling tool  
Tooling System  
User's Guide  
Index





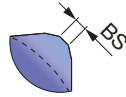
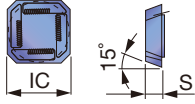
## INSERT

### SDCN/SDEN 53Z



### 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	0.236						●	●			0.625	0.187	15°	0.047
SDEN53ZFN	0.236								●		0.625	0.187	15°	0.047
SDEN53ZTN	0.236				●		●		●		0.625	0.187	15°	0.047
SDEN53ZTNCR	0.236						●				0.625	0.187	15°	0.055
SDEN53ZTN20	0.236					●					0.625	0.187	15°	0.079
SDKN53ZFN	0.236								●		0.625	0.187	15°	0.047
SDKN53ZTN	0.236	●	●	●	●		●	●	●		0.625	0.187	15°	0.047
SDKN53ZTNCR	0.236						●				0.625	0.187	15°	0.063
SDKN53ZTN16	0.236					●					0.625	0.187	15°	0.063
SDKR53ZSR-MJ	0.236				●	●					0.625	0.187	15°	0.079

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

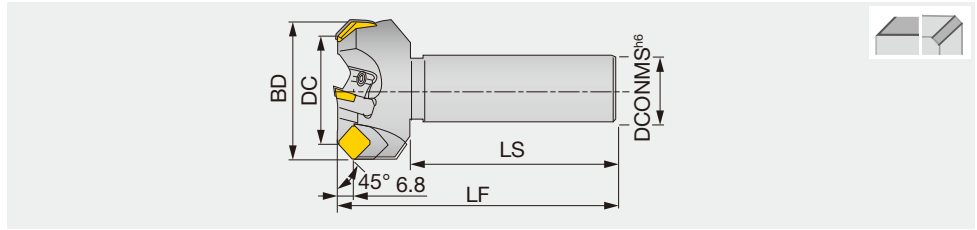
e-catalog



## EGD4400

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

GAMP = +15°, GAMF = -3°

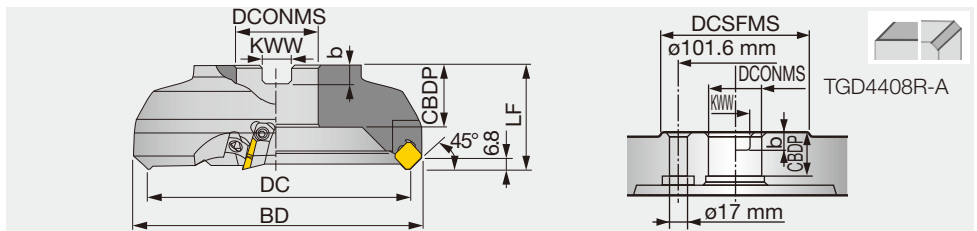


Metric	APMX	DC	CICT	BD	DCONMS	LS	LH	LF	WT(kg)	Insert
EGD4450R	4	50	4	67	32	80	35	115	1.1	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA
EGD4463R	4	63	4	79	32	80	35	115	1.4	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA

## TGD4400-A

45° face mill, with wedge clamp system

GAMP = +15°, GAMF = -3°



Metric	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



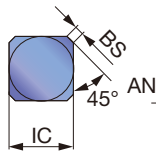


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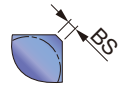
## SDCN/SDEN/SDKN 42Z

## SDCN42ZFN-DIA

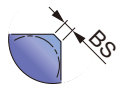
Regular edge  
SD\*N42Z\*N



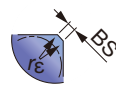
Details of edge  
SDKN42ZTN16



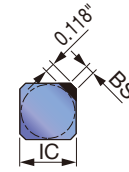
SD\*N42ZTN20



SDKN42ZTNCR  
SDEN42ZTNCR

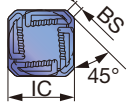


SDCN42ZFN-DIA

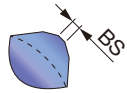


## SDKR42Z-MJ

SDKR42ZSR-MJ  
with 3-dimensional  
chipbreaker

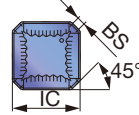


Details of edge

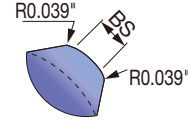


## SDMR/SDKR 1203-MJ

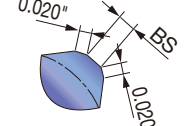
SD\*R1203AETN-MJ  
with 3-dimensional  
chipbreaker



Details of edge  
SDMR1203AETN-MJ

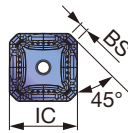


SDKR1203AETN-MJ

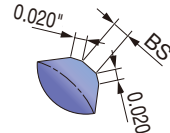


## SDKR42Z-MS

SDKR42ZPN-MS

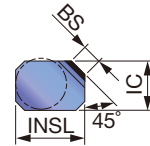


Details of edge



## 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	0.157																						
SDCN42ZTN	0.157																						
SDCN42ZTN20	0.157																						
SDEN42ZFN	0.157																						
SDEN42ZTN	0.157	●	●		●		●	●															
SDEN42ZTNCR	0.157	●	●		●	●																	
SDEN42ZTN20	0.157																						
SDKN42ZFN	0.157																						
SDKN42ZTN	0.157	●	●	●	●	●	●	●															
SDKN42ZTNCR	0.157	●	●	●	●	●	●																
SDKN42ZTN16	0.157																						
SDCN42ZFN-DIA	0.079																						
SDKR42ZSR-MJ	0.157	●	●		●	●																	
SDMR1203AETN-MJ	0.157																						
SDKR1203AETN-MJ	0.157																						
SDKR42ZPN-MS	0.157	●		●	●																		
WDCN42ZFR-DIA	0.020																						

●: Line up

DX140: Packing Quantity = 1 pc.

# STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



EGD4400

e-catalog

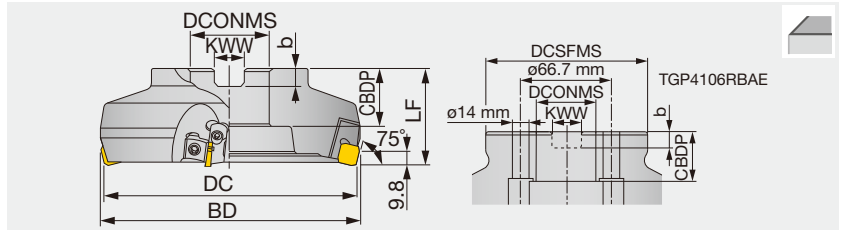


TGD4400-A

# TGP4100RIA/BAA/RBAE

75° face mill, with wedge clamp system

GAMP = +7°, GAMF = +1°



Metric	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...

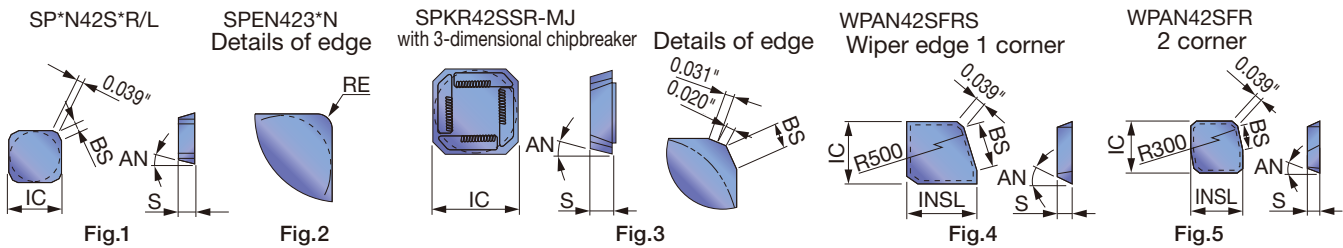
## SPARE PARTS

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



	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	TH115	T3130	NS740	N308	FX105	UX30	TH10						
SPCN42STR	0	0.276						●	●			0.500	-	0.125	11°	0.055	1	
SPCN42SFR	0	0.276									●	0.500	-	0.125	11°	0.055	1	
SPEN42STR	0	0.276						●				0.500	-	0.125	11°	0.055	1	
SPKN42STR	0	0.276	●	●	●	●	●	●				0.500	-	0.125	11°	0.055	1	
SPKN42STL	0	0.276						●				0.500	-	0.125	11°	0.055	1	
SPKN42SFR	0	0.276									●	0.500	-	0.125	11°	0.055	1	
SPKN42SFL	0	0.276									●	0.500	-	0.125	11°	0.055	1	
SPKR42SSR-MJ	0	0.276		●	●	●						0.500	-	0.125	11°	0.000	3	
WPAN42SFERS	0	-									●	0.488	0.587	0.125	11°	0.382	4	
WPAN42SFR	0	-									●	0.488	0.543	0.125	11°	0.205	5	
SPGN120312TN	0.047	0.276							●			0.500	-	0.125	11°	-	2	
SPEN423TN*	0.047	0.276				●		●			●	0.500	-	0.125	11°	-	2	
SPEN423FN*	0.047	0.276									●	0.500	-	0.125	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

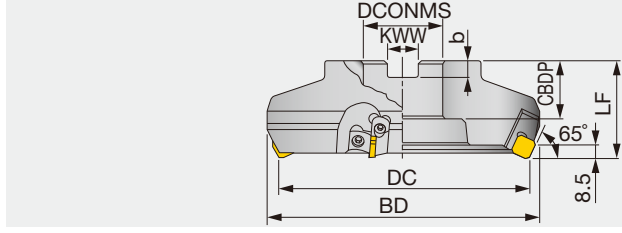




# TGP4200R-A

Face mill, with wedge clamp system

GAMP = +5°, GAMF = +1°



Right hand (R) shown.

Metric	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

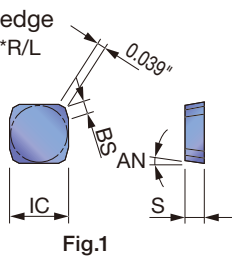
Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench
TGP42**R-A	LP413R	FDS-8S	CM4X0.7X14	WP440R	TP-4

Recommended clamping torque: 8 N·m

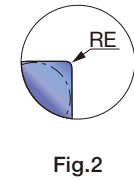
## INSERT

### SPAN/SPCN/SPEN/SPKN 42Z

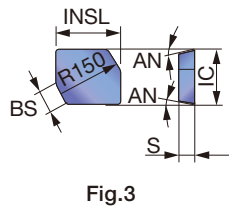
Regular edge  
SP\*N42Z\*R/L



SPEN423\*N



Wiper edge 2 corners  
WPAN42Z\*R/L



Right hand (R) shown.

	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	0.236						●	0.500	-	0.125	11°	0.079	-	1
SPCN42ZFL	0.236						●	0.500	-	0.125	11°	0.079	-	1
SPCN42ZFR	0.236						●	0.500	-	0.125	11°	0.079	-	1
SPCN42ZTR	0.236				●	●		0.500	-	0.125	11°	0.079	-	1
SPEN423TN	0.236	●		●		●		0.500	-	0.125	11°	-	0.047	2
SPEN423FN	0.236						●	0.500	-	0.125	11°	-	0.047	2
SPEN42ZTR	0.236			●				0.500	-	0.125	11°	0.079	-	1
SPKN42ZFL	0.236						●	0.500	-	0.125	11°	0.079	-	1
SPKN42ZFR	0.236						●	0.500	-	0.125	11°	0.079	-	1
SPKN42ZTR	0.236	●	●	●	●	●	●	0.500	-	0.125	11°	0.079	-	1
WPAN42ZFR	0.236						●	0.480	0.562	0.125	11°	0.177	-	3

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

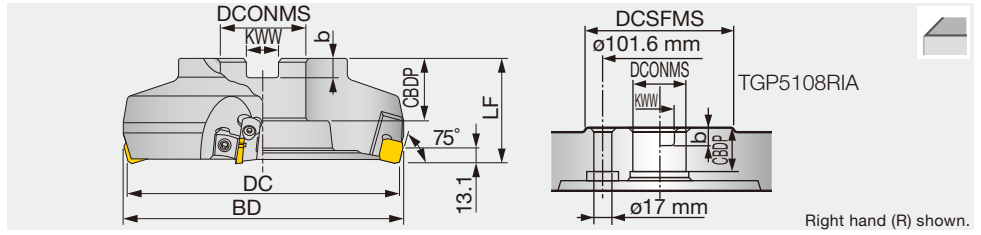
e-catalog



# TGP5100RIA

Face mill, with wedge clamp system

GAMP = +7°, GAMF = +1°



Metric	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

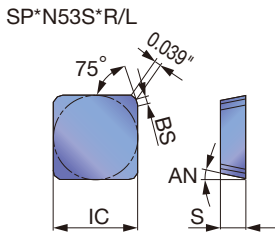


Fig.1

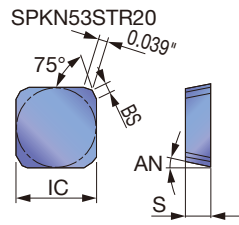


Fig.2

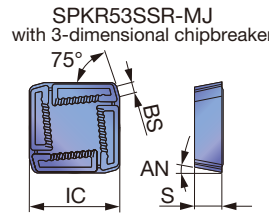


Fig.3

Right hand (R) shown.

	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	0.394							0.625	0.187	11°	0.047	1
SPCN53STR	0.394							0.625	0.187	11°	0.047	1
SPKN53SFR	0.394							0.625	0.187	11°	0.047	1
SPKN53STL	0.394							0.625	0.187	11°	0.047	1
SPKN53STR	0.394	●	●		●			0.625	0.187	11°	0.047	1
SPKN53STR20	0.394			●				0.625	0.187	11°	0.079	2
SPKR53SSR-MJ	0.394	●	●					0.625	0.187	11°	0.079	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)
	DCONWS	BD	ℓ 1	ℓ 2				
TAQ32	19	32	18	8.5	3/M6	8	3	4×10 <sup>3</sup>
TAQ40	24	40	21	10	3/M6	10	5	5.5×10 <sup>3</sup>
TAQ50	30	50	25	12	4/M8	12	8	9×10 <sup>3</sup>
TAQ63	38	63	32	15	4/M8	16	10	12×10 <sup>3</sup>
TAQ80	48	80	40	18	5/M10	18	20	18×10 <sup>3</sup>
TAQ100	60	100	50	22	6/M12	20	30	23×10 <sup>3</sup>

### 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 <sup>3</sup>	1200
QC adapter	10°	35 / 70	20	9.8×10 <sup>3</sup>	490
Other makes A	4°	35 / 62	22.5	9.8×10 <sup>3</sup>	436

### Repeatability for accuracy

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

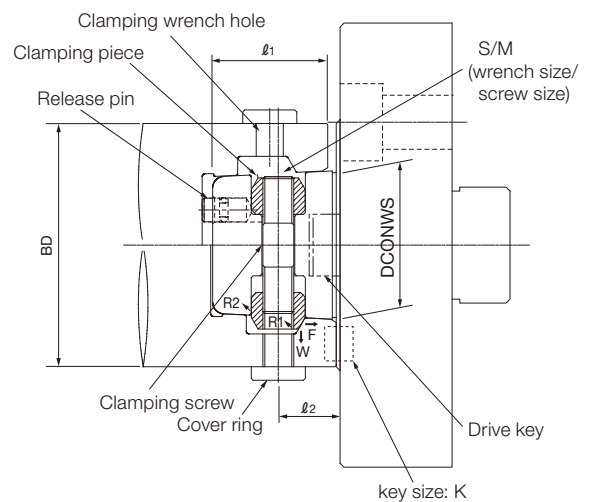
Note: Measured at 150 mm far from end face.



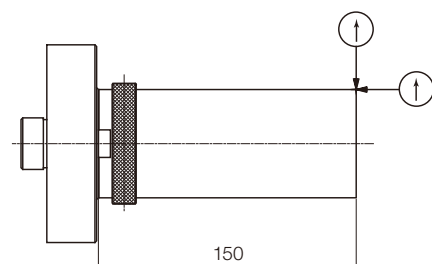
### Labor-saving tool change

- 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

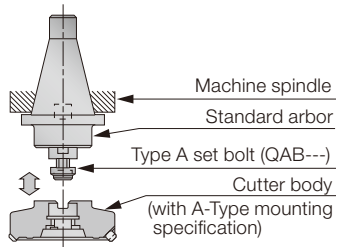


# QC system for TAC Mills

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.

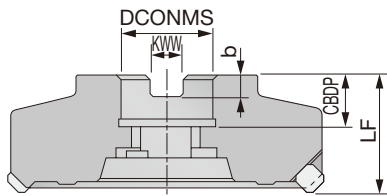
#### Replacement method

**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

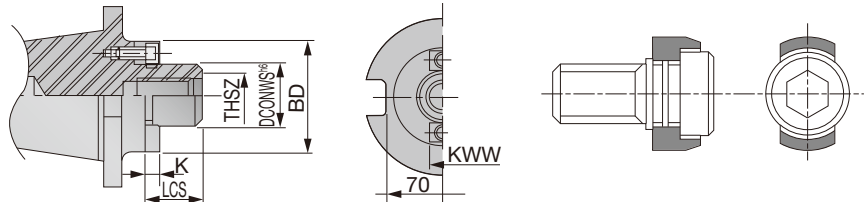
#### Dimensional details of mount (For $\phi 80$ to $\phi 160$ mm dia. TAC mills)



Cutter dia. (mm)	Dimensions (mm)				
	DCONMS	b	KWW	CDBP	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

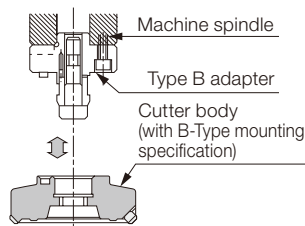
#### Arbors

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
31.75	60	M16	20	12.7	7	QAB-4 (R/L)	Hex. Socket-head screw M12 x 30
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.

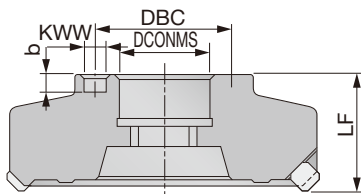
#### Replacement method

**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  $90^\circ$  and turn adapter bolt one to two turns for tightening.

**Removal** - Loosen adapter bolt by one or two turns and turn the cutter by  $90^\circ$ . The cutter can now be removed.

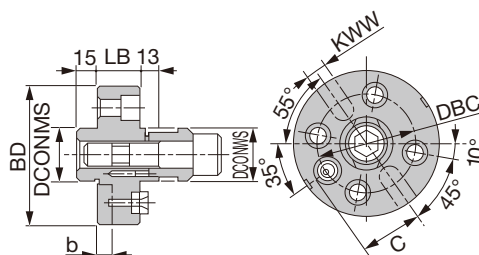
### B-type QC Mounting System for Small Diameter TAC Mills

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



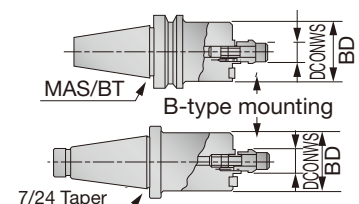
Cutter dia.	Dimensions (mm)					
	DCONMS	b	KWW	LF	DBC	S
$\phi 80$	25.4	7	10	50	45	M10
$\phi 100$	31.75	7	12	63	55	M10
$\phi 125$	38.1	7	15	63	70	M12
$\phi 160$	50.8	7	18	63	85	M16

#### 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.



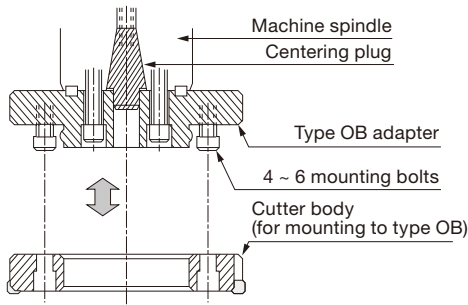




# QC system for TAC Mills

## 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.

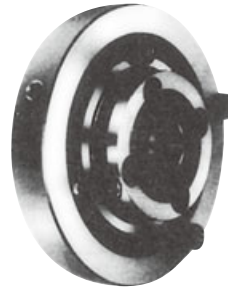
### OB-type QC Mounting System for Large Diameter TAC Mills (Elongated mounting hole type)

#### 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.

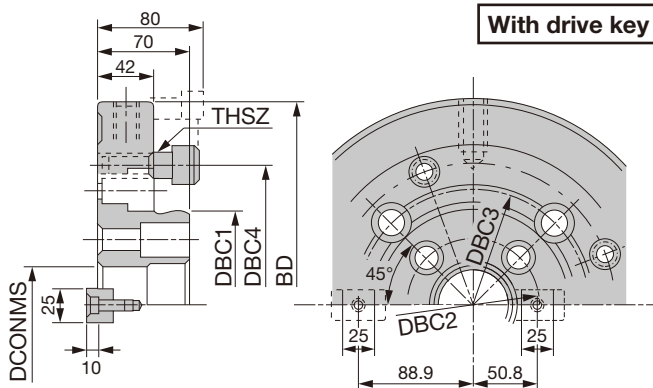
OB type adapter



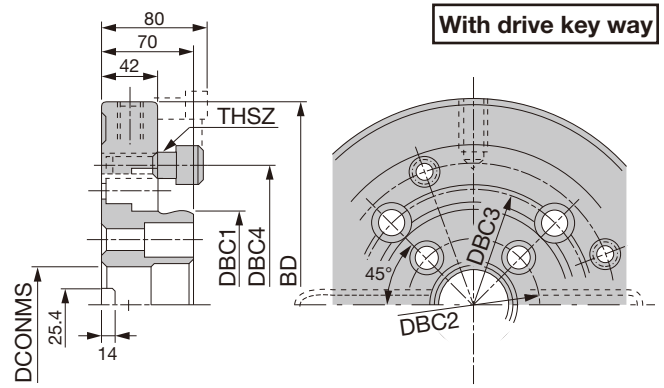
OB type cutter body



#### Dimensional details of mount of OB-type adapters



QA12K to QA16K type shown.



QA12M to QA16M type shown.

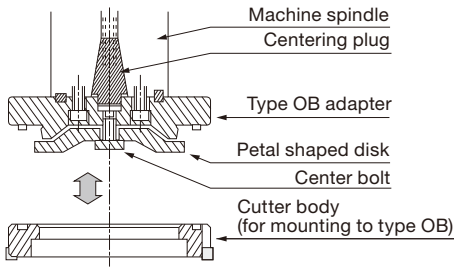
Adapter Designation	Dimensions (mm)							
	BD	DCONMS	DBC1	DBC2	DBC3	DBC4	THSZ	Bolts
QA08K/M	198	47.625	63.5	101.6	-	114.3	M16x40	4
QA10K/M	248	60	133.35	101.6	-	177.8	M16x50	4
QA12K/M	313	60	146.05	101.6	177.8	215.9	M20x50	4
QA14K/M	353	60	215.9	101.6	177.8	260.4	M20x50	6
QA16K/M	398	60	254	101.6	177.8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

- Notes:
- Dimension  $\phi d$  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.

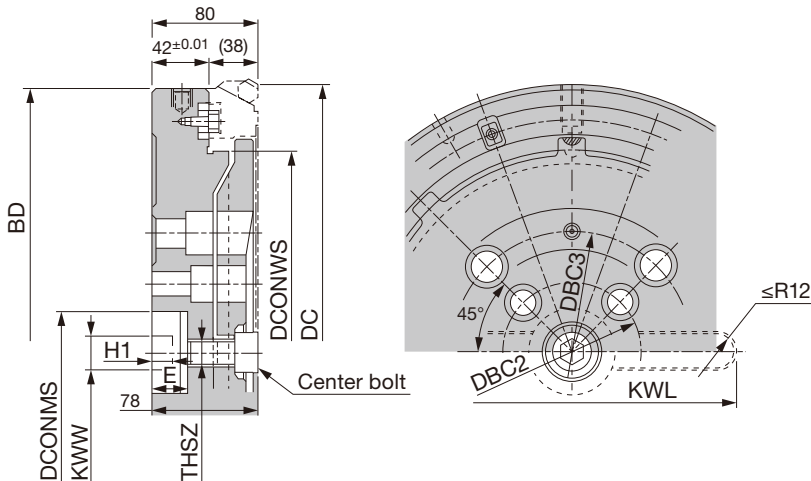
#### CB type adapter



#### CB type cutter body



### Dimensional details of mount of CB-type adapters



Adapter Designation	Dimensions (mm)											
	DC	DCONMS	BD	DCONWS	DBC2	DBC3	KWW	H1	KWL	THSZ	E	Center bolt
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  $\phi$ d can be made to customer's specifications.

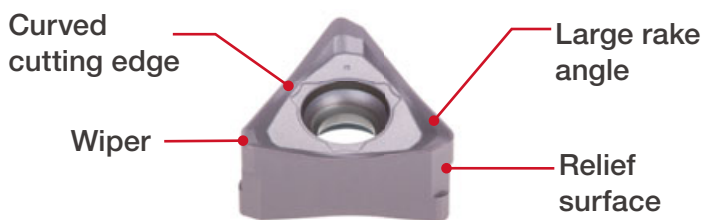
- Because of the dimensional restriction of "E", standard CO- type centering plugs can not be used for the adapters shown in the above table. Special centering plugs applicable for the above adapters can be made to order on request.



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

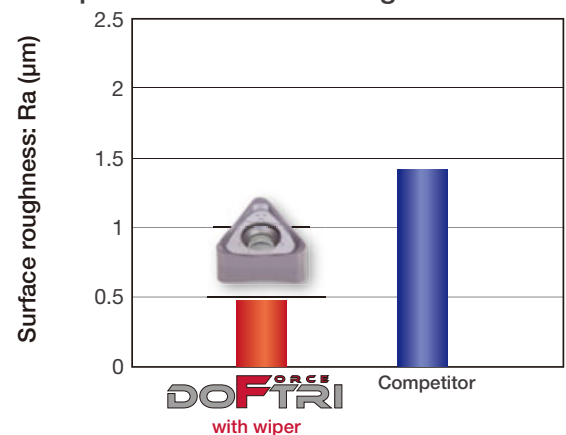
### Innovative insert

- 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.



Reference pages: [H171](#) - [H174](#)

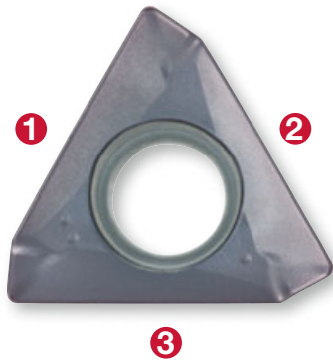
Comparison of surface roughness



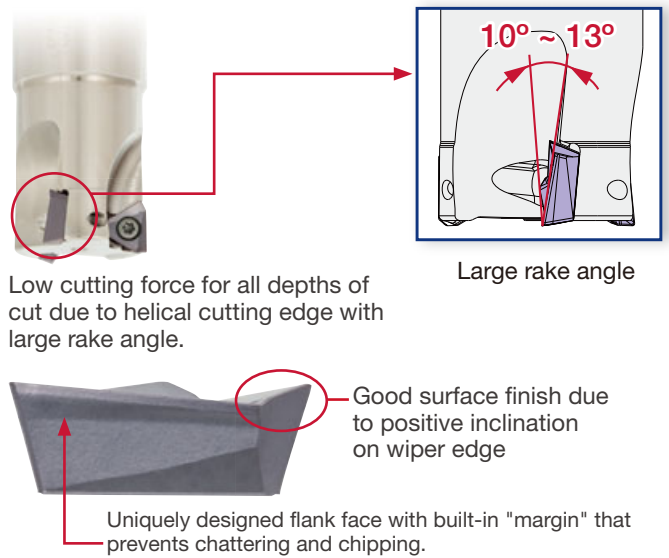


## Excellent cutting performance with improved profitability

### Economical 3 cutting-edge inserts

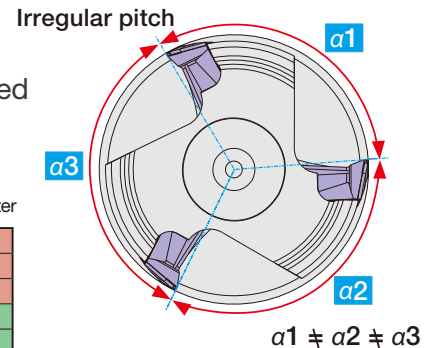


### Drastically reduced cutting force



### 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.

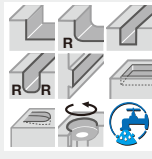
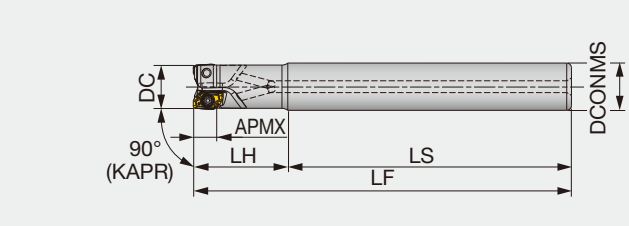


### Cutting performance

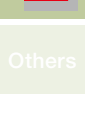
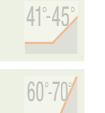
ap (in)	0.400	<b>OK</b>	0.002	0.004	0.006	0.008	0.010
	0.360						
	0.320						
	0.280						
	0.240						
	0.200						
	0.160						
	0.120						
	0.080						
	0.040						
Applicable area	fz (ipt)						

ap (in)	0.400	<b>OK</b>	0.002	0.004	0.006	0.008	0.010
	0.360						
	0.320						
	0.280						
	0.240						
	0.200						
	0.160						
	0.120						
	0.080						
	0.040						
Applicable area	fz (ipt)						

Cutter : EPA10R125U0125W03N (DC = 1.250", CICT = 3)  
 Insert : TOMT100404PDER-MJ  
 Grade : AH3135  
 Workpiece : 1055 (200 HB)  
 Cutting speed : Vc = 500 sfm  
 Width of cut : ae = 1.250"  
 Machine : Vertical M/C, CAT50



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPAV06U0.31C0.37R01	0.236	0.313	1	0.375	2.463	0.787	3.250	0.09	With	AVGT06...
EPAV06U0.37C0.37R01	0.236	0.375	1	0.375	2.463	0.787	3.250	0.09	With	AVGT06...
EPAV06U0.37C0.37R01L	0.236	0.375	1	0.375	2.622	1.378	4.000	0.11	With	AVGT06...
EPAV06U0.50C0.50R02	0.236	0.500	2	0.500	2.463	0.787	3.250	0.15	With	AVGT06...
EPAV06U0.50C0.50R03	0.236	0.500	3	0.500	2.463	0.787	3.250	0.15	With	AVGT06...
EPAV06U0.50C0.50R02L	0.236	0.500	2	0.500	3.388	1.362	4.750	0.22	With	AVGT06...
EPAV06U0.62C0.62R03	0.236	0.625	3	0.625	2.713	0.787	3.500	0.26	With	AVGT06...
EPAV06U0.62C0.62R04	0.236	0.625	4	0.625	2.713	0.787	3.500	0.26	With	AVGT06...
EPAV06U0.62C0.62R03L	0.236	0.625	3	0.625	4.122	1.378	5.500	0.42	With	AVGT06...
EPAV12U0.62W0.62R02	0.453	0.625	2	0.625	1.906	1.000	2.906	0.22	With	AVM/GT12...
EPAV12U0.62W0.62R03	0.453	0.625	3	0.625	1.906	1.000	2.906	0.22	With	AVM/GT12...
EPAV12U0.62C0.62R02L	0.453	0.625	2	0.625	4.250	1.500	5.750	0.44	With	AVM/GT12...
EPAV06U0.75C0.62R04	0.236	0.750	4	0.625	2.815	1.185	4.000	0.33	With	AVGT06...
EPAV06U0.75C0.75R04	0.236	0.750	4	0.750	2.815	1.185	4.000	0.44	With	AVGT06...
EPAV06U0.75C0.75R05	0.236	0.750	5	0.750	2.815	1.185	4.000	0.44	With	AVGT06...
EPAV06U0.75C0.75R04L	0.236	0.750	4	0.750	6.500	1.375	7.875	0.90	With	AVGT06...
EPAV12U0.75W0.75R03	0.453	0.750	3	0.750	2.031	1.250	3.281	0.33	With	AVM/GT12...
EPAV12U0.75W0.75R04	0.453	0.750	4	0.750	2.031	1.250	3.281	0.33	With	AVM/GT12...
EPAV12U0.75C0.75R03L	0.453	0.750	3	0.750	5.250	2.000	7.250	0.79	With	AVM/GT12...
EPAV06U1.00C0.75R06	0.236	1.000	6	0.750	3.125	1.375	4.500	0.55	With	AVGT06...
EPAV06U1.00C1.00R05	0.236	1.000	5	1.000	3.125	1.375	4.500	0.93	With	AVGT06...
EPAV06U1.00C1.00R06	0.236	1.000	6	1.000	3.125	1.375	4.500	0.93	With	AVGT06...
EPAV06U1.00C1.00R04L	0.236	1.000	4	1.000	6.425	1.575	8.000	1.68	With	AVGT06...
EPAV12U1.00W1.00R03	0.453	1.000	3	1.000	2.281	1.500	3.781	0.71	With	AVM/GT12...
EPAV12U1.00W1.00R04	0.453	1.000	4	1.000	2.281	1.500	3.781	0.71	With	AVM/GT12...
EPAV12U1.00W1.00R06	0.453	1.000	6	1.000	2.281	1.500	3.781	0.71	With	AVM/GT12...
EPAV12U1.00C1.00R03L	0.453	1.000	3	1.000	5.750	2.750	8.500	1.65	With	AVM/GT12...
EPAV12U1.25W1.25R04	0.453	1.250	4	1.250	2.281	1.500	3.781	1.10	With	AVM/GT12...
EPAV12U1.25W1.25R06	0.453	1.250	6	1.250	2.281	1.500	3.781	1.12	With	AVM/GT12...
EPAV12U1.25W1.25R08	0.453	1.250	8	1.250	2.281	1.500	3.781	1.15	With	AVM/GT12...
EPAV12U1.25C1.25R03L	0.453	1.250	3	1.250	7.000	3.000	10.000	3.15	With	AVM/GT12...



Metric	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...



Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
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...

### INCH SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench
EPAV06U...	CSPB-2H	M-1000	IP-6DB
EPAV12U0.62W0.62R02	CSPB-2.5	-	IP-8D
EPAV12U0.62W0.62R03	CSPB-2.5S	-	IP-8D
EPAV12U0.62C0.62R02L	CSPB-2.5	-	IP-8D
EPAV12U0.75W0.75R03	CSPB-2.5	-	IP-8D
EPAV12U0.75W0.75R04	CSPB-2.5S	-	IP-8D
EPAV12U0.75C0.75R03L	CSPB-2.5	-	IP-8D
EPAV12U1.00W1.00R03	CSPB-2.5	-	IP-8D
EPAV12U1.00W1.00R04	CSPB-2.5	-	IP-8D
EPAV12U1.00W1.00R06	CSPB-2.5S	-	IP-8D
EPAV12U1.00C1.00R03L	CSPB-2.5	-	IP-8D
EPAV12U1.25W1.25R04	CSPB-2.5	-	IP-8D
EPAV12U1.25W1.25R06	CSPB-2.5	-	IP-8D
EPAV12U1.25W1.25R08	CSPB-2.5S	-	IP-8D
EPAV12U1.25C1.25R03L	CSPB-2.5	-	IP-8D

Recommended clamping torque:  
CSPB-2H = 0.52 lbs-ft, CSPB-2.5, CSPB-2.5S = 0.96 lbs-ft

### METRIC SPARE PARTS



Designation	Clamping screw	Lubricant	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

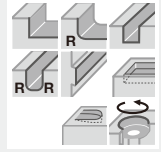
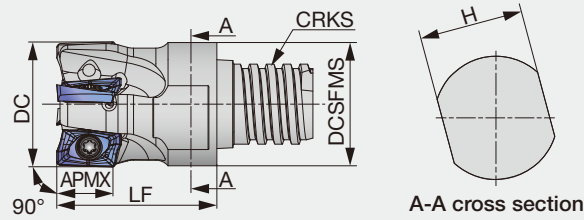




## HPAV06-S

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

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



Metric	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	Wrench
HPAV06M...	CSPB-2H	M-1000	IP-6DB

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

\*sold separately

Recommended clamping torque: 0.7 N·m

### Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

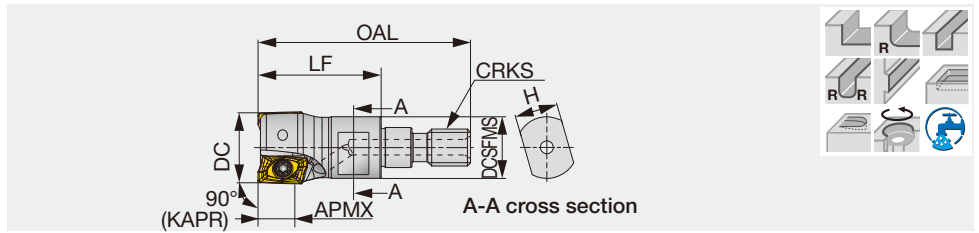
90°

Others

## 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°



Metric	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	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



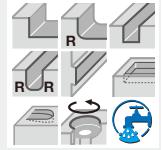
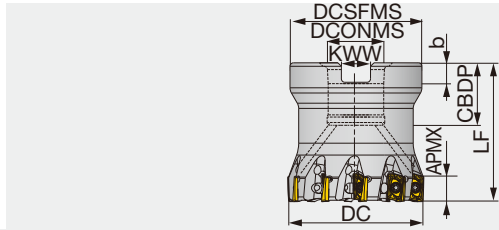
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

# TUNG F<sup>ORCE</sup> REC

## TPAV06/12

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°



Inch	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	KWW	b	WT(lb)	Air hole	Insert
TPAV12U1.50B0.50R05	0.453	1.500	5	1.417	0.500	0.630	1.575	0.258	0.157	0.460	With	AVM/GT12...
TPAV12U2.00B0.75R05	0.453	2.000	5	1.772	0.750	0.750	1.575	0.315	0.197	0.770	With	AVM/GT12...
TPAV12U2.00B0.75R12	0.453	2.000	12	1.772	0.750	0.750	1.575	0.315	0.197	0.840	With	AVM/GT12...

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

### SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench	Shell locking bolt
TPAV06M040B16.0R10	CSPB-2H	M-1000	IP-6DB	CM8X30H
TPAV12U1.50B...	CSPB-2.5	-	IP-8D	SR UNF 1/4X3/4 B18.3
TPAV12U2.00B...	CSPB-2.5	-	IP-8D	C0.375X1.125H

Recommended clamping torque: CSPB-2H = 0.52 lbs-ft, 0.7 N-m, CSPB-2.5 = 0.96 lbs-ft, 1.3 N-m

### Approach angle

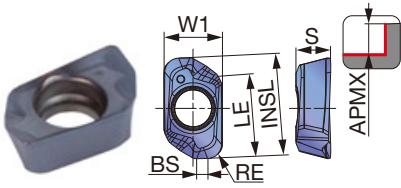
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°

Others

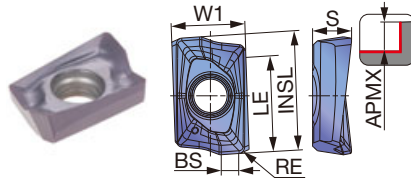
Reference pages: Standard cutting conditions → [H142](#) - [H143](#)

# INSERT

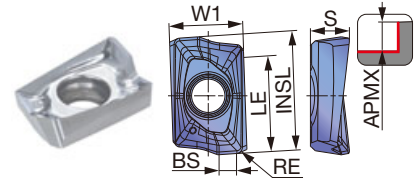
## AVMT04-MM



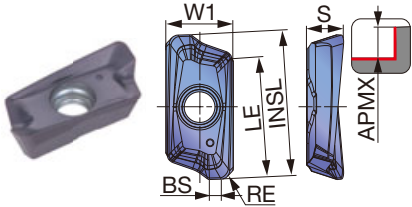
## AVGT06-MJ



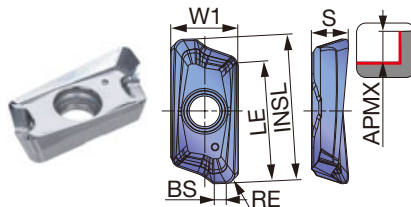
## AVG06T-AJ



## AVMT-12MM



## AVGT12-AM



<b>P</b> Steel	☆	☆	★	★																	
<b>M</b> Stainless		☆	☆	★	☆																
<b>K</b> Cast iron	★				☆																
<b>N</b> Non-ferrous									★												
<b>S</b> Superalloys	★	★		★																	
<b>H</b> Hard materials	★																				

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated						Carbide	W1	INSL	S	BS	LE
			AH120	AH130	AH3135	AH3225	T1215	T3225	KS05F					
AVMT040204PPER-MM	0.016	0.157	●	●						0.138	0.238	0.083	0.039	0.173
AVMT040208PPER-MM	0.031	0.157	●	●						0.138	0.238	0.083	0.024	0.173
AVGT060300PBER-MJ	0.000	0.236		●	●					0.197	0.315	0.106	0.063	0.256
AVGT060302PBER-MJ	0.008	0.236	●	●	●	●				0.197	0.315	0.106	0.059	0.256
AVGT060304PBER-MJ	0.016	0.236	●	●	●	●				0.197	0.315	0.106	0.051	0.256
AVGT060308PBER-MJ	0.031	0.236	●	●	●	●				0.197	0.315	0.102	0.035	0.256
AVGT060300PBFR-AJ	0.000	0.236						●		0.197	0.315	0.106	0.063	0.256
AVGT060302PBFR-AJ	0.008	0.236						●		0.197	0.315	0.106	0.059	0.256
AVGT060304PBFR-AJ	0.016	0.236						●		0.197	0.315	0.106	0.051	0.256
AVGT060308PBFR-AJ	0.031	0.236						●		0.197	0.315	0.102	0.035	0.256
AVMT120404PDER-MM	0.016	0.453	●		●	●	●			0.260	0.559	0.142	0.059	0.465
AVMT120408PDER-MM	0.031	0.453	●		●	●	●			0.260	0.559	0.142	0.043	0.465
AVMT120412PDER-MM	0.047	0.453	●		●	●	●			0.260	0.559	0.142	0.028	0.465
AVMT120416PDER-MM	0.063	0.453	●		●	●	●			0.260	0.559	0.142	0.012	0.465
AVMT120420PDER-MM	0.079	0.413	●		●	●	●			0.260	0.500	0.134	0.047	0.437
AVMT120430PDER-MM	0.118	0.413	●		●	●	●			0.260	0.500	0.134	0.008	0.437
AVGT120404PDFR-AM	0.016	0.453						●		0.260	0.559	0.142	0.059	0.465
AVGT120408PDFR-AM	0.031	0.453						●		0.260	0.559	0.142	0.043	0.465

● : Line up

Reference pages: Standard cutting conditions → **H142 - H143**



# STANDARD CUTTING CONDITIONS

## EPAV04

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
	Low carbon steel 1015, etc.	- 200 HB	First choice	AH3225	328 - 984	0.002 - 0.005
<b>P</b>	Carbon steel and alloy steel 1055, etc.	- 300 HB	First choice	AH3225	328 - 820	0.002 - 0.005
	Prehardend steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3225	328 - 656	0.002 - 0.004
<b>M</b>	Stainless steel 304SS, etc.	- 200 HB	First choice	AH3225	262 - 591	0.002 - 0.004
<b>K</b>	Gray cast iron Class 25, etc.	150 - 250 HB	First choice	AH120	328 - 984	0.002 - 0.005
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	328 - 820	0.002 - 0.005
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3225	66 - 197	0.002 - 0.003
	Superalloys Inconel718, etc.	- 40 HRC	First choice	AH120	66 - 131	0.002 - 0.003
<b>H</b>	Hardened steel	H13, etc.	First choice	AH120	164 - 492	0.002 - 0.003
		D2, etc.	First choice	AH120	131 - 230	0.002 - 0.003

## EPAV06, HPAV06-M, HPAV06-S, TPAV06

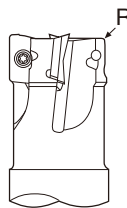
ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
	Low carbon steel 1015, etc.	- 200 HB	First choice	AH3225	755 - 1410	0.003 - 0.005
<b>P</b>	Carbon steel and alloy steel 1055, etc.	- 300 HB	First choice	AH3225	490 - 1150	0.003 - 0.005
	Prehardend steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3225	325 - 750	0.003 - 0.005
<b>M</b>	Stainless steel 304SS, etc.	- 200 HB	First choice	AH3135	490 - 720	0.003 - 0.004
<b>K</b>	Gray cast iron Class 25, etc.	150 - 250 HB	First choice	AH120	655 - 1080	0.003 - 0.005
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	490 - 785	0.003 - 0.005
<b>N</b>	Aluminum alloys Si < 13%	-	First choice	KS05F	2130 - 3280	0.003 - 0.005
	Aluminum alloys Si ≥ 13%	-	First choice	KS05F	325 - 750	0.003 - 0.005
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH130	130 - 295	0.0016 - 0.004
	Superalloys Inconel718, etc.	- 40 HRC	First choice	AH130	145 - 210	0.0016 - 0.004
<b>H</b>	Hardened steel	H13, etc.	First choice	AH120	145 - 225	0.002 - 0.004
		D2, etc.	First choice	AH120	130 - 210	0.0016 - 0.003

EPAV12, HPAV12-M, TPAV12

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	
P	Low carbon steel 1028, etc.	- 200 HB	First choice	AH3225	328 - 984	0.002 - 0.009	
		- 200 HB	Wear resistance	T3225	656 - 1312	0.002 - 0.007	
	Carbon steel and alloy steel 1045, etc.	- 300 HB	First choice	AH3225	328 - 820	0.002 - 0.009	
		- 300 HB	Wear resistance	T3225	656 - 1312	0.002 - 0.007	
	Prehardend steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3225	328 - 656	0.002 - 0.009	
		30 - 40 HRC	Wear resistance	T3225	656 - 1312	0.002 - 0.006	
M	Stainless steel 304SS, etc.	- 200 HB	First choice	AH3225	262 - 591	0.003 - 0.008	
K	Gray cast iron No. 250B, etc.	150 - 250 HB	First choice	AH120	328 - 984	0.002 - 0.005	
		150 - 250 HB	Wear resistance	T1215	656 - 1312	0.002 - 0.007	
	Ductile cast iron 60-40-18, etc.	150 - 250 HB	First choice	AH120	328 - 820	0.002 - 0.005	
		150 - 250 HB	Wear resistance	T1215	492 - 984	0.002 - 0.007	
N	Aluminum alloys Si < 13%	-	First choice	KS05F	984 - 4921	0.002 - 0.013	
	Aluminum alloys Si ≥ 13%	-	First choice	KS05F	328 - 656	0.002 - 0.013	
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3225	66 - 197	0.002 - 0.006	
	Superalloys Inconel718, etc.	- 40 HRC	First choice	AH120	66 - 131	0.002 - 0.006	
H	Hardened steel	H13, etc.	40 - 50 HRC	First choice	AH120	164 - 492	0.002 - 0.003
		D2, etc.	50 - 60 HRC	First choice	AH120	131 - 230	0.002 - 0.003

Cautionary point in modifying cutter bodies

When using inserts with corner radius RE ≥ 0.0787", standard cutter bodies have to be modified "R". (EPAV12, TPAV12, HPAV12)



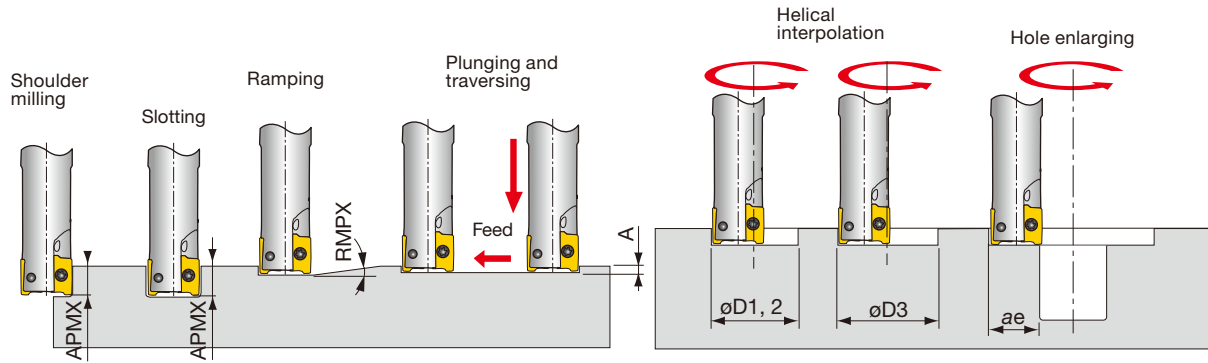
Corner radius RE (in)	The dimension of modifying (in)
0.0157 - 0.0623	Unnecessary
0.0787 - 0.1181	0.0787

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





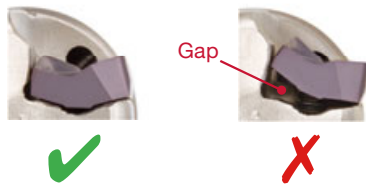
# MACHINING APPLICATIONS



Inch	DC	Max. depth of cut	Max. ramping angle	Max. plunging	Min. machining	Max. machining		Max. cutting width in enlarging
		APMX	RMPX	A	$\phi D1$	$\phi D2$	$\phi D3^*$	$ae$
EPAV06U0.31...	0.313	0.236	-	-	-	-	-	-
EPAV06U0.37...	0.375	0.236	3°	0.012	0.591	0.748	0.709	0.374
EPAV06U0.50...	0.500	0.236	3°	0.012	0.709	0.906	0.866	0.453
EPAV06U0.62...	0.625	0.236	2.3°	0.012	1.026	1.220	1.181	0.610
EPAV06U0.75...	0.750	0.236	2°	0.012	1.276	1.460	1.421	0.730
EPAV06U1.00...	1.000	0.236	1.6°	0.012	1.775	1.960	1.921	0.980
EPAV12U0.62...	0.625	0.453	3.5°	0.020	0.986	1.211	1.171	0.586
EPAV12U0.75...	0.750	0.453	3°	0.020	1.224	1.461	1.421	0.711
EPAV12U1.00...	1.000	0.453	2.5°	0.020	1.709	1.961	1.921	0.961
EPAV12U1.25...	1.250	0.453	2°	0.020	2.201	2.461	2.421	1.211
TPAV12U1.50...	1.500	0.453	1.7°	0.020	2.700	2.961	2.921	1.461
TPAV12U2.00...	2.000	0.453	1.2°	0.020	3.750	3.961	3.921	1.961

\*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.



Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

90°

Others



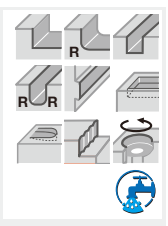
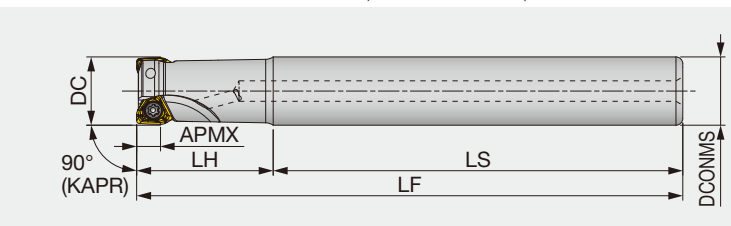


# TUNG-TRI

## EPA04/06/10/15

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°



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPA06R050U0050-01N	0.236	0.500	1	0.500	2.250	0.750	3.000	0.15	Without	TOMT06...
EPA06R063U0063-02N	0.236	0.625	2	0.625	2.563	0.937	3.500	0.29	Without	TOMT06...
EPA06R075U0075-03N	0.236	0.750	3	0.750	2.858	1.142	4.000	0.46	With	TOMT06...
EPA06R100U0100W04N	0.236	1.000	4	1.000	2.280	1.500	3.780	0.76	Without	TOMT06...
EPA10R100U0075W02N	0.394	1.000	2	0.750	2.362	1.378	3.740	0.44	Without	TO*T10...
EPA10R100U0100W02N	0.394	1.000	2	1.000	2.362	1.378	3.740	0.71	Without	TO*T10...
EPA10R100U0100W02L	0.394	1.000	2	1.000	5.748	2.752	8.500	1.68	With	TO*T10...
EPA10R125U0125W02L	0.394	1.250	2	1.250	7.000	3.000	10.000	3.15	With	TO*T10...
EPA10R125U0125W03N	0.394	1.250	3	1.250	2.362	1.378	3.740	1.12	Without	TO*T10...
EPA10R125U0125W03ML	0.394	1.250	3	1.250	4.250	2.250	6.500	2.07	With	TO*T10...
EPA10R150U0125W02L	0.394	1.500	2	1.250	8.000	2.000	10.000	3.33	With	TO*T10...
EPA10R150U0125W03ML	0.394	1.500	3	1.250	4.250	2.250	6.500	2.43	With	TO*T10...
EPA10R150U0125W04N	0.394	1.500	4	1.250	3.157	1.969	5.126	1.68	Without	TO*T10...
EPA15R150U0125W03N	0.590	1.500	3	1.250	2.250	2.250	4.500	1.48	With	TO*T15...
EPA15R150U0125W02L	0.590	1.500	2	1.250	2.250	4.250	6.500	2.07	With	TO*T15...
EPA15R200U0125W04N	0.590	2.000	4	1.250	2.250	2.250	4.500	1.74	Without	TO*T15...

Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPA04R008M08.0-01	3.5	8	1	8	48	12	60	0.02	With	TOMT04...
EPA04R010M10.0-02	3.5	10	2	10	60	20	80	0.04	With	TOMT04...
EPA04R010M10.0-02L	3.5	10	2	10	65	35	100	0.05	With	TOMT04...
EPA04R012M12.0-02	3.5	12	2	12	60	20	80	0.06	With	TOMT04...
EPA04R012M12.0-03	3.5	12	3	12	60	20	80	0.06	With	TOMT04...
EPA04R012M12.0-02L	3.5	12	2	12	85	35	120	0.09	With	TOMT04...
EPA06R012M16.0-01N	6	12	1	16	50	18	68	0.09	Without	TO*T06...
EPA04R016M16.0-03	3.5	16	3	16	70	20	90	0.12	With	TOMT04...
EPA04R016M16.0-04	3.5	16	4	16	70	20	90	0.12	With	TOMT04...
EPA04R016M16.0-03L	3.5	16	3	16	105	35	140	0.19	With	TOMT04...
EPA06R016M16.0-02N	6	16	2	16	60	24	84	0.12	Without	TO*T06...
EPA06R016M16.0-02L	6	16	2	16	105	40	145	0.2	With	TO*T06...
EPA06R018M16.0-02N	6	18	2	16	60	24	84	0.13	Without	TO*T06...
EPA06R018M16.0-02L	6	18	2	16	115	30	145	0.21	With	TO*T06...
EPA04R020M20.0-04	3.5	20	4	20	70	30	100	0.21	With	TOMT04...
EPA04R020M20.0-05	3.5	20	5	20	70	30	100	0.21	With	TOMT04...
EPA04R020M20.0-04L	3.5	20	4	20	165	35	200	0.44	With	TOMT04...
EPA06R020M16.0-02N	6	20	2	16	60	30	90	0.14	Without	TO*T06...
EPA06R020M20.0-02N	6	20	2	20	70	30	100	0.23	Without	TO*T06...
EPA06R020M20.0-03N	6	20	3	20	70	30	100	0.22	Without	TO*T06...
EPA06R020M20.0-02L	6	20	2	20	135	50	185	0.41	With	TO*T06...
EPA06R022M20.0-02N	6	22	2	20	70	30	100	0.23	Without	TO*T06...
EPA06R022M20.0-03N	6	22	3	20	70	30	100	0.23	Without	TO*T06...
EPA06R022M20.0-02L	6	22	2	20	145	40	185	0.42	With	TO*T06...
EPA04R025M25.0-05	3.5	25	5	25	80	35	115	0.39	With	TOMT04...
EPA04R025M25.0-06	3.5	25	6	25	80	35	115	0.39	With	TOMT04...
EPA04R025M25.0-04L	3.5	25	4	25	160	40	200	0.7	With	TOMT04...
EPA06R025M25.0-03N	6	25	3	25	80	35	115	0.41	Without	TO*T06...
EPA06R025M25.0-04N	6	25	4	25	80	35	115	0.41	Without	TO*T06...
EPA06R025M25.0-02L	6	25	2	25	150	70	220	0.78	With	TO*T06...
EPA10R025M25.0-02N	10	25	2	25	80	35	115	0.38	Without	TO*T10...
EPA10R025M25.0-02L	10	25	2	25	150	70	220	0.75	With	TO*T10...
EPA06R028M25.0-03N	6	28	3	25	80	35	115	0.42	Without	TO*T06...
EPA06R028M25.0-04N	6	28	4	25	80	35	115	0.42	Without	TO*T06...
EPA06R028M25.0-02L	6	28	2	25	180	40	220	0.8	With	TO*T06...



Others

Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPA10R028M25.0-02N	10	28	2	25	80	35	115	0.39	Without	TO*T10...
EPA10R028M25.0-02L	10	28	2	25	185	35	220	0.78	With	TO*T10...
EPA10R032M32.0-02N	10	32	2	32	80	40	120	0.66	Without	TO*T10...
EPA10R032M32.0-03N	10	32	3	32	80	40	120	0.65	Without	TO*T10...
EPA10R032M32.0-02L	10	32	2	32	175	80	255	1.46	With	TO*T10...
EPA10R035M32.0-02N	10	35	2	32	80	40	120	0.7	Without	TO*T10...
EPA10R035M32.0-03N	10	35	3	32	80	40	120	0.68	Without	TO*T10...
EPA10R035M32.0-02L	10	35	2	32	215	40	255	1.52	With	TO*T10...
EPA10R040M32.0-03N	10	40	3	32	80	40	120	0.72	Without	TO*T10...
EPA10R040M32.0-04N	10	40	4	32	80	40	120	0.73	Without	TO*T10...
EPA10R040M32.0-02L	10	40	2	32	205	50	255	1.57	With	TO*T10...
EPA15R040M32.0-03N	15	40	3	32	80	40	120	0.73	Without	TO*T15...
EPA15R040M32.0-02L	15	40	2	32	205	50	255	1.56	With	TO*T15...
EPA15R050M32.0-04N	15	50	4	32	80	40	120	0.83	Without	TO*T15...
EPA15R050M42.0-02L	15	50	2	42	310	50	360	3.84	With	TO*T15...

### SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Wrench	Torx bit
EPA04R008M08.0-01	CSPB-1.8L3.3	IP-6DB	-	-	-
EPA04R010 - 025...	CSPB-1.8L3.6	IP-6DB	-	-	-
EPA06R050, 063U... EPA06R012 - 018M...	CSTB-2.5S	-	M-1000	T-8D	-
EPA06R075, 100U... EPA06R020 - 028M...	CSTB-2.5	-	M-1000	T-8D	-
EPA10...	SR14-562/S	SW6-SD	M-1000	-	BLDT10/S7
EPA15...	TS45120I	H-TB2W	M-1000	-	BT20S

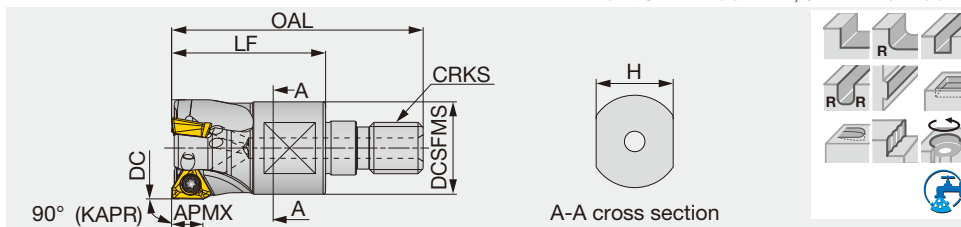
Recommended clamping torque: CSPB-1.8L3.6 = 0.37 lbs-ft, 0.5 N·m, CSTB-2.5S, CSTB-2.5 = 0.96 lbs-ft, 1.3 N·m, SR14-562/S = 2.58 lbs-ft, 3.5 N·m, CSPB-1.8L3.3, TS45120I = 3.69 lbs-ft, 5 N·m

## 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°



Metric	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	Wrench	Torx bit
HPA06R016MM08-02	CSTB-2.5S	-	M-1000	T-8D	-
HPA06R020 - 032MM...	CSTB-2.5	-	M-1000	T-8D	-
HPA10...	SR14-562/S	SW6-SD	M-1000	-	BLDT10/S7

Recommended clamping torque: CSTB-2.5, CSTB-2.5S = 1.3 N·m, SR14-562/S = 3.5 N·m

Reference pages: Inserts → **H153**, Standard cutting conditions → **H154 - H155**, TungFlex → **H038 - H039**

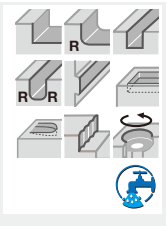
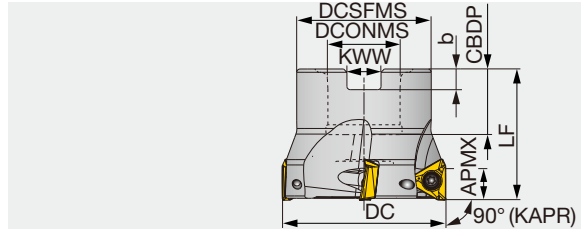
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

# TUNG-TRI

## TPA06/10/15

High precision square shoulder mill, with screw clamp system

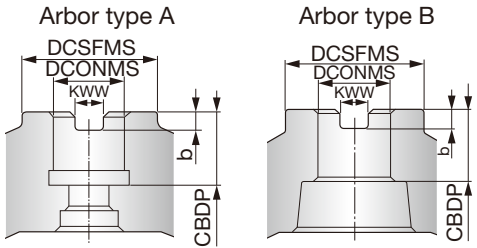
TPA06: GAMP = +8.5°~ +11.5°, GAMF = -5.5°~ -12.5°  
 TPA10: GAMP = +9.5°~ +11°, GAMF = -4.5°~ -0.5°  
 TPA15: GAMP = +12°~ +13.5°, GAMF = -6°~ -3.5°



Inch	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Insert	Arbor type
TPA10R150U0050A04	0.394	1.500	4	1.378	0.500	0.610	1.575	0.157	0.258	0.400	With	TO*T10...	A
TPA06R200U0075A08	0.236	2.000	8	1.693	0.750	0.750	1.575	0.197	0.315	0.310	With	TOMT06...	A
TPA10R200U0075A04	0.394	2.000	4	1.693	0.750	0.750	1.575	0.197	0.315	0.440	With	TO*T10...	A
TPA15R200U0075A04	0.590	2.000	4	1.625	0.750	0.750	1.570	0.197	0.315	0.600	With	TO*T15...	A
TPA10R250U0075A06	0.394	2.500	6	1.693	0.750	0.750	1.575	0.197	0.315	0.680	With	TO*T10...	A
TPA15R250U0075A05	0.590	2.500	5	2.125	0.750	0.750	1.570	0.197	0.315	0.900	With	TO*T15...	A
TPA10R300U0100A07	0.394	3.000	7	2.283	1.000	1.024	1.969	0.236	0.374	1.120	With	TO*T10...	A
TPA15R300U0100A06	0.590	3.000	6	2.250	1.000	1.024	1.750	0.236	0.374	1.900	With	TO*T15...	A
TPA10R400U0150A08	0.394	4.000	8	3.150	1.500	1.413	2.480	0.394	0.626	2.290	With	TO*T10...	B
TPA15R400U0150A07N	0.590	4.000	7	3.000	1.500	1.181	2.000	0.394	0.626	1.270	Without	TO*T15...	B
TPA15R500U0150A08N	0.590	5.000	8	4.000	1.500	1.175	2.000	0.394	0.626	2.800	Without	TO*T15...	B
TPA15R600U0200A10N	0.590	6.000	10	4.750	2.000	1.220	2.000	0.433	0.748	10.520	Without	TO*T15...	B

Metric	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...

### Arbor type



Reference pages: Inserts → **H153**, Standard cutting conditions → **H154 - H155**

## INCH SPARE PARTS

Designation	Clamping screw	Grip 1	Grip 2	Lubricant	Wrench	Torx bit	Shell locking bolt (Optional parts)
TPA06R200U0075A08	CSTB-2.5	-	-	M-1000	T-8D	-	(C0.375X1.125H)
TPA10R150U0050A04	SR14-562/S	-	SW6-SD	M-1000	-	BLDT10/S7	(SF UNF 1/4x3/4 B18.3)
TPA10R200 - 250U...	SR14-562/S	-	SW6-SD	M-1000	-	BLDT10/S7	(C0.375X1.125H)
TPA10R300U0100A07	SR14-562/S	-	SW6-SD	M-1000	-	BLDT10/S7	(C0.500X1.375H)
TPA10R400U0150A08	SR14-562/S	-	SW6-SD	M-1000	-	BLDT10/S7	(TMBA-0.750H)
TPA15R200, 250U...	TS45120I	H-TB2W	-	M-1000	-	BT20S	(C0.375X1.125H)
TPA15R300U0100A06	TS45120I	H-TB2W	-	M-1000	-	BT20S	(C0.500X1.375H)
TPA15R400U0150A07N	TS45120I	H-TB2W	-	M-1000	-	BT20S	(TMBA-0.750H)
TPA15R500U0150A08N	TS45120I	H-TB2W	-	M-1000	-	BT20M	(TMBA-0.750H)
TPA15R600U0200A10N	TS45120I	H-TB2W	-	M-1000	-	BT20M	-

Recommended clamping torque: CSTB-2.5 = 0.96 lbs-ft, SR14-562/S = 2.58 lbs-ft, TS45120I = 3.69 lbs-ft

## METRIC SPARE PARTS

Designation	Clamping screw	Grip 1	Grip 2	Lubricant	Center bolt 1	Center bolt 2	Wrench	Torx bit
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	SR14-562/S	-	SW6-SD	M-1000	-	CM8X30H	-	BLDT10/S7
TPA10R050, 063M...	SR14-562/S	-	SW6-SD	M-1000	-	CM10X30H	-	BLDT10/S7
TPA10R080M...	SR14-562/S	-	SW6-SD	M-1000	-	CM12X30H	-	BLDT10/S7
TPA10R100M...	SR14-562/S	-	SW6-SD	M-1000	-	CM16X40H	-	BLDT10/S7
TPA15R050M22.0E04	TS45120I	H-TB2W	-	M-1000	-	FSHM10-40H	-	BT20S
TPA15R063M22.0E05	TS45120I	H-TB2W	-	M-1000	-	CM10X30H	-	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

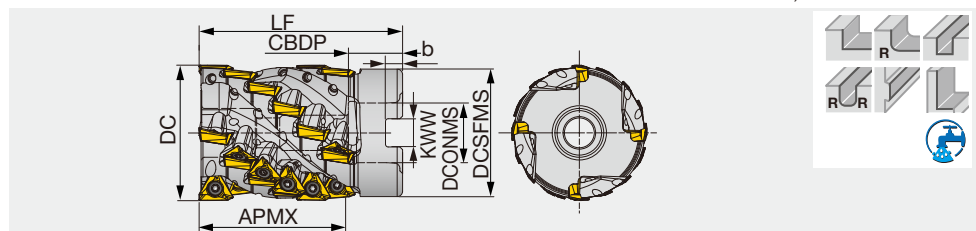
Recommended clamping torque: CSTB-2.5 = 1.3 N·m, SR14-562/S = 3.5 N·m, TS45120I = 5 N·m

# TUNG-TRI

## TLA10

Square shoulder mill for roughing, with screw clamp system

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



Inch	APMX	DC	ZEPF	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Insert
TLA10R200L213U0075A04	2.126	2.000	4	24	1.875	0.750	0.750	3.250	0.197	0.315	1.760	With	TO*T10...
TLA10R250L213U0100A04	2.126	2.500	4	24	2.375	1.000	1.024	3.250	0.236	0.374	2.960	With	TO*T10...
Metric	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.

## SPARE PARTS

Designation	Clamping screw	Lubricant	Center bolt 1	Center bolt 2	Wrench	Shell locking bolt
TLA10R200L213U0075A04	SR14-562	M-1000	-	-	T-10D	SD06-102
TLA10R250L213U0100A04	SR14-562	M-1000	-	-	T-10D	SD-08-C8
TLA10R050L054M22.0E04	SR14-562	M-1000	CAP-CM10X1.5X55-H	-	T-10D	-
TLA10R063L...	SR14-562	M-1000	-	CAP-CM12X1.75X50	T-10D	-

Recommended clamping torque: 2.58 lbs-ft, 3.5 N·m

Reference pages: Inserts → **H153**, Standard cutting conditions → **H154 - H155**





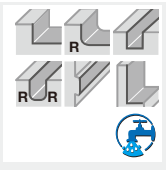
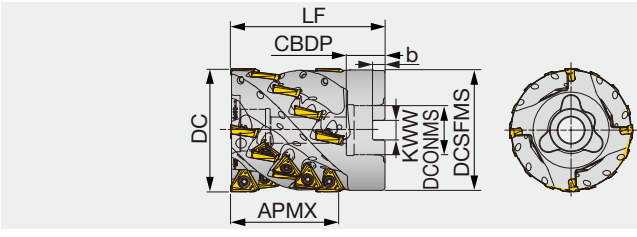


# TUNG-TRI

## TLA15-M

Square shoulder mill for roughing, with screw clamp system

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



Inch	APMX	DC	ZEPF	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Insert
TLA15R300L275U0125A04M	2.756	3.000	4	20	2.937	1.250	1.260	3.940	0.315	0.500	4.560	With	TO*T15...
TLA15R400L326U0150A05M	3.268	4.000	5	20	3.875	1.500	1.260	4.375	0.394	0.626	10.00	With	TO*T15...



Metric	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...

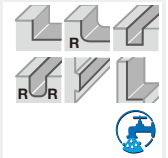
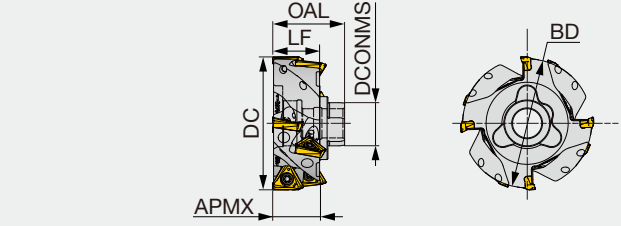
Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.



## 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°

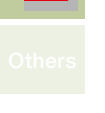
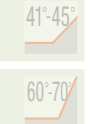


Inch	APMX	DC	ZEPF	CICT	BD	DCONMS	OAL	LF	WT(lb)	Air hole	Insert
TLA15R300L110A04S	1.102	3.000	4	8	2.898	1.024	1.703	1.102	1.240	With	TO*T15...
TLA15R400L110A05S	1.102	4.000	5	10	3.882	1.299	1.814	1.102	2.440	With	TO*T15...

Metric	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	Lubricant	Torx bit	Center bolt	Shell locking bolt
TLA15R300L275U0125A04M	TS45120I	H-TB2W	M-1000	BT20S	-	SD-10-54
TLA15R400L326U0150A05M	TS45120I	H-TB2W	M-1000	BT20S	-	SD12-B9
TLA15R080L**M	TS45120I	H-TB2W	M-1000	BT20S	CM16X75	-
TLA15R100L**M	TS45120I	H-TB2W	M-1000	BT20S	CM20X80	-
TLA15R**S	TS45120I	H-TB2W	M-1000	BT20S	-	-

Recommended clamping torque: 3.69 lbs-ft, 5 N·m

### CENTER BOLT

(Optional parts)

No. of subunits	1 pc	2 pcs
TLA15R300..	SD10-04	SD10-B3
TLA15R400..	SD12-C1	SD12-B8

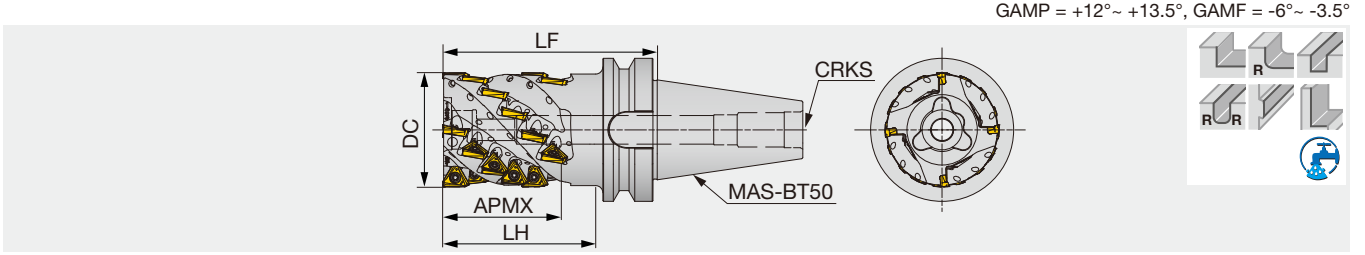
### CENTER BOLT

(Optional parts)

No. of subunits	1	2
TLA15R080L028-04S	CM16x120	CM16x140
TLA15R100L028-05S	CM20x120	CM20x150

Reference pages: Inserts → **H153**, Standard cutting conditions → **H154 - H155**

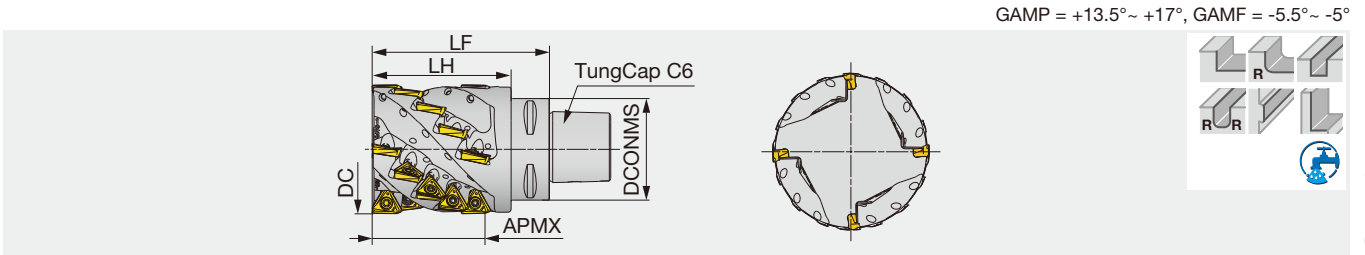
Square shoulder mill for roughing, with BT tapered shank



Metric	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



Metric	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

### SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit	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: 5 N·m

### CENTER BOLT

(Optional parts)

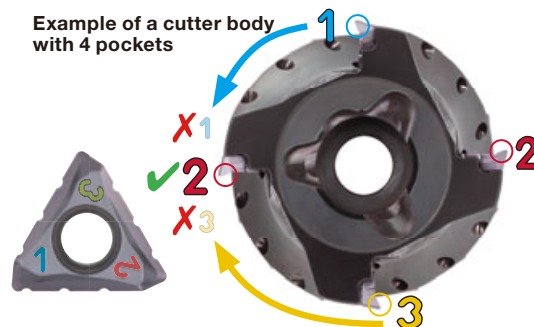
No. of subunits	1	2
TLA15R080L083BT50-04M	CAP-CM16x2.0x55	CM16x120
TLA15R100L097BT50-05M	CAP-CM20x2.5x50	CM20x80

## 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.

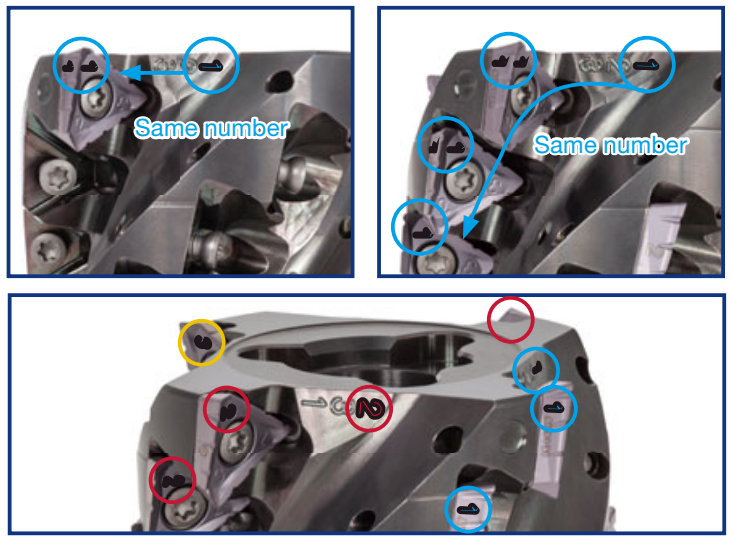
Item: TOMT150608PDER-NMJ



Reference pages: Inserts → **H153**, Standard cutting conditions → **H154 - H155**

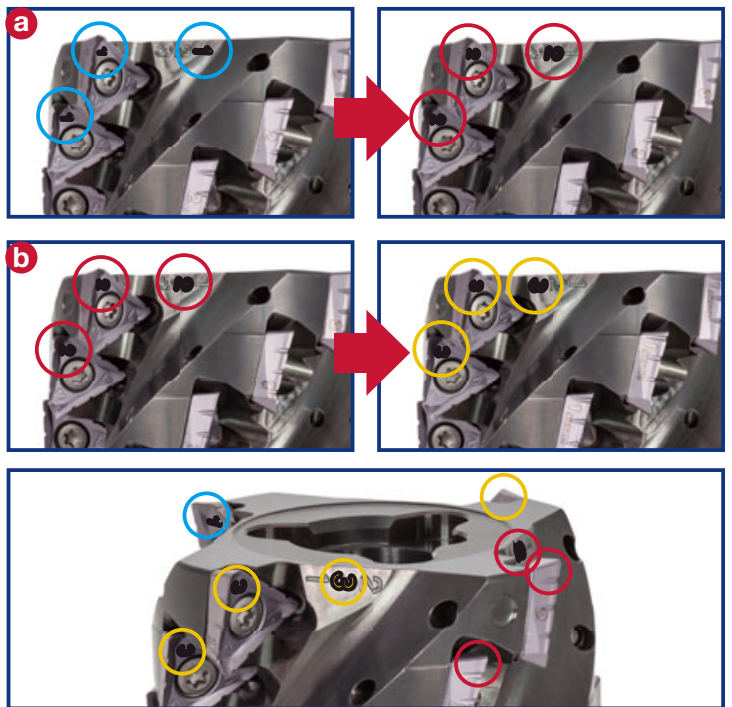
## Directions for setting NMJ inserts on roughing type bodies

- 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.

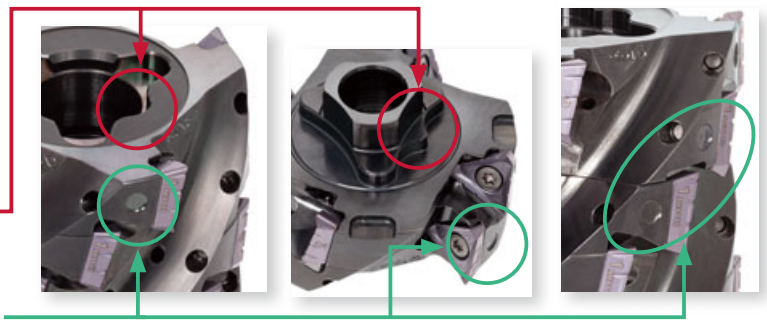


## How to set a sub-unit

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.

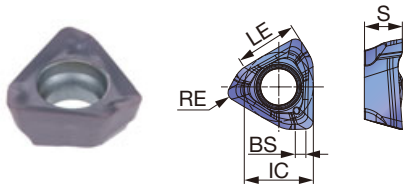
Projection for error-proofing (Poka-yoke)

Marking

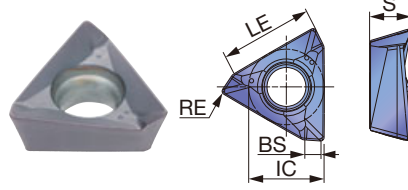


# INSERTS

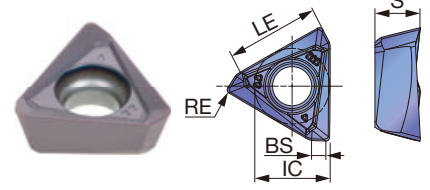
## TOMT-MM



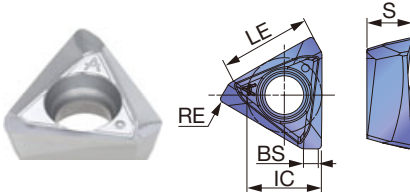
## TOMT-MJ



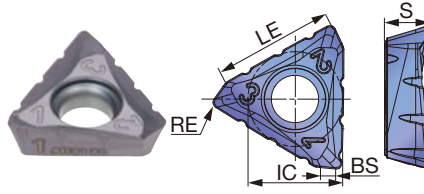
## TOET-MJ (For precision machining)



## TOGT-AJ



## TOMT-NMJ



<b>P</b> Steel	☆	★	★			☆					
<b>M</b> Stainless		★	★			☆					
<b>K</b> Cast iron	★				★						
<b>N</b> Non-ferrous								★			
<b>S</b> Superalloys	★	☆	★	★							
<b>H</b> Hard materials				★							

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated					Un-coated	LE	IC	S	BS
			AH120	AH3135	AH3225	AH8015	T1215	T3225				
TOMT040204PDER-MM	0.016	0.138	●	●	●				0.142	0.157	0.087	0.024
TOMT040208PDER-MM	0.031	0.138	●	●	●				0.142	0.157	0.087	0.008
TOMT060302PDER-MJ	0.008	0.236	●	●	●				0.244	0.220	0.126	0.055
TOMT060304PDER-MJ	0.016	0.236	●	●	●		●		0.244	0.220	0.126	0.047
TOMT060308PDER-MJ	0.031	0.236	●	●	●		●	●	0.244	0.220	0.126	0.031
TOGT060304PDFR-AJ	0.016	0.236					●		0.244	0.220	0.130	0.047
TOGT060308PDFR-AJ	0.031	0.236					●		0.244	0.220	0.130	0.031
TOET060302PDER-MJ	0.008	0.236		●	●				0.244	0.220	0.130	0.051
TOET060304PDER-MJ	0.016	0.236		●	●				0.244	0.220	0.130	0.043
TOMT100404PDER-MJ	0.016	0.394	●	●	●		●		0.413	0.339	0.185	0.059
TOMT100408PDER-MJ	0.031	0.394	●	●	●		●	●	0.413	0.339	0.185	0.043
TOMT100416PDER-MJ	0.063	0.394	●	●	●				0.413	0.339	0.185	0.008
TOGT100404PDFR-AJ	0.016	0.394					●		0.413	0.339	0.205	0.059
TOGT100408PDFR-AJ	0.031	0.394					●		0.413	0.339	0.201	0.043
TOET100404PDER-MJ	0.016	0.394		●	●				0.413	0.339	0.201	0.059
TOET100408PDER-MJ	0.031	0.394		●	●				0.413	0.339	0.201	0.043
TOMT150604PDER-MJ	0.016	0.591	●	●	●		●		0.618	0.500	0.236	0.087
TOMT150608PDER-MJ	0.031	0.591	●	●	●		●	●	0.618	0.500	0.236	0.075
TOMT150616PDER-MJ	0.063	0.591	●	●	●				0.618	0.500	0.236	0.043
TOMT150620PDER-MJ	0.079	0.591	●	●	●				0.618	0.500	0.236	0.028
TOMT150608PDER-NMJ	0.031	0.591	●	●	●		●		0.618	0.500	0.236	0.075
TOGT150604PDFR-AJ	0.016	0.591					●		0.618	0.492	0.220	0.083
TOGT150608PDFR-AJ	0.031	0.591					●		0.618	0.492	0.217	0.071
TOET150604PDER-MJ	0.016	0.591		●	●				0.618	0.492	0.220	0.087
TOET150608PDER-MJ	0.031	0.591		●	●				0.618	0.492	0.220	0.075

● : Line up

Reference pages: Standard cutting conditions → **H154 - H155**





# STANDARD CUTTING CONDITIONS

## EPA04

ISO	Workpiece materials	Hardness	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	
<b>P</b>	Low carbon steel 1015, etc.	- 200 HB	AH3225	326 - 820	0.002 - 0.005	
	Carbon steel and alloy steel 1055, etc.	- 300 HB	AH3225	326 - 755	0.002 - 0.005	
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	AH3225	326 - 591	0.002 - 0.004	
<b>M</b>	Stainless steel 304SS, etc.	- 200 HB	AH3225	295 - 656	0.002 - 0.004	
<b>K</b>	Gray cast iron Class 25, etc.	150 - 250 HB	AH120	326 - 984	0.002 - 0.005	
	Ductile cast iron 65-45-12, etc.	150 - 250 HB	AH120	326 - 656	0.002 - 0.005	
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	AH3225	66 - 197	0.002 - 0.004	
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	AH8015	66 - 131	0.002 - 0.003	
<b>H</b>	Hardened steel	H13, etc.	40 - 50 HRC	AH8015	164 - 492	0.002 - 0.003
		D2, etc.	50 - 60 HRC	AH8015	131 - 230	0.002 - 0.003

· 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	Chipbreakers	Grades	T/E/HPA06		T/E/HPA10		T/EPA15		
						Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)	
<b>P</b>	Low carbon steel 1015, etc.	- 200 HB	First Choice	MJ/NMJ	AH3225	330 - 726	0.0020 - 0.0059	330 - 825	0.0031 - 0.0079	330 - 990	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 825	0.0031 - 0.0039	330 - 990	0.0031 - 0.0047	330 - 990	0.0031 - 0.0059	0.0031 - 0.0059
	Carbon steel and alloy steel 1055, 4140, etc.	- 300 HB	First Choice	MJ/NMJ	AH3225	330 - 561	0.0020 - 0.0047	330 - 825	0.0024 - 0.0087	330 - 825	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 825	0.0020 - 0.0039	330 - 990	0.0020 - 0.0047	330 - 990	0.0020 - 0.0059	0.0020 - 0.0059
	Prehardened and tool steel NAK80, PX5, H13, etc.	30 - 40 HRC	First Choice	MJ/NMJ	AH3225	330 - 396	0.0020 - 0.0047	330 - 660	0.0024 - 0.0087	330 - 660	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 825	0.0020 - 0.0039	330 - 990	0.0020 - 0.0047	330 - 990	0.0020 - 0.0059	0.0020 - 0.0059
<b>M</b>	Stainless steel 304, etc.	- 200 HB	First Choice	MJ/NMJ	AH3135	264 - 495	0.0020 - 0.0059	264 - 660	0.0031 - 0.0079	297 - 660	0.0031 - 0.0079	0.0031 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	297 - 660	0.0020 - 0.0039	297 - 825	0.0020 - 0.0047	297 - 825	0.0020 - 0.0059	0.0020 - 0.0059
<b>K</b>	Gray cast iron No.250B, etc.	150 - 250 HB	First Choice	MJ/NMJ	AH120	330 - 660	0.0020 - 0.0059	330 - 825	0.0020 - 0.0059	462 - 825	0.0031 - 0.0098	0.0031 - 0.0059
			Wear Resistance	MJ	T1215	495 - 825	0.0020 - 0.0047	495 - 990	0.0031 - 0.0079	660 - 990	0.0031 - 0.0071	-
	Ductile cast iron 65-45-12, etc.	150 - 250 HB	First Choice	MJ/NMJ	AH120	264 - 495	0.0020 - 0.0059	264 - 660	0.0031 - 0.0079	363 - 660	0.0031 - 0.0098	0.0031 - 0.0059
			Wear Resistance	MJ	T1215	330 - 660	0.0020 - 0.0047	429 - 825	0.0020 - 0.0059	495 - 825	0.0031 - 0.0071	-
<b>N</b>	Aluminum Si < 13%	-	First Choice	AJ	KS05F	990 - 2970	0.0031 - 0.0087	990 - 3300	0.0031 - 0.0087	990 - 3300	0.0031 - 0.0087	-
	Aluminum Si ≥ 13%	-	First Choice	AJ	KS05F	330 - 660	0.0031 - 0.0087	330 - 660	0.0031 - 0.0087	330 - 660	0.0031 - 0.0087	-
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First Choice	MJ/NMJ	AH3135	66 - 165	0.0020 - 0.0039	66 - 198	0.0020 - 0.0039	66 - 198	0.0031 - 0.0059	0.0031 - 0.0059
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	First Choice	MJ/NMJ	AH120	66 - 1155	0.0012 - 0.0031	66 - 132	0.0020 - 0.0051	66 - 132	0.0028 - 0.0059	0.0028 - 0.0059

· When you use the NMJ chipbreaker, please set up the feed less than 0.006 ipt.  
 · 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.

## TLA (Roughing type)

ISO	Workpiece Materials	Hardness	Priority	Chip-breakers	Grades	TLA10		TLA15		
						Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)	
									MJ/AJ	NMJ
P	Low carbon steel 1015, etc	- 200 HB	First Choice	MJ/NMJ	AH3225	330 - 825	0.0031 - 0.0079	330 - 990	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 990	0.0031 - 0.0047	330 - 990	0.0031 - 0.0059	0.0031 - 0.0059
	Carbon steel and alloy steel 1055, 4140, etc.	- 300 HB	First Choice	MJ/NMJ	AH3225	330 - 825	0.0024 - 0.0087	330 - 825	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 990	0.0020 - 0.0047	330 - 990	0.0020 - 0.0059	0.0020 - 0.0059
	Prehardened and tool steel NAK80, PX5, H13, etc	30 - 40 HRC	First Choice	MJ/NMJ	AH3225	330 - 660	0.0024 - 0.0087	330 - 660	0.0024 - 0.0087	0.0024 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	330 - 990	0.0020 - 0.0047	330 - 990	0.0020 - 0.0059	0.0020 - 0.0059
M	Stainless steel 304, etc.	- 200 HB	First Choice	MJ/NMJ	AH3135	264 - 660	0.0031 - 0.0079	297 - 660	0.0031 - 0.0079	0.0031 - 0.0059
			Wear Resistance	MJ/NMJ	T3225	297 - 825	0.0020 - 0.0047	297 - 825	0.0020 - 0.0059	0.0020 - 0.0059
K	Gray cast iron No.250B, etc.	150 - 250 HB	First Choice	MJ/NMJ	AH120	330 - 825	0.0020 - 0.0059	462 - 825	0.0031 - 0.0098	0.0031 - 0.0059
			Wear Resistance	MJ	T1215	495 - 990	0.0031 - 0.0079	660 - 990	0.0031 - 0.0071	-
	Ductile cast iron 65-45-12, etc.	150 - 250 HB	First Choice	MJ/NMJ	AH120	264 - 660	0.0031 - 0.0079	363 - 660	0.0031 - 0.0098	0.0031 - 0.0059
			Wear Resistance	MJ	T1215	429 - 825	0.0020 - 0.0059	495 - 825	0.0031 - 0.0071	-
N	Aluminum Si < 13%	-	First Choice	AJ	KS05F	990 - 3300	0.0031 - 0.0087	990 - 3300	0.0031 - 0.0087	-
	Aluminum Si ≥ 13%	-	First Choice	AJ	KS05F	330 - 660	0.0031 - 0.0087	330 - 660	0.0031 - 0.0087	-
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First Choice	MJ/NMJ	AH3135	66 - 198	0.0020 - 0.0039	66 - 198	0.0031 - 0.0059	0.0031 - 0.0059
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	First Choice	MJ/NMJ	AH120	66 - 132	0.0020 - 0.0051	66 - 132	0.0028 - 0.0059	0.0028 - 0.0059

· When using NMJ chipbreaker, please set up the feed not to exceed 0.006 ipt.

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

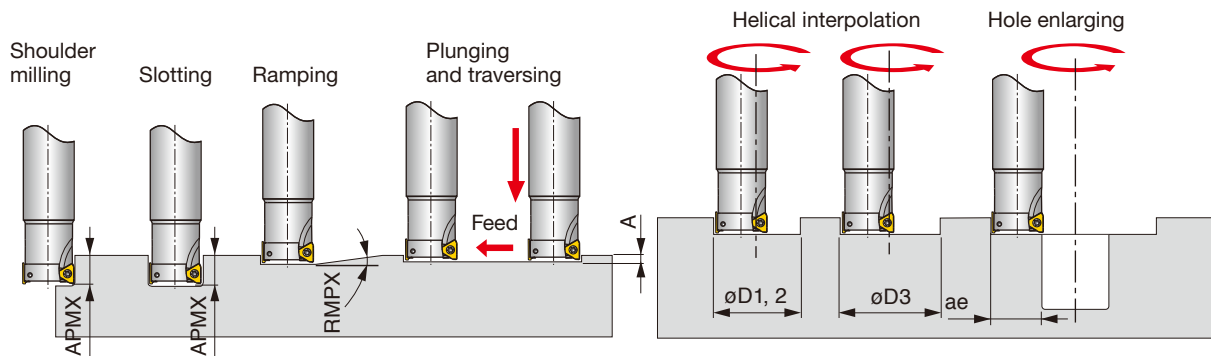
Tooling System

User's Guide

Index



# APPLICATION RANGE

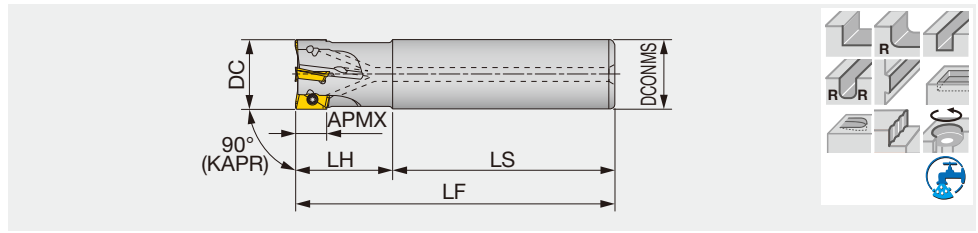


			Max. depth of cut	Max. ramping angle	Max. plunging depth	Min. machining diameter	Max. machining diameter		Max. cutting width in enlarging
	Inch	DC	APMX	RMPX	A	øD1	øD2	øD3*	ae
EPA06R050U...		0.500	0.236	5°	0.024	0.748	0.984	0.882	0.48
EPA06R063U...		0.625	0.236	4°	0.024	0.984	1.234	1.132	0.605
EPA06R075U...		0.750	0.236	3°	0.024	1.24	1.484	1.382	0.73
EPA06R100U...		1.000	0.236	2°	0.024	1.752	1.984	1.882	0.98
TPA06R200U...		2.000	0.236	0.7°	0.024	3.74	3.984	3.882	1.98
EPA10R100U...		1.000	0.394	2°	0.024	1.689	1.984	1.882	0.98
EPA10R125U...		1.250	0.394	2°	0.024	2.189	2.484	2.382	1.23
EPA10R150U...		1.500	0.394	1.4°	0.024	2.689	2.984	2.882	1.48
TPA10R200U...		2.000	0.394	0.8°	0.024	3.689	3.984	3.882	1.98
TPA10R250U...		2.500	0.394	0.7°	0.024	4.689	4.984	4.882	2.48
TPA10R300U...		3.000	0.394	0.6°	0.024	5.689	5.984	5.882	2.98
TPA10R400U...		4.000	0.394	0.5°	0.024	7.689	7.984	7.882	3.98
EPA15R150U...		1.500	0.59	2.3°	0.031	2.547	2.969	2.823	1.461
E/TPA15R200U...		2.000	0.59	1.7°	0.031	3.547	3.969	3.823	1.961
TPA15R250U...		2.500	0.59	1.4°	0.031	4.547	4.969	4.823	2.461
TPA15R300U...		3.000	0.59	1°	0.031	5.547	5.969	5.823	2.961
TPA15R400U...		4.000	0.59	0.8°	0.031	7.547	7.969	7.823	3.961
TPA15R500U...		5.000	0.59	0.6°	0.031	9.547	9.969	9.823	4.961
TPA15R600U...		6.000	0.59	0.5°	0.031	11.547	11.969	11.823	5.961

\* Flat bottom hole

Note: Corner RE for dimensions of øD1, øD2 and øD3: RE = 0.016" for EPA04, T/E/HPA06, T/E/HPA10 and RE = 0.031" for T/EPA15.

- 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



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPS11050RLU	0.417	0.500	1	0.625	3.750	1.250	5.000	0.350	With	AS*T11T3...
EPS11050RSU	0.417	0.500	1	0.625	2.362	0.984	3.346	0.240	With	AS*T11T3...
EPS11062RLU	0.417	0.625	2	0.625	4.250	1.500	5.750	0.440	With	AS*T11T3...
EPS11062RSU	0.417	0.625	2	0.625	2.362	0.984	3.346	0.240	With	AS*T11T3...
EPS11075RLU	0.417	0.750	2	0.750	5.250	2.000	7.250	0.790	With	AS*T11T3...
EPS11075RSBU	0.417	0.750	3	0.750	2.362	1.181	3.543	0.370	With	AS*T11T3...
EPS11100RLU	0.417	1.000	2	1.000	5.750	2.750	8.500	1.700	With	AS*T11T3...
EPS11100RSBU	0.417	1.000	4	1.000	2.362	1.378	3.740	0.700	With	AS*T11T3...
EPS11100RSBU-3/4	0.417	1.000	4	0.750	2.360	1.378	3.738	0.480	With	AS*T11T3...
EPS11125RLU	0.417	1.250	2	1.250	7.000	3.000	10.000	3.190	With	AS*T11T3...
EPS11125RSBU	0.417	1.250	5	1.250	2.362	1.378	3.740	1.120	With	AS*T11T3...

### SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EPS11050RLU	CSPB-2.5	M-1000	IP-8D
EPS11050RSU	CSPB-2.5S	M-1000	IP-8D
EPS11062RLU	CSPB-2.5	M-1000	IP-8D
EPS11062RSU	CSPB-2.5S	M-1000	IP-8D
EPS11075RLU	CSPB-2.5	M-1000	IP-8D
EPS11075RSBU	CSPB-2.5S	M-1000	IP-8D
EPS11100RLU	CSPB-2.5	M-1000	IP-8D
EPS11100RSBU	CSPB-2.5	M-1000	IP-8D
EPS11100RSBU-3/4	CSPB-2.5	M-1000	IP-8D
EPS11125RLU	CSPB-2.5	M-1000	IP-8D
EPS11125RSBU	CSPB-2.5	M-1000	IP-8D

Recommended clamping torque: 0.96 lbs-ft



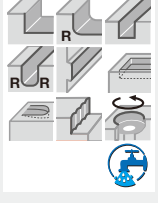
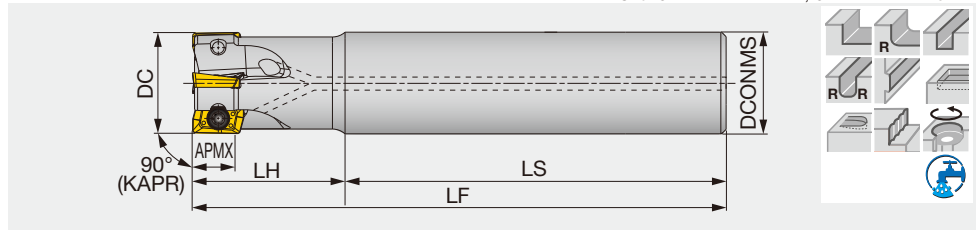
# TUNGREC

## EPO07/11/18



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

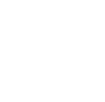
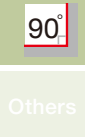
EPO07: GAMP = +7°, GAMF = +13° ~ +18°  
 EPO11: GAMP = +8.7° ~ +18°, GAMF = -5.3° ~ -19.4°  
 EPO18: GAMP = +14° ~ +17°, GAMF = +22° ~ +31°



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPO07R050U0050-02	0.276	0.500	2	0.500	2.250	0.750	3.000	0.140	With	AO*T0702...
EPO07R063U0063-04	0.276	0.625	4	0.625	2.563	0.937	3.500	0.250	With	AO*T0702...
EPO07R075U0075-05	0.276	0.750	5	0.750	2.875	1.125	4.000	0.410	With	AO*T0702...
EPO07R100U0075-03	0.276	1.000	3	0.750	2.000	1.500	3.500	0.400	With	AO*T0702...
EPO07R100U0100W07	0.276	1.000	7	1.000	2.281	1.500	3.781	0.680	With	AO*T0702...
EPO18R100U0100W02	0.657	1.000	2	1.000	2.250	1.750	4.000	0.730	With	AO*T1805...
EPO18R100U0100W02L	0.657	1.000	2	1.000	2.250	2.750	5.000	0.910	With	AO*T1805...
EPO18R125U0125W03	0.657	1.250	3	1.250	2.250	2.250	4.500	1.320	With	AO*T1805...
EPO18R125U0125W03L	0.657	1.250	3	1.250	2.250	4.250	6.500	1.880	With	AO*T1805...
EPO18R150U0125W03L	0.657	1.500	3	1.250	2.250	4.250	6.500	2.420	With	AO*T1805...
EPO18R150U0125W04	0.657	1.500	4	1.250	2.250	2.250	4.500	1.460	With	AO*T1805...
EPO18R200U0125W05	0.657	2.000	5	1.250	2.250	2.250	4.500	1.680	With	AO*T1805...



Metric	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...



Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert	Grade
EPO18R030M32.0-02L	16.7	30	2	32	175	80	255	1.4	With	AO*T1805...	A
EPO18R030M32.0-03	16.7	30	3	32	80	40	120	0.6	With	AO*T1805...	A
EPO11R032M32.0-02L	10.6	32	2	32	175	80	255	1.48	With	AS*T11T3...	B
EPO11R032M32.0-03	10.6	32	3	32	80	40	120	0.68	With	AS*T11T3...	B
EPO11R032M32.0-05	10.6	32	5	32	80	40	120	0.67	With	AS*T11T3...	B
EPO18R032M32.0-02	16.7	32	2	32	80	40	120	0.7	With	AO*T1805...	B
EPO18R032M32.0-02L	16.7	32	2	32	175	80	255	1.5	With	AO*T1805...	B
EPO18R032M32.0-03	16.7	32	3	32	80	40	120	0.6	With	AO*T1805...	B
EPO11R035M32.0-02L	10.6	35	2	32	215	40	255	1.49	With	AS*T11T3...	C
EPO11R035M32.0-03	10.6	35	3	32	80	40	120	0.69	With	AS*T11T3...	C
EPO11R035M32.0-05	10.6	35	5	32	80	40	120	0.67	With	AS*T11T3...	C
EPO18R035M32.0-02	16.7	35	2	32	80	40	120	0.7	With	AO*T1805...	C
EPO18R035M32.0-02L	16.7	35	2	32	175	80	255	1.5	With	AO*T1805...	C
EPO18R035M32.0-03	16.7	35	3	32	80	40	120	0.7	With	AO*T1805...	C
EPO11R040M32.0-02L	10.6	40	2	32	205	50	255	1.53	With	AS*T11T3...	D
EPO11R040M32.0-04	10.6	40	4	32	80	40	120	0.72	With	AS*T11T3...	D
EPO11R040M32.0-06	10.6	40	6	32	80	40	120	0.71	With	AS*T11T3...	D
EPO18R040M32.0-02L	16.7	40	2	32	205	50	255	1.6	With	AO*T1805...	D
EPO18R040M32.0-03	16.7	40	3	32	80	40	120	0.7	With	AO*T1805...	D
EPO18R040M32.0-04	16.7	40	4	32	80	40	120	0.7	With	AO*T1805...	D
EPO18R040M42.0-02L	16.7	40	2	42	210	100	310	3	With	AO*T1805...	D
EPO11R050M32.0-05	10.6	50	5	32	80	40	120	0.83	With	AS*T11T3...	E
EPO11R050M32.0-07	10.6	50	7	32	80	40	120	0.82	With	AS*T11T3...	E
EPO11R050M42.0-03L	10.6	50	3	42	310	50	360	3.78	With	AS*T11T3...	E
EPO18R050M32.0-03	16.7	50	3	32	80	40	120	0.8	With	AO*T1805...	E
EPO18R050M32.0-05	16.7	50	5	32	80	40	120	0.8	With	AO*T1805...	E
EPO18R050M42.0-03L	16.7	50	3	42	310	50	360	3.8	With	AO*T1805...	E
EPO18R063M32.0-04	16.7	63	4	32	80	45	125	1	With	AO*T1805...	F
EPO18R063M32.0-06	16.7	63	6	32	80	45	125	1.1	With	AO*T1805...	F
EPO18R063M42.0-03L	16.7	63	3	42	310	50	360	4	With	AO*T1805...	F

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 + 0.024" [0.6 mm]).
- The LF and L are the lengths when using MJ chipbreaker. With AJ chipbreaker, the length is (LF, L + 0.004" [0.1 mm]).
- With HJ chipbreaker, the length is (LF, L + 0.020" [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 + 0.008" [0.2 mm]).

## SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench
EPO07R050U0050-02 EPO07R012M...	SR 10503833-S	-	T-7DB
EPO07R063 - 100U... EPO07R016 - 028M...	CSTB-2.5L046	-	T-7DB
EPO11R012 - 022M...	CSPB-2.5S	M-1000	IP-8D
EPO11R025 - 050M...	CSPB-2.5	M-1000	IP-8D
EPO18R100U... EPO18R025 - 030M...	CSTB-4L085	-	T-15DB
EPO18R125 - 200U... EPO18R032 - 050M...	CSTB-4L093	-	T-15DB
EPO18R063M...	CSTB-4L120	-	T-15DB

Recommended clamping torque: SR 10503833-S, CSTB-2.5L046 = 0.66 lbs-ft, 0.9 N·m, CSPB-2.5, CSPB-2.5S = 0.96 lbs-ft, 1.3 N·m, CSTB-4L085, CSTB-4L093, CSTB-4L120 = 2.58 lbs-ft, 3.5 N·m

Reference pages: Inserts → **H166 - H167**

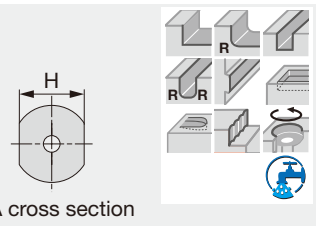
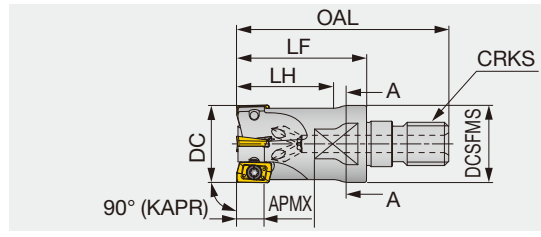


# TUNGREC

## 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°



Metric	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...

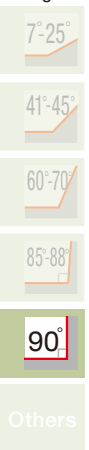
### SPARE PARTS



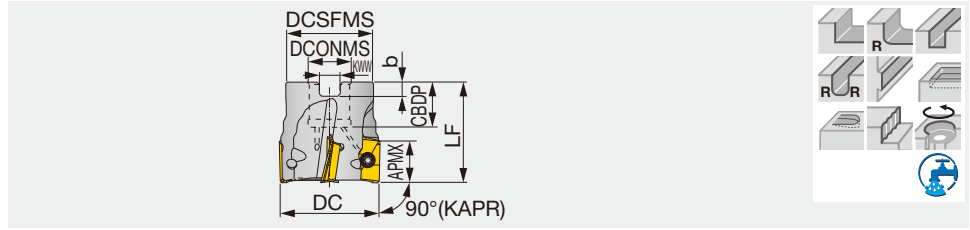
Designation	Clamping screw	Lubricant	Wrench
HPO07R012MM0*-02	SR 10503833-S	M-1000	T-7DB
HPO07R016 - 025...	CSTB-2.5L046	M-1000	T-7DB
HPO11R020MM10-02	CSPB-2.5S	M-1000	IP-8D
HPO11R025, 032...	CSPB-2.5	M-1000	IP-8D

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

### Approach angle



Reference pages: Inserts → **H166 - H167**, TungFlex → **H038 - H039**



Inch	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Insert
TPS11200RBU	0.417	2.000	7	1.693	0.750	0.750	1.575	0.197	0.315	0.88	With	AS*T11T3...
TPS11300RBU	0.417	3.000	10	2.283	1.000	1.024	1.969	0.236	0.374	2.64	With	AS*T11T3...
TPS11400RBU	0.417	4.000	11	3.150	1.500	1.457	2.480	0.394	0.626	5.29	With	AS*T11T3...

### SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench	Shell locking bolts (Optional parts)
TPS11200RBU	CSPB-2.5	M-1000	IP-8D	(C0.375x1.125H)
TPS11300RBU	CSPB-2.5	M-1000	IP-8D	(C0.500x1.375H)
TPS11400RBU	CSPB-2.5	M-1000	IP-8D	(TMBA-0.750H)

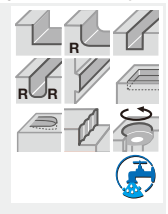
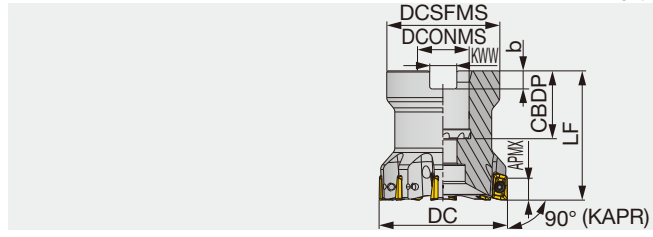
Recommended clamping torque: 0.96 lbs-ft





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°

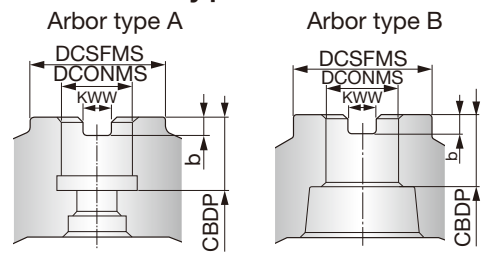


Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TPO07R200U0075A12	0.276	2.000	12	1.693	1.575	0.750	0.789	0.315	0.197	0.660	With	AO*T0702...	A
TPO18R200U0075A05	0.657	2.000	5	1.625	1.570	0.750	0.750	0.315	0.197	0.780	With	AO*T1805...	A
TPO18R250U0075A06	0.657	2.500	6	2.125	1.570	0.750	0.750	0.315	0.197	1.320	With	AO*T1805...	A
TPO18R300U0100A07	0.657	3.000	7	2.250	1.750	1.000	1.000	0.374	0.236	1.890	With	AO*T1805...	A
TPO18R400U0150A08	0.657	4.000	8	3.000	2.000	1.500	1.060	0.630	0.354	3.140	Without	AO*T1805...	B
TPO18R500U0150A09	0.657	5.000	9	4.000	2.000	1.500	1.060	0.630	0.354	6.270	Without	AO*T1805...	B
TPO18R600U0200A10	0.657	6.000	10	4.750	2.000	2.000	1.060	0.748	0.394	8.370	Without	AO*T1805...	B

Metric	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	10	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 + 0.024" [0.6 mm]).  
 - The LF and L are the lengths when using MJ chipbreaker. With AJ chipbreaker, the length is (LF, L + 0.004" [0.1 mm]).  
 With HJ chipbreaker, the length is (LF, L + 0.020" [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 + 0.008" [0.2 mm]).

### Arbor type



Reference pages: Inserts → **H166 - H167**

## INCH SPARE PARTS

Designation	Clamping screw	Grip	Torx bit	Shell locking bolt (Optional parts)	Wrench
TPO07R200U0075A12	CSTB-2.5L046	-	-	(C0.375X1.125H)	T-7DB
TPO18R200..., 250...	CSTB-4L093	H-TBS	BT15M	(C0.375X1.125H)	-
TPO18R300...	CSTB-4L120	H-TBS	BT15M	(C0.500X1.375H)	-
TPO18R400..., 500...	CSTB-4L120	H-TBS	BT15M	(TMBA-0.750H)	-
TPO18R600...	CSTB-4L120	H-TBS	BT15M	-	-

Recommended clamping torque: CSTB-2.5L046 = 0.66 lbs-ft, CSTB-4L093, CSTB-4L120 = 2.58 lbs-ft

## METRIC SPARE PARTS

Designation	Clamping screw	Lubricant	Grip	Shell locking bolt 1	Shell locking bolt 2	Wrench	Torx bit
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: CSTB-2.5L046 = 0.9 N·m, CSPB-2.5 = 1.3 N·m, CSTB-4L093, CSTB-4L120 = 3.5 N·m

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

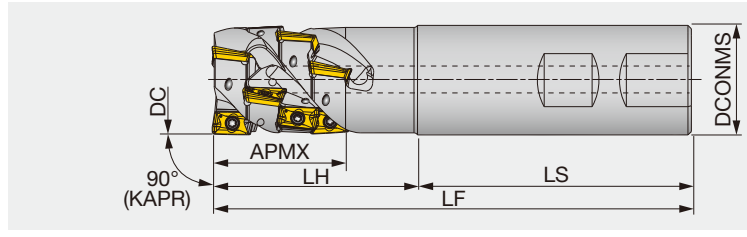
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# TUNGREC

## ELS11

High efficiency roughing endmill, shank type



GAMP = +8.7° ~ +18°, GAMF = -5.3° ~ -19.4°



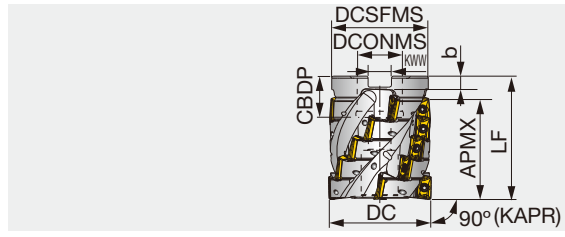
Inch	APMX	DC	ZEFP	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
ELS11R100U0100W02	1.197	1.000	2	6	1.000	2.250	1.500	3.750	0.670	With	AS*T11T3...
ELS11R125U0125W03	1.535	1.250	3	12	1.250	2.250	2.250	4.500	1.330	With	AS*T11T3...
ELS11R150U0125W03	1.575	1.500	3	12	1.250	2.329	2.171	4.500	1.330	With	AS*T11T3...

Metric	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...

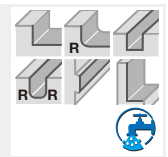


## TLS11

High efficiency square shoulder mill for roughing



GAMP = +8.7° ~ +18°, GAMF = -5.3° ~ -19.4°



Inch	APMX	DC	ZEFP	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TLS11R200U0075A04	1.921	2.000	4	20	1.875	2.356	0.750	0.750	0.315	0.197	1.330	With	AS*T11T3...

Metric	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...

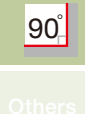
Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.



### SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
ELS11...	CSPB-2.5	M-1000	-	IP-8D
TLS11R200U0075A04	CSPB-2.5	M-1000	C0.375X1.125H	IP-8D
TLS11R050M22.0E04	CSPB-2.5	M-1000	CM10X40H	IP-8D

Recommended clamping torque: 0.96 lbs-ft, 1.3 N·m



Reference pages: Inserts → [H166](#) - [H167](#)

# MEMO

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

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**

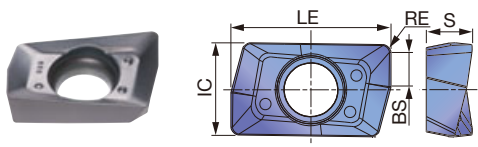
Index

**M**

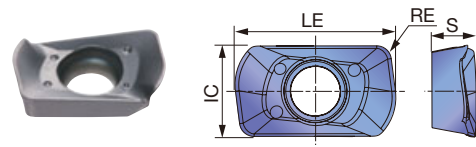
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

**INSERT**

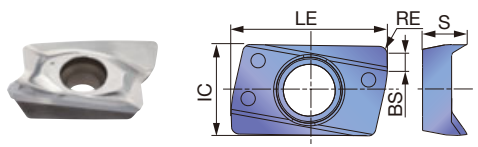
**AOMT07-MJ**



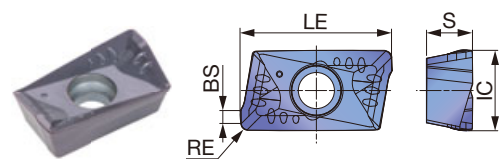
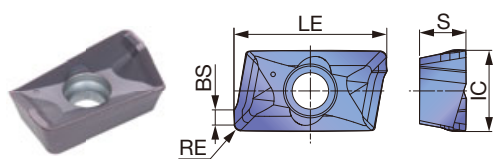
**AOMT07-HJ**



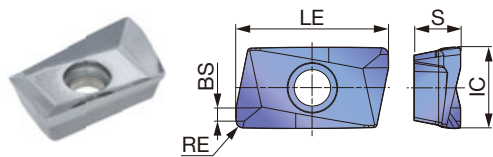
**AOGT07-AJ**



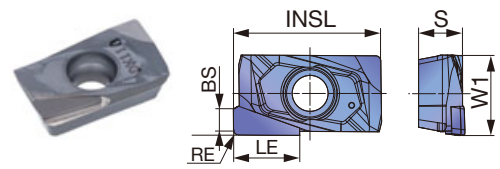
**ASMT11-MJ**



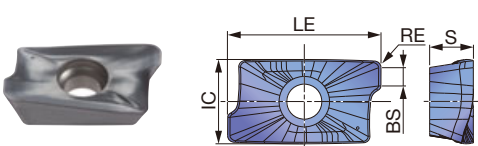
**ASGT11-AJ**



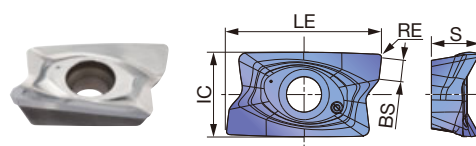
**ASGW11-D**



**AOMT18-MJ**



**AOGT18-AJ**



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

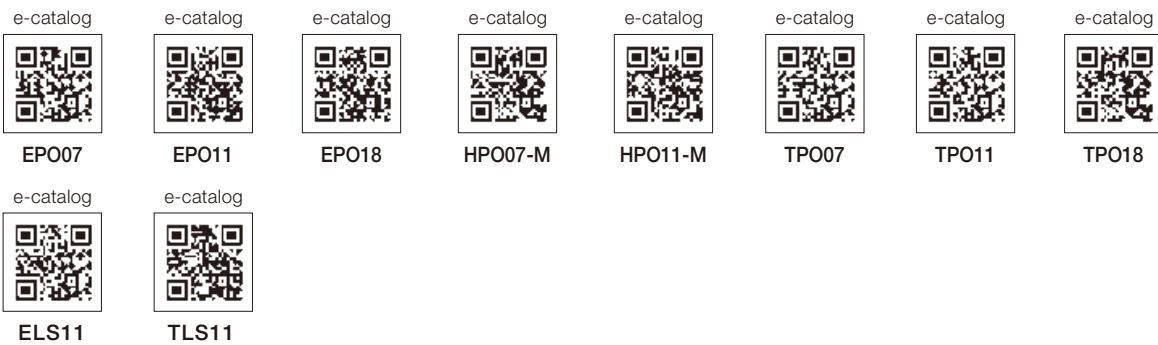
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated							Cermet	Uncoated	PCD		LE	INSL	IC	W1	S	BS
			AH120	AH130	AH140	AH725	AH3225	T3225	T1215			DS1100	NS740						
AOMT070202PDPR-MJ	0.008	0.276			●	●								0.315	-	0.185	-	0.091	0.083
AOMT070204PDPR-MJ	0.016	0.276			●	●								0.315	-	0.185	-	0.091	0.073
AOMT070208PDPR-MJ	0.031	0.276			●	●								0.315	-	0.185	-	0.091	0.060
AOMT070216PDPR-MJ	0.063	0.276			●	●								0.315	-	0.185	-	0.091	0.027
AOMT070208PDPR-HJ	0.031	0.031			●	●								0.346	-	0.193	-	0.094	-
AOGT070204PDRF-AJ	0.016	0.252								●				0.319	-	0.185	-	0.091	0.073
ASMT11T304PDPR-MJ	0.016	0.417	●	●		●	●	●	●	●				0.484	-	0.264	-	0.146	0.055
ASMT11T308PDPR-MJ	0.031	0.417	●	●		●	●	●	●	●				0.484	-	0.264	-	0.146	0.055
ASMT11T312PDPR-MJ	0.047	0.417	●	●		●	●	●						0.484	-	0.264	-	0.146	0.039
ASMT11T316PDPR-MJ	0.063	0.417	●	●		●	●	●	●	●				0.484	-	0.264	-	0.146	0.024
ASMT11T320PDPR-MJ	0.079	0.417	●				●	●						0.484	-	0.264	-	0.146	0.020
ASMT11T330PDPR-MJ	0.118	0.417	●	●			●	●	●					0.484	-	0.264	-	0.146	0.008
ASMT11T304PDPR-MS	0.016	0.417		●	●		●							0.484	-	0.264	-	0.146	0.055
ASGT11T304PDRF-AJ	0.016	0.417							●					0.484	-	0.264	-	0.146	0.055
ASGT11T308PDRF-AJ	0.031	0.417							●					0.484	-	0.264	-	0.146	0.055
ASGW11T302PDRF-D	0.008	0.177										●		0.205	0.465	-	0.252	0.146	0.071
ASGW11T304PDRF-D	0.016	0.177										●		0.205	0.465	-	0.252	0.146	0.063
AOMT180508PDPR-MJ	0.031	0.657			●	●								0.768	-	0.421	-	0.220	0.092
AOMT180516PDPR-MJ	0.063	0.657			●	●								0.768	-	0.421	-	0.220	0.062
AOMT180524PDPR-MJ	0.094	0.657			●	●								0.768	-	0.421	-	0.220	0.060
AOMT180532PDPR-MJ	0.126	0.657			●	●								0.768	-	0.421	-	0.220	-
AOGT180504PDRF-AJ	0.016	0.657								●				0.780	-	0.425	-	0.240	0.092
AOGT180508PDRF-AJ	0.031	0.657								●				0.780	-	0.425	-	0.240	0.092

Caution : The contour radius when using the tool is smaller than the RE value. ● : Line up  
If RE is 0.047" or more, it will be about 10% smaller than RE.  
PCD inserts listed above are not designed to be re-ground and re-used.

## STANDARD CUTTING CONDITIONS

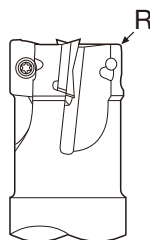
Please scan below.



## CAUTIONARY POINT IN MODIFYING CUTTER BODIES

When using inserts with corner radius RE ≥ 0.079", 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 = 0.016" or 0.031"

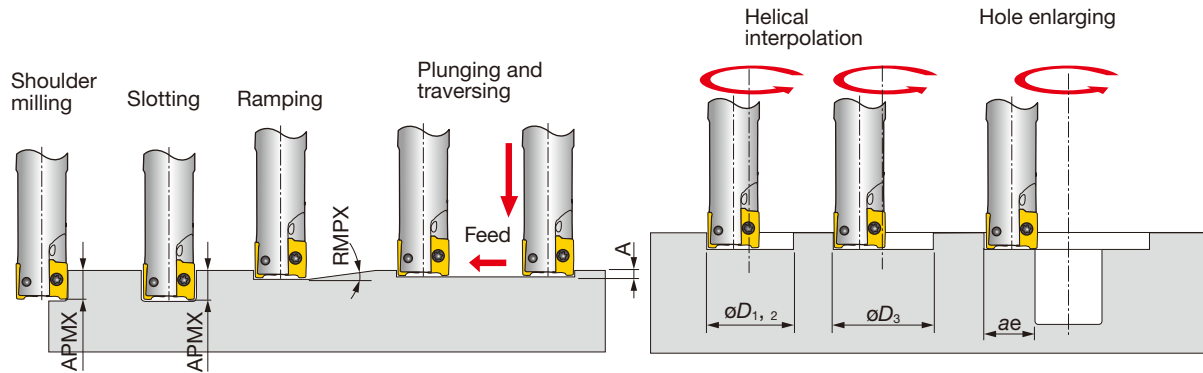


Corner radius RE (in)	The dimension of modifying (in)
0.016 - 0.063	Unnecessary
0.079 - 0.118	0.080





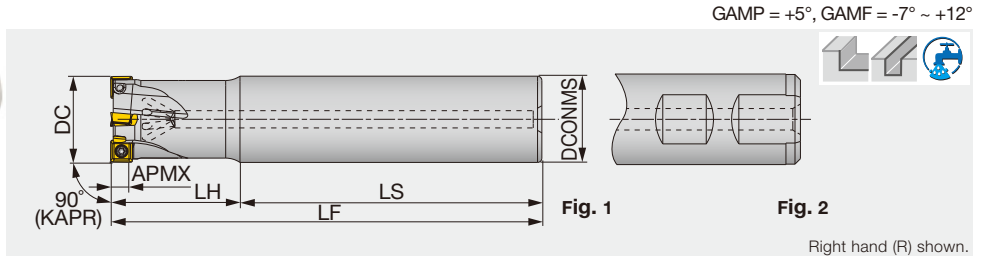
# APPLICATION RANGE



	Tool dia.	Chipbreaker	Max. depth of cut	Max. ramping angle	Max. plunging depth	Min. machining	Max. machining		Max. cutting width in enlarging
	Inch	DC	APMX	RMPX	A	øD1	øD2	øD3*	ae
High Feed Milling	EPO07R050U0050-02	0.500	MJ, AJ	0.276	7.5	0.020	0.750	0.862	0.480
		0.524	HJ	0.031	4.5	0.030	0.786	-	0.406
Face Milling	EPO07R063U0063-04	0.625	MJ, AJ	0.276	5	0.020	0.938	1.112	0.610
		0.649	HJ	0.031	4	0.030	0.974	-	0.531
Shoulder Milling	EPO07R075U0075-05	0.750	MJ, AJ	0.276	3.5	0.020	1.125	1.362	0.730
		0.774	HJ	0.031	2.5	0.030	1.161	-	0.656
Slot Milling	EPO07R100U...	1.000	MJ, AJ	0.276	2.4	0.020	1.500	1.862	0.980
		1.024	HJ	0.031	2	0.030	1.536	-	0.906
Profile Milling	EPS11050...	0.500	MJ, MS, AJ	0.417	6	0.020	0.590	0.882	0.480
	EPS11062...	0.625	MJ, MS, AJ	0.417	5	0.020	0.790	1.332	0.610
	EPS11075...	0.750	MJ, MS, AJ	0.417	3	0.020	1.100	1.382	0.730
	EPS11100...	1.000	MJ, MS, AJ	0.417	2	0.020	1.500	1.882	0.980
	EPS11125...	1.250	MJ, MS, AJ	0.417	1.5	0.020	2.050	2.382	1.230
Chamfering, Counterbore	EPO18R100U...	1.000	MJ, AJ	0.657	5.5	0.039	1.272	1.764	0.961
	EPO18R125U...	1.250	MJ, AJ	0.657	3.5	0.039	1.772	2.264	1.211
	EPO18R150U...	1.500	MJ, AJ	0.657	2.7	0.039	2.272	2.764	1.461
Finish Face Milling	T/EPO18R200U...	2.000	MJ, AJ	0.657	1.9	0.039	3.272	3.764	1.961
Approach angle 7°-25°	TPO07R200U0075A12	2.000	MJ, AJ	0.276	0.9	0.020	3.000	3.960	1.980
		2.024	HJ	0.031	0.6	0.030	3.036	4.008	1.906
Approach angle 41°-45°	TPS11200RBU	2.000	MJ, MS, AJ	0.417	0.7	0.020	3.460	3.900	1.950
	TPS11300RBU	3.000	MJ, MS, AJ	0.417	0.4	0.020	5.830	6.260	3.130
Approach angle 60°-70°	TPS11400RBU	4.000	MJ, MS, AJ	0.417	0.3	0.020	7.400	7.830	3.920
	TPO18R250U0075A06	2.500	MJ, AJ	0.657	1.4	0.039	4.272	4.921	2.461
Approach angle 85°-88°	TPO18R300U0100A07	3.000	MJ, AJ	0.657	1.1	0.039	5.272	5.921	2.961
	TPO18R400U0150A08	4.000	MJ, AJ	0.657	0.8	0.039	7.272	7.921	3.961
	TPO18R500U0150A09	5.000	MJ, AJ	0.657	0.6	0.039	9.272	9.921	4.961
	TPO18R600U0200A10	6.000	MJ, AJ	0.657	0.5	0.039	11.272	11.921	5.961
Approach angle 90°									
Others									

\*Flat bottom hole  
 Corner RE for dimensions of øD1, øD2, and øD3: RE = 0.016" for EPO07 / EPO11 and RE = 0.031" for EPO18.

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

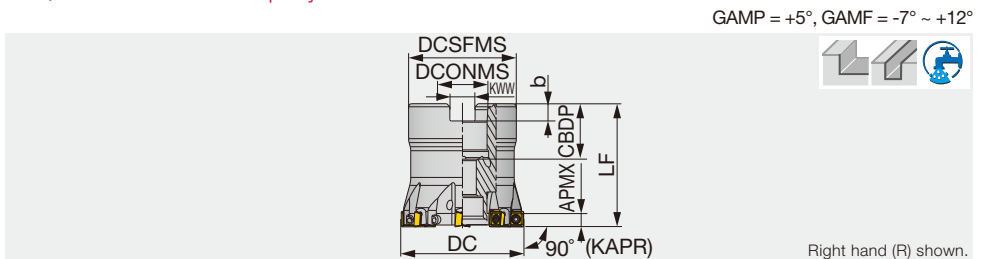


Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Shank	Insert	Shank type
EPD05R050U0050-02	0.157	0.500	2	0.500	1.780	1.220	3.000	0.220	With	Straight	SD*T0502...	Fig .1
EPD05R063U0063-03	0.157	0.625	3	0.625	2.000	1.500	3.500	0.440	With	Straight	SD*T0502...	Fig .1
EPD05R075U0075W04	0.157	0.750	4	0.750	2.030	1.720	3.750	0.440	With	Weldon	SD*T0502...	Fig .2
EPD05R100U0100W05	0.157	1.000	5	1.000	2.280	1.720	4.000	0.660	With	Weldon	SD*T0502...	Fig .2
EPD05R125U0100W06	0.157	1.000	6	1.250	2.280	1.720	4.000	1.100	With	Weldon	SD*T0502...	Fig .2

Metric	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



Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBBDP	KWW	b	WT(lb)	Air hole	Insert
TPD05R150U0075A08	0.157	1.500	8	1.461	1.570	0.750	0.750	0.313	0.170	0.220	With	SD*T0502...
TPD05R200U0075A10	0.157	2.000	10	1.750	1.570	0.750	0.750	0.313	0.170	0.440	With	SD*T0502...

Metric	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBBDP	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...

## SPARE PARTS

Designation	Clamping screw	Shell locking bolt	Wrench	Shell locking bolt (Optional parts)
EPD05...	CSPB-2L043	-	IP-6DB	-
TPD05R**U...	CSPB-2L043	-	IP-6DB	(C0.375X1.125H)
TPD05R032M16.0E06	CSPB-2L043	CM8X30H	IP-6DB	-
TPD05R040M22.0E08	CSPB-2L043	CM10X30H	IP-6DB	-

Recommended clamping torque: 0.52 lbs·ft, 0.7 N·m

Reference pages: Inserts → **H170**

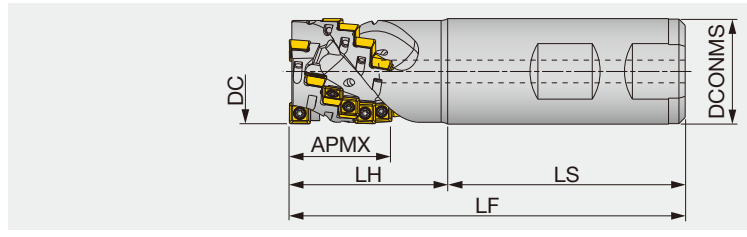


# TUNGQUAD

## ELD05

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

GAMP = +5°, GAMF = -3°



Inch	APMX	DC	ZAFP	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
ELD05R075U0075W02	0.799	0.750	2	10	0.750	2.031	1.219	3.250	0.440	With	SD*T0502...
ELD05R100U0100W03	0.953	1.000	3	18	1.000	2.250	1.500	3.750	0.670	With	SD*T0502...

Metric	APMX	DC	ZAFP	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...

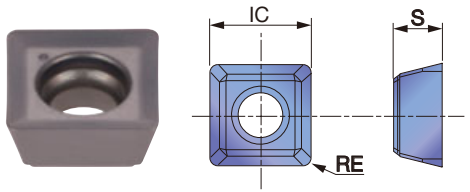
### SPARE PARTS

Designation	Clamping screw	Wrench
ELD05...	CSPB-2L043	IP-6DB

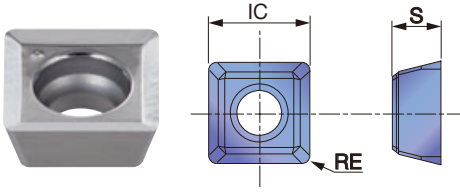
Recommended clamping torque: 0.52 lbs·ft, 0.7 N·m

### 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	0.016	0.157	●	●			0.094	0.200
SDHT050204FN-AJ	0.016	0.157			●		0.094	0.200

● : Line up

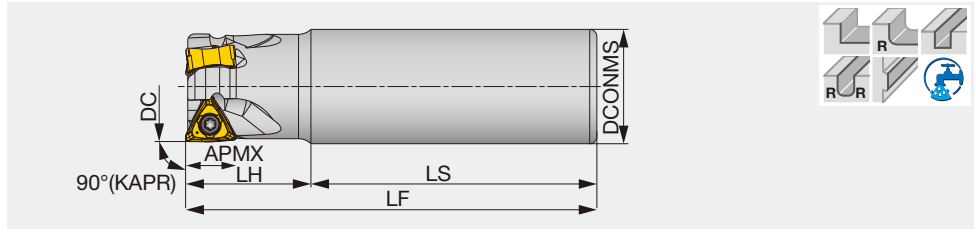
### STANDARD CUTTING CONDITIONS

Please scan below.



Square shoulder endmill, with screw clamp system

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



Inch	APMX	DC	CICT	DCONMS	LS	LH <sup>(1)</sup>	LF <sup>(1)</sup>	WT(lb)	Air hole	Insert
EPTN07U0.75C0.75R02	0.256	0.750	2	0.750	2.500	1.000	3.500	0.370	With	TN <sup>U</sup> 07...
EPTN07U0.75C0.75R02L	0.256	0.750	2	0.750	4.750	1.670	6.420	0.710	With	TN <sup>U</sup> 07...
EPTN07U1.00C1.00R03	0.256	1.000	3	1.000	3.000	1.500	4.500	0.880	With	TN <sup>U</sup> 07...
EPTN07U1.00C1.00R03L	0.256	1.000	3	1.000	5.700	3.000	8.700	1.720	With	TN <sup>U</sup> 07...
EPTN07U1.00C1.00R04	0.256	1.000	4	1.000	3.000	1.500	4.500	0.880	With	TN <sup>U</sup> 07...
EPTN07U1.25C1.25R04	0.256	1.250	4	1.250	3.000	1.500	4.500	1.390	With	TN <sup>U</sup> 07...
EPTN07U1.25C1.25R05	0.256	1.250	5	1.250	3.000	1.500	4.500	1.390	With	TN <sup>U</sup> 07...
EPTN12U1.25C1.25R03N	0.433	1.250	3	1.250	3.000	1.500	4.500	1.560	Without	TN <sup>U</sup> 12...
EPTN07U1.50C1.25R06	0.256	1.500	6	1.250	2.250	2.250	4.500	1.460	With	TN <sup>U</sup> 07...
EPTN12U1.50C1.25R04N	0.433	1.500	4	1.250	3.000	1.500	4.500	1.780	Without	TN <sup>U</sup> 12...

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

(1) The value is true with R0.8 mm (0.031") insert. For other Corner R, please refer to page H173.

**SPARE PARTS**

Designation	Clamping screw	Grip	Wrench	Torx bit	Lubricant
EPTN07...	CSPB-2.5SH	-	IP-7D	-	-
EPTN12...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000

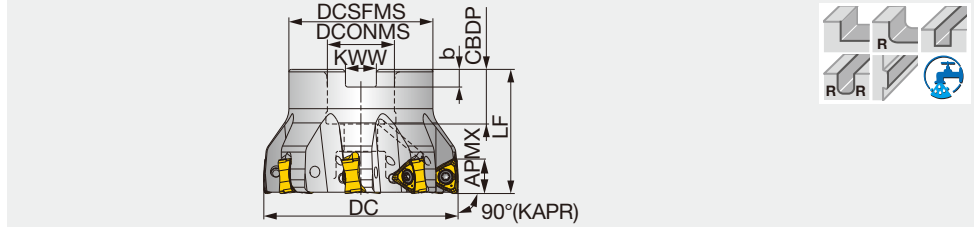
Recommended clamping torque: CSPB-2.5SH = 0.81 lbs-ft, 1.1 N-m, CSPB-3.5 = 2.58 lbs-ft, 3.5 N-m





Square shoulder mill, with screw clamp system

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



Inch	APMX	DC	CICT	DCSFMS	LF <sup>(1)</sup>	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TPTN07U2.00B0.75R08	0.256	2.000	8	1.850	1.575	0.750	0.750	0.315	0.197	0.93	With	TN MU07...	A
TPTN12U2.00B0.75R05	0.433	2.000	5	1.850	1.575	0.750	0.750	0.315	0.197	0.89	With	TN*U12...	A
TPTN12U2.50B0.75R06	0.433	2.500	6	1.850	1.575	0.750	0.750	0.315	0.197	1.33	With	TN*U12...	A
TPTN12U3.00B1.00R08	0.433	3.000	8	2.835	1.969	1.000	1.024	0.374	0.236	2.44	With	TN*U12...	A
TPTN12U4.00B1.50R10	0.433	4.000	10	3.150	1.969	1.500	1.181	0.626	0.394	3.11	With	TN*U12...	B
TPTN12U5.00B1.50R12	0.433	5.000	12	3.150	2.480	1.500	1.181	0.626	0.394	5.33	With	TN*U12...	B
TPTN12U6.00B2.00R12N	0.433	6.000	12	3.858	2.48	2.000	1.496	0.748	0.433	8.82	Without	TN*U12...	B

Metric	APMX	DC	CICT	DCSFMS	LF <sup>(1)</sup>	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TPTN07M040B16.0R06	6.5	40	6	35	40	16	18	8.4	5.6	0.24	With	TN MU07...
TPTN07M050B22.0R08	6.5	50	8	47	40	22	20	10.4	6.3	0.41	With	TN MU07...
TPTN12M050B22.0R04	11	50	4	47	40	22	20	10.4	6.3	0.4	With	TN*U12...
TPTN12M050B22.0R05	11	50	5	47	40	22	20	10.4	6.3	0.4	With	TN*U12...
TPTN12M063B22.0R05	11	63	5	47	40	22	20	10.4	6.3	0.6	With	TN*U12...
TPTN12M063B22.0R06	11	63	6	47	40	22	20	10.4	6.3	0.6	With	TN*U12...
TPTN12J080B25.4R06	11	80	6	58	50	25.4	26	9.5	6	1.1	With	TN*U12...
TPTN12J080B25.4R08	11	80	8	58	50	25.4	26	9.5	6	1.1	With	TN*U12...
TPTN12M080B27.0R06	11	80	6	58	50	27	22	12.4	7	1.1	With	TN*U12...
TPTN12M080B27.0R08	11	80	8	58	50	27	22	12.4	7	1.1	With	TN*U12...
TPTN12J100B31.7R07	11	100	7	67	50	31.75	32	12.7	8	1.4	With	TN*U12...
TPTN12J100B31.7R10	11	100	10	67	50	31.75	32	12.7	8	1.4	With	TN*U12...
TPTN12M100B32.0R07	11	100	7	67	50	32	28.5	14.4	8	1.4	With	TN*U12...
TPTN12M100B32.0R10	11	100	10	67	50	32	28.5	14.4	8	1.4	With	TN*U12...
TPTN12J125B38.1R08	11	125	8	71	63	38.1	38	15.9	10	2.4	With	TN*U12...
TPTN12J125B38.1R12	11	125	12	71	63	38.1	38	15.9	10	2.5	With	TN*U12...
TPTN12M125B40.0R08	11	125	8	71	63	40	32	16.4	9	2.3	With	TN*U12...
TPTN12M125B40.0R12	11	125	12	71	63	40	32	16.4	9	2.4	With	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 mm (0.031") insert. For other Corner R, please refer to page H173.

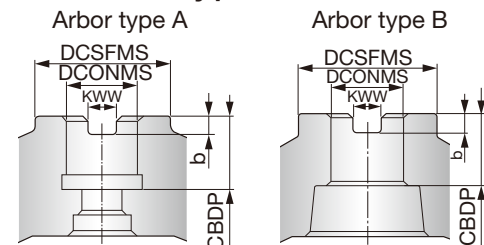
SPARE PARTS



Designation	Clamping screw	Grip	Wrench	Torx bit	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3 (Optional parts)
TPTN07U2.00B0.75R08	CSPB-2.5SH	-	IP-7D	-	M-1000	-	-	(C0.375X1.125H)
TPTN12U2.00, 2.50B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	-	(C0.375X1.125H)
TPTN12U3.00B1.00R08	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	-	(C0.500X1.375H)
TPTN12U4.00, 5.00B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	-	(TMBA-0.750H)
TPTN12U6.00B2.00R12N	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	-	-
TPTN07M040B16.0R06	CSPB-2.5SH	-	IP-7D	-	-	-	CM8X30H	-
TPTN07M050B22.0R08	CSPB-2.5SH	-	IP-7D	-	-	-	CM10X30H	-
TPTN12M050, 063B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	CM10X30H	-
TPTN12*080B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	CM12X30H	-
TPTN12*100B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	TMBA-M16H	-	-
TPTN12*125B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	TMBA-M20H	-	-
TPTN12*160B...	CSPB-3.5	H-TB2W	-	BLDIP15/S7	M-1000	-	-	-

Recommended clamping torque: CSPB-2.5SH = 0.81 lbs-ft, 1.1 N-m, CSPB-3.5 = 2.58 lbs-ft, 3.5 N-m

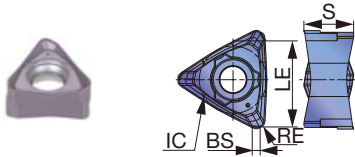
Arbor type



Reference pages: Standard cutting conditions → H174

# INSERT

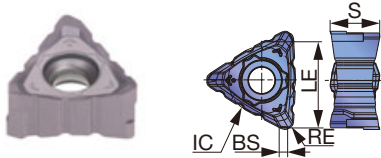
## TNMU07-MJ



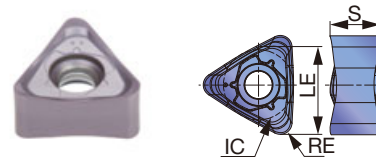
## TNGU12-MJ/TNMU12-MJ



## TNMU12-NMJ



## TNMU12-R-MJ



<b>P</b> Steel	☆	★	☆	☆						
<b>M</b> Stainless		☆	★	☆						
<b>K</b> Cast iron	★	☆		☆						
<b>N</b> Non-ferrous										
<b>S</b> Superalloy	★		☆							
<b>H</b> Hard materials										

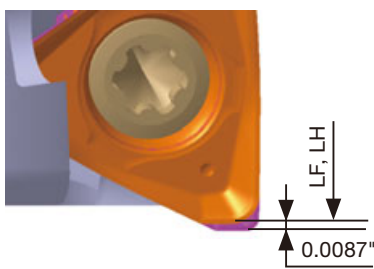
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated					LE	IC	S	BS
			AH120	AH3225	AH3135	T1215	T3225				
TNMU070304PER-MJ	0.016	0.256	●	●				0.256	0.224	0.161	0.024
TNMU070308PER-MJ	0.031	0.256	●	●	●			0.256	0.224	0.161	0.024
TNGU120708PER-MJ	0.031	0.433	●	●	●	●		0.472	0.375	0.277	0.046
TNMU120708PER-MJ	0.031	0.433	●	●	●	●	●	0.472	0.375	0.280	0.046
TNMU120708PER-NMJ	0.031	0.433	●	●	●			0.472	0.375	0.280	0.046
TNMU1207R16PER-MJ	0.063	0.433	●	●	●			0.472	0.375	0.271	-
TNMU1207R20PER-MJ	0.079	0.433	●	●	●	●		0.472	0.375	0.265	-

● : Line up

## Notes

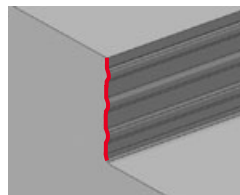
### LF and LH dimensions for R0.016", size 07 insert



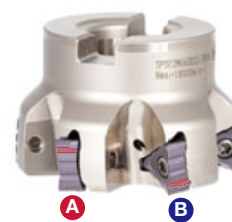
Add 0.0087" to LH and LF measurements when R0.016" insert is used.

### Serrated size 12 insert (NMJ)

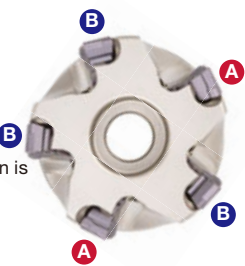
To obtain good wall accuracy, the serrated inserts must be arranged in alternative orders on the cutter so that the same serrated edge will not cut the same surface twice, generating steps on the wall. One of the serration grooves (marked in red) on the cutting edge has a irregular shape, and this must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



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



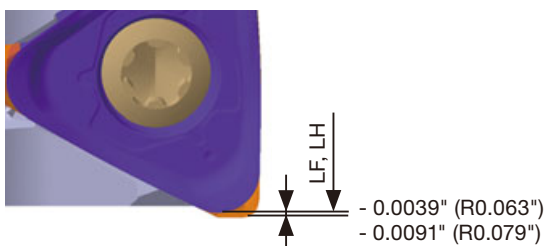
The groove in red is asymmetric for easy identification



This position is A or B

Insert orientation for odd number of teeth

### LF and LH dimensions for R0.063" / 0.079", size 12 insert



Subtract 0.0039" (R0.063") or 0.0091" (R0.079") to LH and LF measurements when R0.063" or R0.079" insert is used.

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





# STANDARD CUTTING CONDITIONS

## Size 07 inserts

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Carbon steel 1018, 1026, etc.	- 200 HB	First choice	AH3225	328 - 820	0.003 - 0.008
			For fracture resistance	AH3135	328 - 820	0.003 - 0.008
			For wear resistance	T3225	328 - 984	0.003 - 0.012
	High Carbon steel, Alloy steel 1045, 4140, etc.	- 300 HB	First choice	AH3225	328 - 755	0.003 - 0.006
			For fracture resistance	AH3135	328 - 755	0.003 - 0.006
			For wear resistance	T3225	328 - 919	0.003 - 0.012
Prehardened steel H-13, P-20, etc.	30 - 40 HRC	First choice	AH3225	328 - 591	0.003 - 0.010	
		For fracture resistance	AH3135	328 - 591	0.003 - 0.010	
		For wear resistance	T3225	328 - 656	0.003 - 0.010	
M	Stainless steel 304, 316, etc.	- 200 HB	First choice	AH3135	295 - 656	0.003 - 0.006
			For wear resistance	AH3225	295 - 656	0.003 - 0.006
			Low cutting force	AH3225	328 - 755	0.003 - 0.006
K	Gray cast iron Class 25, Class 30, etc.	150 - 250 HB	First choice	AH120	459 - 820	0.003 - 0.008
			For fracture resistance	AH3225	459 - 820	0.003 - 0.008
			For wear resistance	T1215	459 - 984	0.003 - 0.012
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	361 - 656	0.003 - 0.006
			For fracture resistance	AH3225	361 - 656	0.003 - 0.006
			For wear resistance	T1215	361 - 820	0.003 - 0.010
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3135	66 - 197	0.003 - 0.006
			Low cutting force	AH3135	66 - 197	0.003 - 0.006
S	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	First choice	AH120	66 - 131	0.003 - 0.004
			Low cutting force	AH120	66 - 131	0.003 - 0.004

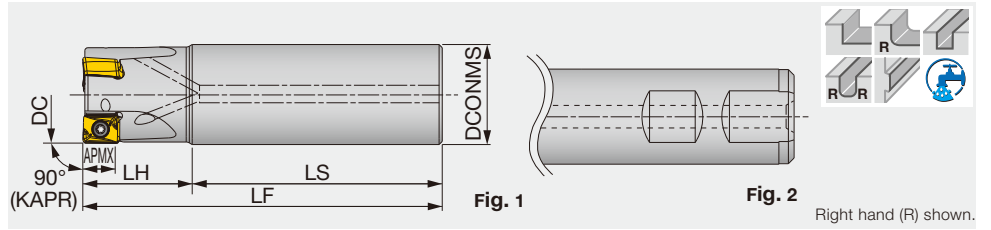
## Size 12 inserts

ISO	Workpiece material	Hardness	Priority	Grade	Chipbreaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Carbon steel 1018, 1026, etc.	- 200 HB	First choice	AH3225	MJ	328 - 820	0.003 - 0.012
			For fracture resistance	AH3135	MJ	328 - 820	0.003 - 0.012
			For wear resistance	T3225	MJ	328 - 984	0.003 - 0.012
			Low cutting force	AH3225	NMJ	328 - 820	0.003 - 0.006
			First choice	AH3225	MJ	328 - 755	0.003 - 0.012
			For fracture resistance	AH3135	MJ	328 - 755	0.003 - 0.012
	High Carbon steel, Alloy steel 1045, 4140, etc.	- 300 HB	For wear resistance	T3225	MJ	328 - 919	0.003 - 0.012
			Low cutting force	AH3225	NMJ	328 - 755	0.003 - 0.006
			First choice	AH3225	MJ	328 - 591	0.003 - 0.010
			For fracture resistance	AH3135	MJ	328 - 591	0.003 - 0.010
			For wear resistance	T3225	MJ	328 - 656	0.003 - 0.010
			Low cutting force	AH3225	NMJ	328 - 591	0.003 - 0.006
Prehardened steel H-13, P-20, etc.	30 - 40 HRC	First choice	AH3225	MJ	328 - 591	0.003 - 0.010	
		For fracture resistance	AH3135	MJ	328 - 591	0.003 - 0.010	
		For wear resistance	T3225	MJ	328 - 656	0.003 - 0.010	
		Low cutting force	AH3225	NMJ	328 - 591	0.003 - 0.006	
		First choice	AH3135	MJ	295 - 656	0.003 - 0.010	
		For wear resistance	T3225	MJ	295 - 820	0.003 - 0.010	
M	Stainless steel 304, 316, etc.	- 200 HB	Low cutting force	AH3135	NMJ	295 - 656	0.003 - 0.006
			First choice	AH120	MJ	459 - 820	0.003 - 0.012
			For fracture resistance	AH3225	MJ	459 - 820	0.003 - 0.012
			For wear resistance	T1215	MJ	459 - 984	0.003 - 0.012
			Low cutting force	AH120	NMJ	459 - 820	0.003 - 0.006
			First choice	AH120	MJ	361 - 656	0.003 - 0.010
K	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	For fracture resistance	AH3225	MJ	361 - 656	0.003 - 0.010
			For wear resistance	T1215	MJ	361 - 820	0.003 - 0.010
			Low cutting force	AH120	NMJ	361 - 656	0.003 - 0.006
			First choice	AH3135	MJ	66 - 197	0.003 - 0.008
			Low cutting force	AH3135	NMJ	66 - 197	0.003 - 0.006
			First choice	AH120	MJ	66 - 131	0.003 - 0.007
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	Low cutting force	AH120	NMJ	66 - 131	0.003 - 0.006
			First choice	AH120	MJ	66 - 131	0.003 - 0.006
S	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	Low cutting force	AH120	NMJ	66 - 131	0.003 - 0.006
			First choice	AH120	MJ	66 - 131	0.003 - 0.006

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

Designation	Chip thickness (in)
TNMMU120708PER-NMJ	< 0.008"

Square shoulder endmill, shank type, with screw clamp system



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert	Shank type
EPQ11R100U0100W02	0.354	1.000	2	1.000	2.280	1.220	3.500	0.750	With	LQMU1107...	Fig.2
EPQ11R125U0125W03	0.354	1.250	3	1.250	2.500	1.500	4.000	1.540	With	LQMU1107...	Fig.2
EPQ11R150U0125W04	0.354	1.500	4	1.250	2.250	1.750	4.000	1.650	With	LQMU1107...	Fig.2

Metric	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

SPARE PARTS

Designation	Clamping screw	Grip 1	Grip 2	Torx bit	Wrench
EPQ11...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	T-10D
EPQ18...	SR14-591	-	H-TB	BT20M	T-20D

Recommended clamping torque : CSTB-3.5L115 = 1.84 lbs-ft, 2.5 N·m, SR14-591 = 3.69 lbs-ft, 5 N·m

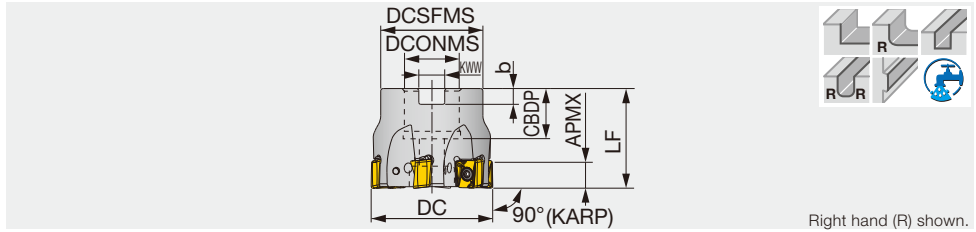




Square shoulder mill, with screw clamp system



GAMP = +4° ~ +5°, GAMF = +13° ~ +15°

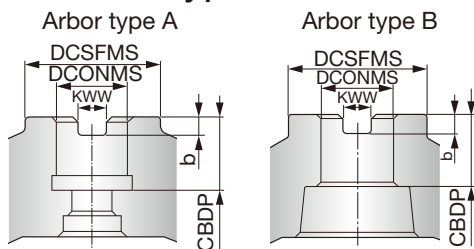


Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TPQ11R200U0075A06	0.354	2.000	6	1.693	1.575	0.750	0.787	0.320	0.187	0.880	With	LQMU1107...	A
TPQ11R250U0075A07	0.354	2.500	7	1.693	1.575	0.750	0.787	0.320	0.187	1.320	With	LQMU1107...	A
TPQ11R300U0100A10	0.354	3.000	10	2.165	1.969	1.000	1.024	0.383	0.219	2.310	With	LQMU1107...	A
TPQ11R400U0150A12	0.354	4.000	12	3.150	1.969	1.500	1.496	0.633	0.375	4.410	With	LQMU1107...	B
TPQ18R200U0075A03	0.630	2.000	3	1.772	1.575	0.750	0.750	0.320	0.187	0.880	With	LQMU1808...	A
TPQ18R250U0100A04	0.630	2.500	4	2.165	1.969	1.000	1.024	0.383	0.219	1.760	With	LQMU1808...	A
TPQ18R300U0100A05	0.630	3.000	5	2.165	1.969	1.000	1.024	0.383	0.219	2.430	With	LQMU1808...	A
TPQ18R400U0150A06	0.630	4.000	6	3.150	1.969	1.500	1.496	0.633	0.375	3.750	With	LQMU1808...	B
TPQ18R500U0150A08	0.630	5.000	8	3.150	2.480	1.500	1.693	0.626	0.394	6.170	With	LQMU1808...	B
TPQ18R600U0200A09	0.630	6.000	9	3.937	2.480	2.000	1.811	0.758	0.437	9.040	Without	LQMU1808...	B

Metric	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...

**Arbor type**



Reference pages: Standard cutting conditions → **H178**

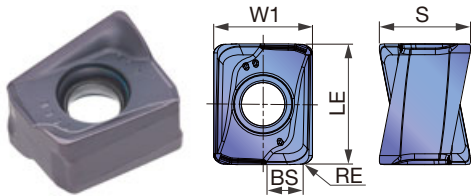
## SPARE PARTS

Designation	Clamping screw	Grip 1	Grip 2	Torx bit	Shell locking bolt	Shell locking bolt (Optional parts)
TPQ11R200, 250U..., TPQ18R200, 250U...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	-	(C0.375X1.125H)
TPQ11R300U..., TPQ18R300U...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	-	(C0.500X1.375H)
TPQ11R400U..., TPQ18R400, 500U...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	-	(TMBA-0.750H)
TPQ18R600U0200A09	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	-	-
TPQ11R040M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM8×30H	-
TPQ11R050, 063M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10×30H	-
TPQ11R080M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM12×30H	-
TPQ11R100M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	TMBA-M16H	-
TPQ18R050M...	SR14-591	-	H-TB	BT20M	CM10×30H	-
TPQ18R063, 080M...	SR14-591	-	H-TB	BT20M	CM12×30H	-
TPQ18R100M...	SR14-591	-	H-TB	BT20M	TMBA-M16H	-
TPQ18R125M...	SR14-591	-	H-TB	BT20M	TMBA-M20H	-
TPQ18R160M...	SR14-591	-	H-TB	BT20M	-	-

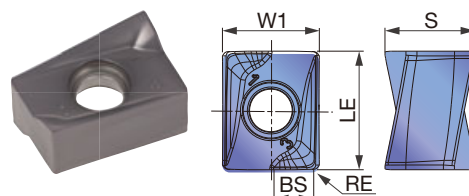
Recommended clamping torque : CSTB-3.5L115 = 1.84 lbs-ft, 2.5 N·m, SR14-591 = 3.69 lbs-ft, 5 N·m

## INSERT

### LQMU11-PXER-MJ (Available for multi function)



### LQMU11/18-PNER-MJ



<b>P</b> Steel	☆	★	★	
<b>M</b> Stainless		★	☆	★
<b>K</b> Cast iron	★		☆	
<b>N</b> Non-ferrous				
<b>S</b> Superalloys	★	★	☆	
<b>H</b> Hard materials				

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated				LE	S	W1	BS
			AH120	AH140	AH725	AH3135				
LQMU110704PNER-MJ	0.016	0.354	●	●	●		0.433	0.331	0.354	0.059
LQMU110708PNER-MJ	0.031	0.354	●	●	●		0.433	0.327	0.354	0.043
LQMU110708PXER-MJ	0.031	0.354	●			●	0.433	0.327	0.354	0.043
LQMU110716PNER-MJ	0.063	0.354	●	●	●		0.433	0.323	0.354	0.012
LQMU110720PNER-MJ	0.079	0.354	●				0.433	0.319	0.354	-
LQMU180804PNER-MJ	0.016	0.630	●	●	●		0.689	0.429	0.453	0.079
LQMU180808PNER-MJ	0.031	0.630	●	●	●		0.689	0.429	0.453	0.063
LQMU180816PNER-MJ	0.630	0.630	●	●	●		0.689	0.429	0.453	0.031
LQMU180824PNER-MJ	0.094	0.630	●	●	●		0.689	0.421	0.453	-

● : Line up

# STANDARD CUTTING CONDITIONS

## LQMU11-PXER-MJ

High Feed Milling

Face Milling

Shoulder Milling

Slot Milling

Profile Milling

Chamfering, Counterbore

Finish Face Milling

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, etc.	- 200HB	AH3135	330 - 820	0.004 - 0.010*
	Alloy steel 1055, etc.	- 300HB	AH3135	325 - 755	0.004 - 0.008*
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	AH3135	325 - 750	0.004 - 0.008*
M	Stainless steel 304SS, etc.	- 200HB	AH3135	295 - 590	0.004 - 0.010*
K	Gray cast iron Class 25, etc.	150 - 250HB	AH120	455 - 820	0.004 - 0.010*
	Ductile cast iron 60-40-18, etc.	150 - 250HB	AH120	360 - 655	0.004 - 0.010*
S	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	AH120	95 - 195	0.0032 - 0.008*
	Superalloys Inconel 718, etc.	- 40HRC	AH120	65 - 160	0.0024 - 0.004*
H	Hardened steel	H13, etc.	AH120	145 - 225	0.004 - 0.006*
		D2, etc.	AH120	130 - 210	0.0024 - 0.004*

## LQMU11/18-PNER-MJ

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1018, 1020, 1026, etc.	- 200HB	AH725	330 - 800	0.004 - 0.010*
	High carbon steel 1045, 1055, etc.	200 - 300HB	AH725	330 - 750	0.004 - 0.008*
	Alloyed steel 4140, 8620, etc.	- 300HB	AH725	330 - 750	0.004 - 0.008*
	Tool steel H13, D2, etc.	- 300HB	AH725	330 - 600	0.004 - 0.008*
M	Stainless steel 304SS, 316SS, 17-4 PH, etc.	- 200HB	AH140	300 - 600	0.004 - 0.010*
K	Gray cast iron Class 25, Class 30, etc.	150 - 250HB	AH120	450 - 800	0.004 - 0.010*
	Ductile cast iron 60-40-18, 60-55-06, etc.	150 - 250HB	AH120	450 - 800	0.004 - 0.010*
S	Heat-resistant alloy Inconel 718, etc.	- 40HRC	AH725	65 - 160	0.003 - 0.008*

\* When using LQMU11 inserts, see page H179 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.

Approach angle

7°-25°

41°-45°

60°-70°

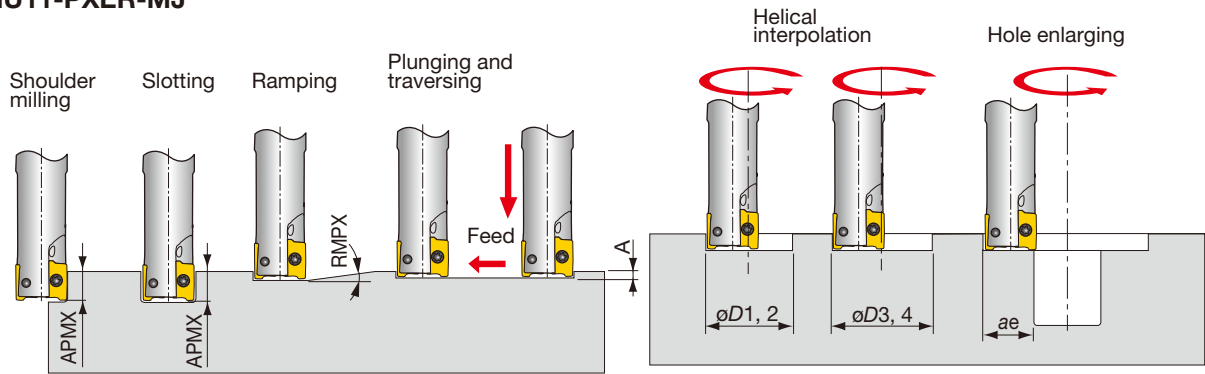
85°-88°

90°

Others

# APPLICATION RANGE

## LQMU11-PXER-MJ



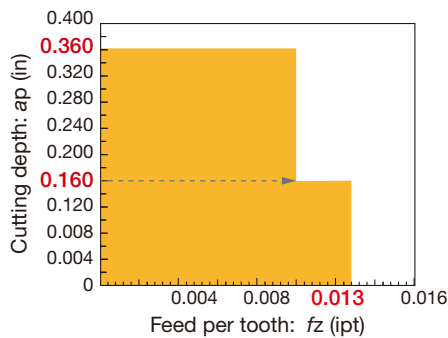
Inch	DC	Max. depth of cut	Max. ramping angle	Max. plunging	Min. machining	Max. machining				Max. cutting width in enlarging
		APMX	RMPX	A	øD1	øD2*	øD3	øD4*	RE	ae
EPQ11R100...	1.00	0.354	1.8°	0.023	1.41	1.87	1.96	1.94	0.031	0.96
EPQ11R125...	1.25	0.354	1.3°	0.023	1.91	2.37	2.46	2.44	0.031	1.21
TPQ11R150...	1.50	0.354	0.9°	0.023	2.41	2.87	2.96	2.94	0.031	1.46
TPQ11R200...	2.00	0.354	0.7°	0.023	3.41	3.87	3.96	3.94	0.031	1.96
TPQ11R250...	2.50	0.354	0.5°	0.023	4.41	4.87	4.96	4.94	0.031	2.46
TPQ11R300...	3.00	0.354	0.4°	0.023	5.41	5.87	5.96	5.94	0.031	2.96
TPQ11R400...	4.00	0.354	0.3°	0.023	7.41	7.87	7.96	7.94	0.031	3.96

\*For a flat bottom

## NOTE WHEN USING LQMU11 INSERTS

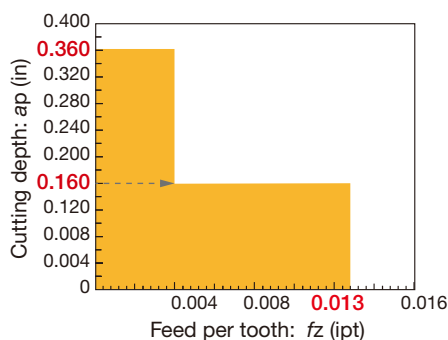
Maximum feed rate per tooth varies depending on the cutting depth and width. Use proper feed rate as described below. Use caution. Tool may damage if the parameters are not properly set.

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



Cutter : TPQ11R200U0075A06 (DC = 2.000", z = 6)  
 Insert : LQMU110708PXER-MJ  
 Grade : AH3135  
 Workpiece material : 1055 (200HB)  
 Cutting Speed :  $V_c = 660$  sfm  
 Cutting width :  $ae = 0.200$ "  
 Coolant : Dry  
 Machine : Vertical M/C, 22 HP

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



Cutter : TPQ11R200U0075A06 (DC = 2.000", z = 6)  
 Insert : LQMU110708PXER-MJ  
 Grade : AH3125  
 Workpiece material : 1055 (200HB)  
 Cutting Speed :  $V_c = 660$  sfm  
 Cutting width :  $ae = 1.673$ "  
 Coolant : Dry  
 Machine : Vertical M/C, 22 HP



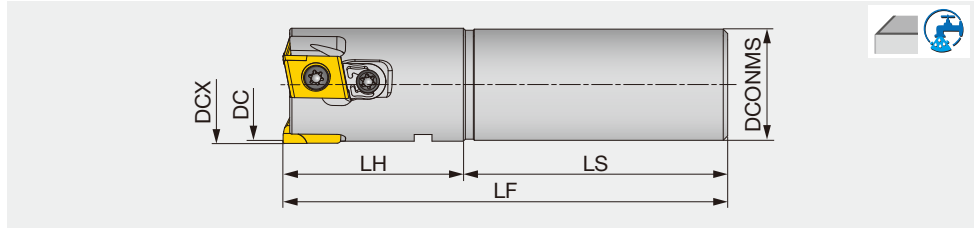


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

# TUNGSMILL

## EPYP12

High speed PCD endmill for non ferrous metal



Metric	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

### SPARE PARTS

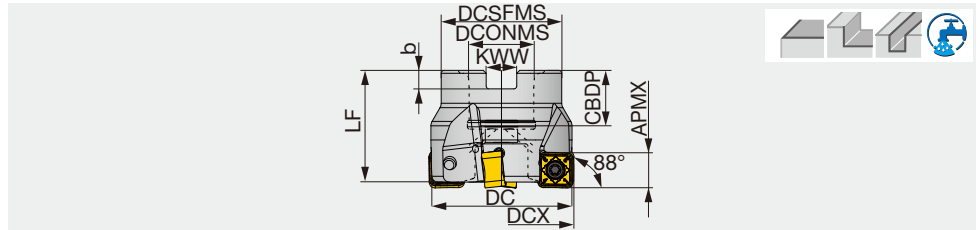
Designation	Clamping screw	Wrench 1	Wrench 2	Wedge fixing screw	Wedge
EPYP12M025C25.0R03	VX040024A	T-15F	T-8F	VX040028A	RSFTC1011
EPYP12M032C25.0R05	VX040024A	T-15F	T-8F	RSRGR5M40	RSFTC1009

Recommended clamping torque: 4.5 N·m

### Approach angle

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

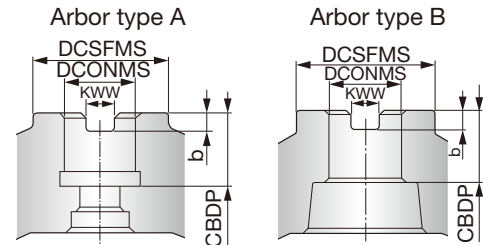
Reference pages: Inserts, Standard cutting conditions → [H109](#)



Inch	APMX	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT (lb)	Air hole	Insert	Arbor type
THSN12U2.00B0.75R04	0.374	2.000	2.024	4	1.850	1.575	0.750	0.750	0.315	0.197	0.920	With	SNMU1206...	A
THSN12U2.00B0.75R05	0.374	2.000	2.024	5	1.850	1.575	0.750	0.750	0.315	0.197	0.910	With	SNMU1206...	A
THSN12U2.50B0.75R04	0.374	2.500	2.524	4	1.850	1.575	0.750	0.750	0.315	0.197	1.220	With	SNMU1206...	A
THSN12U2.50B0.75R06	0.374	2.500	2.524	6	1.850	1.575	0.750	0.750	0.315	0.197	1.220	With	SNMU1206...	A
THSN12U3.00B1.00R05	0.374	3.000	3.024	5	1.969	1.969	1.000	1.024	0.374	0.236	2.120	With	SNMU1206...	A
THSN12U3.00B1.00R08	0.374	3.000	3.024	8	1.969	1.969	1.000	1.024	0.374	0.236	2.090	With	SNMU1206...	A
THSN12U4.00B1.50R06	0.374	4.000	4.024	6	3.150	1.969	1.500	1.299	0.626	0.394	3.640	Without	SNMU1206...	B
THSN12U4.00B1.50R08	0.374	4.000	4.024	8	3.150	1.969	1.500	1.299	0.626	0.394	3.550	Without	SNMU1206...	B

Metric	APMX	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	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...

**Arbor type**



**SPARE PARTS**

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt	Shell locking bolt (Optional parts)
THSN12U2.00, 2.50...	CSPB-4	BLDIP15/S7	H-TB2W	-	(C0.375X1.125H)
THSN12U3.00...	CSPB-4	BLDIP15/S7	H-TB2W	-	(C0.500X1.375H)
THSN12U4.00...	CSPB-4	BLDIP15/S7	H-TB2W	-	(TMBA-0.750H)
THSN12M050, 063...	CSPB-4	BLDIP15/S7	H-TB2W	CM10x30H	-
THSN12J080..., THSN12M080...	CSPB-4	BLDIP15/S7	H-TB2W	CM12X30H	-
THSN12J100..., THSN12M100...	CSPB-4	BLDIP15/S7	H-TB2W	TMBA-M16H	-

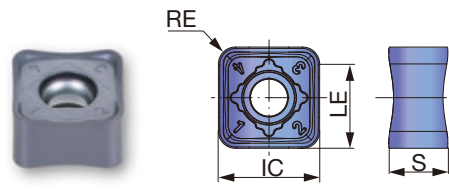
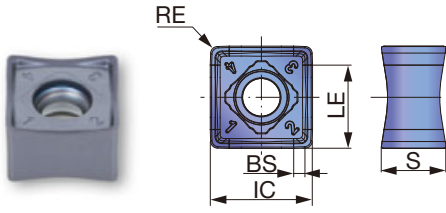
Recommended clamping torque: 2.58 lbs·ft, 3.5 N·m



# INSERTS

## SNMU120608HNEN-MM

## SNMU120612/20EN-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	S	IC	BS
			AH120	AH3225	AH3135	T1215	T3225				
SNMU120608HNEN-MM	0.031	0.374	●	●	●	●		0.386	0.295	0.472	0.055
SNMU120612EN-MM	0.047	0.374		●	●	●		0.425	0.285	0.472	-
SNMU120620EN-MM	0.079	0.374		●	●	●		0.394	0.276	0.472	-

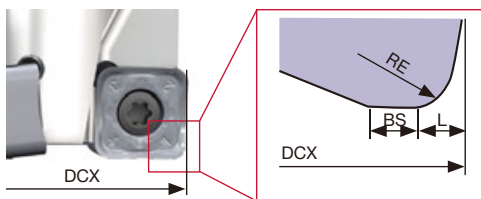
● : Line up

# STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, etc.	- 200HB	First choice	AH3225	MM	328 - 820	0.002 - 0.012
			For wear resistance	T3225	MM	656 - 1148	0.002 - 0.010
	High carbon and alloy steel 1055, 4140, etc.	- 300HB	First choice	AH3225	MM	328 - 820	0.002 - 0.012
			For wear resistance	T3225	MM	591 - 984	0.002 - 0.010
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	MM	328 - 656	0.002 - 0.010
			For wear resistance	T3225	MM	492 - 820	0.002 - 0.008
M	Austenitic stainless steel 304, 316, etc.	- 200HB	First choice	AH3135	MM	328 - 656	0.002 - 0.010
			For wear resistance	T3225	MM	328 - 820	0.002 - 0.008
	Cast stainless steel 1.4849, etc.	-	First choice	T3225	MM	197 - 394	0.002 - 0.008
			For fracture resistance	AH3135	MM	197 - 394	0.002 - 0.008
			Gray cast iron Class 25, etc.	150 - 250HB	First choice	T1215	MM
For fracture resistance	AH120	MM			328 - 820	0.002 - 0.012	
K	Ductile cast iron 65-45-12, etc.	150 - 250HB	First choice	T1215	MM	328 - 1148	0.002 - 0.010
			For fracture resistance	AH120	MM	262 - 656	0.002 - 0.012
S	Titanium alloys Ti-6Al-4V, etc.	- 40HRC	First choice	AH3135	MM	98 - 197	0.002 - 0.008
	Heat-resistant alloys Inconel718, etc.	- 40HRC	First choice	AH120	MM	33 - 131	0.002 - 0.006
H	Hardened steel H13, etc.	40 - 50HRC	First choice	AH3225	MM	262 - 427	0.002 - 0.006
	Hardened steel D2, etc.	50 - 60HRC	First choice	AH120	MM	164 - 230	0.001 - 0.003

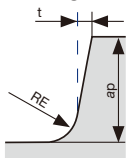
# Tool offset

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



Inch	RE	BS	L
SNMU120608HNEN-MM	0.031	0.055	0.051
SNMU120612EN-MM	0.047	-	0.067
SNMU120620EN-MM	0.079	-	0.098

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



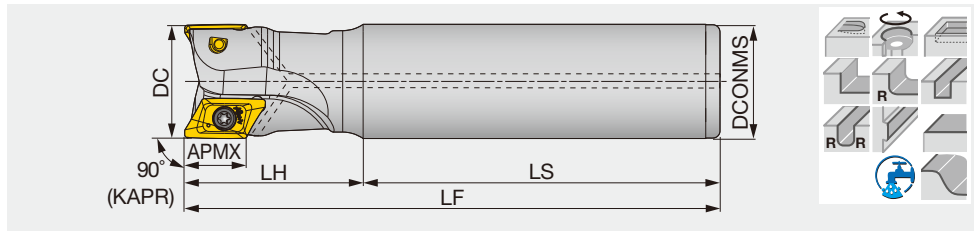
Inch	ap (in)									
	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354	0.374
SNMU120608HNEN-MM	0.0004	0.0016	0.0020	0.0020	0.0028	0.0035	0.0055	0.0079	0.0106	0.0106
SNMU120612EN-MM	-	0	0	0.0004	0.0008	0.0020	0.0035	0.0059	0.0087	0.0098
SNMU120620EN-MM	-	0	0	0	0.0008	0.0020	0.0035	0.0059	0.0087	0.0098

# TUNG-ALUMILL

## EPXV16

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

GAMP = +6° ~ +10°, GAMF = -12° ~ -9°

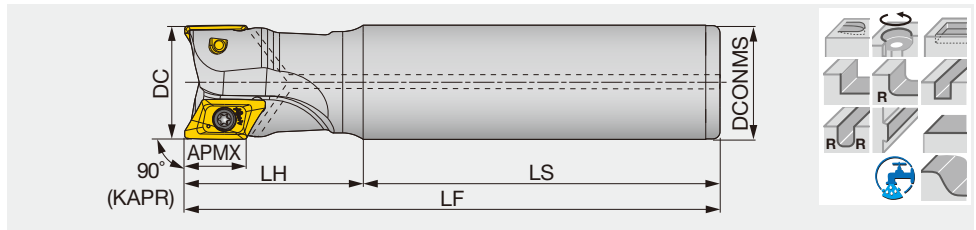


Inch	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
EPXV16U1.00W1.00R02	1.000	2	1.000	3.000	2.000	5.000	0.820	With	51,400	XVCT16**-AM
EPXV16U1.00W1.00R02L	1.000	2	1.000	4.000	3.000	7.000	1.170	With	51,400	XVCT16**-AM
EPXV16U1.25W1.25R03	1.250	3	1.250	4.000	2.000	6.000	1.680	With	46,000	XVCT16**-AM
EPXV16U1.25W1.25R03L	1.250	3	1.250	5.000	3.000	8.000	2.270	With	46,000	XVCT16**-AM
EPXV16U1.50W1.25R03	1.500	3	1.250	5.000	2.000	7.000	2.080	With	42,000	XVCT16**-AM
Metric	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
EPXV16M025C25.0R02	25	2	25	70	55	125	0.37	With	52,000	XVCT16**-AM
EPXV16M025C25.0R02L	25	2	25	100	70	170	0.53	With	52,000	XVCT16**-AM
EPXV16M032C32.0R03	32	3	32	100	50	150	0.76	With	46,000	XVCT16**-AM
EPXV16M032C32.0R03L	32	3	32	120	80	200	1.03	With	46,000	XVCT16**-AM
EPXV16M040C32.0R03	40	3	32	115	55	170	0.94	With	41,200	XVCT16**-AM

## EPV16

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

GAMP = +6° ~ +10°, GAMF = -12° ~ -9°



Inch	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
EPV16R100U0100W02	1.000	2	1.000	3.000	2.000	5.000	0.820	With	38,000	XVCT1605...
EPV16R100U0100W02L	1.000	2	1.000	4.000	3.000	7.000	1.170	With	38,000	XVCT1605...
EPV16R125U0125W02	1.250	2	1.250	4.000	2.000	6.000	1.690	With	34,000	XVCT1605...
EPV16R125U0125W02L	1.250	2	1.250	5.000	3.000	8.000	2.280	With	34,000	XVCT1605...
EPV16R125U0125W03	1.250	3	1.250	4.000	2.000	6.000	1.680	With	34,000	XVCT1605...
EPV16R125U0125W03L	1.250	3	1.250	5.000	3.000	8.000	2.270	With	34,000	XVCT1605...
EPV16R150U0125W03	1.500	3	1.250	5.000	2.000	7.000	2.080	With	30,000	XVCT1605...
EPV16R150U0125W03L	1.500	3	1.250	8.000	2.000	10.000	3.140	With	30,000	XVCT1605...
Metric	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Max. RPM (min <sup>-1</sup> )	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...

### SPARE PARTS

Designation	Clamping screw	Grip	Torx bit
EPXV16U1.00W..., EPXV16M025..., EPV16R100U..., EPV16R025M...	TS40085I/HG	H-TBS	BT15S
EPXV16U1.25W..., EPXV16U1.50W, EPXV16M032..., EPXV16M040..., EPV16R125, 150U..., EPV16R032, 040M...	TS40093I/HG	H-TBS	BT15S

Recommended clamping torque: 3.32 lbs-ft, 4.5 N-m

Reference pages: Inserts, Standard cutting conditions → **H186**

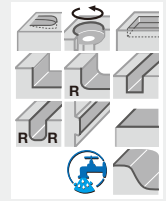
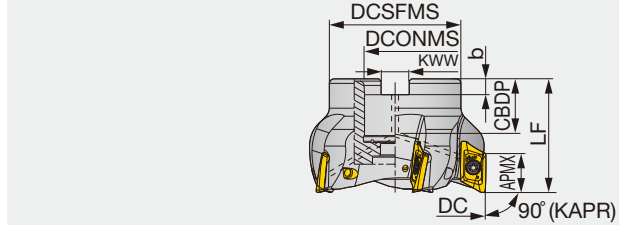


# TUNG-ALUMILL

## TPXV16

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

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



Inch	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
TPXV16U1.50B0.75R03	1.500	3	1.421	0.750	0.750	2.000	0.170	0.315	0.440	With	42,000	XVCT16**-AM
TPXV16U2.00B0.75R04	2.000	4	1.890	0.750	0.750	2.000	0.170	0.315	0.890	With	36,400	XVCT16**-AM
TPXV16U2.50B1.00R05	2.500	5	2.165	1.000	0.750	2.000	0.197	0.375	1.340	With	32,500	XVCT16**-AM
TPXV16U3.00B1.00R05	3.000	5	2.362	1.000	0.750	2.000	0.197	0.375	1.920	With	29,700	XVCT16**-AM
TPXV16U4.00B1.50R06	4.000	6	3.150	1.500	1.059	2.500	0.319	0.625	4.280	With	25,700	XVCT16**-AM
TPXV16U5.00B1.50R07	5.000	7	3.740	1.500	1.059	2.500	0.319	0.625	6.700	With	23,000	XVCT16**-AM

Metric	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
TPXV16M040B16.0R03	40	3	38	16	20	50	5.6	8.4	0.23	With	41,200	XVCT16**-AM
TPXV16M050B22.0R04	50	4	45	22	22	50	6.3	10.4	0.33	With	36,800	XVCT16**-AM
TPXV16M063B22.0R05	63	5	47	22	22	50	6.3	10.4	0.54	With	32,700	XVCT16**-AM
TPXV16M080B27.0R05	80	5	58	27	28	50	7	12.4	0.86	With	29,000	XVCT16**-AM
TPXV16M100B32.0R06	100	6	66	32	26	63	8	14.4	1.55	With	26,000	XVCT16**-AM
TPXV16M125B40.0R07	125	7	85	40	32	63	9	16.4	2.53	With	23,200	XVCT16**-AM

### SPARE PARTS



Designation	Clamping screw	Grip	Shell locking bolt	Torx bit
TPXV16U1.50..., TPXV16M040...	TS40093I/HG	H-TBS	SHM8X1.25X35-C	BT15S
TPXV16U2.00..., TPXV16U2.50..., TPXV16M050..., TPXV16M063...	TS40093I/HG	H-TBS	SHM10X1.5X30-C	BT15S
TPXV16U3.00..., TPXV16M080...	TS40093I/HG	H-TBS	LHM12X1.75X30-C	BT15S
TPXV16U4.00..., TPXV16M100...	TS40093I/HG	H-TBS	SHM16X2X35-C	BT15S
TPXV16U5.00..., TPXV16M125...	TS40093I/HG	H-TBS	SHM20X2.5X40-C	BT15S

Recommended clamping torque: 3.32 lbs-ft, 4.5 N-m

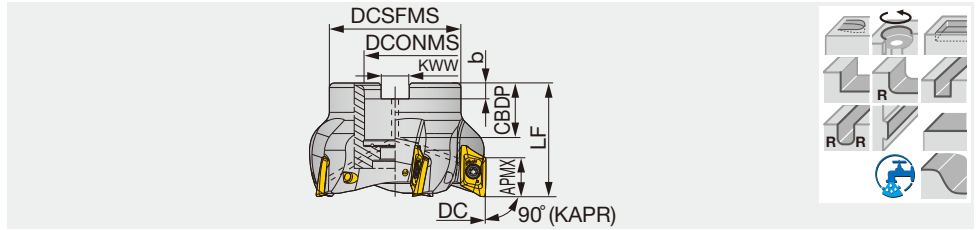
Reference pages: Inserts, Standard cutting conditions → [H186](#)

# TUNG-ALUMILL

## TPV16

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

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



Inch	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(lb)	Air hole	Max. RPM (min <sup>-1</sup> )	Insert
TPV16R150U0075A03	1.500	3	1.421	0.750	0.750	2.000	0.315	0.170	0.440	With	30,000	XVCT1605...
TPV16R200U0075A04	2.000	4	1.890	0.750	0.750	2.000	0.315	0.170	0.890	With	27,000	XVCT1605...
TPV16R250U0100A05	2.500	5	2.165	1.000	0.750	2.000	0.375	0.197	1.340	With	24,000	XVCT1605...
TPV16R300U0100A05	3.000	5	2.362	1.000	0.750	2.000	0.375	0.197	1.920	With	21,000	XVCT1605...
TPV16R400U0150A06	4.000	6	3.150	1.500	1.059	2.500	0.625	0.319	4.280	With	19,000	XVCT1605...
TPV16R500U0150A07	5.000	7	3.740	1.500	1.059	2.500	0.625	0.319	6.700	With	17,000	XVCT1605...

Metric	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Max. RPM (min <sup>-1</sup> )	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	Shell locking bolt	Torx bit
TPV16R150U0075A03	TS40093I/HG	H-TBS	TCS 9.525-35-I	BT15S
TPV16R200U0075A04	TS40093I/HG	H-TBS	SD06-46	BT15S
TPV16R250, 300U...	TS40093I/HG	H-TBS	SD08-47	BT15S
TPV16R400, 500U...	TS40093I/HG	H-TBS	SD12-82	BT15S
TPV16R040M16.0E03	TS40093I/HG	H-TBS	SHM8X1.25X35-C	BT15S
TPV16R050, 063M...	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: 3.32 lbs-ft, 4.5 N·m

Reference pages: Inserts, Standard cutting conditions → **H186**

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

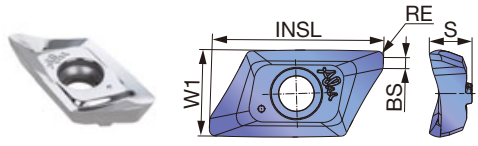






# INSERT

## XVCT16-AM



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

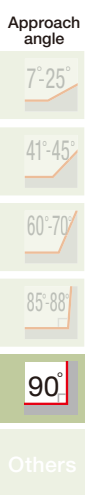
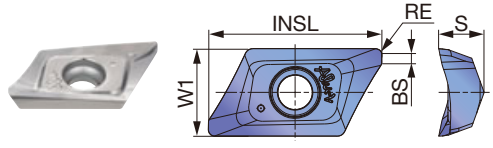
★ : First choice

Designation	RE	APMX	Uncoated										INSL	W1	S	BS	
			TH10														
XVCT160504PEFR-AM	0.016	0.630	●											0.874	0.441	0.217	0.059
XVCT160508PEFR-AM	0.031	0.630	●											0.874	0.441	0.217	0.043
XVCT160512PEFR-AM	0.047	0.630	●											0.858	0.441	0.217	0.043
XVCT160516PEFR-AM	0.063	0.630	●											0.835	0.441	0.217	0.043
XVCT160520PEFR-AM	0.079	0.610	●											0.819	0.441	0.213	0.043
XVCT160525PEFR-AM	0.098	0.571	●											0.795	0.441	0.209	0.043
XVCT160530PEFR-AM	0.118	0.571	●											0.772	0.441	0.205	0.039
XVCT160532PEFR-AM	0.126	0.571	●											0.756	0.441	0.205	0.043
XVCT160540PEFR-AM	0.157	0.571	●											0.728	0.441	0.205	0.059
XVCT160550PEFR-AM	0.197	0.571	●											0.720	0.441	0.201	0.024

When using inserts with corner radius  $RE \geq 0.126"$ , standard cutter body has to be modified with "R". "R" =  $RE - 0.012"$

● : Line up

## XVCT16-AJ



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

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Uncoated										INSL	W1	S	BS	
			TH10														
XVCT160504R-AJ	0.016	0.630	●											0.874	0.441	0.232	0.051
XVCT160508R-AJ	0.031	0.630	●											0.874	0.441	0.232	0.039
XVCT160512R-AJ	0.047	0.610	●											0.858	0.441	0.228	0.039
XVCT160516R-AJ	0.063	0.591	●											0.835	0.441	0.226	0.039
XVCT160520R-AJ	0.079	0.571	●											0.819	0.441	0.226	0.039
XVCT160524R-AJ	0.094	0.551	●											0.800	0.441	0.224	0.039
XVCT160525R-AJ	0.098	0.551	●											0.795	0.441	0.224	0.039
XVCT160530R-AJ	0.118	0.551	●											0.772	0.441	0.220	0.039
XVCT160532R-AJ	0.126	0.551	●											0.756	0.441	0.220	0.039
XVCT160540R-AJ	0.157	0.512	●											0.728	0.441	0.217	0.047
XVCT160550R-AJ	0.197	0.512	●											0.720	0.441	0.213	0.016

When using inserts with corner radius  $RE \geq 0.126"$ , standard cutter body has to be modified with "R". "R" =  $RE - 0.012"$

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>N</b>	Aluminum alloy	60	TH10	AJ	984 - 16404	0.006 - 0.014
		100	TH10	AJ	656 - 6562	0.004 - 0.010
	Cast aluminum alloy Si ≤ 12%	75	TH10	AJ	656 - 6562	0.006 - 0.012
		90	TH10	AJ	656 - 4921	0.004 - 0.010
	Cast aluminum alloy Si > 12%	130	TH10	AJ	656 - 3281	0.003 - 0.006
	Copper alloys Pb > 1%	110	TH10	AJ	656 - 2625	0.003 - 0.006
	Copper alloys	90	TH10	AJ	984 - 3281	0.004 - 0.006
		100	TH10	AJ	984 - 2625	0.004 - 0.006
	Duroplastics, fiber plastics	-	TH10	AJ	328 - 1640	0.004 - 0.006
	Hard rubber	-	TH10	AJ	328 - 984	0.004 - 0.006

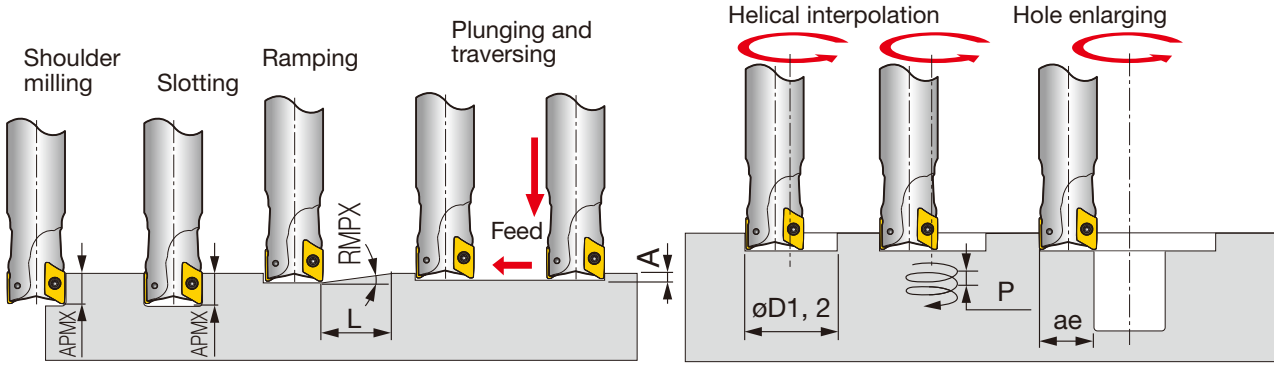
### Safety guidelines

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 3.32 lbs-ft.
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.

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

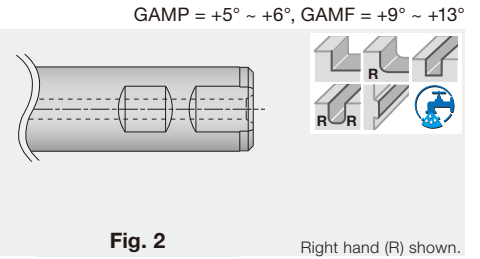
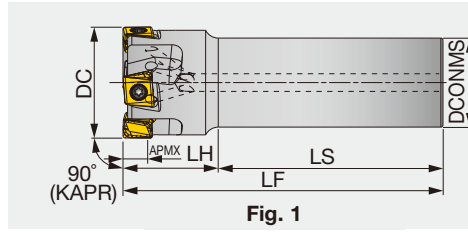


# APPLICATION RANGE



Inch	DC	Tool	Corner radius	Max. depth of cut	Max. ramping angle	Min. length	Max. plunging depth	Straight ramp down		Step down		Helical ramp down		Hole enlarging
								Max. machining	Min. pitch/rev	Max. machining	Min. pitch/rev	Max. machining	Min. pitch/rev	
RE	APMX	RMPX	L	A	$\phi D1$	P	$\phi D2$	P	ae					
EPV16R100...	1.000	1.000	0.016, 0.031	0.630	22°	1.570	0.166	1.150	0.173	1.970	0.535	0.886		
EPV16R100...	1.000	1.000	0.047	0.610	22°	1.570	0.166	1.150	0.173	1.970	0.535	0.886		
EPV16R100...	1.000	1.000	0.063	0.591	22°	1.500	0.146	1.150	0.173	1.970	0.520	0.886		
EPV16R100...	1.000	1.000	0.079	0.571	22°	1.500	0.146	1.150	0.173	1.970	0.520	0.886		
EPV16R100...	1.000	1.000	0.118, 0.126	0.551	21°	1.500	0.098	1.150	0.165	1.970	0.484	0.886		
EPV16R100...	1.000	1.000	0.157, 0.197	0.512	18.5°	1.570	0.090	1.150	0.146	1.970	0.484	0.886		
EPV16R125...	1.250	1.250	0.016, 0.031	0.630	16.5°	2.130	0.158	1.690	0.346	2.520	0.535	1.134		
EPV16R125...	1.250	1.250	0.047	0.610	16.5°	2.130	0.158	1.690	0.346	2.520	0.535	1.134		
EPV16R125...	1.250	1.250	0.063	0.591	16°	2.130	0.138	1.690	0.335	2.520	0.520	1.134		
EPV16R125...	1.250	1.250	0.079	0.571	16°	2.130	0.138	1.690	0.335	2.520	0.520	1.134		
EPV16R125...	1.250	1.250	0.118, 0.126	0.551	15°	2.130	0.118	1.700	0.311	2.520	0.484	1.134		
EPV16R125...	1.250	1.250	0.157, 0.197	0.512	13.5°	2.200	0.098	1.700	0.280	2.520	0.484	1.134		
T/EPV16R150...	1.500	1.500	0.016, 0.031	0.630	11.5°	3.110	0.158	2.330	0.409	3.150	0.535	1.417		
T/EPV16R150...	1.500	1.500	0.047	0.610	11.5°	3.110	0.158	2.330	0.409	3.150	0.535	1.417		
T/EPV16R150...	1.500	1.500	0.063	0.591	11°	3.150	0.138	2.330	0.390	3.150	0.520	1.417		
T/EPV16R150...	1.500	1.500	0.079	0.571	11°	3.150	0.138	2.330	0.390	3.150	0.520	1.417		
T/EPV16R150...	1.500	1.500	0.118, 0.126	0.551	10°	3.230	0.118	2.330	0.354	3.150	0.484	1.417		
T/EPV16R150...	1.500	1.500	0.157, 0.197	0.512	8.5°	3.540	0.098	2.330	0.299	3.150	0.484	1.417		
TPV16R200...	2.000	2.000	0.016, 0.031	0.630	9.5°	3.780	0.158	3.110	0.512	3.940	0.535	1.772		
TPV16R200...	2.000	2.000	0.047	0.610	9.5°	3.780	0.158	3.110	0.512	3.940	0.535	1.772		
TPV16R200...	2.000	2.000	0.063	0.591	9°	3.860	0.138	3.110	0.484	3.940	0.520	1.772		
TPV16R200...	2.000	2.000	0.079	0.571	9°	3.860	0.138	3.110	0.484	3.940	0.520	1.772		
TPV16R200...	2.000	2.000	0.118, 0.126	0.551	8°	4.060	0.118	3.110	0.429	3.940	0.484	1.772		
TPV16R200...	2.000	2.000	0.157, 0.197	0.512	7°	4.330	0.098	3.110	0.374	3.940	0.484	1.772		
TPV16R250...	2.500	2.500	0.016, 0.031	0.630	7°	5.120	0.158	4.130	0.535	4.960	0.535	2.232		
TPV16R250...	2.500	2.500	0.047	0.610	7°	5.120	0.158	4.130	0.535	4.960	0.535	2.232		
TPV16R250...	2.500	2.500	0.063	0.591	6.5°	5.350	0.138	4.130	0.504	4.960	0.520	2.232		
TPV16R250...	2.500	2.500	0.079	0.571	6.5°	5.350	0.138	4.130	0.504	4.960	0.520	2.232		
TPV16R250...	2.500	2.500	0.118, 0.126	0.551	6°	5.350	0.118	4.140	0.465	4.960	0.484	2.232		
TPV16R250...	2.500	2.500	0.157, 0.197	0.512	5.5°	5.510	0.098	4.140	0.425	4.960	0.484	2.232		
TPV16R300...	3.000	3.000	0.016, 0.031	0.630	5°	7.200	0.158	5.470	0.535	6.300	0.535	2.835		
TPV16R300...	3.000	3.000	0.047	0.610	5°	7.200	0.158	5.470	0.535	6.300	0.535	2.835		
TPV16R300...	3.000	3.000	0.063	0.591	4.5°	7.760	0.138	5.470	0.488	6.300	0.520	2.835		
TPV16R300...	3.000	3.000	0.079	0.571	4.5°	7.760	0.138	5.470	0.488	6.300	0.520	2.835		
TPV16R300...	3.000	3.000	0.118, 0.126	0.551	4°	8.150	0.118	5.480	0.433	6.300	0.484	2.835		
TPV16R300...	3.000	3.000	0.157, 0.197	0.512	3.5°	8.700	0.098	5.480	0.378	6.300	0.484	2.835		
TPV16R400...	4.000	4.000	0.016, 0.031	0.630	3.5°	10.310	0.158	7.040	0.508	7.870	0.535	3.543		
TPV16R400...	4.000	4.000	0.047	0.610	3.5°	10.310	0.158	7.040	0.508	7.870	0.535	3.543		
TPV16R400...	4.000	4.000	0.063	0.591	3°	11.650	0.138	7.040	0.437	7.870	0.520	3.543		
TPV16R400...	4.000	4.000	0.079	0.571	3°	11.650	0.138	7.040	0.437	7.870	0.520	3.543		
TPV16R400...	4.000	4.000	0.118, 0.126	0.551	2.5°	13.070	0.118	7.050	0.362	7.870	0.484	3.543		
TPV16R400...	4.000	4.000	0.157, 0.197	0.512	2.5°	12.170	0.098	7.050	0.362	7.870	0.457	3.543		
TPV16R500...	5.000	5.000	0.016, 0.031	0.630	2.5°	14.450	0.158	9.020	0.476	9.840	0.535	4.429		
TPV16R500...	5.000	5.000	0.047	0.610	2.5°	14.450	0.158	9.020	0.476	9.840	0.535	4.429		
TPV16R500...	5.000	5.000	0.063	0.591	2°	17.480	0.138	9.020	0.382	9.840	0.520	4.429		
TPV16R500...	5.000	5.000	0.079	0.571	2°	17.480	0.138	9.020	0.382	9.840	0.520	4.429		
TPV16R500...	5.000	5.000	0.118, 0.126	0.551	1.5°	21.810	0.118	9.020	0.287	9.840	0.343	4.429		
TPV16R500...	5.000	5.000	0.157, 0.197	0.512	1.5°	20.310	0.098	9.020	0.287	9.840	0.343	4.429		

Square shoulder endmill, shank type, with screw clamp system



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert	Fig.
EPM11R125U0125W03	0.381	1.250	3	1.250	2.250	1.750	4.000	0.66	With	LMMU1107...	2
EPM11R150U0125W04	0.381	1.500	4	1.250	2.250	1.750	4.000	1.10	With	LMMU1107...	2
Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert	Fig.
EPM11R032M32.0-03	9.7	32	3	32	80	35	115	0.6	With	LMMU1107...	1
EPM11R040M32.0-04	9.7	40	4	32	80	35	115	0.7	With	LMMU1107...	1
EPM11R050M32.0-04	9.7	50	4	32	80	40	120	0.9	With	LMMU1107...	1
EPM11R063M32.0-06	9.7	63	6	32	80	40	120	1.2	With	LMMU1107...	1
EPM11R080M32.0-07	9.7	80	7	32	80	40	120	1.6	With	LMMU1107...	1

### SPARE PARTS



Designation	Clamping screw	Wrench
EPM11...	SM35-114-H0	T-15DF

Recommended clamping torque : 2.58 lbs-ft, 3.5 N·m



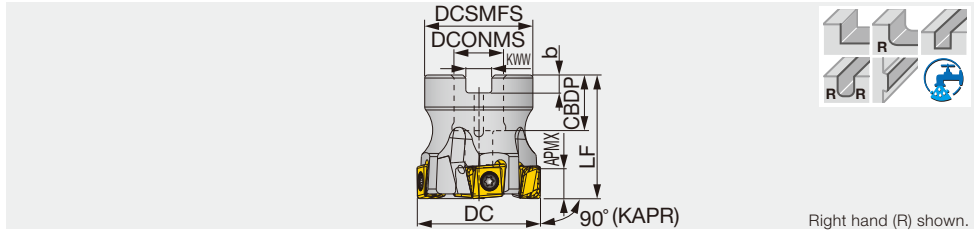


# TECMILL

## TPM11,16

Square shoulder mill, with screw clamp system

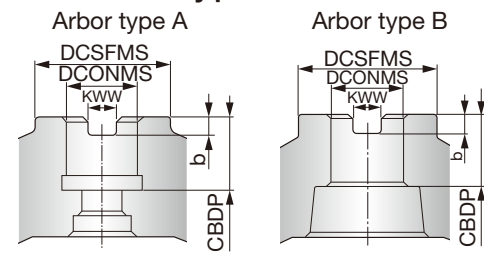
GAMP = +5° ~ +6°, GAMF = +9° ~ +13°



Inch	APMX	DC	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TPM11R200U0075A05	0.381	2.000	5	1.772	1.570	0.750	0.750	0.315	0.197	0.660	With	LMMU1107...	A
TPM11R250U0075A06	0.381	2.500	6	1.772	1.570	0.750	0.750	0.315	0.197	1.100	With	LMMU1107...	A
TPM11R300U0100A06	0.381	3.000	6	2.165	1.970	1.000	0.750	0.374	0.236	1.980	With	LMMU1107...	A
TPM11R300U0100A08	0.381	3.000	8	2.165	1.970	1.000	0.750	0.374	0.236	2.200	With	LMMU1107...	A
TPM16R300U0100A05	0.594	3.000	5	2.165	1.970	1.000	0.750	0.374	0.236	2.200	With	LMMU1107...	A
TPM11R400U0150A08	0.381	4.000	8	3.071	1.970	1.500	1.063	0.626	0.394	3.090	With	LMMU1107...	B
TPM11R400U0150A11	0.381	4.000	11	3.071	1.970	1.500	1.063	0.626	0.394	3.310	With	LMMU1107...	B
TPM11R080M25.4-07	0.594	4.000	6	3.071	1.970	1.500	1.063	0.626	0.394	3.530	With	LMMU1107...	B
TPM16R500U0150A07	0.594	5.000	7	3.071	2.480	1.500	1.063	0.626	0.394	6.610	With	LMMU1107...	B

Metric	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...

### Arbor type



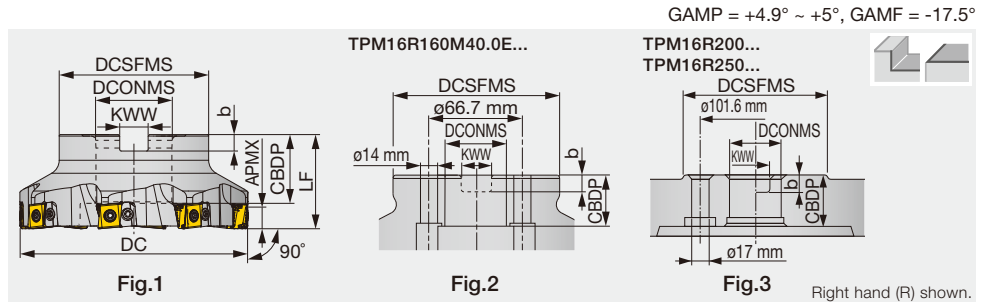
### SPARE PARTS

Designation	Clamping screw	Wrench	Shell locking bolt 1	Shell locking bolt 2	Torx bit	Shell locking bolt 3 (Optional parts)
TPM11R200, 250U...	SM35-114-H0	T-15DF	-	-	-	(C0.375X1.125H)
TPM11R300U...	SM35-114-H0	T-15DF	-	-	-	(C0.500X1.375H)
TPM11R400U...	SM35-114-H0	T-15DF	-	-	-	(TMBA-0.750H)
TPM16R300U...	CSTB-5L159	-	-	-	BT20S	(C0.500X1.375H)
TPM16R400, 500U...	CSTB-5L159	-	-	-	BT20S	(TMBA-0.750H)
TPM11R050, 063M...	SM35-114-H0	T-15DF	-	CM10X30H	-	-
TPM11R080M...	SM35-114-H0	T-15DF	-	CM12X30H	-	-
TPM11R100M...	SM35-114-H0	T-15DF	TMBA-M16H	-	-	-
TPM16R080M...	CSTB-5L159	-	-	CM12X30H	BT20S	-
TPM16R100M...	CSTB-5L159	-	TMBA-M16H	-	BT20S	-
TPM16R125M...	CSTB-5L159	-	TMBA-M20H	-	BT20S	-

Recommended clamping torque : SM35-114-H0 = 2.58 lbs-ft, 3.5 N-m, CSTB-5L159 = 3.69 lbs-ft, 5 N-m

Reference pages: Inserts → **H192**, Standard cutting conditions → **H193**

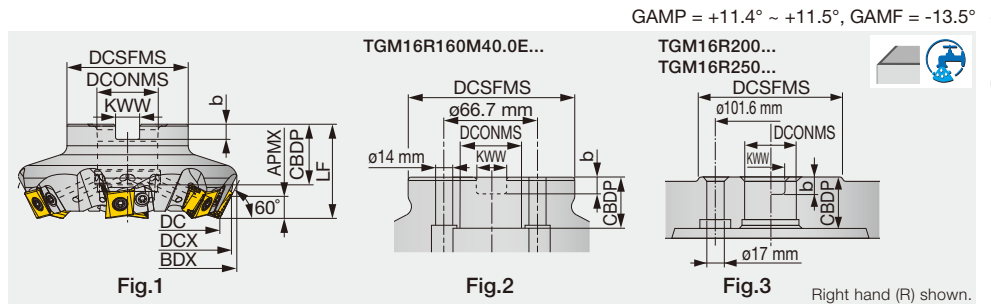
### Square shoulder mill (shell mill)



Metric	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)



Metric	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	Torx bit	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 : 5 N·m





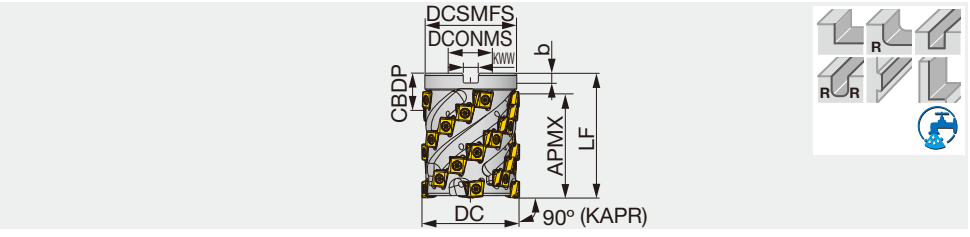


# TECMILL

## TLM11

Square shoulder mill for roughing, with screw clamp system

GAMP = +5° ~ +6°, GAMF = +9° ~ +13°



Inch	APMX	DC	ZAFP	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TLM11R200U0075A03	2.303	2.000	3	21	1.850	2.750	0.750	0.750	0.315	0.157	1.780	With	LMMU1107...
TLM11R250U0100A04	2.634	2.500	4	32	2.323	3.250	1.000	1.024	0.374	0.236	3.330	With	LMMU1107...

Metric	APMX	DC	ZAFP	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.

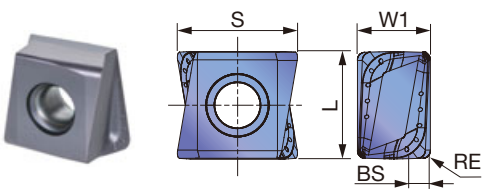
### SPARE PARTS

Designation	Clamping screw	Wrench	Shell locking bolt
TLM11R200U0075A03	SM35-114-H0	T-15DF	SD06-A2
TLM11R250U0100A04	SM35-114-H0	T-15DF	SD08-52
TLM11R050M22.0E03	SM35-114-H0	T-15DF	SD06-A3
TLM11R063M...	SM35-114-H0	T-15DF	SD08-98

Recommended clamping torque : 2.58 lbs-ft, 3.5 N-m

## INSERT

### LMMU11/16-MJ



<b>P</b> Steel	★	☆			☆
<b>M</b> Stainless	★		☆		
<b>K</b> Cast iron		★		☆	
<b>N</b> Non-ferrous					
<b>S</b> Superalloys	☆	★	☆		
<b>H</b> Hard materials		★			

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated						S	L	W1	BS
			AH3135	AH725	AH120	AH140	T1215	T3225				
LMMU110708PNER-MJ	0.031	0.382	●	●	●	●	●	●	0.461	0.413	0.280	0.079
LMMU110716PNER-MJ	0.063	0.382	●	●	●	●	●	●	0.453	0.413	0.280	0.047
LMMU110724PNER-MJ	0.094	0.382		●	●	●			0.445	0.413	0.280	0.016
LMMU110732PNER-MJ	0.126	0.382		●	●	●			0.437	0.413	0.280	-
LMMU160908PNER-MJ	0.031	0.594	●	●	●	●	●	●	0.681	0.630	0.374	0.094
LMMU160916PNER-MJ	0.063	0.594	●	●	●	●			0.673	0.630	0.374	0.063
LMMU160924PNER-MJ	0.094	0.594		●	●	●			0.665	0.630	0.374	0.031
LMMU160932PNER-MJ	0.126	0.594		●	●	●			0.661	0.630	0.374	-

● : Line up

# STANDARD CUTTING CONDITIONS

## Bore, shank type

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)	
						TPM16...	TGM16...
P	Low carbon steel 1015, etc.	- 200HB	First choice	AH3135	262 - 820	0.003 - 0.012	0.004 - 0.016
			Wear resistance	T3225	328 - 1148	0.003 - 0.012	0.004 - 0.016
	Carbon steel and alloy steel 1055, 4140, etc.	- 300HB	First choice	AH3135	262 - 820	0.003 - 0.012	0.004 - 0.016
			Wear resistance	T3225	328 - 1148	0.003 - 0.012	0.004 - 0.016
M	Prehardend steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3135	262 - 820	0.002 - 0.010	0.003 - 0.012
M	Stainless steel S30400, etc.	- 200HB	First choice	AH3135	262 - 656	0.002 - 0.010	0.003 - 0.012
			Wear resistance	T3225	328 - 820	0.002 - 0.010	0.003 - 0.012
K	Gray cast iron No.250B, etc.	150 - 250HB	First choice	T1215	328 - 1148	0.003 - 0.012	0.004 - 0.016
			Fracture resistance	AH120	262 - 820	0.003 - 0.012	0.004 - 0.016
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	AH120	262 - 820	0.002 - 0.012	0.004 - 0.016
			Wear resistance	T1215	328 - 1148	0.003 - 0.012	0.004 - 0.016
S	Titanium alloys Ti-6Al-4V, etc.	- 45HRC	First choice	AH3135	98 - 197	0.002 - 0.008	0.003 - 0.010
			Wear resistance	AH725	98 - 197	0.002 - 0.008	0.003 - 0.010
S	Superalloys Inconel718, etc.	- 45HRC	First choice	AH725	66 - 164	0.0016 - 0.006	0.002 - 0.007
			Wear resistance	AH725	66 - 164	0.0016 - 0.006	0.002 - 0.007
H	Hardened steel	H13, etc. 40 - 55HRC	First choice	AH3135	164 - 427	0.0012 - 0.007	0.002 - 0.008
			Wear resistance	AH725	164 - 427	0.0012 - 0.007	0.002 - 0.008
	D2, etc. 55 - 60HRC	40 - 55HRC	First choice	AH725	131 - 230	0.0012 - 0.004	0.0016 - 0.005
			Wear resistance	AH725	131 - 230	0.0012 - 0.004	0.0016 - 0.005

## Roughing type

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, etc.	- 200 HB	First choice	AH3135	328 - 820	0.004 - 0.010
			Wear resistance	T3225	492 - 1148	0.004 - 0.008
	Carbon steel and alloy steel 1055, 4140, etc.	- 300 HB	First choice	AH3135	328 - 656	0.004 - 0.008
			Wear resistance	T3225	492 - 984	0.004 - 0.008
M	Prehardend steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3135	328 - 656	0.004 - 0.008
			Wear resistance	T3225	394 - 984	0.004 - 0.008
M	Stainless steel S30400, etc.	- 200 HB	First choice	AH3135	295 - 492	0.004 - 0.010
K	Gray cast iron No.250B, etc.	150 - 250 HB	First choice	AH120	328 - 820	0.004 - 0.010
			Wear resistance	T1215	394 - 1148	0.004 - 0.010
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	328 - 656	0.004 - 0.010
			Wear resistance	T1215	394 - 1148	0.004 - 0.010
S	Titanium alloys Ti-6Al-4V, etc.	- 45HRC	First choice	AH725	66 - 164	0.002 - 0.006
			Wear resistance	AH725	66 - 164	0.002 - 0.006
S	Superalloys Inconel718, etc.	- 45HRC	First choice	AH725	66 - 131	0.002 - 0.004
			Wear resistance	AH725	66 - 131	0.002 - 0.004
H	Hardened steel	H13, etc. 40 - 50 HRC	First choice	AH725	98 - 197	0.003 - 0.006
		D2, etc. 50 - 60 HRC	First choice	AH725	82 - 180	0.002 - 0.004

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



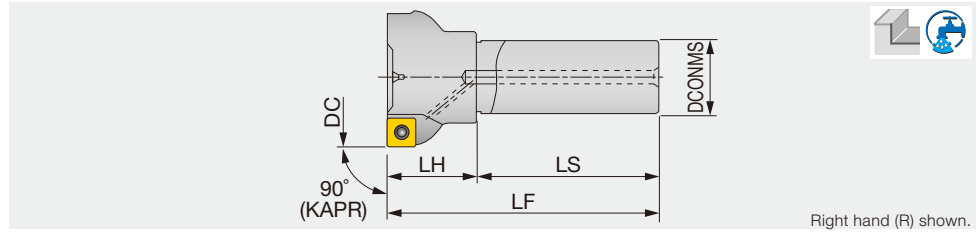


# TUNG MILL

## EPW13

Square shoulder endmill, shank type, with screw clamp system

GAMP = +11.5°, GAMF = -13° ~ -10.5°



Right hand (R) shown.

Metric	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

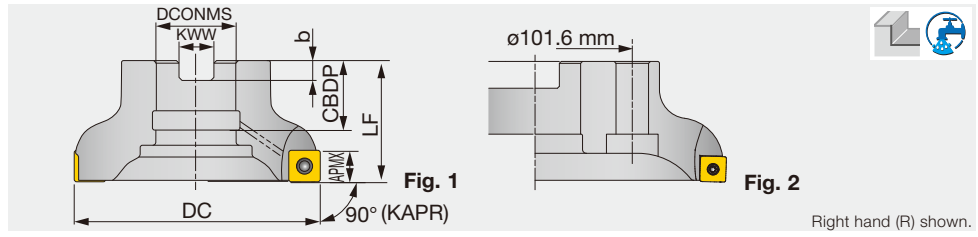
Designation	Clamping screw	Lubricant	Shim screw	Shim	Wrench	Wrench
EPW13R032, 040...	CSPB-3.5	M-1000	-	-	IP-15D	-
EPW13R050 - 080...	CSPB-3.5	M-1000	DTS5-3.5SS	FSSP1102	IP-15D	P-3.5

Recommended clamping torque : 3.5 N-m

## TPW13

Square shoulder mill, with screw clamp system

GAMP = +11.5°, GAMF = -13° ~ -10.5°



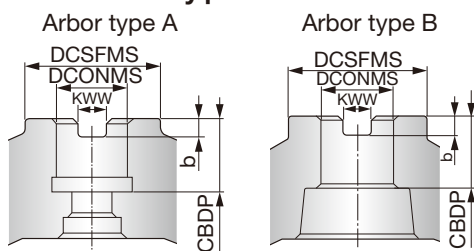
Right hand (R) shown.

Inch	APMX	DC	CICT	LF	DCONMS	CBBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type	Fig.
TPW13R200U0075A03	0.394	2.000	3	1.575	0.750	0.750	0.315	0.197	0.660	With	SW*T1304...	A	1
TPW13R200U0075A04	0.394	2.000	4	1.575	0.750	0.750	0.315	0.197	0.660	With	SW*T1304...	A	1
TPW13R200U0075A05	0.394	2.000	5	1.575	0.750	0.750	0.315	0.197	0.660	With	SW*T1304...	A	1
TPW13R300U0100A04	0.394	3.000	4	1.969	1.000	1.024	0.374	0.236	1.760	With	SW*T1304...	A	1
TPW13R300U0100A06	0.394	3.000	6	1.969	1.000	1.024	0.374	0.236	1.540	With	SW*T1304...	A	1
TPW13R300U0100A08	0.394	3.000	8	1.969	1.000	1.024	0.374	0.236	1.760	With	SW*T1304...	A	1
TPW13R400U0150A05	0.394	4.000	5	1.969	1.500	1.378	0.626	0.394	3.530	With	SW*T1304...	B	1
TPW13R400U0150A07	0.394	4.000	7	1.969	1.500	1.378	0.626	0.394	3.310	With	SW*T1304...	B	1
TPW13R400U0150A10	0.394	4.000	10	1.969	1.500	1.378	0.626	0.394	3.310	With	SW*T1304...	B	1
TPW13R500U0150A06	0.394	5.000	6	2.480	1.500	1.457	0.626	0.394	5.510	With	SW*T1304...	B	1
TPW13R500U0150A08	0.394	5.000	8	2.480	1.500	1.457	0.626	0.394	5.290	With	SW*T1304...	B	1
TPW13R500U0150A12	0.394	5.000	12	2.480	1.500	1.457	0.626	0.394	5.510	With	SW*T1304...	B	1
TPW13R600U0200A08	0.394	6.000	8	2.480	2.000	1.496	0.748	0.433	7.940	Without	SW*T1304...	B	1
TPW13R600U0200A12	0.394	6.000	12	2.480	2.000	1.496	0.748	0.433	8.160	Without	SW*T1304...	B	1
TPW13R600U0200A15	0.394	6.000	15	2.480	2.000	1.496	0.748	0.433	8.160	Without	SW*T1304...	B	1

Reference pages: Inserts → **H196**

Metric	APMX	DC	CICT	LF	DCONMS	CBDP	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

## Arbor type



### SPARE PARTS

Designation	Clamping screw	Lubricant	Shim screw	Shell locking bolt 1	Shell locking bolt 2	Shim	Wrench 1	Wrench 2
TPW13R200U...	CSPB-3.5	M-1000	DTS5-3.5SS	-	C0.375X1.125H	FSSP1102	IP-15D	P-3.5
TPW13R300U...	CSPB-3.5	M-1000	DTS5-3.5SS	-	C0.500X1.375H	FSSP1102	IP-15D	P-3.5
TPW13R400, 500U...	CSPB-3.5	M-1000	DTS5-3.5SS	-	TMBA-0.750H	FSSP1102	IP-15D	P-3.5
TPW13R600U...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSP1102	IP-15D	P-3.5
TPW13R050, 063M...	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, 200M...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSP1102	IP-15D	P-3.5

Recommended clamping torque : 2.58 lbs-ft, 3.5 N-m

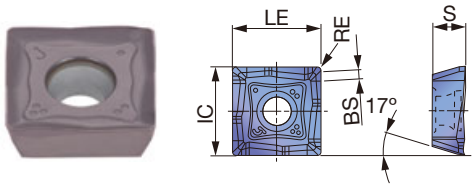
Grade  
Insert  
Ext. Toolholder  
Int. Toolholder  
Threading  
Grooving  
Miniature tool  
Milling cutter  
Endmill  
Drilling tool  
Tooling System  
User's Guide  
Index



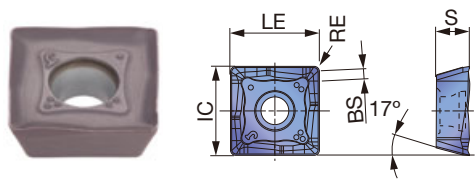


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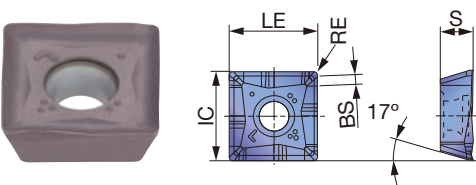
## SWG1304-MJ



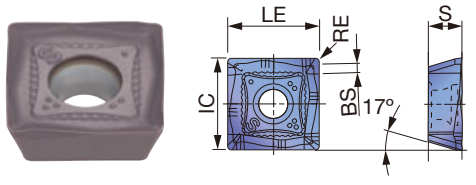
## SWMT1304-MJ



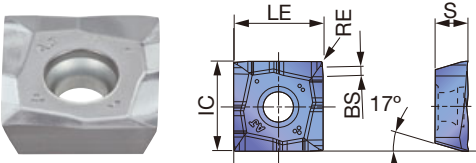
## SWMT1304-ML



## SWMT1304-MS



## SWG1304-AJ

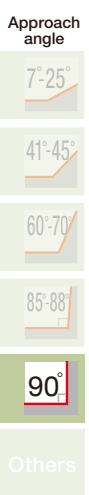


<b>P</b> Steel	☆			★			☆	☆	★									
<b>M</b> Stainless		★	☆	★				☆										
<b>K</b> Cast iron	★				☆	★												
<b>N</b> Non-ferrous									★					★				
<b>S</b> Superalloys	★	☆																
<b>H</b> Hard materials																		

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated							Cermet	Uncoated	LE	IC	S	BS			
			AH120	AH130	AH140	AH3135	T1115	T1215	T3130							T3225	DS1100	NS740
SWG1304PDPR-MJ	0.031	0.394	●								●				0.535	0.535	0.197	0.055
SWMT1304PDPR-MJ	0.031	0.394	●	●	●	●	●	●	●	●	●				0.535	0.535	0.197	0.055
SWMT1304PDER-ML	0.031	0.394	●			●									0.535	0.535	0.197	0.055
SWMT1304PDPR-MS	0.031	0.394		●	●										0.535	0.535	0.197	0.055
SWG1304PDFR-AJ	0.000	0.394								●		●			0.535	0.535	0.197	0.063

● : Line up



# STANDARD CUTTING CONDITIONS

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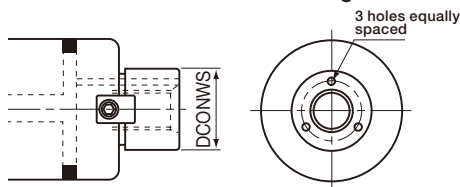


EPW13



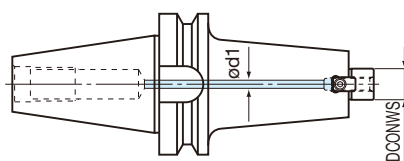
TPW13

## Face mill arbors with center through-coolant hole



Cutter diameter DC (in)	2.000	3.000	4.000 5.000	6.000
Nominal diameter DCONWS (in)	0.750	1.000	1.500	2.000

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



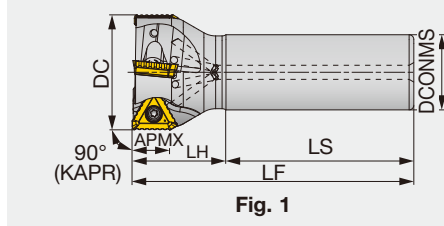
Nominal diameter DCONWS (in)	0.750	1.000	1.500	2.000
Applicable arbor types	FMC SM1	FMA FMC	FMA	FMA
Through hole diameter ød1 (in)	0.20 ~ 0.30	0.25 ~ 0.35	0.40 ~ 0.60	0.40 ~ 0.60

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.

Square shoulder endmill, shank type, with screw clamp system



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

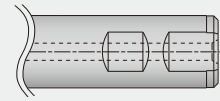


Fig. 2

Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert	Fig.
EPTC16U2.00W1.25R04	0.630	2.000	4	1.250	2.250	2.250	4.500	1.700	With	TC*T16...	2
Metric	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert	Fig.
EPTC16M050C32.0R04	16	50	4	32	80	40	120	0.8	With	TC*T16...	1
EPTC16M050C42.0R02L	16	50	2	42	310	50	360	3.8	With	TC*T16...	1

### SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
EPTC16...	TS 40B100I	H-TB2W	M-1000	BT15S

Recommended clamping torque: 2.58 lbs-ft, 3.5 N-m



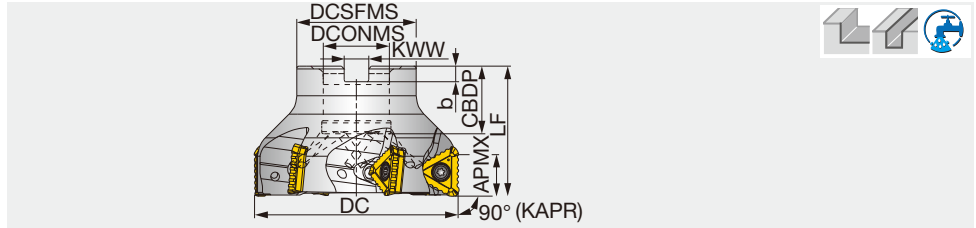
- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

# TUNG T<sup>RI</sup>SHRED

## TPTC16

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

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

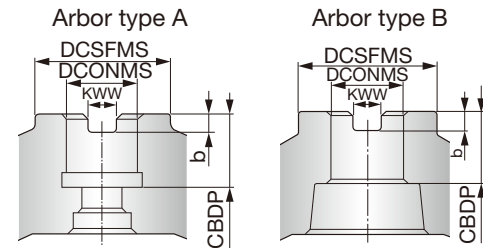


Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert	Arbor type
TPTC16U2.00B0.75R04	0.630	2.000	4	1.625	1.570	0.750	0.750	0.315	0.197	0.710	With	TC*T16...	A
TPTC16U2.50B0.75R05	0.630	2.500	5	2.125	1.570	0.750	0.750	0.315	0.197	1.260	With	TC*T16...	A
TPTC16U3.00B1.00R06	0.630	3.000	6	2.250	1.752	1.000	1.024	0.374	0.236	1.810	With	TC*T16...	A
TPTC16U4.00B1.50R07	0.630	4.000	7	3.000	2.000	1.500	1.193	0.626	0.394	3.170	With	TC*T16...	B

Metric	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	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...

### Arbor type



### SPARE PARTS

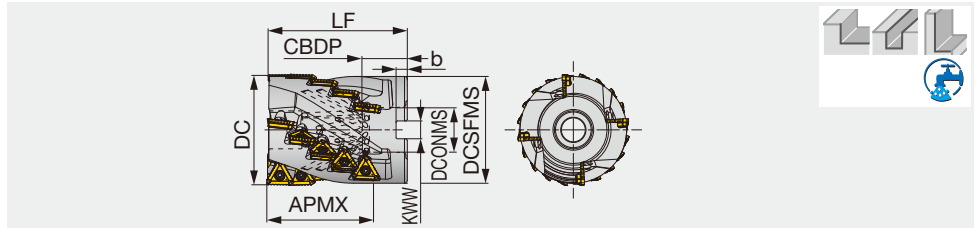
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit	Shell locking bolt 3 (Optional parts)
TPTC16U2.00B0.75R04	TS 40B100I	H-TB2W	M-1000	-	TCS9.525-35-I	BT15S	-
TPTC16U2.50B0.75R05	TS 40B100I	H-TB2W	M-1000	-	-	BT15S	(C0.375X1.125H)
TPTC16U3.00B1.00R06	TS 40B100I	H-TB2W	M-1000	-	-	BT15S	(C0.500X1.375H)
TPTC16U4.00B1.50R07	TS 40B100I	H-TB2W	M-1000	-	-	BT15S	(TMBA-0.750H)
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	-

Recommended clamping torque: 2.58 lbs-ft, 3.5 N-m

Reference pages: Inserts, Standard cutting conditions → **H200**

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

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



Inch	APMX	DC	ZAFP	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
LPTC16U2.50B1.00L2.4R03	2.402	2.500	3	12	2.350	3.350	1.000	1.024	0.374	0.236	2.820	With	TC*T16...
LPTC16U3.00B1.25L3.0R04	2.992	3.000	4	20	2.839	4.000	1.250	1.260	0.500	0.315	4.670	With	TC*T16...
Metric	APMX	DC	ZAFP	CICT	DCSFMS	LF	DCONMS	CBDP	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	Lubricant	Shell locking bolt	Torx bit
LPTC16U2.50B1.00L2.4R03	TS 40B100I	H-TB2W	M-1000	SD-08-C8	BT15S
LPTC16U3.00B1.25L3.0R04	TS 40B100I	H-TB2W	M-1000	SD-10-54	BT15S
LPTC16*063B...	TS 40B100I	H-TB2W	M-1000	CAP-CM12X1.75X50	BT15S
LPTC16*080B...	TS 40B100I	H-TB2W	M-1000	CM16X75	BT15S

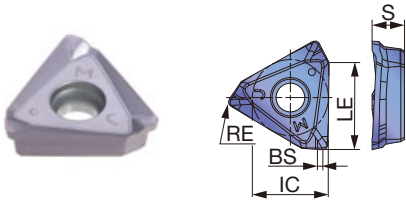
Recommended clamping torque: 2.58 lbs-ft, 3.5 N·m



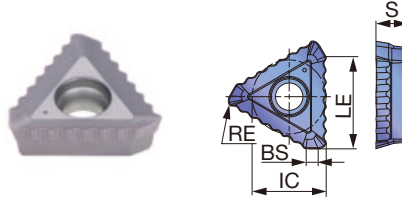


# INSERT

## 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	0.031	0.630	●	●			0.630	0.539	0.228	0.039
TCMT160620PDER-NMJ	0.079	0.630	●	●	●	●	0.630	0.524	0.228	0.079

● : Line up

# STANDARD CUTTING CONDITIONS

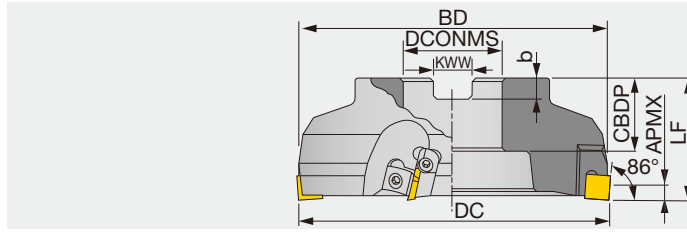
ISO	Workpiece materials	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steels 1015, 1020, etc.	- 300 HB	First choice	AH3135	NMJ*	330 - 820	0.003 - 0.006
			Wear resistance	T3225	NMJ*	330 - 990	0.003 - 0.006
			For finishing	AH3135	MJ	330 - 820	0.003 - 0.008
	Carbon steels, Alloy steels 1055, 4140, etc.	- 300 HB	First choice	AH3135	NMJ*	330 - 760	0.003 - 0.006
			Wear resistance	T3225	NMJ*	330 - 920	0.003 - 0.006
			For finishing	AH3135	MJ	330 - 760	0.003 - 0.008
Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3135	NMJ*	330 - 590	0.003 - 0.006	
		Wear resistance	T3225	NMJ*	330 - 200	0.003 - 0.006	
		For finishing	AH3135	MJ	330 - 590	0.003 - 0.008	
M	Stainless steels 304, 316, etc.	- 250 HB	First choice	AH3135	NMJ*	300 - 660	0.003 - 0.006
			Wear resistance	T3225	NMJ*	300 - 820	0.003 - 0.006
			For finishing	AH3135	MJ	300 - 660	0.003 - 0.008
K	Gray cast irons No.25, No.30, etc.	150 - 250 HB	First choice	AH120	NMJ*	460 - 820	0.003 - 0.006
			Wear resistance	T1215	NMJ*	490 - 980	0.003 - 0.006
			For finishing	AH120	MJ	460 - 820	0.003 - 0.010
	Ductile cast irons 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	NMJ*	460 - 820	0.003 - 0.006
			Wear resistance	T1215	NMJ*	490 - 980	0.003 - 0.006
			For finishing	AH120	MJ	460 - 820	0.003 - 0.010
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH120	NMJ*	70 - 200	0.003 - 0.006
			For finishing	AH120	MJ	70 - 200	0.003 - 0.007
			First choice	AH120	NMJ*	70 - 130	0.003 - 0.005
	Heat-resistant alloys Inconel718, etc.	-	For finishing	AH120	MJ	70 - 130	0.003 - 0.006

\* When using the -NMJ chipbreaker, do not feed higher than 0.006 ipt.

# THE4000RIA

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

GAMP = 13°, GAMF = +7° ~ +9°



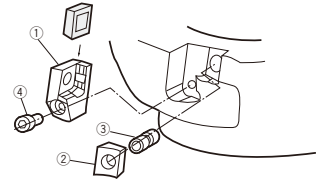
Right hand (R) shown.

Metric	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...

## SPARE PARTS

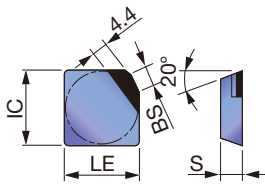
Designation	① Locator	② Wedge	③ Wedge fixing screw	④ Locator fixing screw	Wrench
THE4003RIA	LE413R	WP440R	FDS-8SS	CM4X0.7X14	TP-4
THE4004RIA	LE413R	WP440R	FDS-8S	CM4X0.7X14	TP-4

Recommended clamping torque : 8 N·m

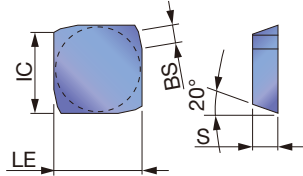


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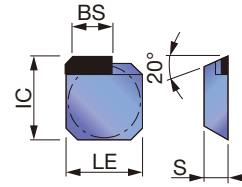
### SECN42ZFR-DIA



### SEEN/SECN 42Z



### WECN42ZFR-DIA



	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	0.138		●										0.500	0.500	0.125	0.098
SECN42ZFR	0.236	●											0.500	0.500	0.125	0.098
SEEN42ZFR	0.236	●											0.500	0.500	0.125	0.098
WECN42ZFR-DIA	0.020		●										0.488	0.509	0.125	0.236

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



EPO07





High Feed Milling

## ESE3000R

Square shoulder endmill, shank type, with wedge clamp system

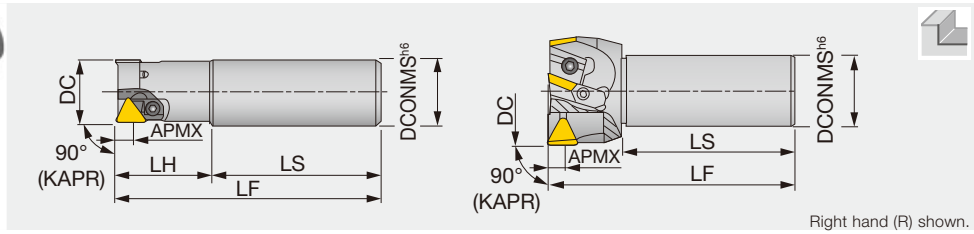
GAMP = +17°, GAMF = +5°



Face Milling



Shoulder Milling



Slot Milling



Profile Milling

Metric	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.



Chamfering, Counterbore

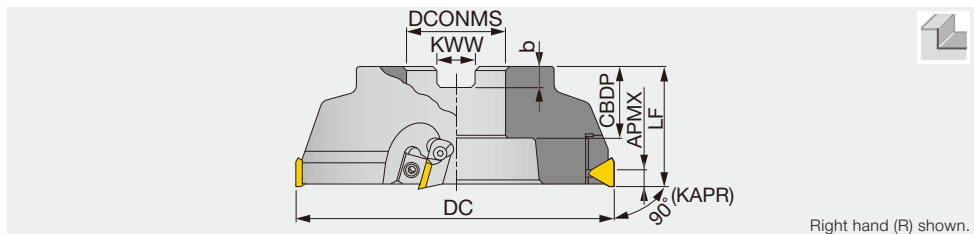
## TSE3000R

Square shoulder mill, with wedge clamp system

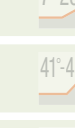
GAMP = +17°, GAMF = +5°



Finish Face Milling



Approach angle



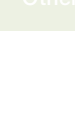
7°-25°



41°-45°



60°-70°



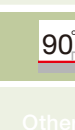
85°-88°



90°

Metric	APMX	DC	CICT	LF	DCONMS	CBDP	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...
TSE3004RIAE	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.



Others

### SPARE PARTS



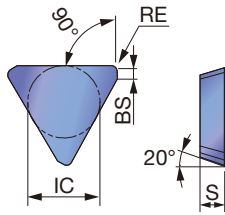
Designation	Clamp set	Locator	Wedge fixing screw	Locator fixing screw	Wedge1	Wedge 2	Wrench 1	Wrench 2
TSE3050R.... 63R... ESE3020R - ESE3040R	CSL-4	-	-	-	-	-	-	P-3
TSE300*RIA (E/-E)	-	LE303R	FDS-8S	CM4X0.7X12	WF330R	-	TP-4	-
ESE3050R, ESE3063R	-	LE302R	DS-8S	SHCM4-10	-	WP302R	TP-4	-

Recommended clamping torque : 8 N·m

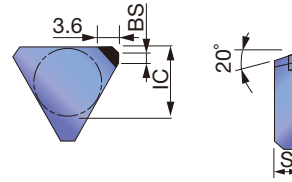
Reference pages: Inserts → [H174](#)

# INSERT

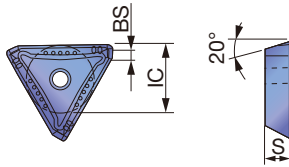
## TECN/TEEN 32Z



## TECN32ZFR-DIA



## TEKR16-MS



<b>P</b> Steel	★			☆	☆		☆	★		☆	★	☆	☆					
<b>M</b> Stainless		★	☆					★		☆								
<b>K</b> Cast iron	★					☆			★									
<b>N</b> Non-ferrous															★	★		
<b>S</b> Superalloys	★	☆																
<b>H</b> Hard materials																		

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated										IC	S	BS					
			AH120	AH130	AH140	AH330	GH330	T1115	T3130	AH3135	T1215	T3225				NS740	N308	UX30	TH10	DX140
TECN32ZFR	-	0.315																0.375	0.125	0.054
TECN32ZTR	0.031	0.315													●	●	●	0.375	0.125	0.039
TEEN32ZFR	-	0.315															●	0.375	0.125	0.054
TEEN32ZTR	0.031	0.315	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.375	0.125	0.039
TECN32ZFR-DIA	-	0.098															●	0.375	0.125	0.054
TEKR1603PEPR-MS	-	0.315			●													0.375	0.125	0.059

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

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



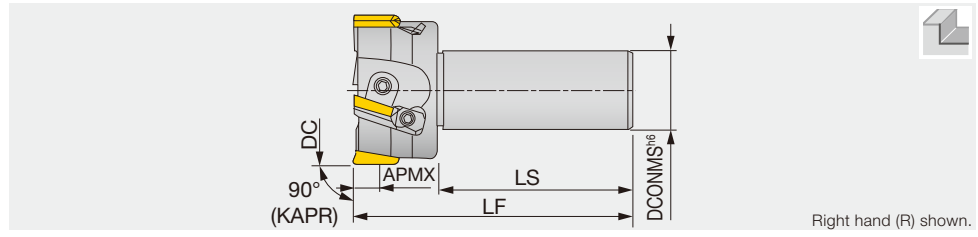
High Feed Milling

## ESE4000R

Square shoulder endmill, shank type, with wedge clamp system

Face Milling

Shoulder Milling



Slot Milling

Metric	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.

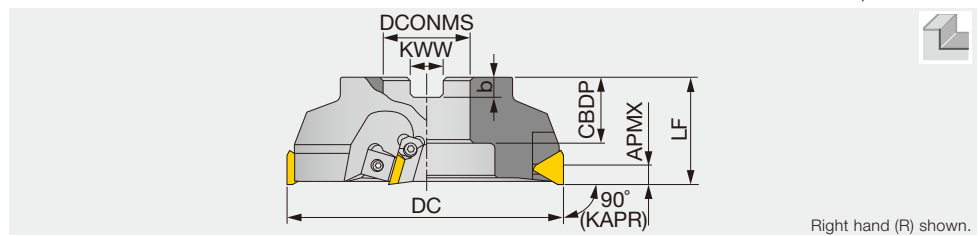
Profile Milling

## TSE4000RIAU

Square shoulder mill, with wedge clamp system

Chamfering, Counterbore

Finish Face Milling



Inch	APMX	DC	CICT	LF	DCONMS	CBDBP	KWW	b	WT(lb)
TSE4003RIAU	0.394	3.150	4	1.970	1.000	1.020	0.375	0.236	2.20
TSE4004RIAU	0.394	4.000	6	2.480	1.500	1.260	0.500	0.394	4.19
TSE4005RIAU	0.394	4.920	6	2.480	1.500	1.500	0.625	0.394	6.39
TSE4006RIAU	0.394	6.300	8	2.480	2.000	1.500	0.750	0.433	10.80
TSE4008RIA	0.394	7.870	10	2.480	2.500	1.500	1.000	0.551	16.31
TSE4010RIA	0.394	9.840	12	2.480	2.500	1.500	1.000	0.551	30.42
TSE4012RIA	0.394	12.400	14	2.480	2.500	1.500	1.000	0.551	48.72

Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

90°

Others

### SPARE PARTS

Designation	Locator	Wedge fixing screw	Locator fixing screw	Wedge	Wrench	Shell locking bolt	Shell locking bolt (Optional parts)
ESE4050RA	LE402AR	DS-8S	-	WT402R	TP-4	SHCM4-10	-
ESE4063RA	LE402AR	DS-8	-	WT402R	TP-4	SHCM4-10	-
ESE4003RIA-S32	LE403R	FDS-8S	CM4X0.7X14	WF330N	TP-4	-	-
TSE4003RIAU	LE403R	FDS-8S	CM4X0.7X14	WF330N	TP-4	-	(C0.500X1.375H)
TSE4004RIAU	LE403R	FDS-8S	CM4X0.7X14	WF330N	TP-4	-	(TMBA-0.750H)
TSE4005RIAU	LE405R	FDS-8S	CM4X0.7X14	WF500R	TP-4	-	(TMBA-0.750H)
TSE4006 - 4012...	LE405R	FDS-8S	CM4X0.7X14	WF500R	TP-4	-	-

Recommended clamping torque : 5.9 lbs-ft, 8 N·m

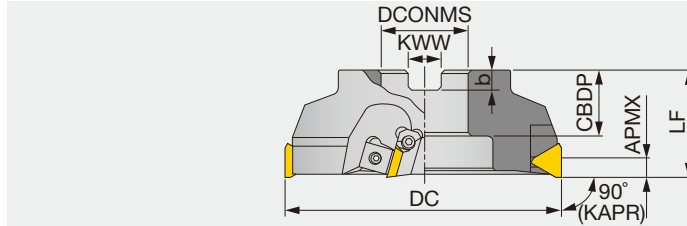
Reference pages: Inserts → [H206](#)



# TSE4000RIA

Square shoulder mill, with wedge clamp system

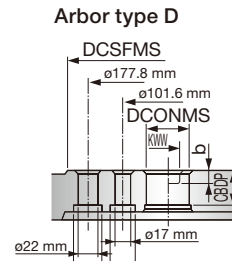
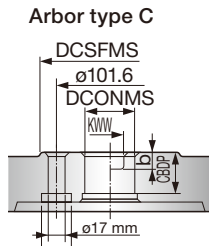
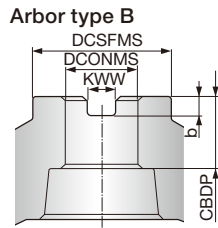
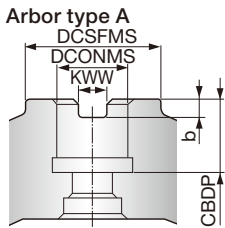
GAMP = +17°, GAMF = +5°



Right hand (R) shown.

Metric	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
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

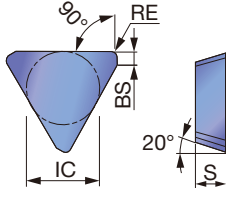
Reference pages: Inserts → **H206**



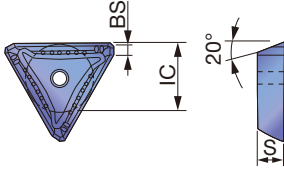
High Feed Milling  
Face Milling  
Shoulder Milling  
Slot Milling  
Profile Milling  
Chamfering, Counterbore  
Finish Face Milling  
Approach angle  
7°-25°  
41°-45°  
60°-70°  
85°-88°  
90°  
Others

## INSERT

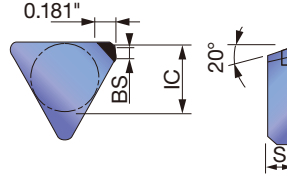
### TECN/TEEN 43Z



### TEKR22-MS



### TECN43ZFR-DIA



	P	M	K	N	S	H
Steel	☆	☆	☆	☆	☆	☆
Stainless	☆	★	☆	☆	☆	☆
Cast iron	★	☆	☆	☆	☆	☆
Non-ferrous	☆	☆	☆	☆	☆	☆
Superalloys	☆	☆	☆	☆	☆	☆
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						
TECN43ZFR	0.020	0.394																			0.500	0.187	0.079
TECN43ZTR	0.039	0.394													●	●					0.500	0.187	0.052
TEEN43ZFR	0.020	0.394																			0.500	0.187	0.079
TEEN43ZTR	0.039	0.394	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		0.500	0.187	0.052
TECN43ZFR-DIA	-	0.138																			0.500	0.187	0.079
TEKR2204PEPR-MS	-	0.394		●																	0.500	0.187	0.071

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



ESE4000R

e-catalog

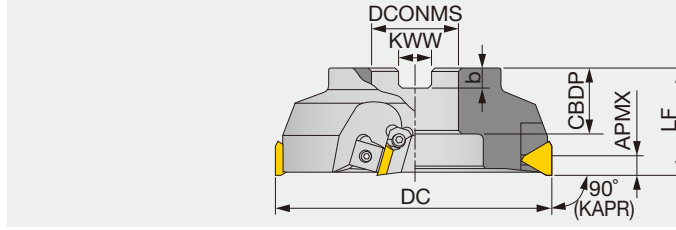


TSE4000RIA

# TSP4000RIA-U

Square shoulder mill, with wedge clamp system, for positive triangular inserts

GAMP = +5°, GAMF = 0°



Right hand (R) shown.

Inch	APMX	DC	CICT	LF	DCONMS	CBDP	KWW	b	WT(lb)	Insert
TSP4003RIA-U	0.394	3.150	4	1.970	1.000	1.020	0.375	0.236	2.43	TP*N43 / TP*R...
TSP4004RIA-U	0.394	4.000	6	2.480	1.500	1.260	0.625	0.394	4.41	TP*N43 / TP*R...
TSP4005RIA-U	0.394	4.920	6	2.480	1.500	1.500	0.625	0.394	6.83	TP*N43 / TP*R...
TSP4006RIA-U	0.394	6.300	8	2.480	2.000	1.500	0.750	0.433	11.24	TP*N43 / TP*R...
TSP4008RIA-U	0.394	7.870	10	2.480	2.500	1.500	1.000	0.551	16.98	TP*N43 / TP*R...
TSP4010RIA	0.394	9.840	12	2.480	2.500	1.500	1.000	0.551	31.08	TP*N43 / TP*R...
TSP4012RIA	0.394	12.400	14	2.480	2.500	1.500	1.000	0.551	49.82	TP*N43 / TP*R...

## SPARE PARTS



Designation	Locator	Wedge	Wedge fixing screw	Locator fixing screw	Wrench	Shell locking bolt (Optional parts)
TSP4003RIA-U	LP403R	WF330N	FDS-8S	CM4X0.7X14	TP-4	(C0.500X1.375H)
TSP4004RIA-U	LP403R	WF330N	FDS-8S	CM4X0.7X14	TP-4	(TMBA-0.750H)
TSP4005RIA-U	LP405R	WF500R	FDS-8S	CM4X0.7X14	TP-4	(TMBA-0.750H)
TSP4006 - 4012...	LP405R	WF500R	FDS-8S	CM4X0.7X14	TP-4	-

Recommended clamping torque : 5.9 lbs-ft

Reference pages: Inserts → [H209](#)

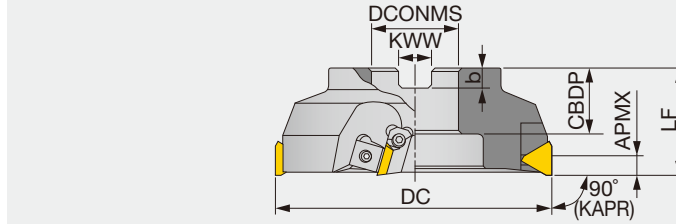


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling

## TSP4000IA

Square shoulder mill, with wedge clamp system

GAMP = +5°, GAMF = 0°



Right hand (R) shown.

Metric	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

Approach angle

7°-25°

41°-45°

60°-70°

85°-88°

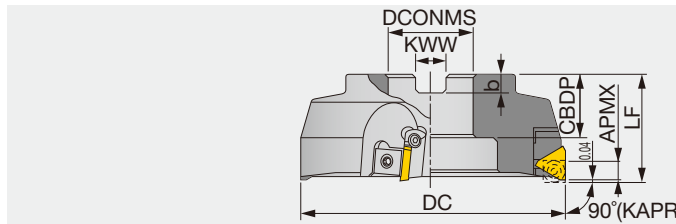
90°

Others

## TFP4000IA

Square shoulder mill with finisher

GAMP = +5°, GAMF = 0°



Right hand (R) shown.

Metric	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

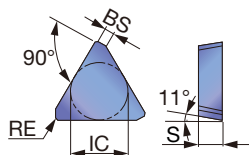
Recommended clamping torque : 8 N·m

# INSERT

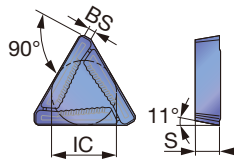
## TPCN/TPEN/TPKN 43Z

## TPKR/TPMR-MJ

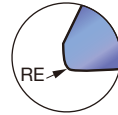
## SPHA-FNW



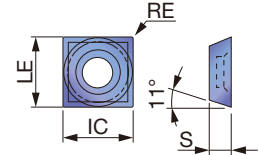
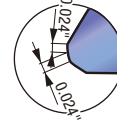
Right hand (R) shown.



PDSR-MJ



ZSR-MJ



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	C0.020	0.394									●				0.500	-	0.187	0.079
TPCN43ZTR	C0.020	0.394						●	●	●					0.500	-	0.187	0.079
TPEN43ZTR	C0.020	0.394						●							0.500	-	0.187	0.079
TPEN43ZTRCR	0.039	0.394													0.500	-	0.187	0.079
TPKN43ZFR	C0.020	0.394									●				0.500	-	0.187	0.079
TPKN43ZTR	C0.020	0.394	●	●	●	●	●	●	●	●					0.500	-	0.187	0.079
TPKR43ZSR-MJ	-	0.394				●	●								0.500	-	0.187	0.059
TPMR2204PDSR-MJ	0.031	0.394				●	●								0.500	-	0.187	0.047
TPKN43ZFL	C0.020	0.394									●				0.500	-	0.187	0.079
SPHA431FNW	0.016	-							●		●				0.500	0.500	0.187	-

● : Line up

# STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



TSP4000IA

e-catalog



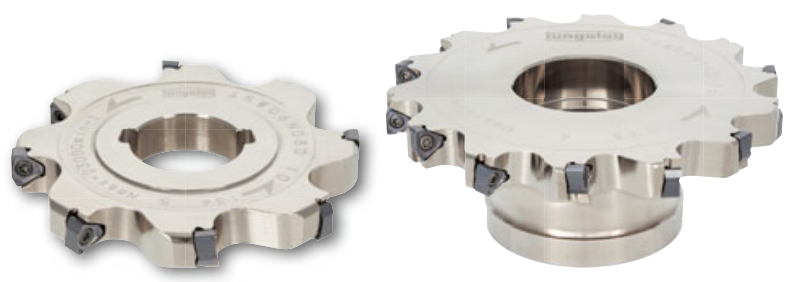
TFP4000IA

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





# TUNGUSLOT NIVERSAL



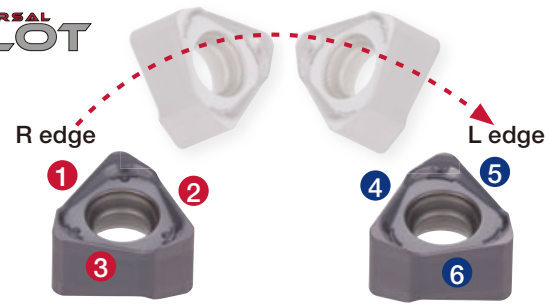
High economy by 6-corner insert with wiper  
 Machining stability with the cutter design for optimum chip evacuation

## 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 = 0.394", 0.472", 0.551", 0.630"



## Excellent chip evacuation even in deep slot milling - optimum pocket design

**TUNGUSLOT**

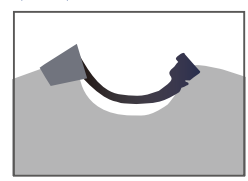
Competitor

**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 1055 (200HB)**  
 Edge width: CW = 0.394", Dry  
 Corner radius: RE = 0.031"

Chips at ae = 1.181" depth

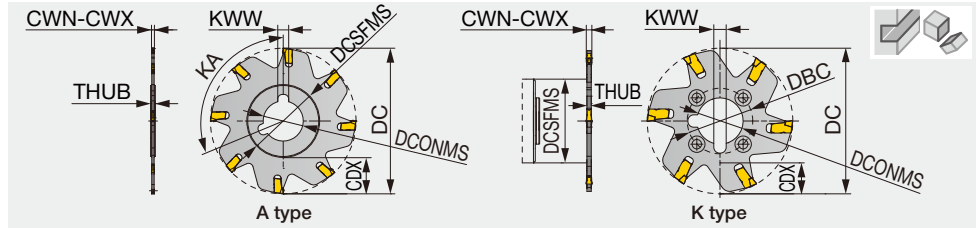
Cutter	Depth of slot: ae (in)		
	0.394"	0.787"	1.181"
<b>TUNGUSLOT</b>	○	○	○
Competitor A	○	○	✗



Chips are packed because of bad chip control and flow.

**Packed chips**

Reference pages: **H217 - H219**



Metric	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 <sup>(2)</sup>	22	2.4	40 <sup>(1)</sup>	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 <sup>(2)</sup>	22	3.2	40 <sup>(1)</sup>	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 <sup>(3)</sup>	22	2.4	40 <sup>(1)</sup>	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 <sup>(3)</sup>	22	3.2	40 <sup>(1)</sup>	32	-	6	SW32-40	-	R 22-46	K	SSM4*N/ SSS4*N
ASG01N125-1.6 <sup>(4)</sup>	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 <sup>(4)</sup>	1.6	1.5	1.79	125	12	1	30	27	2.4	64	-	75	7	-	-	-	A	SSM1*N/ SSS1*N
ASG02N125-2 <sup>(4)</sup>	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 <sup>(4)</sup>	2.2	1.8	2.69	125	12	2	32	27	2.4	60	-	75	7	-	-	-	A	SSM2*N/ SSS2*N
SSG03R125-3 <sup>(4)</sup>	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 <sup>(4)</sup>	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 <sup>(4)</sup>	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
SSG04R125-E4 <sup>(4)</sup>	4.1	3.54	4.52	125	8	4	34	32	3.2	55	45	-	8	S32-55	-	R 32-55	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.  
 (5) CWN\*\* and CWX\*\* shows the min and Max width of insert that can be positioned on the cutter.  
 The CW dimension depends on the insert width chosen.

### Tolerance of slot width\*

±0.1

\*Just for reference

### SPARE PARTS

Designation	Grip	Extractor
SSG01/02..., ASG01/02...	ESG0.5	-
SSG03/04...	-	ESG1

Reference pages: Inserts, Standard cutting conditions → H212

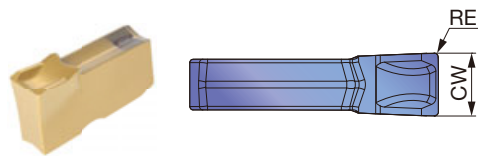




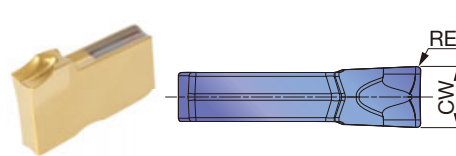


## INSERT

### SSM



### SSS



<b>P</b> Steel	★																			
<b>M</b> Stainless	★																			
<b>K</b> Cast iron	★																			
<b>N</b> Non-ferrous																				
<b>S</b> Superalloys																				
<b>H</b> Hard materials																				

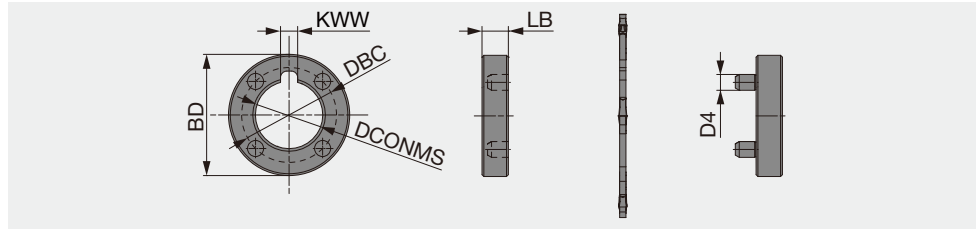
★ : First choice  
☆ : Second choice

Designation	RE	Coated										CW±0.0016"											
		GH130																					
SSM22N	0.008	●																				0.087	
SSM31N	0.008	●																					0.122
SSM41N	0.010	●																					0.161
SSS16N	0.006	●																					0.063
SSS22N	0.008	●																					0.087
SSS31N	0.008	●																					0.122
SSS41N	0.010	●																					0.161

● : Line up

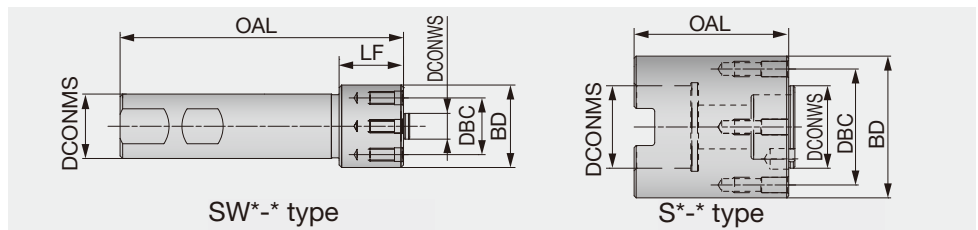
## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Insert	Cutting speed Vc (sfm)	Chip thickness t (in)
<b>P</b>	Low carbon steel 1015, etc.	- 200	SSM...	490 - 760	0.0020 - 0.006
	High carbon steel 1045, etc.	200 - 300	SSM...	330 - 560	0.0016 - 0.005
	Alloy steel 4140, etc.	150 - 300	SSM...	300 - 530	0.0016 - 0.005
	Tool steel D2, etc.	- 300	SSM...	230 - 390	0.0016 - 0.005
<b>M</b>	Stainless steel 304, etc.	- 200	SSS...	300 - 660	0.0016 - 0.005
<b>K</b>	Gray cast iron No250B, etc.	150 - 250	SSM...	330 - 660	0.0020 - 0.006
	Ductile cast iron 65-45-12, etc.	150 - 250	SSM...	260 - 430	0.0020 - 0.006



Inch	DCONMS	BD	D4	DBC	LB	KWW
R1.00-46	1.000	1.811	0.197	1.417	0.394	0.250
R1.25-55	1.250	2.165	0.236	1.772	0.394	0.236
Metric	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



Inch	DCONMS	DCONMS	DCONWS	BD	DBC	LF	OAL
SW1.00-32	1.000	-	0.394	1.260	0.866	1.000	4.331
SW1.25-46	1.250	-	1.000	1.811	1.417	1.181	4.724
S1.25-55	-	1.250	1.250	2.165	1.772	-	2.362
Metric	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



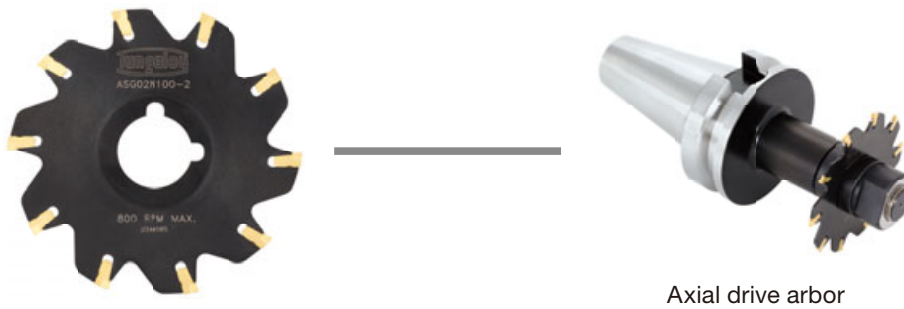
Designation	Screw	Wrench		
		Mono block type	Torx bit	Grip
SW1.00-32	SR76-961	SETT-15/5	-	-
SW1.25-46	SR76-963	SETT-15/5	-	-
S1.25-55	SR76-943	-	BT20M	H-TB
SW25-32, SW1.00-32	SR76-961	SETT-15/5	-	-
SW32-40, SW32-25.4-46-J, SW1.25-46	SR76-963	SETT-15/5	-	-
S32-55	SR76-943	-	BT20M	H-TB

- 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

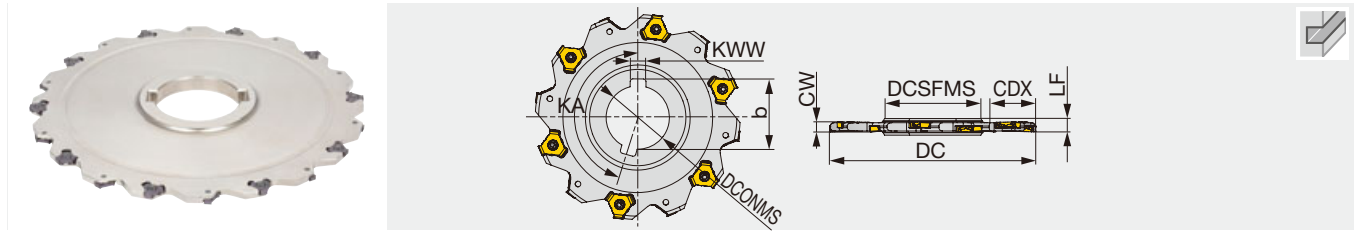
Shank adaptor

Shell adaptor

Shell mill / Endmill arbor

Tool dia.	ø2.480"	ø3.150"	ø3.937"	ø4.921"
Drive flange	-	✓	✓	✓
Shank / Shell adaptor	✓	✓	✓	✓

## Axial drive slot mill, for tangentially mounted inserts



Inch	CW*	DC	ZEFP/CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	KA	Insert
ASV04N300-U025	0.250	3.000	4/8	1.614	1.000	0.394	1.102	0.250	0.595	157.5	TVKX04H3...
ASV05N300-U031	0.313	3.000	4/8	1.614	1.000	0.472	1.102	0.250	0.595	157.5	TVKX0504...
ASV04N400-U025	0.250	4.000	5/10	1.890	1.250	0.394	1.386	0.312	0.957	162	TVKX04H3...
ASV05N400-U031	0.313	4.000	5/10	1.890	1.250	0.472	1.386	0.312	0.957	162	TVKX0504...
ASV04N500-U025	0.250	5.000	6/12	2.283	1.500	0.394	1.665	0.375	1.260	165	TVKX04H3...
ASV05N500-U031	0.313	5.000	6/12	2.283	1.500	0.472	1.665	0.375	1.260	165	TVKX0504...
ASV04N600-U025	0.250	6.000	8/16	2.283	1.500	0.394	1.665	0.375	1.760	168.75	TVKX04H3...
ASV05N600-U031	0.313	6.000	8/16	2.283	1.500	0.472	1.665	0.375	1.760	168.75	TVKX0504...
ASV04N800-U025	0.250	8.000	10/20	2.717	2.000	0.394	2.197	0.500	2.543	171	TVKX04H3...
ASV05N800-U031	0.313	8.000	10/20	2.717	2.000	0.472	2.197	0.500	2.543	171	TVKX0504...

Metric	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...

CW\*: CW of the cutter can be altered by using a special Insert in the same pocket. with in a range

SPARE PARTS					
Designation	Clamping screw	Grip	Lubricant	Torx bit	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: SR114-018-L3.40 = 0.52 lbs-ft, 0.7 N·m, SR14-500/L5.1, SR14-500-L7.0 = 2.58 lbs-ft, 3.5 N·m

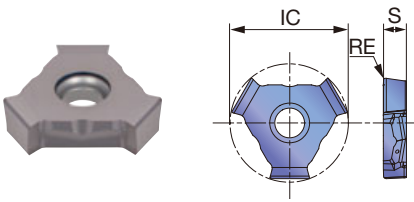
Reference pages: Inserts, Standard cutting conditions → **H216**





# INSERT

## TVKX-MJ

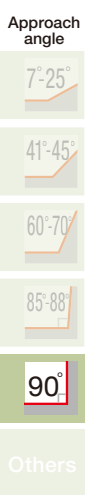


<b>P</b> Steel	☆	★	★	★
<b>M</b> Stainless		★	☆	☆
<b>K</b> Cast iron	★		☆	☆
<b>N</b> Non-ferrous				
<b>S</b> Superalloys	★	☆	★	★
<b>H</b> Hard materials				

★ : First choice  
☆ : Second choice

Designation	RE	Coated				S	IC
		AH120	AH130	AH725	SH725		
TVKX020202TN-MJ	0.008	●		●		0.094	0.370
TVKX020202FN-MJ	0.008				●	0.094	0.370
TVKX020204TN-MJ	0.016	●		●		0.094	0.370
TVKX03X302TN-MJ	0.008	●		●		0.126	0.370
TVKX03X302FN-MJ	0.008				●	0.126	0.370
TVKX03X304TN-MJ	0.016	●		●		0.126	0.370
TVKX04H302FN-MJ	0.008				●	0.138	0.665
TVKX04H304TN-MJ	0.016	●	●	●		0.138	0.665
TVKX04H308TN-MJ	0.031	●	●	●		0.138	0.665
TVKX050402FN-MJ	0.008				●	0.177	0.665
TVKX050404TN-MJ	0.016	●	●	●		0.177	0.665
TVKX050408TN-MJ	0.031	●	●	●		0.177	0.665

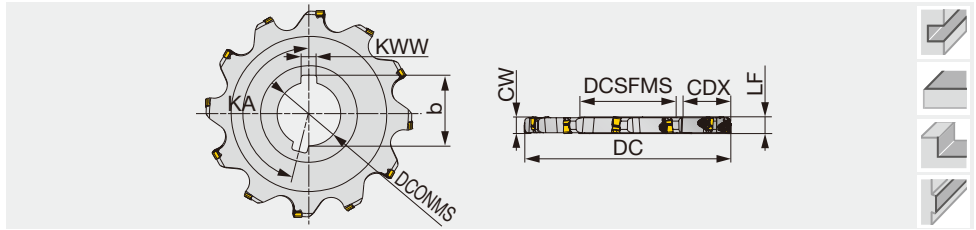
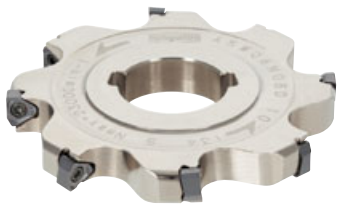
● : Line up



# STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per edge line: fz (ipt)			
						ASV			
						ae / DC (in)			
						10%	20%	30%	≤ 50%
<b>P</b>	Low carbon steels 1015, etc.	- 200 HB	First choice	AH725	300 - 590	0.0031 - 0.0098	0.0024 - 0.0075	0.0020 - 0.0063	0.0020 - 0.0059
			Fracture resistance	AH130	300 - 590	0.0031 - 0.0098	0.0024 - 0.0075	0.0020 - 0.0063	0.0020 - 0.0059
	High carbon steels 1045, etc.	200 - 300 HB	First choice	AH725	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
			Fracture resistance	AH130	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
	Alloy steels 4140, etc.	150 - 300 HB	First choice	AH725	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
			Fracture resistance	AH130	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
	Tool steels D2, etc.	- 300 HB	First choice	AH725	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
			Fracture resistance	AH130	300 - 590	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
<b>M</b>	Stainless steel 304, etc.	- 200 HB	-	AH130	300 - 660	0.0028 - 0.0087	0.0020 - 0.0063	0.0016 - 0.0055	0.0016 - 0.0051
<b>K</b>	Gray cast irons No250B, etc.	150 - 250 HB	-	AH120	390 - 760	0.0031 - 0.0098	0.0024 - 0.0075	0.0020 - 0.0063	0.0020 - 0.0059
	Ductile cast irons 65-45-12, etc.	150 - 250 HB	-	AH120	300 - 490	0.0031 - 0.0098	0.0024 - 0.0075	0.0020 - 0.0063	0.0020 - 0.0059
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH725	100 - 130	0.0028 - 0.0047	0.0020 - 0.0035	0.0016 - 0.0028	0.0016 - 0.0028
			Fracture resistance	AH130	100 - 130	0.0028 - 0.0047	0.0020 - 0.0035	0.0016 - 0.0028	0.0016 - 0.0028
	Nickel-based alloys Inconel 718, etc.	- 40 HRC	First choice	AH725	70 - 120	0.0028 - 0.0047	0.0020 - 0.0035	0.0016 - 0.0028	0.0016 - 0.0028
			Fracture resistance	AH130	70 - 120	0.0028 - 0.0047	0.0020 - 0.0035	0.0016 - 0.0028	0.0016 - 0.0028

## Axial drive slot mill



Inch	CW	DC	ZEFP/CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	KA	Insert
ASW06N300-U037	0.375	3.000	4/8	1.614	1.000	0.375	1.102	0.250	0.654	157.5	WNGU0603...
ASW06N400-U037	0.375	4.000	5/10	1.890	1.250	0.375	1.386	0.312	1.016	162	WNGU0603...
ASW07N400-U050	0.500	4.000	5/10	1.890	1.250	0.500	1.386	0.312	1.016	162	WNGU07T3...
ASW06N500-U037	0.375	5.000	6/12	2.283	1.500	0.375	1.665	0.375	1.319	165	WNGU0603...
ASW07N500-U050	0.500	5.000	6/12	2.283	1.500	0.500	1.665	0.375	1.319	165	WNGU07T3...
ASW06N600-U037	0.375	6.000	7/14	2.283	1.500	0.375	1.665	0.375	1.819	167.14	WNGU0603...
ASW07N600-U050	0.500	6.000	7/14	2.283	1.500	0.500	1.665	0.375	1.819	167.14	WNGU07T3...
ASW09N600-U062	0.625	6.000	7/14	2.283	1.500	0.625	1.665	0.375	1.819	167.14	WNGU0904...

Metric	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

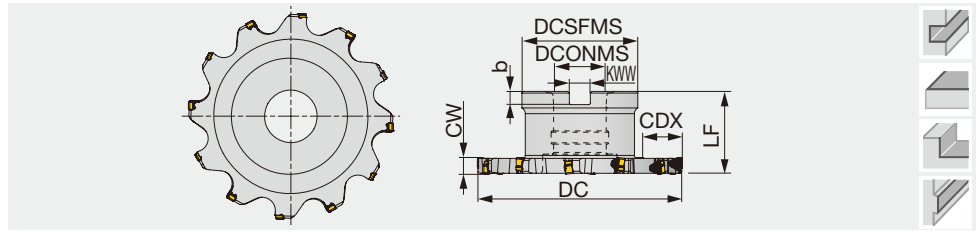
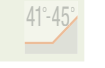
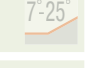
Designation	Clamping screw1	Clamping screw2	Grip 1	Grip 2	Lubricant	Torx bit	Wrench
ASW06N...	-	CSPB-2.5	-	-	M-1000	-	IP-8D
ASW07N400, 500-U..., ASW07N100/125-...	-	CSPD-3	-	SW6-SD	M-1000	BLD IP10/S7	-
ASW07N600-U..., ASW07N160-...	-	CSPD-3	-	-	M-1000	-	IP-10D
ASW09N100-...	CSPB-3.5	-	H-TB2W	-	M-1000	BLDIP15/S7	-
ASW09N600-U..., ASW09N160-...	CSPB-3.5	-	-	-	M-1000	-	IP-15D

Recommended clamping torque: CSPB-2.5 = 0.96 lbs·ft, 1.3 N·m, CSPB-3.5 = 2.58 lbs·ft, 3.5 N·m, CSPD-3 = 1.84 lbs·ft, 2.5 N·m





Radial drive slot mill



Inch	CW	DC	ZAFP/CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	Insert
TSW06R400-U037	0.375	4.000	5/10	1.969	1.000	1.969	0.236	0.374	0.976	WNGU0603...
TSW07R400-U050	0.500	4.000	5/10	1.969	1.000	1.969	0.236	0.374	0.976	WNGU07T3...
TSW06R500-U037	0.375	5.000	6/12	2.756	1.250	1.969	0.315	0.500	1.083	WNGU0603...
TSW07R500-U050	0.500	5.000	6/12	2.756	1.250	1.969	0.315	0.500	1.083	WNGU07T3...
TSW06R600-U037	0.375	6.000	7/14	3.937	1.500	2.480	0.394	0.626	0.992	WNGU0603...
TSW07R600-U050	0.500	6.000	7/14	3.937	1.500	2.480	0.394	0.626	0.992	WNGU07T3...
TSW09R600-U062	0.625	6.000	7/14	3.937	1.500	2.480	0.394	0.626	0.992	WNGU0904...

Metric	CW	DC	ZAFP/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...

**INCH SPARE PARTS**



Designation	Clamping screw1	Clamping screw2	Grip	Lubricant	Torx bit	Mono block type Torx bit	Shell locking bolt (Optional parts)
TSW06R400-U037	-	CSPB-2.5	-	M-1000	-	IP-8D	(C0.500X1.375H)
TSW07R400-U050	-	CSPD-3	SW6-SD	M-1000	BLD IP10/S7	-	(C0.500X1.375H)
TSW06R500-U037	-	CSPD-3	-	M-1000	-	IP-8D	-
TSW07R500-U050	-	CSPD-3	SW6-SD	M-1000	BLD IP10/S7	-	-
TSW06R600-U037	-	CSPD-3	-	M-1000	-	IP-8D	(TMBA-0.750H)
TSW07R600-U050	-	CSPD-3	-	M-1000	-	IP-10D	(TMBA-0.750H)
TSW09R600-U062	CSPB-3.5	-	-	M-1000	-	IP-15D	(TMBA-0.750H)

Recommended clamping torque: CSPB-2.5 = 0.96 lbs·ft, CSPB-3.5 = 2.58 lbs·ft, CSPD-3 = 1.84 lbs·ft

**METRIC SPARE PARTS**



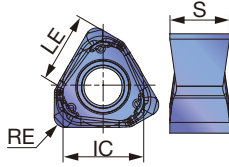
Designation	Clamping screw1	Clamping screw2	Grip	Lubricant	Torx bit	Mono block type Torx bit
TSW06R...	-	CSPB-2.5	-	M-1000	-	IP-8D
TSW07R100/125-...	-	CSPD-3	SW6-SD	M-1000	BLD IP10/S7	-
TSW07R160-...	-	CSPD-3	-	M-1000	-	IP-10D
TSW09R160-...	CSPB-3.5	-	-	M-1000	-	IP-15D

Recommended clamping torque: CSPB-2.5 = 1.3 N·m, CSPB-3.5 = 3.5 N·m, CSPD-3 = 2.5 N·m



# INSERT

## WNGU-MJ



<b>P</b>	Steel	☆	★	★
<b>M</b>	Stainless		★	☆
<b>K</b>	Cast iron	★	☆	
<b>N</b>	Non-ferrous			
<b>S</b>	Superalloys	★	☆	★
<b>H</b>	Hard materials			

★ : First choice  
☆ : Second choice

Designation	RE	Coated				LE	IC	S
		AH120	AH130	AH725	AH3135			
WNGU060304TN-MJ	0.016	●		●		0.220	0.240	0.173
WNGU060308TN-MJ	0.031	●	●	●	●	0.220	0.240	0.173
WNGU060310TN-MJ	0.039	●		●		0.220	0.240	0.173
WNGU060316TN-MJ	0.063	●	●	●		0.220	0.240	0.173
WNGU060320TN-MJ	0.079	●		●		0.220	0.240	0.173
WNGU07T304TN-MJ	0.016	●		●		0.268	0.291	0.217
WNGU07T308TN-MJ	0.031	●	●	●		0.268	0.291	0.217
WNGU07T310TN-MJ	0.039	●		●		0.268	0.291	0.217
WNGU07T316TN-MJ	0.063	●	●	●		0.268	0.291	0.217
WNGU07T320TN-MJ	0.079	●		●		0.268	0.291	0.217
WNGU090404TN-MJ	0.016	●		●		0.335	0.339	0.256
WNGU090408TN-MJ	0.031	●	●	●		0.335	0.339	0.256
WNGU090410TN-MJ	0.039	●		●		0.335	0.339	0.256
WNGU090416TN-MJ	0.063	●	●	●		0.335	0.339	0.256
WNGU090420TN-MJ	0.079	●		●		0.335	0.339	0.256

● : Line up

# STANDARD CUTTING CONDITIONS

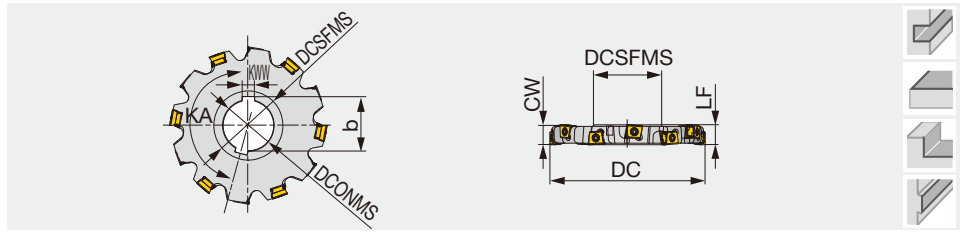
ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per edge line: fz (ipt)			
						TSW / ASW			
						ae / DC (in)			
						10%	20%	30%	≤ 50%
<b>P</b>	Low carbon steels 1015, etc.	- 200 HB	First choice	AH725	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
			Fracture resistance	AH130	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
	High carbon steels 1045, etc.	200 - 300 HB	First choice	AH725	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
			Fracture resistance	AH130	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
	Alloy steels 4140, etc.	150 - 300 HB	First choice	AH725	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
			Fracture resistance	AH130	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
Tool steels D2, etc.	- 300 HB	First choice	AH725	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079	
		Fracture resistance	AH130	300 - 590	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079	
<b>M</b>	Stainless steel 304, etc.	- 200 HB	-	AH130	300 - 660	0.0047 - 0.0130	0.0035 - 0.0098	0.0028 - 0.0083	0.0028 - 0.0079
<b>K</b>	Gray cast irons No250B, etc.	150 - 250 HB	-	AH120	390 - 760	0.0047 - 0.0165	0.0035 - 0.0122	0.0028 - 0.0106	0.0028 - 0.0098
	Ductile cast irons 65-45-12, etc.	150 - 250 HB	-	AH120	300 - 490	0.0047 - 0.0165	0.0035 - 0.0122	0.0028 - 0.0106	0.0028 - 0.0098
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH725	100 - 130	0.0039 - 0.0067	0.0031 - 0.0051	0.0024 - 0.0043	0.0024 - 0.0039
			Fracture resistance	AH130	100 - 130	0.0039 - 0.0067	0.0031 - 0.0051	0.0024 - 0.0043	0.0024 - 0.0039
	Nickel-based alloys Inconel 718, etc.	- 40 HRC	First choice	AH725	70 - 120	0.0039 - 0.0067	0.0031 - 0.0051	0.0024 - 0.0043	0.0024 - 0.0039
			Fracture resistance	AH130	70 - 120	0.0039 - 0.0067	0.0031 - 0.0051	0.0024 - 0.0043	0.0024 - 0.0039



# TEC TANGENTIAL SLOTT

## ASN 10/12/15

Axial drive slot mill, for tangentially mounted inserts



Metric	CW	DC	ZEFP	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

Approach angle

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

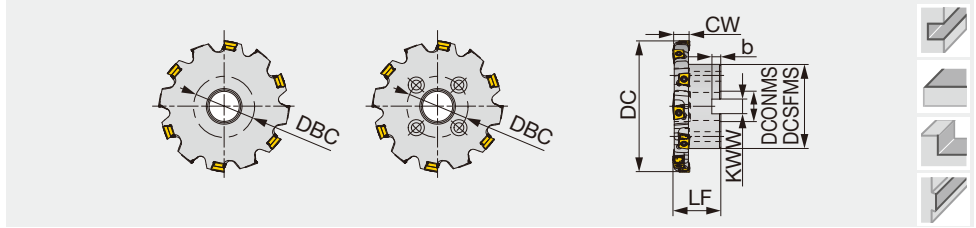
### SPARE PARTS

Designation	Clamping screw	Grip	Torx bit
ASN10/12R...	SM40-143-H0	H-TB	BT15S
ASN15R...	CSTB-5L159	H-TB	BT20S

Recommended clamping torque: SM40-143-H0 = 2.58 lbs·ft, 3.5 N·m, CSTB-5L159 = 3.69 lbs·ft, 5 N·m

Reference pages: Inserts, Standard cutting conditions → [H222](#)

Radial drive slot mill, for tangentially mounted inserts



Metric	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**ZTEN-MJ
TSN10R100M27.0E16-05	16	100	5	10	58	27	50	7	12.4	20	-	LMEU1008**ZTEN-MJ
TSN12R100M25.4-19-05	19	100	5	10	50	25.4	50	6	9.5	24	-	LMEU1208**ZTEN-MJ
TSN12R100M27.0E19-05	19	100	5	10	58	27	50	7	12.4	20	-	LMEU1208**ZTEN-MJ
TSN10R125M31.7-16-06	16	125	6	12	70	31.75	50	8	12.7	26.5	-	LMEU1008**ZTEN-MJ
TSN10R125M32.0E16-06	16	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1008**ZTEN-MJ
TSN12R125M31.7-19-06	19	125	6	12	70	31.75	50	8	12.7	26.5	-	LMEU1208**ZTEN-MJ
TSN12R125M32.0E19-06	19	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1208**ZTEN-MJ
TSN15R125M31.7-25-05	25	125	5	10	70	31.75	50	8	12.7	26.5	-	LMEU1509**ZTEN-MJ
TSN15R125M32.0E25-05	25	125	5	10	66	32	50	8	14.4	28.5	-	LMEU1509**ZTEN-MJ
TSN10R160M38.1-16-07	16	160	7	14	100	38.1	63	10	15.9	29	-	LMEU1008**ZTEN-MJ
TSN10R160M40.0E16-07	16	160	7	14	82	40	63	9	16.4	38	-	LMEU1008**ZTEN-MJ
TSN12R160M38.1-19-07	19	160	7	14	100	38.1	63	10	15.9	29	-	LMEU1208**ZTEN-MJ
TSN12R160M40.0E19-07	19	160	7	14	82	40	63	9	16.4	38	-	LMEU1208**ZTEN-MJ
TSN15R160M38.1-25-06	25	160	6	12	100	38.1	63	10	15.9	29	-	LMEU1509**ZTEN-MJ
TSN15R160M40.0E25-06	25	160	6	12	82	40	63	9	16.4	38	-	LMEU1509**ZTEN-MJ
TSN10R200M40.0E16-08	16	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1008**ZTEN-MJ
TSN10R200M47.6-16-08	16	200	8	16	135	47.625	63	14	25.4	31.5	101.6	LMEU1008**ZTEN-MJ
TSN12R200M40.0E19-08	19	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1208**ZTEN-MJ
TSN12R200M47.6-19-08	19	200	8	16	135	47.625	63	14	25.4	31.5	101.6	LMEU1208**ZTEN-MJ
TSN15R200M40.0E25-07	25	200	7	14	95	40	63	9	16.4	55	66.7	LMEU1509**ZTEN-MJ
TSN15R200M47.6-25-07	25	200	7	14	135	47.625	63	14	25.4	31.5	101.6	LMEU1509**ZTEN-MJ
TSN15R200M50.8-25-07	25	200	7	14	135	50.8	63	14	25.4	31.5	101.6	LMEU1509**ZTEN-MJ
TSN12R250M47.6-19-09	19	250	9	18	140	47.625	63	14	25.4	54	101.6	LMEU1208**ZTEN-MJ
TSN12R250M60.0E19-09	19	250	9	18	135	60	63	14	25.7	60	101.6	LMEU1208**ZTEN-MJ
TSN15R250M47.6-25-08	25	250	8	16	140	47.625	63	14	25.4	54	101.6	LMEU1509**ZTEN-MJ
TSN15R250M60.0E25-08	25	250	8	16	135	60	63	14	25.7	60	101.6	LMEU1509**ZTEN-MJ
TSN15R250M63.5-25-08	25	250	8	16	140	63.5	63	14	25.4	54	101.6	LMEU1509**ZTEN-MJ

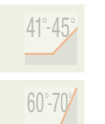
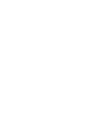
SPARE PARTS



Designation	Clamping screw	Grip	Torx bit	Shell locking bolt (Optional parts)
TSN10R100M25.4-16-05	SM40-143-H0	H-TB	BT15S	(C0.500X1.375H)
TSN10/12R125, 200M..., TSN12R125, 250M...	SM40-143-H0	H-TB	BT15S	-
TSN10/12R160M...	SM40-143-H0	H-TB	BT15S	(TMBA-0.750H)
TSN15R125, 200, 250M...	CSTB-5L159	H-TB	BT20S	-
TSN15R160M38.1-25-06	CSTB-5L159	H-TB	BT20S	(TMBA-0.750H)

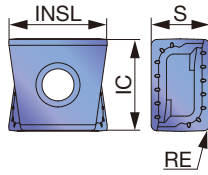
Recommended clamping torque: SM40-143-H0 = 3.5 N·m, CSTB-5L159 = 5 N·m





# INSERT

## LMEU-MJ



<b>P</b> Steel	☆	☆	★
<b>M</b> Stainless		☆	★
<b>K</b> Cast iron	★	☆	
<b>N</b> Non-ferrous			
<b>S</b> Superalloys	★	★	
<b>H</b> Hard materials			

★ : First choice  
☆ : Second choice

Designation	RE	Coated				INSL	IC	S
		AH120	AH140	AH725	AH3135			
LMEU100808ZHEN-MJ	0.031	●	●	●	●	0.500	0.413	0.315
LMEU100810ZHEN-MJ	0.039	●			●	0.500	0.413	0.315
LMEU100816ZHEN-MJ	0.063	●	●	●	●	0.492	0.413	0.315
LMEU100820ZHEN-MJ	0.079	●	●	●	●	0.488	0.413	0.315
LMEU100824ZHEN-MJ	0.094	●	●	●	●	0.488	0.413	0.315
LMEU100830ZHEN-MJ	0.118	●			●	0.480	0.413	0.315
LMEU100832ZHEN-MJ	0.126	●	●	●	●	0.480	0.413	0.315
LMEU120808ZHEN-MJ	0.031	●	●	●	●	0.535	0.500	0.315
LMEU120816ZHEN-MJ	0.063	●	●	●	●	0.528	0.500	0.315
LMEU120820ZHEN-MJ	0.079	●	●	●	●	0.524	0.500	0.315
LMEU120824ZHEN-MJ	0.094	●	●	●	●	0.520	0.500	0.315
LMEU120830ZHEN-MJ	0.118	●			●	0.516	0.500	0.315
LMEU120832ZHEN-MJ	0.126	●	●	●	●	0.516	0.500	0.315
LMEU150908ZHEN-MJ	0.031	●	●	●	●	0.614	0.591	0.374
LMEU150916ZHEN-MJ	0.063	●	●	●	●	0.606	0.591	0.374
LMEU150920ZHEN-MJ	0.079	●	●	●	●	0.606	0.591	0.374
LMEU150924ZHEN-MJ	0.094	●	●	●	●	0.602	0.591	0.374
LMEU150930ZHEN-MJ	0.118	●			●	0.598	0.591	0.374
LMEU150932ZHEN-MJ	0.126	●	●	●	●	0.594	0.591	0.374
LMEU150940ZHEN-MJ*	0.157	●			●	0.587	0.591	0.374
LMEU150950ZHEN-MJ*	0.197	●			●	0.579	0.591	0.374

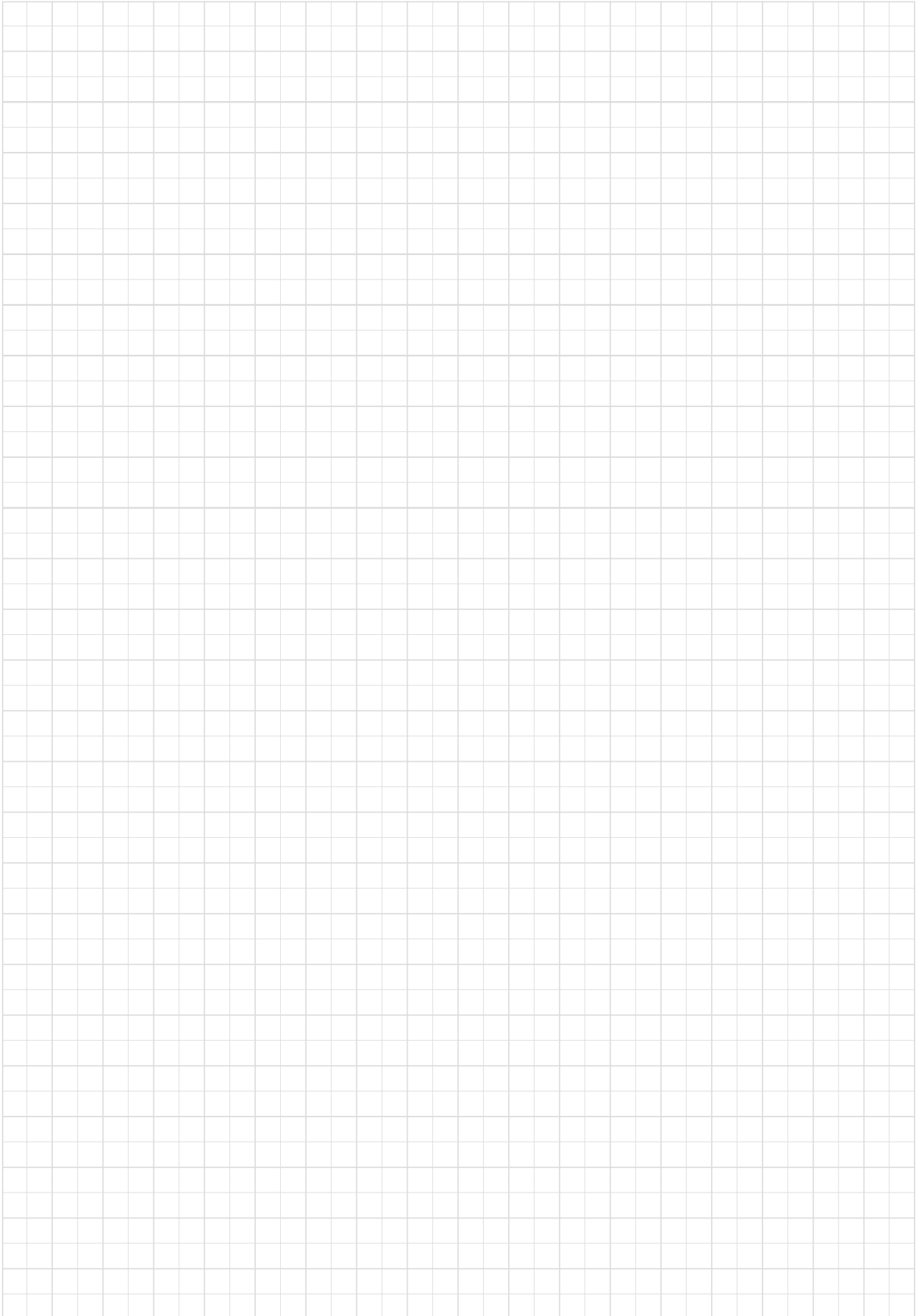
\* Please note that LMEU150940 and LMEU150950 inserts are for special cutter bodies only and do not fit standard versions.

● : Line up

# STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per edge line: fz (ipt)			
						TSN / ASN			
						ae / DC (in)			
						10%	20%	30%	≤ 50%
<b>P</b>	Low carbon steels 1015, etc.	- 200 HB	First choice	AH3135	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
			Fracture resistance	AH725	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
	High carbon steels 1045, etc.	200 - 300 HB	First choice	AH3135	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
			Fracture resistance	AH725	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
	Alloy steels 4140, etc.	150 - 300 HB	First choice	AH3135	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
			Fracture resistance	AH725	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
Tool steels D2, etc.	- 300 HB	First choice	AH3135	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098	
		Fracture resistance	AH725	300 - 590	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098	
<b>M</b>	Stainless steel 304, etc.	- 200 HB	-	AH3135	300 - 660	0.0087 - 0.0165	0.0063 - 0.0122	0.0055 - 0.0106	0.0051 - 0.0098
<b>K</b>	Gray cast irons No250B, etc.	150 - 250 HB	-	AH120	390 - 760	0.0087 - 0.0200	0.0063 - 0.0150	0.0055 - 0.0126	0.0051 - 0.0118
	Ductile cast irons 65-45-12, etc.	150 - 250 HB	-	AH120	300 - 490	0.0087 - 0.0130	0.0063 - 0.0098	0.0055 - 0.0083	0.0051 - 0.0079
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH725	100 - 130	0.0047 - 0.0087	0.0035 - 0.0063	0.0028 - 0.0055	0.0028 - 0.0051
	Nickel-based alloys Inconel 718, etc.	- 40 HRC	First choice	AH725	70 - 120	0.0047 - 0.0087	0.0035 - 0.0063	0.0028 - 0.0055	0.0028 - 0.0051

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**

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

# ADD<sup>FORCE</sup> 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<sup>FORCE</sup> BARREL

DCX = 20 mm (0.787"),  
PRFRAD = 30 mm (1.181")



Cusp height

## Ball endmill

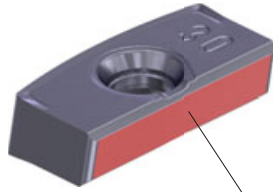
DCX = 20 mm (0.787"),  
R = 10 mm (0.394")



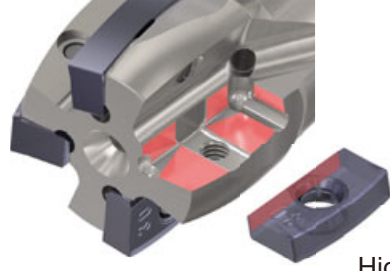
Cusp height

**AddForceBarrel** reduces the number of passes by 40% compared to ball endmill with 10 mm (0.394") radius without compromising the surface quality (cusp height).

**Excellent clamping reliability with dove-tail back support**



Wide contact surface



High clamping rigidity

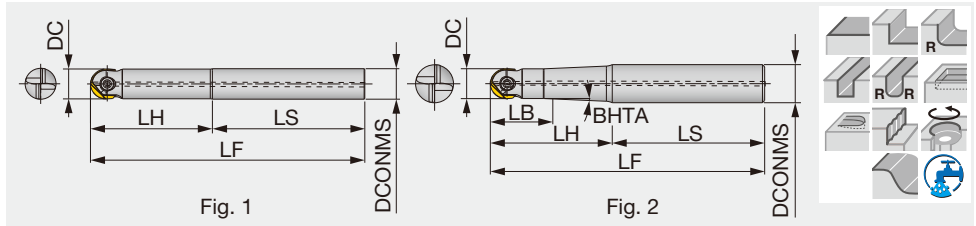


Dove-tail clamping

Reference pages: **H231 - H232**



High precision finishing endmill, shank type, with screw clamp system



Inch	DC	DCONMS	LS	LH	LF	LB	BHTA	Air hole	Fig.	Shank material	Insert
EBFU037T050S0400	0.375	0.500	3.000	1.000	4.000	0.625	9.0°	With	2	Steel	ZF*U037
EBFU037S037C0550	0.375	0.375	2.500	3.000	5.500	-	-	Without	1	Carbide	ZF*U037
EBFU037T062S0600	0.375	0.625	3.500	2.500	6.000	0.625	3.5°	With	2	Steel	ZF*U037
EBFU037S037C0875	0.375	0.375	3.250	5.500	8.750	-	-	Without	1	Carbide	ZF*U037
EBFU050S050S0437	0.500	0.500	3.187	1.188	4.375	-	-	With	1	Steel	ZF*U050
EBFU050S050C0637	0.500	0.500	2.750	3.625	6.375	-	-	Without	1	Carbide	ZF*U050
EBFU050T062S0637	0.500	0.625	4.000	2.375	6.375	1.000	2.5°	With	2	Steel	ZF*U050
EBFU050S050C0875	0.500	0.500	2.750	6.000	8.750	-	-	Without	1	Carbide	ZF*U050
EBFU062T075S0500	0.625	0.750	3.000	2.000	5.000	0.563	2.0°	With	2	Steel	ZF*U062
EBFU062S062C0637	0.625	0.625	3.375	3.000	6.375	-	-	Without	1	Carbide	ZF*U062
EBFU062T075S0637	0.625	0.750	3.625	2.750	6.375	0.563	1.5°	With	2	Steel	ZF*U062
EBFU062S062C0875	0.625	0.625	2.750	6.000	8.750	-	-	Without	1	Carbide	ZF*U062
EBFU075T100S0700	0.750	1.000	4.000	3.000	7.000	1.563	4.5°	With	2	Steel	ZF*U075
EBFU075S075C0875	0.750	0.750	4.000	4.750	8.750	-	-	Without	1	Carbide	ZF*U075
EBFU075T100S0875	0.750	1.000	4.000	4.750	8.750	1.000	1.5°	With	2	Steel	ZF*U075
EBFU075S075C1200	0.750	0.750	3.250	8.750	12.000	-	-	Without	1	Carbide	ZF*U075
EBFU100T125S0800	1.000	1.250	4.000	4.000	8.000	1.250	2.5°	With	2	Steel	ZF*U100
EBFU100S100C0875	1.000	1.000	4.000	4.750	8.750	-	-	Without	1	Carbide	ZF*U100
EBFU100T125S1000	1.000	1.250	4.000	6.000	10.000	1.188	1.4°	With	2	Steel	ZF*U100
EBFU100S100C1200	1.000	1.000	3.250	8.750	12.000	-	-	Without	1	Carbide	ZF*U100
EBFU125S125S1000	1.250	1.250	6.000	4.000	10.000	-	-	With	1	Steel	ZF*U125
EBFU125S125C1200	1.250	1.250	3.250	8.750	12.000	-	-	Without	1	Carbide	ZF*U125

Metric	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...

Metric dimension heads can fit the imperial bodies and vice-versa, but body projections causing interference need to be checked before using.

Reference pages: Inserts → [H227 - H228](#), Standard cutting conditions → [H229 - H230](#)







## INCH SPARE PARTS

Designation	Clamping screw	Torx bit	Grip	Wrench
EBFU037...	TS30F100A	-	-	T10D
EBFU050...	TS40F120A	-	-	T15D
EBFU062...	TS50F160A	-	-	T-T20
EBFU075...	TS60F200A	BLDT25/M7	SW6-T	-
EBFU100...	TS70F250A	BLDT25/M7	SW6-T	-
EBFU125...	TS70F300A	-	-	T-T30

Recommended clamping torque: TS 30F100A = 1.84 lbs·ft, TS 40F120A = 2.58 lbs·ft, TS 50F160A = 3.69 lbs·ft, TS 60F200A = 5.16 lbs·ft, TS 70F250A = 5.16 lbs·ft

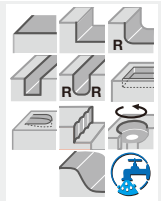
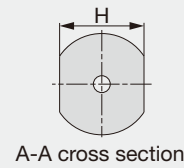
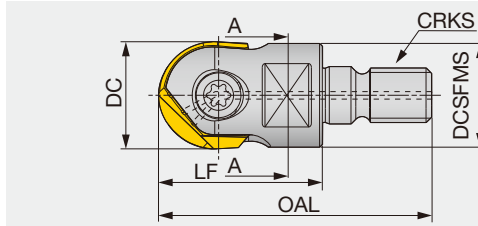
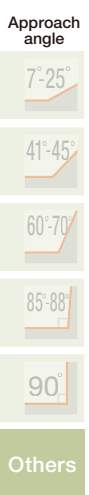
## METRIC SPARE PARTS

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



Metric	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

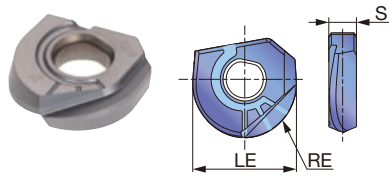
Recommended clamping torque: TS 25F080A = 1.3 N·m, TS 30F100A = 2.5 N·m, TS 40F120A = 3.5 N·m, TS 50F160A = 5 N·m, TS 60F200A, TS 70F250A = 7 N·m, TS 80F300A = 10 N·m

Metric dimension heads can fit the imperial bodies and vice-versa, but body projections causing interference need to be checked before using.

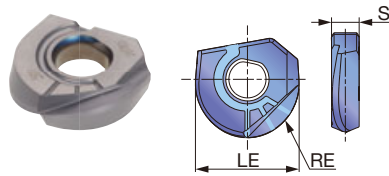
Reference pages: Inserts → [H227 - H228](#), Standard cutting conditions → [H229 - H230](#), TungFlex → [H038 - H039](#)

# INSERT

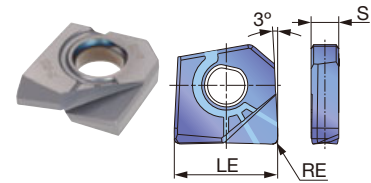
## ZFBU-MJ



## ZFBU-ML



## ZFRU-MJ



Inch	Designation	RE	Coated										LE	S	
			AH725												
	ZFBU037R00-MJ	0.188	●											0.375	0.114
	ZFBU050R00-MJ	0.250	●											0.500	0.134
	ZFBU062R00-MJ	0.313	●											0.625	0.173
	ZFBU075R00-MJ	0.375	●											0.750	0.213
	ZFBU062R00-MJ	0.313	●											0.625	0.173
	ZFBU100R00-MJ	0.500	●											1.000	0.252
	ZFBU075R00-MJ	0.375	●											0.750	0.213
	ZFBU125R00-MJ	0.625	●											1.250	0.291
	ZFBU037R00-ML	0.188	●											0.375	0.114
	ZFBU050R00-ML	0.250	●											0.500	0.134
	ZFBU062R00-ML	0.313	●											0.625	0.173
	ZFBU075R00-ML	0.375	●											0.750	0.213
	ZFBU100R00-ML	0.500	●											1.000	0.252
	ZFBU125R00-ML	0.625	●											1.250	0.291
	ZFRU037R003-MJ	0.031	●											0.375	0.114
	ZFRU050R003-MJ	0.031	●											0.500	0.134
	ZFRU050R006-MJ	0.062	●											0.500	0.134
	ZFRU050R012-MJ	0.125	●											0.500	0.134
	ZFRU062R003-MJ	0.031	●											0.625	0.173
	ZFRU062R006-MJ	0.062	●											0.625	0.173
	ZFRU062R012-MJ	0.125	●											0.625	0.173
	ZFRU075R003-MJ	0.031	●											0.750	0.213
	ZFRU075R006-MJ	0.062	●											0.750	0.213
	ZFRU075R012-MJ	0.125	●											0.750	0.213
	ZFRU100R003-MJ	0.031	●											1.000	0.252
	ZFRU100R006-MJ	0.062	●											1.000	0.252
	ZFRU100R012-MJ	0.125	●											1.000	0.252
	ZFRU125R003-MJ	0.031	●											1.250	0.291
	ZFRU125R006-MJ	0.062	●											1.250	0.291
	ZFRU125R012-MJ	0.125	●											1.250	0.291

★ : First choice  
☆ : Second choice

● : Line up  
ZFBU037 / 050 / 062... : 5 piece per package  
ZFBU075 / 100 / 125... : 1 piece per package  
ZFRU037 / 050 / 062... : 5 piece per package  
ZFRU075 / 100 / 125... : 1 piece per package

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

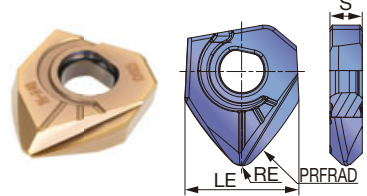
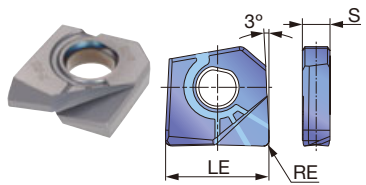
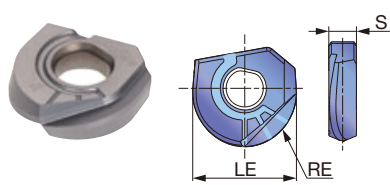




### ZFBM-MJ

### ZFRM-MJ

### ZFCBM-MM



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

★ : First choice  
☆ : Second choice

#### Metric

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:  
 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

● : Line up

# STANDARD CUTTING CONDITIONS

## ZF\*M-MJ

ISO	Workpiece materials	Hardness	Priority	Grades	Max. depth of cut (in)	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)							
							D0.315	D0.394	D0.490	D0.653	D0.816	D0.984	D1.181	D1.260
<b>P</b>	Low carbon steel, alloy steel	85 - 180 HB	First choice	AH725	≤0.04D	590 - 850	0.006	0.008	0.008	0.010	0.010	0.012	0.014	0.014
		85 - 180 HB	Wear resistance	AH710	≤0.04D	590 - 850	0.006	0.008	0.008	0.010	0.010	0.012	0.014	0.014
	High carbon steel, alloy steel	180 - 280 HB	First choice	AH725	≤0.03D	490 - 750	0.006	0.008	0.008	0.010	0.010	0.012	0.014	0.014
		180 - 280 HB	Wear resistance	AH710	≤0.03D	490 - 750	0.006	0.008	0.008	0.010	0.010	0.012	0.014	0.014
	Prehardened steel Die & mold tool steel	40 - 48 HRC	First choice	AH710	≤0.03D	590 - 980	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012
		40 - 48 HRC	Fracture resistance	AH725	≤0.03D	590 - 980	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012
<b>M</b>	Stainless steel	135 - 200 HB	First choice	AH725	≤0.03D	330 - 820	0.004	0.006	0.008	0.008	0.010	0.010	0.012	0.012
<b>K</b>	Cast iron	150 - 240 HB	First choice	AH710	≤0.04D	300 - 1150	0.008	0.008	0.010	0.012	0.012	0.014	0.016	0.016
		150 - 240 HB	Fracture resistance	AH725	≤0.04D	300 - 1150	0.008	0.008	0.010	0.012	0.012	0.014	0.016	0.016
<b>N</b>	Aluminum	-	First choice	AH725	≤0.03D	660 - 1310	0.010	0.010	0.014	0.014	0.014	0.016	0.016	0.018
<b>S</b>	Titanium alloy	- 40 HRC	First choice	AH725	≤ 0.03D	98 - 262	0.003	0.003	0.004	0.005	0.006	0.007	0.008	0.008
	Heat-resistant alloys	- 40 HRC	First choice	AH725	≤ 0.03D	98 - 328	0.003	0.003	0.004	0.005	0.006	0.007	0.008	0.008
<b>H</b>	High hardened steel	48 - 65 HRC	First choice	AH710	≤0.02D	330 - 720	0.003	0.003	0.004	0.005	0.006	0.008	0.008	0.010

· 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 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.

### 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.

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

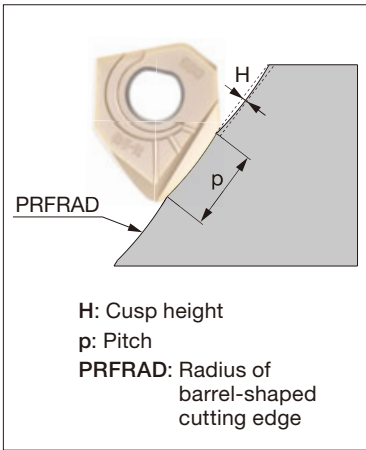


# ZFCBM-MM

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

ISO	Workpiece materials	Hardness	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Width of cut ae (in)
<b>P</b>	Low carbon steel 1020, etc.	- 200HB	328 - 1969	0.002 - 0.012	< 0.012
	Carbon steel 1045, etc.	- 300HB	328 - 1969	0.002 - 0.012	< 0.012
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	328 - 1969	0.002 - 0.012	< 0.012
<b>M</b>	Austenitic stainless steel 304SS, etc.	- 200HB	328 - 1969	0.002 - 0.012	< 0.012
	Precipitation hardening stainless steel 17-4 PH, etc.	- 45HRC	328 - 984	0.002 - 0.01	< 0.008
<b>K</b>	Gray cast iron Class 25, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
	Ductile cast iron 60-40-18, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 45HRC	131 - 394	0.002 - 0.008	< 0.008
	Superalloys Inconel718, etc.	- 45HRC	66 - 262	0.002 - 0.008	< 0.008
<b>H</b>	Hardened steel H-13, etc.	40 - 55HRC	164 - 984	0.002 - 0.008	< 0.008

## ■ Cusp height and pitch



To obtain the pitch (p) from the given cusp height (H)

H (in)	0.00004	0.00008	0.00012	0.00016	0.00020	0.00039	0.00059	0.00079
<b>PRFRAD (in)</b>								
30 (ZFCBM120R300...)	0.019	0.027	0.033	0.039	0.043	0.061	0.075	0.086
40 (ZFCBM160R400...)	0.022	0.031	0.039	0.044	0.050	0.070	0.086	0.100
50 (ZFCBM200R500...)	0.025	0.035	0.043	0.050	0.056	0.079	0.096	0.111
62.5 (ZFCBM250R625...)	0.028	0.039	0.048	0.056	0.062	0.088	0.108	0.124
75 (ZFCBM300R750...)	0.030	0.043	0.053	0.061	0.068	0.096	0.118	0.136

$$p = \sqrt{8 \times H \times \text{PRFRAD}}$$

(mm)

To obtain the cusp height (H) from the given pitch (p)

p (in)	0.020	0.030	0.039	0.049	0.059	0.069	0.079
<b>PRFRAD (in)</b>							
30 (ZFCBM120R300...)	0.00004	0.00008	0.00016	0.00028	0.00035	0.00051	0.00067
40 (ZFCBM160R400...)	0.00004	0.00008	0.00010	0.00020	0.00028	0.00039	0.00051
50 (ZFCBM200R500...)	0.00004	0.00004	0.00010	0.00016	0.00024	0.00032	0.00039
62.5 (ZFCBM250R625...)	0.00004	0.00004	0.00008	0.00010	0.00020	0.00024	0.00032
75 (ZFCBM300R750...)	< 0.00004	0.00004	0.00008	0.00010	0.00016	0.00020	0.00028

$$H = \frac{p^2}{8 \times \text{PRFRAD}}$$

(mm)

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

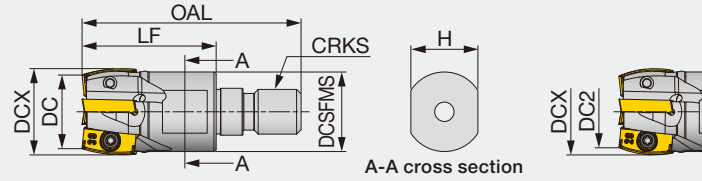
Profiling endmill, modular type (TungFlex)

GAMP = +7.1° ~ +9.2°, GAMF = -20.8° ~ -17.9°



with ZNHU1003R30-MM

with ZNHU1003R20-MM



Metric	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



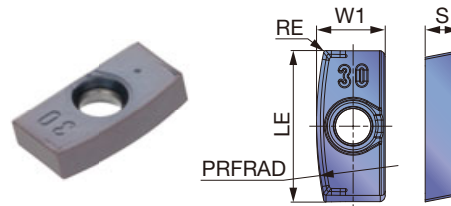
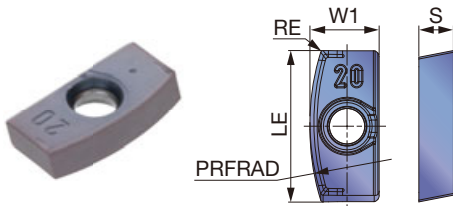
Designation	Clamping screw	Wrench
HFZN10...	SR-M2.5X0.45-L6IP7	IP-7D

Recommended clamping torque: 1 N·m

## INSERTS

### ZNHU1003R20-MM

### ZNHU1003R30-MM



Material	First choice (★)	Second choice (☆)
P Steel	★	
M Stainless	★	
K Cast iron	★	
N Non-ferrous		
S Superalloy	★	
H Hard materials	☆	

★ : First choice  
☆ : Second choice

Designation	PRFRAD	RE	Coated							LE	W1	S
			AH9130									
ZNHU1003R20-MM	0.787	0.008	●							0.453	0.221	0.110
ZNHU1003R30-MM	1.181	0.008	●							0.453	0.219	0.110

● : Line up

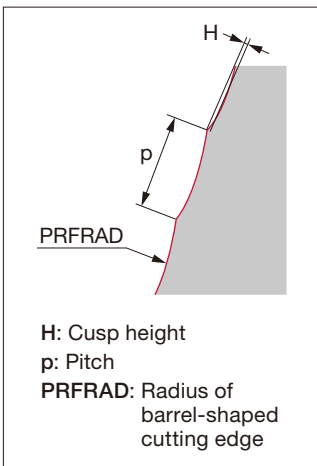


# STANDARD CUTTING CONDITIONS



ISO	Workpiece materials	Hardness	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Width of cut ae (in)
<b>P</b>	Low carbon steel 1020, etc.	- 200HB	328 - 1969	0.002 - 0.012	< 0.016
	Carbon steel 1045, etc.	- 300HB	328 - 1969	0.002 - 0.012	< 0.012
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	328 - 1969	0.002 - 0.012	< 0.012
<b>M</b>	Austenitic stainless steel 304SS, etc.	- 200HB	328 - 1640	0.002 - 0.012	< 0.012
	Precipitation hardening stainless steel 17-4 PH, etc.	- 45HRC	328 - 984	0.002 - 0.01	< 0.008
<b>K</b>	Gray cast iron Class 25, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
	Ductile cast iron 60-40-18, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	- 45HRC	131 - 394	0.002 - 0.008	< 0.008
	Superalloys Inconel718, etc.	- 45HRC	66 - 262	0.002 - 0.008	< 0.008
<b>H</b>	Hardened steel H-13, etc.	40 - 55HRC	164 - 984	0.002 - 0.008	< 0.008

## ■ Cusp height and pitch



To obtain the pitch (p) from the given cusp height (H)

H (in)	0.00004	0.00008	0.00012	0.00016	0.00020	0.00039	0.00059	0.00079
<b>PRFRAD (in)</b>								
<b>20 (ZNHU1003R20...)</b>	0.016	0.022	0.027	0.031	0.035	0.050	0.061	0.070
<b>30 (ZNHU1003R30...)</b>	0.020	0.027	0.033	0.039	0.043	0.061	0.075	0.086

$$p = \sqrt{8 \times H \times \text{PRFRAD}}$$

(mm)

To obtain the cusp height (H) from the given pitch (p)

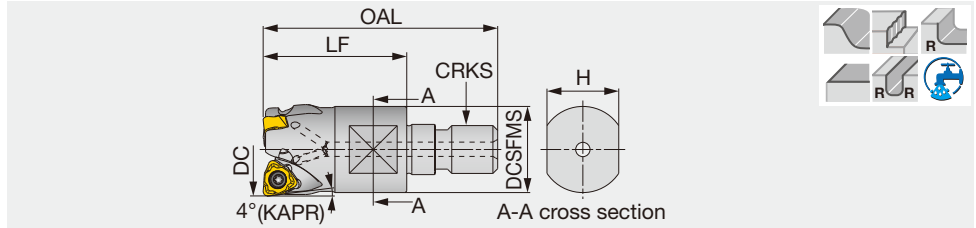
p (in)	0.020	0.030	0.039	0.049	0.059	0.069	0.079
<b>PRFRAD (in)</b>							
<b>20 (ZNHU1003R20...)</b>	0.00008	0.00016	0.00024	0.00039	0.00055	0.00075	0.00098
<b>30 (ZNHU1003R30...)</b>	0.00004	0.00008	0.00016	0.00028	0.00035	0.00051	0.00067

$$H = \frac{p^2}{8 \times \text{PRFRAD}}$$

(mm)







Metric	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

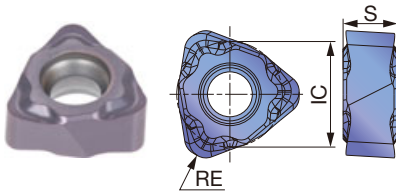


Designation	Clamping screw	Lubricant	Wrench
HFWX04M...	SR34-514	M-1000	T-7F

Recommended clamping torque: 0.9 N·m

## INSERT

### WXHU-MJ



<b>P</b> Steel	★	
<b>M</b> Stainless		
<b>K</b> Cast iron		
<b>N</b> Non-ferrous		
<b>S</b> Superalloys		
<b>H</b> Hard materials	★	

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		IC	S
			AH110			
WXHU040305R-MJ	0.020	0.020	●		0.250	0.125
WXHU040310R-MJ	0.039	0.039	●		0.250	0.125

\* For plunging, the maximum cutting width is 0.079".

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	High carbon steel 1045, 1055, etc.	200 - 300 HB	AH110	328 - 984	0.004 - 0.012
	Alloy steel 4140, etc.	150 - 300 HB	AH110	328 - 984	0.004 - 0.012
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	AH110	328 - 984	0.002 - 0.012
<b>H</b>	Hardened steel	H13, etc.	AH110	262 - 427	0.004 - 0.012
		D2, etc.	AH110	164 - 328	0.002 - 0.006

Reference pages: TungFlex → **H038 - H039**

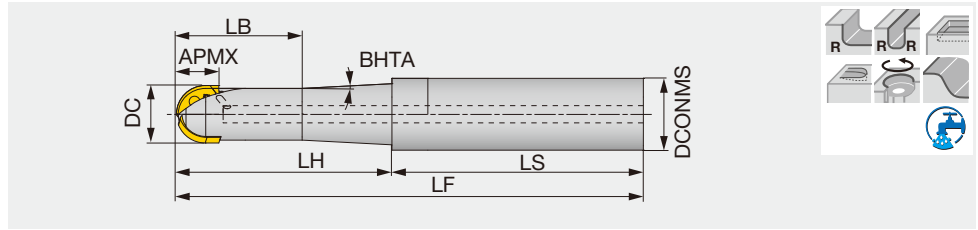




# BALL NOSE

## EBRU..., EBRM...

Ball nose endmill for semi-roughing, shank type, with screw clamp system



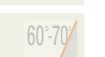
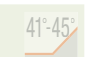
Inch	APMX	DC	CICT	DCONMS	LS	LF	LH	LB	BHTA	WT(lb)	Air hole	Insert
EBRU062SW062S0475	0.470	0.625	2	0.625	3.375	4.748	1.373	0.331	3.000	0.330	With	ZRBU062...
EBRU075SW075S0600	0.510	0.750	2	0.750	4.000	6.000	2.000	0.606	3.000	0.610	With	ZRBU075...
EBRU100SW100S0600	0.690	1.000	2	1.000	3.250	6.000	2.750	1.080	3.000	1.080	With	ZRBU100...

Metric	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...

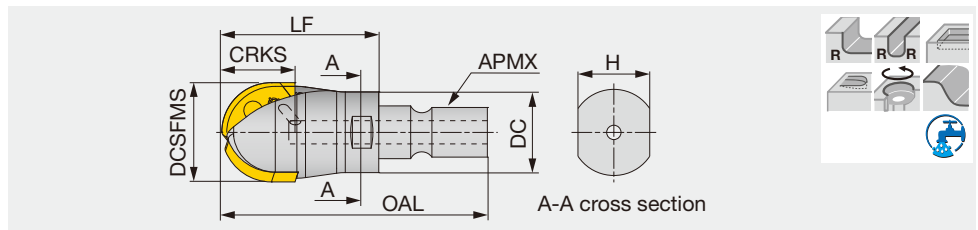
## HBRM...

Ball nose endmill for semi-roughing, modular type (TungFlex), with screw clamp system

Approach angle



Others



Metric	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

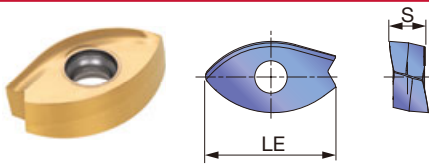


Designation	Clamping screw	Wrench
EBRU062..., EBRM16..., HBRM16...	TS25064I	T-8D
EBRU075...	TS30C72I	T-9D
EBRM20..., HBRM20...	TS30085I/HG	T-9D
EBRU100..., EBRM25..., HBRM25...	TS35085I/HG	T-15D

Recommended clamping torque: TS25064I = 0.96 lbs·ft, 1.3 N·m, TS30C72I, TS30085I/HG = 1.70 lbs·ft, 2.3 N·m, TS35085I/HG = 2.58 lbs·ft, 3.5 N·m

## INSERT

### ZRBU...

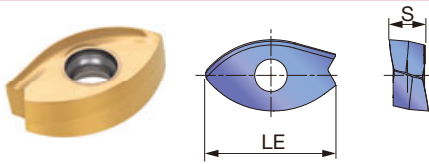


Inch	Designation	RE	Coated										LE	S	
			APH730												
			●												
	ZRBU062-MM	0.313	●											0.586	0.118
	ZRBU075-MM	0.375	●											0.648	0.146
	ZRBU100-MM	0.500	●											0.865	0.177

★ : First choice  
☆ : Second choice

● : Line up  
5 piece per package

### ZRBM...



Metric	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

★ : First choice  
☆ : Second choice

● : Line up  
5 piece per package

## STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Selection criteria	Recommended grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel 1015, 1020, etc.	- 300HB	First choice	APH730	MM	490 - 1145	0.004 - 0.024
	High carbon and alloy steel 1055, 4140, etc.	- 300HB	First choice	APH730	MM	390 - 1045	0.002 - 0.02
	Prehardened steels NAK80, PX5 etc.	30 - 40HRC	First choice	APH730	MM	325 - 655	0.002 - 0.02
M	Austenitic stainless steel 304SS, 316SS, etc.	- 200HB	First choice	APH730	MM	325 - 915	0.002 - 0.024
	Martensitic stainless steel 420SS, etc.	- 200HB	First choice	APH730	MM	325 - 980	0.002 - 0.024
K	Gray cast irons Class25, Class30, etc.	150 - 250HB	First choice	APH730	MM	390 - 1245	0.004 - 0.024
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250HB	First choice	APH730	MM	325 - 915	0.004 - 0.02
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	APH730	MM	65 - 260	0.002 - 0.024
	Heat-resistant alloys Inconel718, etc.	- 40HRC	First choice	APH730	MM	65 - 195	0.002 - 0.016
H	Hardened steel H13, etc.	40 - 50HRC	First choice	APH730	MM	130 - 260	0.002 - 0.008
	Hardened steel D2, etc.	50 - 60HRC	First choice	APH730	MM	95 - 195	0.002 - 0.006

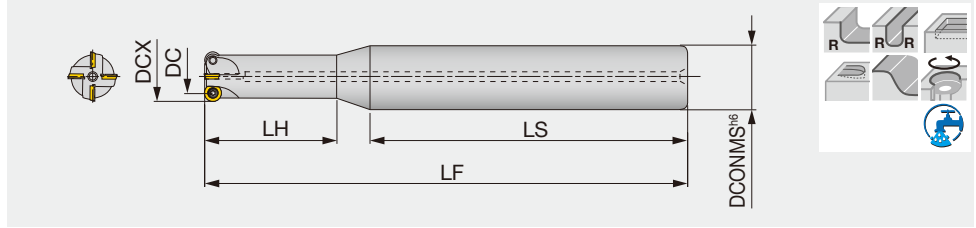
The above cutting parameters are for reference. Adjustments may be required depending on applications, machine powers and rigidity, and/or workpiece fixture/clamping methods.



## EWD05/07/10

Endmill, shank type

GAMP = 0°, GAMF = -3°~ +0.5°



Inch	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	Air hole	Insert
EWD05050RU	0.098	0.500	2	0.304	0.750	3.250	0.750	5.000	With	RDMW05...
EWD05075RU	0.098	0.750	3	0.554	1.000	5.000	1.500	7.000	With	RDMW05...
EWD07075RU	0.138	0.750	4	0.475	1.000	5.000	1.500	7.000	With	RDMW07...
EWD07100RU	0.138	1.000	5	0.725	1.250	5.250	1.750	8.000	With	RDMW07...
EWD10100RU	0.196	1.000	3	0.606	1.250	5.250	1.750	8.000	With	RDMW10...
EWD07125RU	0.138	1.250	3	0.975	1.500	5.500	1.750	9.000	With	RDMW07...
EWD10125RU	0.196	1.250	5	0.856	1.500	5.500	1.750	9.000	With	RDMW10...

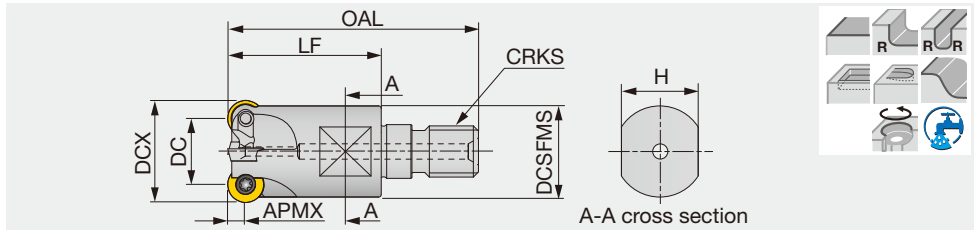
  

Metric	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	Air hole	Insert
EWD05010R	2.5	10	2	5	20	80	20	130	With	RDMW05...
EWD05012R	2.5	12	3	7	20	80	20	130	With	RDMW05...
EWD07015R	3.5	15	3	8	20	100	40	150	With	RDMW07...
EWD05015R	2.5	15	4	10	20	100	40	150	With	RDMW05...
EWD10020R	5.0	20	2	10	25	120	40	170	With	RDMW10...
EWD07020R	3.5	20	4	13	25	120	40	170	With	RDMW07...
EWD05020R	2.5	20	5	15	25	120	40	170	With	RDMW05...
EWD10025R	5.0	25	3	15	32	125	45	195	With	RDMW10...
EWD07025R	3.5	25	5	18	32	125	45	195	With	RDMW07...

## HWD07-M

Endmill, modular type (TungFlex)

GAMP = 0°, GAMF = -3°~ +0.5°



Metric	APMX	DCX	CICT	DC	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole
HWD07R015MM08-03	3.5	15	3	8	42	25	10	12.8	M8	0.03	With
HWD07R020MM10-04	3.5	20	4	13	49	30	15	17.8	M10	0.06	With
HWD07R025MM12-05	3.5	25	5	18	57	35	17	20.8	M12	0.1	With
HWD07R030MM16-05	3.5	30	5	23	63	40	22	28.8	M16	0.2	With

### SPARE PARTS

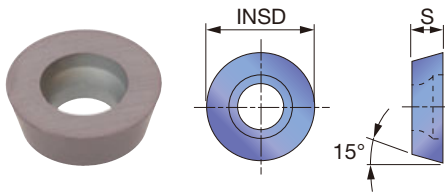
Designation	Clamping screw	Lubricant	Wewnch
EWD05**RU	CSTD-1.8	-	T-6D
EWD07**RU	CSTB-2.5S	-	T-8D
EWD10**RU	CSTB-3.5H	-	T-15D
EWD050**R	CSTD-1.8	M-1000	T-6D
EWD070**R, HWD07**M...	CSTB-2.5S	M-1000	T-8D
EWD100**R	CSTB-3.5H	M-1000	T-15D

Recommended clamping torque: CSTD-1.8 = 0.52 lbs-ft, 0.7 N-m, CSTB-2.5S = 0.96 lbs-ft, 1.3 N-m, CSTB-3.5H = 2.58 lbs-ft, 3.5 N-m

Reference pages: TungFlex → [H038](#) - [H039](#)

# 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	0.098	●						0.197	0.055
RDMW0702M0	0.138	●						0.276	0.094
RDMW1003M0	0.196	●						0.394	3.180

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



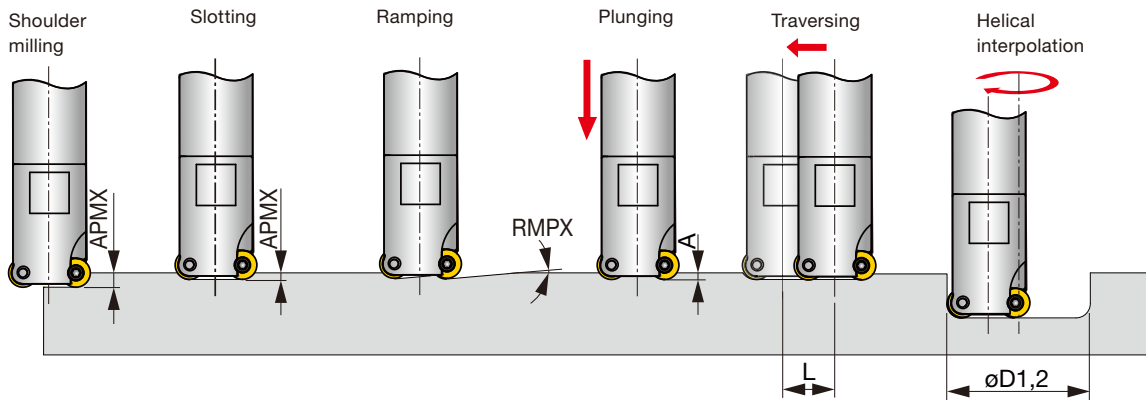
EWD05/07/10

e-catalog



HWD07-M

## APPLICATION RANGE



	Tool- $\phi$	Max. depth of cut	Max. ramping	Max. plunging depth	Machining length for removing uncut portion	Max. machining	*Max. machining
Inch	DCX	APMX	RMPX	A	L	$\phi D1$	$\phi D2$
EWD05050RU	0.500	0.098	12.5°	0.060	0.342	0.804	0.921
EWD05075RU	0.750	0.098	4°	0.040	0.592	1.304	1.421
EWD07075RU	0.750	0.137	12°	0.080	0.513	1.225	1.421
EWD07100RU	1.000	0.137	7.5°	0.090	0.763	1.725	1.921
EWD07125RU	1.250	0.137	5°	0.080	1.013	2.225	2.421
EWD10100RU	1.000	0.196	15°	0.120	0.645	1.607	1.921
EWD10125RU	1.250	0.196	9.5°	0.120	0.895	2.107	2.421

\*For flat bottom hole

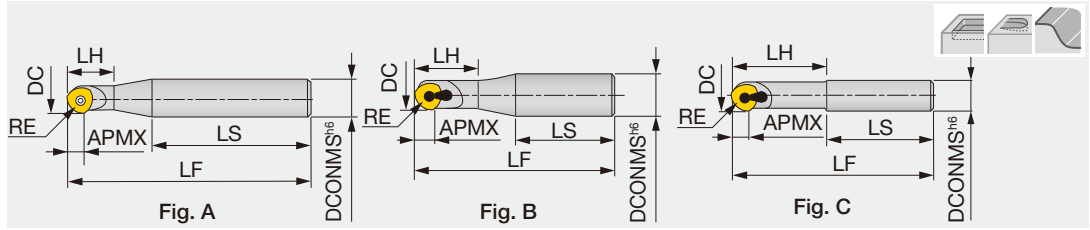
Grade  
Insert  
Ext. Toolholder  
Int. Toolholder  
Threading  
Grooving  
Miniature tool  
Milling cutter  
Endmill  
Drilling tool  
Tooling System  
User's Guide  
Index





# TBN1000

Ball nose endmill for semi-finishing



Metric	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

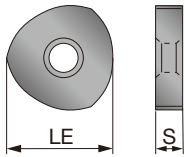
## SPARE PARTS

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

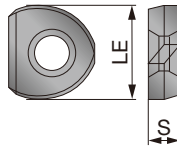
Recommended clamping torque: CSTB-2.5B = 1.3 N·m, CSTB-3S = 2.3 N·m, CSTB-4S/CSTA-5S/CSTA-5SS = 3.5 N·m

## INSERT

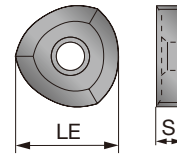
### ZNCA-FN



### 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	●	●	0.313	0.098
ZNCA1203FN	●	●	0.383	0.118
ZNCA1603FN	●	●	0.503	0.138
ZNCA2004FN	●	●	0.624	0.157
ZNCA2505FN	●	●	0.781	0.197
ZNCA3005FN	●	●	0.930	0.197
ZNMM2004EN	●		0.624	0.157
ZNMM2505EN	●		0.781	0.197
ZNMM3005EN	●		0.930	0.217

● : Line up

## STANDARD CUTTING CONDITIONS

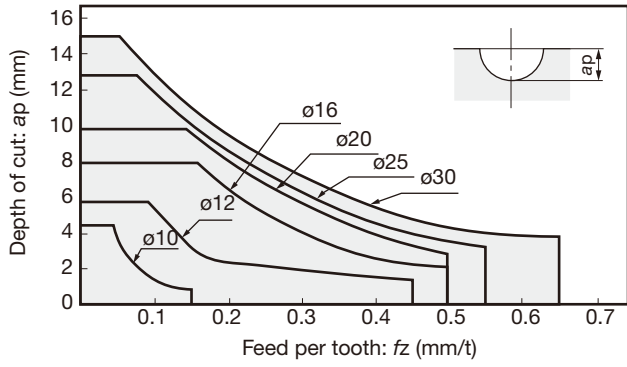
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e-catalog



TBN1000

## GUIDELINES FOR SELECTING DEPTH OF CUT AND FEED



Workpiece material: Carbon steel (S55C, C55)

Insert grade: UX30

Machine power:  $\phi 10 - \phi 16$ : 7.5 kW

$\phi 20 - \phi 30$ : 22.5 kW

No. of revolutions:  $\phi 10 - \phi 16$ : 2000 min<sup>-1</sup>

$\phi 20 - \phi 30$ : 1500 min<sup>-1</sup>

(Unit: mm)

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

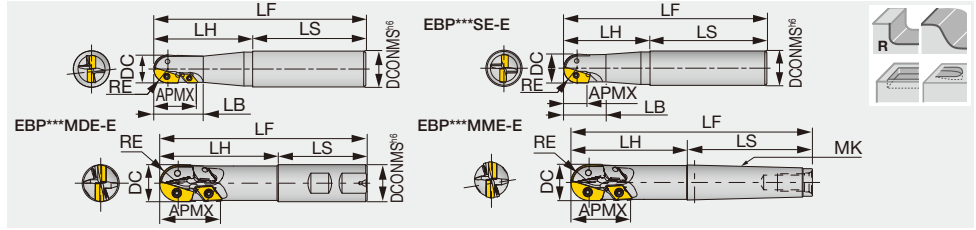
Index

M



# EBP

## Ball nose endmill for semi-finishing



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	LB	RE	MK	Insert 1	Insert 2
EBP075MWU	0.625	0.750	2	1.000	2.280	2.750	5.030	1.250	0.375	-	ZPET075U-MJ	-
EBP075LWEU	1.140	0.750	2+2	1.000	2.280	3.750	6.030	1.250	0.375	MK2	ZPET075U-MJ	DCMW070204TN
EBP100MWU	0.827	1.000	2	1.000	2.280	3.250	5.530	-	0.500	-	ZPET100U-MJ	-
EBP100LWEU	1.610	1.000	2+2	1.000	2.280	4.250	6.530	-	0.500	-	ZPET100U-MJ	DCMW11T304TN
EBP125MWU	1.000	1.250	2	1.250	2.280	3.750	6.030	-	0.625	-	ZPET125U-MJ	-
EBP125LWEU	1.810	1.250	2+2	1.250	2.280	4.750	7.030	-	0.625	-	ZPET125U-MJ	DCMW11T304TN

Metric	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

### INCH SPARE PARTS

Designation	Clamping screw for Insert 1	Clamping screw for Insert 2	Lubricant	Wrench 1 for Insert 1	Wrench 2 for Insert 2
EBP075MWU	CSTD-3T	-	M-1000	T-10D	-
EBP075LWEU	CSTD-3T	CSTB-2.5S	M-1000	T-10D	T-8D
EBP100MWU	CSTB-4S	-	M-1000	T-15D	-
EBP100LWEU	CSTB-4S	CSTB-4S	M-1000	T-15D	T-15D
EBP125MWU	CSTB-5S	-	M-1000	T-20D	-
EBP125LWEU	CSTB-5S	CSTB-4S	M-1000	T-20D	T-15D

Recommended clamping torque: CSTB-2.5S = 0.96 lbs-ft, CSTD-3T = 1.84 lbs-ft, CSTB-4S = 2.58 lbs-ft, CSTB-5S = 3.69 lbs-ft

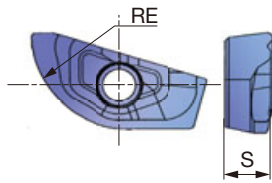
### METRIC SPARE PARTS

Designation	Clamping screw for Insert 1	Clamping screw for Insert 2	Lubricant	Wrench 1 for Insert 1	Wrench 2 for Insert 2
EBP020SS/SD-E	CSTD-3T	-	M-1000	T-10D	-
EBP020*SE/M*E-E	CSTD-3T	CSTB-2.5S	M-1000	T-10D	T-8D
EBP025SS/SD-E, EBP025*SE/M*E-E	CSTB-4S	-	M-1000	T-15D	-
EBP030SS/032SD-E	CSTB-5S	-	M-1000	T-20D	-
EBP030*SE/032M*E-E	CSTB-5S	CSTB-4S	M-1000	T-20D	T-15D

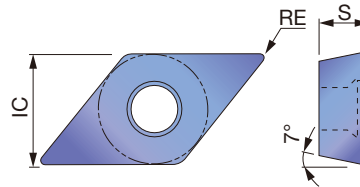
Recommended clamping torque: CSTB-2.5S = 1.3 N-m, CSTD-3T = 2.5 N-m, CSTB-4S = 3.5 N-m, CSTB-5S = 5 N-m

## INSERT

### ZPET-MJ (For R edge)



### DCMW-TN (For P edge)



Inch	Material		☆	★	Application										☆ : Second choice					
	P	M			K	N	S	H	Coated	IC	S									
	Steel	Stainless	☆	★																
	Cast iron			★																
	Non-ferrous																			
	Superalloys																			
	Hard materials		☆																	

Designation	RE	Coated		IC	S
		AH120	AH330		
ZPET075U-MJ	0.375	●	●	-	0.169
ZPET100U-MJ	0.500	●	●	-	0.228
ZPET125U-MJ	0.625	●	●	-	0.276
DCMW21.51TN	0.016	●	●	0.252	0.094
DCMW32.51TN	0.016	●	●	0.374	0.156

● : Line up  
ZPET125U... : 5 piece per package

Metric	Material		☆	★	Application										☆ : Second choice					
	P	M			K	N	S	H	Coated	IC	S									
	Steel	Stainless	☆	★																
	Cast iron			★																
	Non-ferrous																			
	Superalloys																			
	Hard materials		☆																	

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



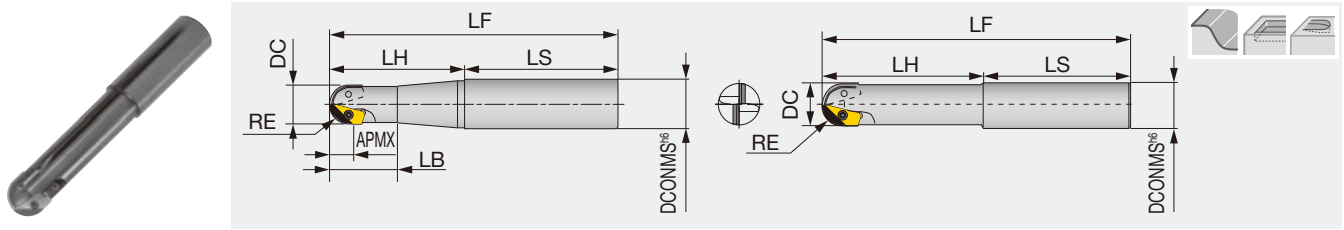
## Machining types

(1) Grooving	(2) Shouldering at shallow depth of cut	(3) Shouldering at deep depth of cut



# EBB

Ball nose endmill for semi-finishing, for CBN inserts



Metric	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

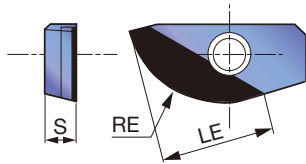
## SPARE PARTS

Designation	Clamping screw	Lubricant	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



<b>P</b> Steel										
<b>M</b> Stainless										
<b>K</b> Cast iron		★								
<b>N</b> Non-ferrous										
<b>S</b> Superalloys										
<b>H</b> Hard materials										

★ : First choice  
☆ : Second choice

Designation	RE	CBN										S	LE	
		BX480												
ZPCW2003-QBN	0.394	●											0.125	0.472
ZPCW25H3-QBN	0.492	●											0.138	0.610
ZPCW30T3-QBN	0.591	●											0.156	0.709
ZPCW4004-QBN	0.787	●											0.187	0.906
ZPCW5004-QBN	0.984	●											0.187	1.102

● : Line up  
BX480 : 1 piece per package

## STANDARD CUTTING CONDITIONS

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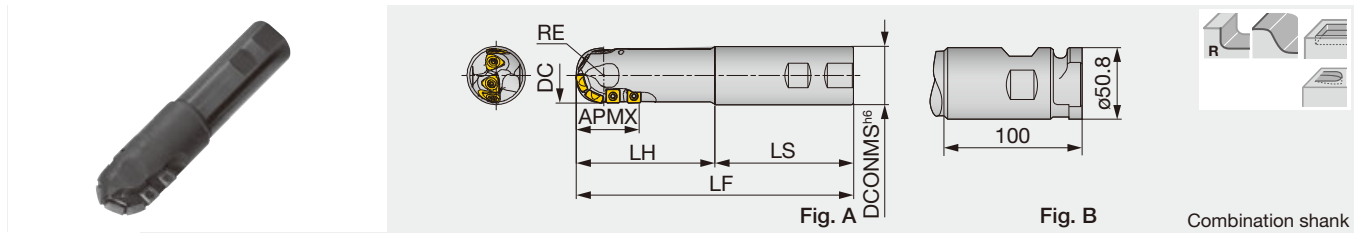
e-catalog



EBB

# EBD

## Ball nose endmill for roughing



Metric	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

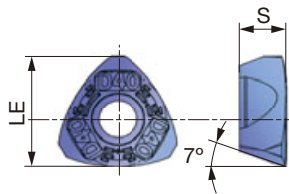
### SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch
EBD040*SE	CSTB-4M	M-1000	T-15T
EBD050**E	CSTB-5	M-1000	T-20T

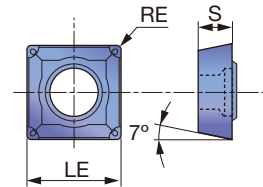
Recommended clamping torque : CSTB-4M = 3.5 N·m, CSTB-5 = 5 N·m

## 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	-	●							0.512	0.217
ZDMT5006-MJ	-	●							0.638	0.256
SCMT09T308-23	0.031	●							0.375	0.156
SCMT120408-23	0.031	●							0.500	0.187

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

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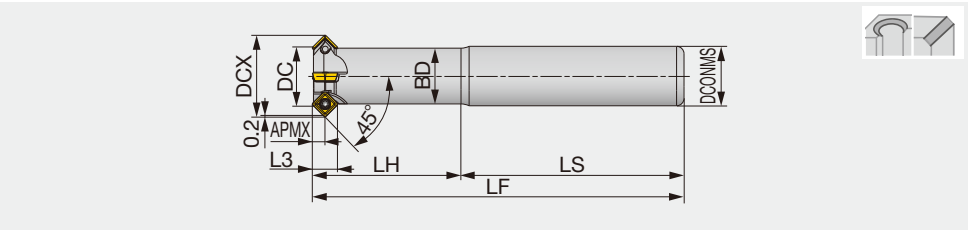
EBD

- 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

## EASD05

### Chamfering endmill



GAMP = +5°, GAMF = -7° ~ +12°

Metric	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 0.012".

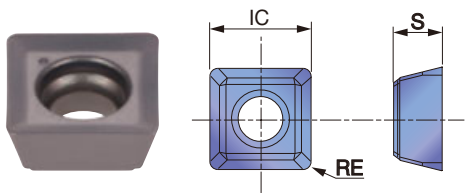
### SPARE PARTS

Designation	Clamping screw	Wrench
EASD05...	CSPB-2L043	IP-6DB

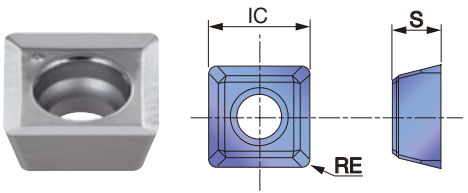
Recommended clamping torque: 0.7 N·m

### INSERT

#### SDMT05-MJ



#### SDHT05-AJ



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

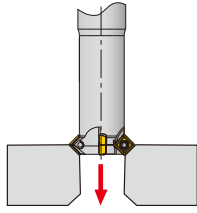
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		Uncoated	S	IC
			AH140	AH725			
SDMT050204PN-MJ	0.016	0.157	●	●	●	0.094	0.200
SDHT050204FN-AJ	0.016	0.157			●	0.094	0.200

● : Line up

## CUTTING PERFORMANCE

### Chamfering & countersinking

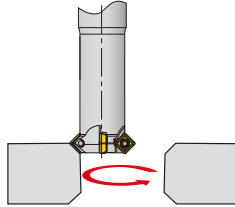


#### ■ C2.5 (45° x 0.098")

Workpiece material: 1055

Designation	Cutting speed Vc (sfm)	Feed rate fz (ipt)
EASD05M006C12.0R01	262 - 394	0.001 - 0.003
EASD05M008C12.0R02	262 - 394	0.001 - 0.003
EASD05M016C16.0R04 (*z=2)	262 - 394	0.001 - 0.003

### Interpolated chamfering

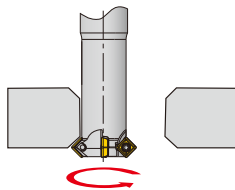


#### ■ C2.5 (45° x 0.098")

Workpiece material: 1055

Designation	Cutting speed Vc (sfm)	Feed rate fz (ipt)
EASD05M006C12.0R01	262 - 394	0.003 - 0.005
EASD05M008C12.0R02	262 - 394	0.003 - 0.005
EASD05M016C16.0R04	262 - 394	0.003 - 0.005

### Back chamfering



#### ■ C1.0 (45° x 0.039")

Workpiece material: 1055

Designation	Cutting speed Vc (sfm)	Feed rate fz (ipt)
EASD05M006C12.0R01	262 - 394	0.003 - 0.005
EASD05M008C12.0R02	262 - 394	0.003 - 0.005
EASD05M016C16.0R04	262 - 394	0.003 - 0.005

## STANDARD CUTTING CONDITIONS

### ■ Interpolated or back chamfering type

ISO	Workpiece material	Brinell hardness (HB)	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel 1018, 1020, 1026, etc.	- 200	AH725	755 - 1050	0.002 - 0.004
	High carbon steel 1045, 1055, etc.	200 - 300	AH725	492 - 755	0.002 - 0.004
	Alloyed steel 4140, 8620, etc.	150 - 300	AH725	492 - 755	0.002 - 0.004
	Tool steel W1-8, etc.	- 300	AH725	361 - 427	0.001 - 0.004
<b>M</b>	Stainless steel 304SS, 316SS, 17-4 PH, etc.	-	AH140	328 - 656	0.001 - 0.004
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250	AH725	492 - 820	0.002 - 0.005
	Ductile cast iron 60-40-18, 60-55-06, etc.	150 - 250	AH725	328 - 591	0.002 - 0.005
<b>N</b>	Aluminum alloys Si < 13%	-	TH10	1148 - 1640	0.002 - 0.006
	Copper alloys	-	TH10	328 - 656	0.002 - 0.006

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

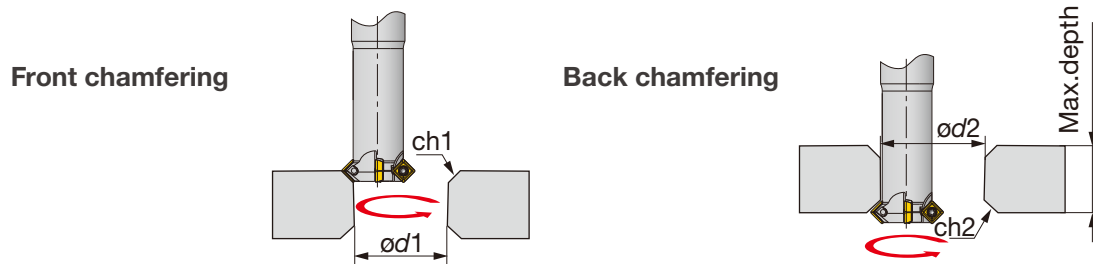


## ■ Front chamfering type

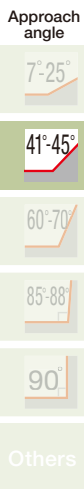
ISO	Workpiece material	Brinell hardness (HB)	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel 1018, 1020, 1026, etc.	- 200	AH725	525 - 722	0.002 - 0.004
	High carbon steel 1045, 1055, etc.	200 - 300	AH725	361 - 525	0.002 - 0.004
	Alloyed steel 4140, 8620, etc.	150 - 300	AH725	361 - 525	0.002 - 0.004
	Tool steel W1-8, etc.	- 300	AH725	262 - 295	0.001 - 0.004
<b>M</b>	Stainless steel 304SS, 316SS, 17-4 PH, etc.	-	AH140	230 - 459	0.001 - 0.004
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250	AH725	361 - 591	0.002 - 0.005
	Ductile cast iron 60-40-18, 60-55-06, etc.	150 - 250	AH725	230 - 427	0.002 - 0.005
<b>N</b>	Aluminum alloys Si < 13%	-	TH10	820 - 1148	0.002 - 0.006
	Copper alloys	-	TH10	230 - 459	0.002 - 0.006

\* When chamfering over C1.0 (45° x 0.039"), decrease the cutting parameters to 70% of the above parameters.

## ■ APPLICATION RANGE



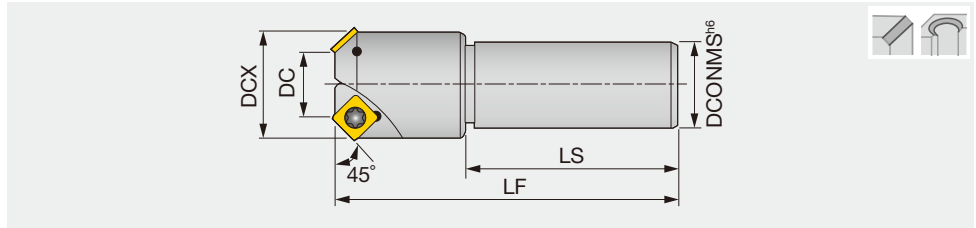
Designation	Minimum hole diameter to be chamfered (in)		Maximum chamfer dimension (at 45°) (in)		Maximum reachable hole distance when back chamfering (in)
	Front-chamfer $\phi d1$	Back-chamfer $\phi d2$	Front ch1	Back ch2	Max. depth
EASD05M006C12.0R01	0.224	0.492	0.114 x 0.114	0.079 x 0.079	0.717
EASD05M008C12.0R02	0.307	0.571	0.114 x 0.114	0.059 x 0.059	1.307
EASD05M016C16.0R04	0.622	0.886	0.114 x 0.114	0.110 x 0.110	1.701





# ECP4400R

Chamfering endmill, screw clamp system, for square inserts



Inch	DC	CICT	DCX	DCONMS	LF	LS	Insert
ECP440AR-U	0.394	1	1.083	1.250	4.500	2.480	SPMA422*N
ECP4423R-U	0.906	2	1.587	1.250	4.500	2.480	SPMA422*N
ECP4436R-U	1.417	3	2.098	1.250	4.500	2.480	SPMA422*N

Metric	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

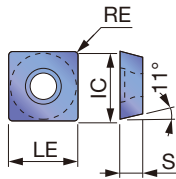


Designation	Clamping screw	Wrench
ECP44...	CSTA-4	T-15D

Recommended clamping torque: 2.58 lbs-ft, 3.5 N-m

## INSERT

### SPMA42



<b>P</b> Steel	★	☆	☆						
<b>M</b> Stainless									
<b>K</b> Cast iron				★					
<b>N</b> Non-ferrous									
<b>S</b> Superalloys									
<b>H</b> Hard materials									

★ : First choice  
☆ : Second choice

Designation	RE	Cermet		Uncoated		LE	IC	S
		NS740	N308	UX30	TH10			
SPMA422TN	0.031	●	●	●		0.500	0.500	0.125
SPMA422FN	0.031			●		0.500	0.500	0.125

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



ECP4400R

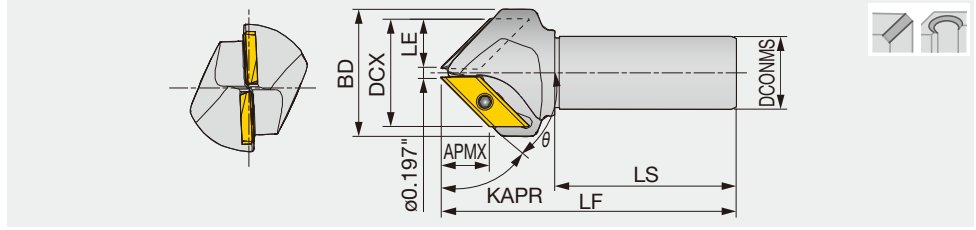
Grade  
Insert  
Ext. Toolholder  
Int. Toolholder  
Threading  
Grooving  
Miniature tool  
Milling cutter  
Endmill  
Drilling tool  
Tooling System  
User's Guide  
Index





# ECC31

Chamfering endmill, screw clamp system, for large parallelogram inserts



Inch	DCX	CICT	KAPR	$\theta$	BD	LE	APMX	DCONMS	LS	LF	Insert
ECC31005RU-30	1.338	1	60°	30°	1.575	0.197	1.004	1.000	2.281	4.250	XCET3104...
ECC31005RU-41	1.698	2	49°	41°	2.205	0.197	0.866	1.000	2.281	4.250	XCET3104...
ECC31005RU-45	1.846	2	45°	45°	2.205	0.197	0.827	1.000	2.281	4.250	XCET3104...
ECC31005RU-60	2.204	2	30°	60°	2.834	0.197	0.571	1.000	2.281	4.250	XCET3104...

Metric	DCX	CICT	KAPR	$\theta$	BD	LE	APMX	DCONMS	LS	LF	Insert
ECC31005R-30	34	1	60°	30°	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	30°	60°	72	25.5	14.5	32	80	130.1	XCET3104...

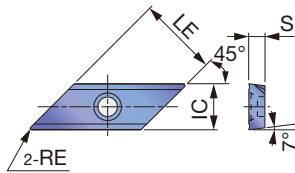
## SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
ECC31...	CSTB-5S	M-1000	T-20D

Recommended clamping torque: 3.69 lbs-ft, 5 N-m

## 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	UX30				
XCET310404ER	0.016	●	●	●	●	●		0.866	0.500	0.177

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Grade	No. of revolutions: $n$ (min-1)	Feed per tooth: $fz$ (ipt)
P	Carbon steels 1055, etc. Alloy steels 4140, etc.	< 300	NS740	1000 - 3000 - 7000	0.004 - 0.010
			UX30	700 - 2000 - 4900	0.004 - 0.010
	Die steels H13, etc.	< 300	AH3135	1000 - 3000 - 7000	0.004 - 0.008
M	Stainless steels S30400, etc.	< 250	AH3135	1000 - 3000 - 7000	0.004 - 0.010
K	Cast irons No.250B, etc.	150 - 250	AH330	1000 - 3000 - 7000	0.004 - 0.010

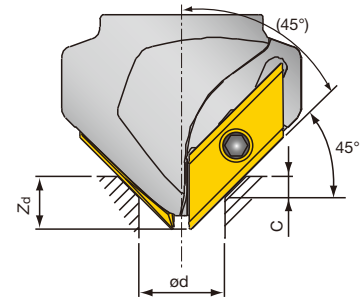
- When the hole diameter to be chamfered is small or the cutting edges near the front end of tool are used, use at higher side of the revolution range shown in the Table.  
In contrast, when the hole diameter to be chamfered is large or the cutting edges far from the tool's front end are used, use the lower side of the revolution range shown in the Table.

- When chamfering a small diameter hole (smaller than  $\phi 0.400''$ ) in a plungemilling mode, peck-feeding should not be used.  
- When the hole diameter to be chamfered is smaller than  $\phi 0.400''$  or the cutting edges near the tool's front end are used, the feed should be set within 0.006 ipt.

## Guidelines for programming

### Z-axis plunging depth $Z_d$ (in) in 45° chamfering of hole

Hole dia. ød (in)	Size of chamfering C (in)						
	0.020	0.039	0.059	0.079	0.118	0.157	0.197
0.197	0.028	0.047	0.067	0.087	0.126	-	-
0.236	0.047	0.067	0.087	0.106	0.146	-	-
0.268	0.063	0.083	0.102	0.122	0.161	-	-
0.315	0.087	0.106	0.126	0.146	0.185	-	-
0.335	0.094	0.114	0.134	0.154	0.193	-	-
0.394	0.126	0.146	0.165	0.185	0.224	0.264	0.303
0.402	0.130	0.150	0.169	0.189	0.228	0.268	0.307
0.472	0.165	0.185	0.205	0.224	0.264	0.303	0.343
0.551	0.205	0.224	0.244	0.264	0.303	0.343	0.382
0.630	0.244	0.264	0.283	0.303	0.343	0.382	0.421
0.689	0.272	0.291	0.311	0.331	0.370	0.408	0.449
0.787	0.323	0.343	0.362	0.382	0.421	0.461	0.500
0.827	0.343	0.362	0.382	0.402	0.441	0.480	0.520
0.945	0.402	0.421	0.441	0.461	0.500	0.539	0.579
1.181	0.520	0.539	0.559	0.579	0.618	0.657	0.697
1.299	0.579	0.598	0.618	0.638	0.677	0.717	0.756
1.417	0.638	0.657	0.677	0.697	0.736	0.776	-
1.654	0.756	0.776	0.795	-	-	-	-

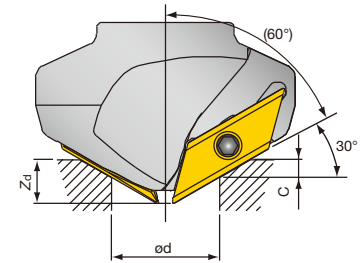


#### Tool: ECC31005R-45

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 $Z_d$ (in) in 30° chamfering of hole

Hole dia. ød (in)	Size of chamfering C (in)						
	0.020	0.039	0.059	0.079	0.098	0.118	0.138
0.197	0.024	0.043	0.063	0.083	-	-	-
0.236	0.035	0.055	0.075	0.094	-	-	-
0.268	0.043	0.063	0.083	0.102	-	-	-
0.315	0.055	0.075	0.094	0.114	-	-	-
0.335	0.063	0.083	0.102	0.122	-	-	-
0.394	0.079	0.098	0.118	0.138	0.157	0.177	0.197
0.402	0.083	0.102	0.122	0.142	0.161	0.181	0.201
0.472	0.102	0.122	0.142	0.161	0.181	0.201	0.220
0.551	0.146	0.165	0.185	0.205	0.224	0.244	0.264
0.630	0.165	0.185	0.205	0.224	0.244	0.264	0.283
0.689	0.193	0.213	0.232	0.252	0.272	0.291	0.311
0.787	0.205	0.224	0.244	0.264	0.283	0.303	0.323
0.827	0.240	0.260	0.280	0.299	0.319	0.339	0.358
0.945	0.307	0.327	0.346	0.366	0.386	0.406	0.45
1.181	0.343	0.362	0.382	0.402	0.421	0.441	0.461
1.299	0.374	0.394	0.413	0.433	0.453	0.472	0.492
1.417	0.398	0.417	0.437	0.457	0.476	0.496	0.516
1.654	0.441	0.461	0.480	0.500	0.520	0.539	0.559
1.811	0.488	0.508	0.528	0.547	0.567	-	-
1.890	0.512	0.531	0.551	0.571	-	-	-
2.047	0.555	-	-	-	-	-	-

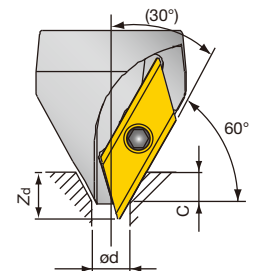


#### Tool: ECC31005R-60

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 $Z_d$ (in) in 60° chamfering of hole

Hole dia. ød (in)	Size of chamfering C (in)							
	0.020	0.039	0.059	0.079	0.098	0.118	0.138	0.157
0.197	0.031	0.051	0.071	0.091	0.110	-	-	-
0.236	0.067	0.087	0.106	0.126	0.146	-	-	-
0.268	0.094	0.114	0.134	0.154	0.173	-	-	-
0.315	0.134	0.154	0.173	0.193	0.213	-	-	-
0.335	0.150	0.169	0.189	0.209	0.228	-	-	-
0.394	0.201	0.220	0.240	0.260	0.280	0.299	0.319	0.339
0.402	0.209	0.228	0.248	0.268	0.287	0.307	0.327	0.346
0.472	0.272	0.291	0.311	0.331	0.350	0.370	0.390	0.409
0.551	0.406	0.425	0.445	0.465	0.484	0.504	0.524	0.543
0.630	0.457	0.476	0.496	0.516	0.535	0.555	0.575	0.594
0.689	0.539	0.559	0.579	0.598	0.618	0.638	0.657	0.677
0.787	0.575	0.594	0.614	0.634	0.654	0.673	0.693	0.713
0.827	0.677	0.697	0.717	0.736	0.756	0.776	0.795	0.815
0.945	0.882	0.902	0.921	0.941	0.961	0.980	1.000	-
1.181	0.980	1.000	-	-	-	-	-	-



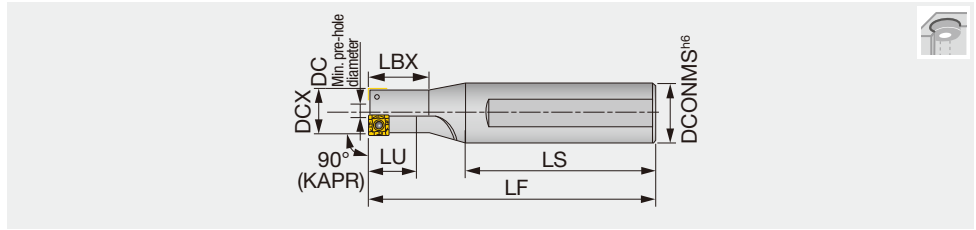
#### Tool: ECC31005R-30

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.



# TCB

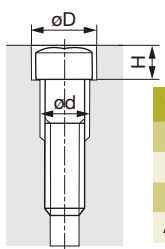
## Counterboring endmill, monoblock type



	Metric	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



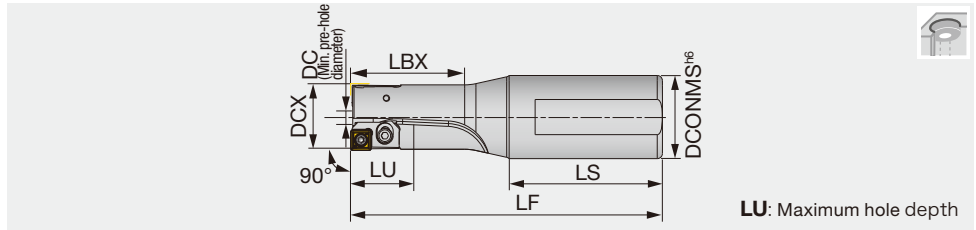
Designation	Clamping screw	Wrench
TCB100... - TCB160...	CSTB-2L040	T-6D
TCB-140...	CSTB-2.2S	T-7D
TCB170... - TCB190...	CSTB-2.2	T-7D
TCB200... - TCB260...	CSTA-NO3	T-9D
TCB-290 - TCB-320	CSTA-NO5	T-9D
TCB-350 - TCB-430	CSTA-4	T-15D

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 → [H253](#), Standard cutting conditions → [H253 - H254](#)

# TCB

## Counterboring endmill, cartridge type

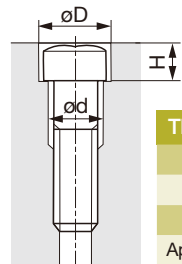


Metric	DCX*	DCONMS	DC*	LU	LS	LBX	LF	WT(kg)	Cartridge set Designation	Shim plate Designation	Shim plate Thickness	Insert
TCB260-290F32	26	32	13.2	40	59	43	120	0.6	TCB04CA-26-29	-	-	SPMP042...
TCB260-290F32	27	32	14.2	40	59	43	120	0.6	TCB04CA-26-29	AP16050	0.5	SPMP042...
TCB260-290F32	28	32	15.2	40	59	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...

\* - Dimensions shown are for min diameter setting. DC dimension changes when shims are added for larger diameter counterboring. 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 → [H253](#), Standard cutting conditions → [H253 - H254](#)





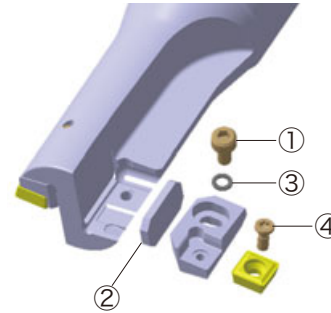
## Body SPARE PARTS

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  $\varnothing 0.1$  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

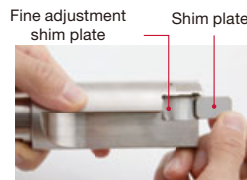


Fig.3



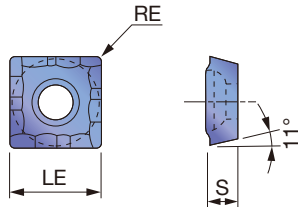
Fig.4

## CUSTOM-BUILT TOOL SERVICE

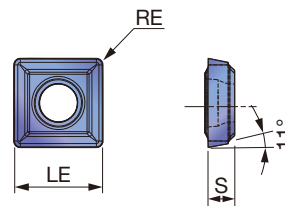
Tungaloy also designs and fabricates semi-standard or tailor-made tools with the TCB inserts according to the desired tool specifications. Contact your Tungaloy representative for further details.

# INSERT

## SPMP/SPMM



## SPMP/SPMM-CG



<b>P</b>	Steel	☆	★	★
<b>M</b>	Stainless	☆	★	★
<b>K</b>	Cast iron	☆	★	★
<b>N</b>	Non-ferrous	☆	☆	☆
<b>S</b>	Superalloys	☆	☆	☆
<b>H</b>	Hard materials	☆	☆	☆

★ : First choice  
☆ : Second choice

Designation	RE	Coated			LE	S
		T313W	AH6030	AH6225		
SPMP771-CG	0.016		▲	●	0.213	0.063
SPMP831-CG	0.016		▲	●	0.250	0.094
SPMP831DS	0.016	●			0.250	0.094
SPMP832-CG	0.031			●	0.250	0.094
SPMP041ER-CG	0.016			●	0.313	0.125
SPMP042ER-CG	0.031		▲	●	0.313	0.125
SPMP042ERD	0.031	●			0.313	0.125
SPMM321ER-CG	0.016			●	0.375	0.125
SPMM322ER-CG	0.031		▲	●	0.375	0.125
SPMM322ERD	0.031	●			0.375	0.125
SPMM431ER-CG	0.016			●	0.500	0.187
SPMM432ER-CG	0.031		▲	●	0.500	0.187
SPMM432ERD	0.031	●			0.500	0.187

● : Line up  
▲ : To be discontinued

# STANDARD CUTTING CONDITIONS

## Counterboring

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed : f (ipr)	
				ø10 - 12 mm (z = 1)	ø13 - 59 mm (z = 2)
<b>P</b>	Carbon steel	- 300 HB	260 - 660	0.001 - 0.003	0.004 - 0.012
<b>M</b>	Stainless steel	- 200 HB	260 - 490	0.001 - 0.002	0.002 - 0.006
<b>K</b>	Gray cast iron	150 - 250 HB	260 - 660	0.002 - 0.004	0.004 - 0.016
<b>N</b>	Non-ferrous	-	330 - 980	0.002 - 0.008	0.004 - 0.016
<b>S</b>	Superalloys	- 40 HRC	160 - 260	0.001 - 0.002	0.002 - 0.006
<b>H</b>	Hard materials	- 50 HRC	160 - 260	0.001 - 0.002	0.002 - 0.006

## Milling

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Carbon steel	- 300 HB	260 - 660	0.002 - 0.006
<b>M</b>	Stainless steel	- 200 HB	260 - 490	0.002 - 0.004
<b>K</b>	Gray cast iron	150 - 250 HB	260 - 660	0.002 - 0.008
<b>N</b>	Non-ferrous	-	330 - 980	0.004 - 0.008
<b>S</b>	Superalloys	- 40 HRC	160 - 260	0.002 - 0.003
<b>H</b>	Hard materials	- 50 HRC	160 - 260	0.002 - 0.003



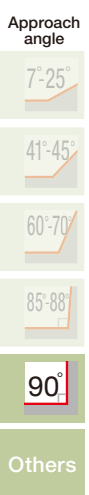
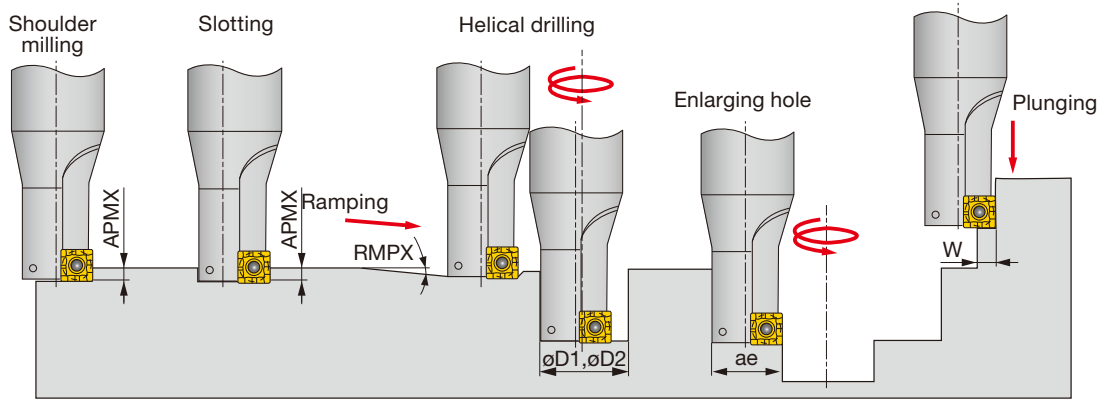




## Internal boring (With one cutting edge)

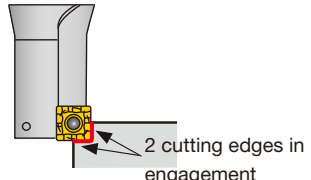
ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Depth of cut ap (in)	Feed : f (ipr)
<b>P</b>	Carbon steel	- 300 HB	260 - 660	0.020 -	0.002 - 0.006
<b>M</b>	Stainless steel	- 200 HB	260 - 490	0.020 -	0.002 - 0.004
<b>K</b>	Gray cast iron	150 - 250 HB	260 - 660	0.020 -	0.002 - 0.008
<b>N</b>	Non-ferrous	-	330 - 980	0.020 -	0.004 - 0.008
<b>S</b>	Superalloys	- 40 HRC	160 - 260	0.020 -	0.002 - 0.003
<b>H</b>	Hard materials	- 50 HRC	160 - 260	0.020 -	0.002 - 0.003

## APPLICATION



Metric	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.)

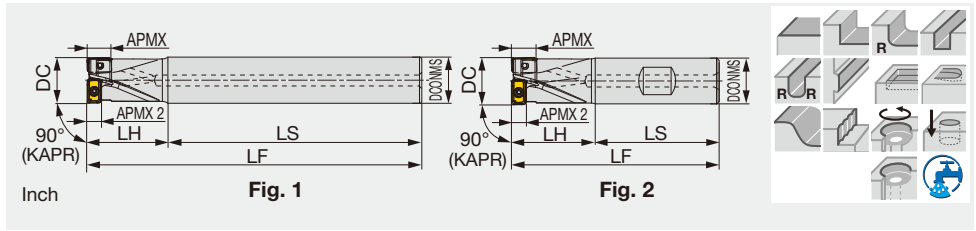


### Cautions in shouldering operation

The cutter is design so that the insert provides 1° taper relief on the periphery. The wall, therefore, will be 89° when milled.

Multi-functional square shoulder milling cutter, with screwed-on inserts and 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  $-15.7^{\circ} \sim -15^{\circ}$



Inch	APMX	APMX 2	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert	Fig.
EVLX06U0.50W0.50R02	0.197	0.110	0.500	2	0.500	1.781	0.756	2.537	0.110	With	LXMU06...	2
EVLX06U0.50C0.50R02L	0.197	0.110	0.500	2	0.500	3.000	1.500	4.500	0.220	With	LXMU06...	1
EVLX08U0.62W0.62R02	0.276	0.157	0.625	2	0.625	1.910	1.250	3.160	0.100	With	LXMU08...	2
EVLX08U0.62C0.62R02L	0.276	0.157	0.625	2	0.625	5.000	2.000	7.000	0.240	With	LXMU08...	1
EVLX10U0.787W0.75R02	0.354	0.157	0.787	2	0.750	2.030	1.380	3.410	0.160	With	LXMU10...	2
EVLX10U0.787C0.75R02L	0.354	0.157	0.787	2	0.750	5.000	2.380	7.380	0.370	With	LXMU10...	1
EVLX12U1.00W1.00R02	0.433	0.236	1.000	2	1.000	2.280	1.750	4.030	0.340	With	LXMU12...	2
EVLX12U1.00C1.00R02L	0.433	0.236	1.000	2	1.000	6.000	3.000	9.000	0.810	With	LXMU12...	1
EVLX16U1.25W1.25R02	0.571	0.276	1.250	2	1.250	2.281	2.000	4.281	1.210	With	LXMU16...	2
EVLX16U1.25C1.25R02L	0.571	0.276	1.250	2	1.250	6.500	3.500	10.000	3.060	With	LXMU16...	1
EVLX19U1.50W1.25R02	0.709	0.394	1.500	2	1.250	2.281	2.250	4.531	1.650	With	LXMU19...	2
EVLX19U1.50C1.25R02L	0.709	0.394	1.500	2	1.250	7.750	2.250	10.000	3.510	With	LXMU19...	1

Metric	APMX	APMX 2	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert	Fig.
EVLX06M012C12.0R02	5	2.8	12	2	12	60	20	80	0.06	With	LXM/GU06...	1
EVLX06M012C12.0R02L	5	2.8	12	2	12	85	35	120	0.09	With	LXM/GU06...	1
EVLX06M013C12.0R02L	5	2.8	13	2	12	95	25	120	0.09	With	LXM/GU06...	1
EVLX08M016C16.0R02	7	4	16	2	16	100	30	130	0.18	With	LXM/GU08...	1
EVLX08M016C16.0R02L	7	4	16	2	16	130	50	180	0.25	With	LXM/GU08...	1
EVLX08M017C16.0R02L	7	4	17	2	16	155	25	180	0.26	With	LXM/GU08...	1
EVLX10M020C20.0R02	9	4	20	2	20	110	35	145	0.31	With	LXM/GU10...	1
EVLX10M020C20.0R02L	9	4	20	2	20	130	60	190	0.41	With	LXM/GU10...	1
EVLX10M021C20.0R02L	9	4	21	2	20	160	30	190	0.42	With	LXM/GU10...	1
EVLX12M025C25.0R02	11	6	25	2	25	105	45	150	0.51	With	LXM/GU12...	1
EVLX12M025C25.0R02L	11	6	25	2	25	150	75	225	0.77	With	LXM/GU12...	1
EVLX12M026C25.0R02L	11	6	26	2	25	190	35	225	0.8	With	LXM/GU12...	1
EVLX16M032C32.0R02	14.5	7	32	2	32	100	50	150	0.83	With	LXM/GU16...	1
EVLX16M032C32.0R02L	14.5	7	32	2	32	165	90	255	1.45	With	LXM/GU16...	1
EVLX16M033C32.0R02L	14.5	7	33	2	32	205	50	255	1.5	With	LXM/GU16...	1
EVLX19M040C32.0R02	18	10	40	2	32	100	55	155	1.03	With	LXM/GU19...	1
EVLX19M040C32.0R02L	18	10	40	2	32	200	55	255	1.6	With	LXM/GU19...	1

**SPARE PARTS**



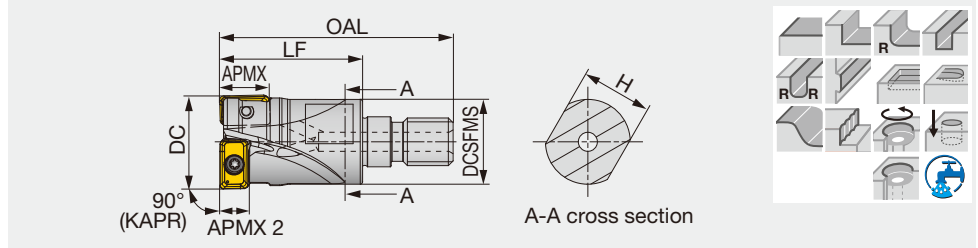
Designation	Clamping screw	Wrench
EVLX06...	CSPB-1.8FL4.3	IP-6DB
EVLX08...	CSPB-2.2	IP-7D
EVLX10...	SR M2.5X0.45-L6 IP7	IP-7D
EVLX12...	TS30100/HG-P	IP-9D
EVLX16...	CSTB-4L090	T-15D
EVLX19...	CSTB-5	T-20D

Recommended clamping torque: CSPB-1.8FL4.3 = 0.37 lbs-ft, 0.5 N-m, CSPB-2.2, SR M2.5X0.45-L6 IP7 = 0.74 lbs-ft, 1 N-m, TS30100/HG-P = 1.48 lbs-ft, 2 N-m, CSTB-4L090 = 2.58 lbs-ft, 3.5 N-m, CSTB-5 = 3.69 lbs-ft, 5 N-m

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

Multi-functional square shoulder modular milling cutter (TungFlex), with screwed-on inserts and center cutting edge

GAMP: Center insert -2.6° ~ -4.4°, Peripheral insert +6.1° ~ +7.1°  
 GAMF: Center insert +0.2° ~ +1.3°, Peripheral insert -15.7° ~ -15°



Metric	APMX	APMX 2	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HVLX06M012M06R02	5	2.8	12	2	34.5	20	7	10	M6	0.02	With	LXM/GU06...
HVLX06M013M06R02	5	2.8	13	2	34.5	20	7	10	M6	0.02	With	LXM/GU06...
HVLX08M016M08R02	7	4	16	2	42	25	10	14.5	M8	0.03	With	LXM/GU08...
HVLX08M017M08R02	7	4	17	2	42	25	10	14.5	M8	0.04	With	LXM/GU08...
HVLX10M020M10R02	9	4	20	2	49	30	15	17.8	M10	0.05	With	LXM/GU10...
HVLX10M021M10R02	9	4	21	2	49	30	15	17.8	M10	0.06	With	LXM/GU10...
HVLX12M025M12R02	11	6	25	2	57	35	17	23	M12	0.1	With	LXM/GU12...
HVLX12M026M12R02	11	6	26	2	57	35	17	23	M12	0.1	With	LXM/GU12...
HVLX16M032M16R02	14.5	7	32	2	63	40	22	28.8	M16	0.21	With	LXM/GU16...
HVLX16M033M16R02	14.5	7	33	2	63	40	22	28.8	M16	0.21	With	LXM/GU16...

**SPARE PARTS**

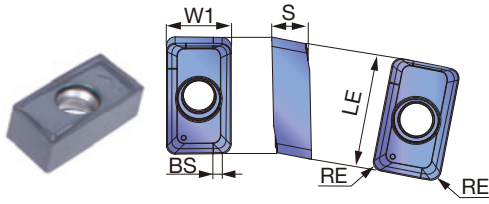


Designation	Clamping screw	Wrench
HVLX06...	CSPB-1.8FL4.3	IP-6DB
HVLX08...	CSPB-2.2	IP-7D
HVLX10...	SR M2.5X0.45-L6 IP7	IP-7D
HVLX12...	TS30100/HG-P	IP-9D
HVLX16...	CSTB-4L090	T-15D

Recommended clamping torque: CSPB-1.8FL4.3 = 0.37 lbs-ft, 0.5 N-m, CSPB-2.2, SR M2.5X0.45-L6 IP7 = 0.74 lbs-ft, 1 N-m, TS30100/HG-P = 1.48 lbs-ft, 2 N-m, CSTB-4L090 = 2.58 lbs-ft, 3.5 N-m

# INSERT

## LXMU-MM



<b>P</b>	Steel	★	☆					
<b>M</b>	Stainless	★						
<b>K</b>	Cast iron		☆	★				
<b>N</b>	Non-ferrous							
<b>S</b>	Superalloys	☆		★				
<b>H</b>	Hard materials			★				

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated			LE	W1	S	BS
			AH3225	AH120	AH8015				
LXMU060204PER-MM	0.0157	0.197	●	●		0.236	0.154	0.091	0.024
LXMU080304PER-MM	0.016	0.276	●	●	●	0.303	0.197	0.110	0.031
LXMU10T304PER-MM	0.016	0.354	●	●		0.394	0.236	0.126	0.047
LXMU10T308PER-MM	0.031	0.354	●	●	●	0.394	0.236	0.126	0.031
LXMU120404PER-MM	0.016	0.433	●	●		0.480	0.280	0.165	0.047
LXMU120408PER-MM	0.031	0.433	●	●	●	0.480	0.280	0.165	0.031
LXMU160504PER-MM	0.0157	0.591	●	●		0.618	0.370	0.206	0.063
LXMU160508PER-MM	0.0315	0.591	●	●		0.618	0.370	0.207	0.047
LXMU190608PER-MM	0.0315	0.709	●	●		0.748	0.492	0.269	0.047

● : Line up

# STANDARD CUTTING CONDITIONS

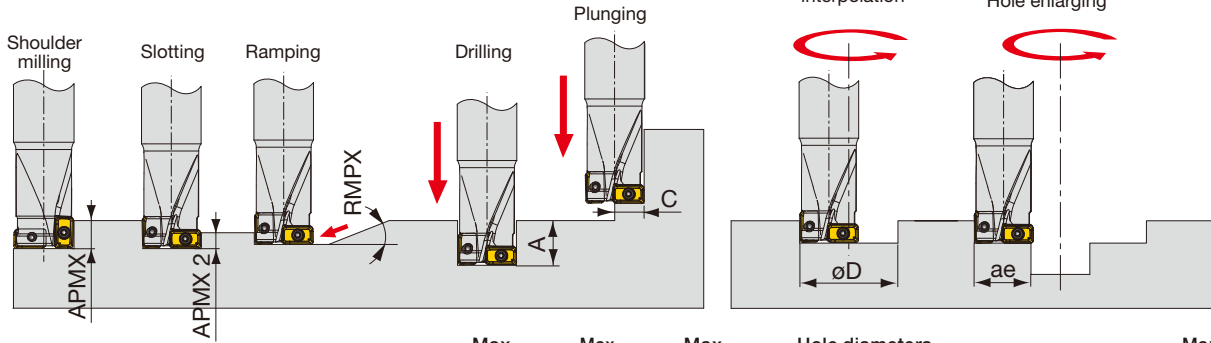
ISO	Workpiece materials	Hardness	Grades	Cutting speed Vc (sfm)	Drilling (ZEFP = 1)* Feed per revolution f (ipr)	Shouldering / Helical interpolation*	
						Feed per tooth fz (ipt)	
						08	10 / 12
<b>P</b>	Low carbon steel 1015, etc.	- 200 HB	AH3225	328 - 984	0.001 - 0.003	0.002 - 0.010	0.002 - 0.012
	Carbon steel and alloy steel 1055, etc.	- 300 HB	AH3225	328 - 820	0.001 - 0.003	0.002 - 0.010	0.002 - 0.012
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	AH3225	328 - 656	0.001 - 0.002	0.002 - 0.008	0.002 - 0.010
<b>M</b>	Stainless steel 304SS, etc.	-	AH3225	262 - 591	0.001 - 0.003	0.002 - 0.008	0.002 - 0.009
<b>K</b>	Gray cast iron Class 25, Class 30, etc.	150 - 250 HB	AH8015	328 - 984	0.001 - 0.004	0.002 - 0.010	0.002 - 0.012
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	AH8015	328 - 820	0.001 - 0.003	0.002 - 0.008	0.002 - 0.010
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	-	AH3225	66 - 197	0.001 - 0.002	0.002 - 0.006	0.002 - 0.006
	Superalloys Inconel718, etc.	-	AH8015	66 - 131	0.001 - 0.002	0.002 - 0.006	0.002 - 0.006
<b>H</b>	Hardened steel	H-13, etc.	AH8015	164 - 492	0.001 - 0.002	0.002 - 0.006	0.002 - 0.006
		D2, etc.	AH8015	131 - 230	0.001 - 0.002	0.002 - 0.006	0.002 - 0.006

\*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 (φD) ≤ 1.25x the tool diameter (DC)
- The axial D.O.C. exceeds APMX2 (See next page for APMX2)

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

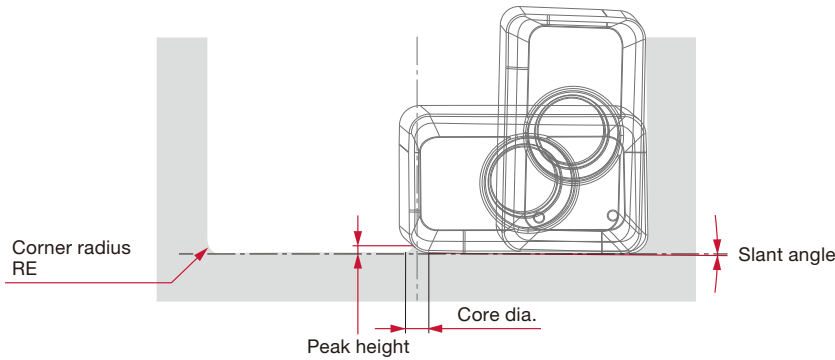
# APPLICATION RANGE



Inch	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	øDmin	øDmax	øDmin	øDmax	ae
EVLX08U0.62...	0.625	0.276	0.157	0.469	0.313	3°	16.930	30.470	0.625	31.330	0.546
EVLX10U0.787...	0.780	0.354	0.157	0.590	0.394	3°	22.000	37.950	0.787	39.150	0.708
EVLX12U1.00...	1.000	0.433	0.236	0.750	0.500	3°	27.450	48.650	1.000	49.750	0.921

\*Use pecking or dwelling method when drilling holes deeper than 0.197".

# HOLE BOTTOM PROFILE AFTER DRILLING

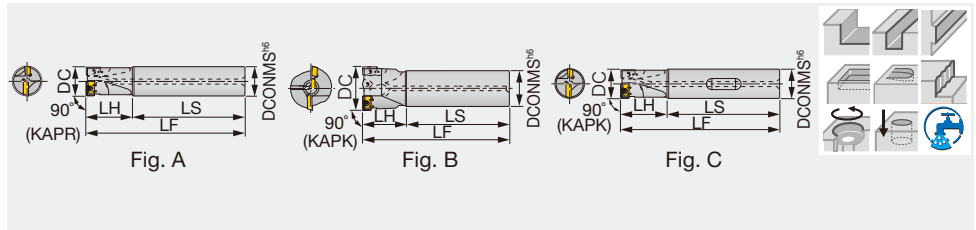


DC	Unit: mm										Unit: in				
	D16	D17	D20		D21		D25		D26		0.625"	0.787"		1.000"	
Insert	LXMU08...		LXMU10...				LXMU12...				LXMU08...	LXMU10...		LXMU12...	
RE	0.4		0.4	0.8	0.4	0.8	0.4	0.8	0.4	0.8	0.016"	0.016"	0.031"	0.016"	0.031"
Peak height	0.43	0.86	0.1	0.24	0.86	0.86	0.45	0.45	0.86	0.86	0.0134"	0.004"	0.009"	0.034"	0.034"
Core dia.	0.9	1.9	0.21	1.02	1.22	2.02	0.7	1.37	1.59	2.36	0.0307"	0.008"	0.04"	0.041"	0.07"
Slant angle	Conical shape with ≈ 0.3° slant angle														

# EVX

Multi purpose endmill, shank type, with center cutting edge

Standard type GAMF = +2°~ +5°, GAMF = -10°~ -3.5°  
Long type GAMF = +5°, GAMF = -4°~ -2°



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	Coolant hole	Fig.	Insert
EVX08062RSU	0.276	0.625	2	0.625	1.906	1.250	3.156	Without	C	XXMU08...
EVX08062RLHU	0.276	0.625	2	0.625	5.375	1.625	7.000	With	A	XXMU08...
EVX10020RSU	0.276	0.787	2	0.750	2.031	1.250	3.281	Without	C	XXMU10...
EVX10020RLHU	0.276	0.787	2	0.750	5.500	2.000	7.500	With	A	XXMU10...
EVX12100RSU	0.276	1.000	2	1.000	2.281	1.625	3.906	Without	C	XXMU12...
EVX12100RLHU	0.354	1.000	2	1.000	6.000	2.750	8.750	With	A	XXMU12...
EVX16125RSU	0.276	1.250	2	1.250	2.281	2.000	4.281	Without	C	XXMU16...
EVX16125RLHU	0.354	1.250	2	1.250	6.750	3.250	10.000	With	A	XXMU16...

Metric	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	Wrench 1	Wrench 2
EVX08...	-	CSPB-2.2	M-1000	IP-7D	-
EVX10...	-	CSPB-2.5	M-1000	IP-8D	-
EVX12...	-	CSPD-3	M-1000	IP-10D	-
EVX16125R**U, EVX16032R...	CSPB-3.5	-	M-1000	IP-15D	-
EVX16050, 63R...	CSPB-3.5	CSTB-3.5D	M-1000	IP-15D	T-9D

Recommended clamping torque: CSPB-2.2 = 0.74 lbs-ft, 1 N-m, CSPB-2.5 = 0.96 lbs-ft, 1.3 N-m, CSPB-3.5 = 2.58 lbs-ft, 3.5 N-m, CSPD-3 = 1.84 lbs-ft, 2.5 N-m, CSTB-3.5D = 1.7 lbs-ft, 2.3 N-m

Reference pages: Inserts, Standard cutting conditions → **H260**

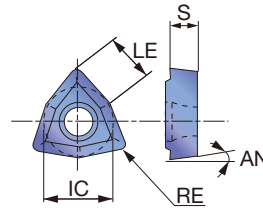
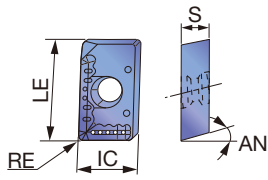




## INSERT

### 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	0.016	●	●	●	0.323	0.220	0.109	10°
XXMU10H308PR-MJ	0.031	●	●	●	0.417	0.268	0.138	11°
XXMU12X408PR-MJ	0.031	●	●	●	0.520	0.311	0.165	11°
XXMU16X508PR-MJ	0.031	●	●	●	0.661	0.437	0.197	11°
WCMT050308-D4	0.031		●	●	0.213	0.313	0.125	7°
WCMT06T308-D4	0.031		●	●	0.256	0.375	0.156	7°

● : Line up

## STANDARD CUTTING CONDITIONS

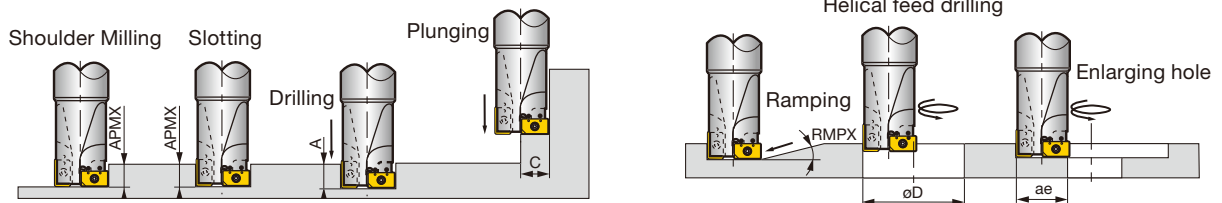
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e-catalog



EVX

## APPLICATION RANGE



Inch	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
EVX08062RSU/RLHU	0.625	0.276	0.315	0.315	3°	0.756	1.250	0.551
EVX10020RSU/RLHU	0.750	0.354	0.394	0.394	3°	0.945	1.500	0.709
EVX12100RSU/RLHU	1.000	0.453	0.492	0.492	3°	1.250	1.890	0.906
EVX16125RSU/RLHU	1.250	0.591	0.630	0.630	3°	1.510	2.440	1.250

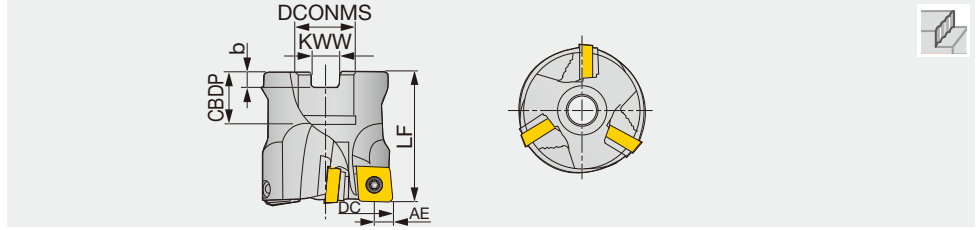


# Z-FEEDMILL

## TZP12

Plunge mill for roughing, with screw clamp system

GAMP = +26°, GAMF = -2°



Metric	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

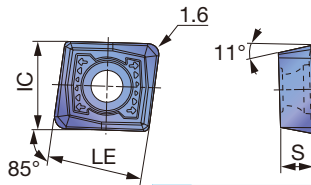
### SPARE PARTS

Designation	Clamping screw	Lubricant	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	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									
APMT120416PR-MJ	0.063	0.394	●	●							0.500	0.531	0.187

● : Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog



TZP12

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

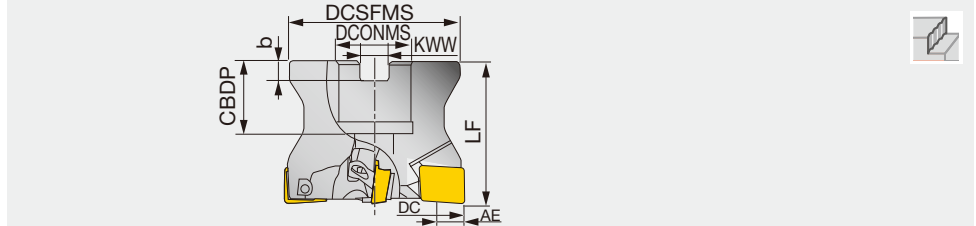


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- Others

# TZP19

Plunge mill for roughing, with wedge clamp system

GAMP = +16°, GAMF = -2°



Metric	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

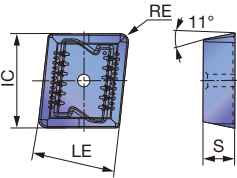
## SPARE PARTS

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	0.063	0.669	●	●	0.750	0.625	0.250

●: Line up

## STANDARD CUTTING CONDITIONS

Please scan below.

e-catalog

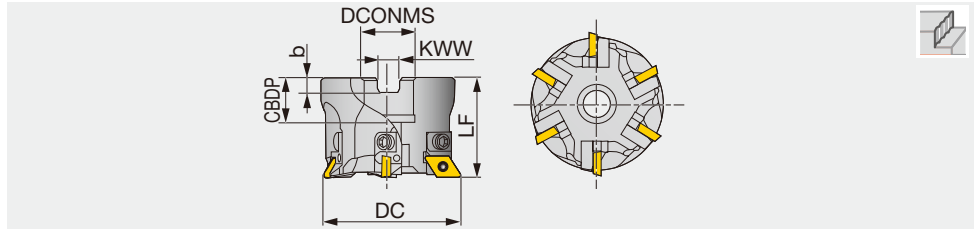


TZP19

# TZF11

High precision plunge mill

GAMP = 0°, GAMF = -6° ~ 0°



Metric	CICT	DC	DCONMS	CBDP	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

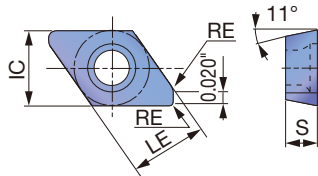
## SPARE PARTS

Designation	Clamping screw	Cartridge	Lubricant	Cartridge fixing screw	Cartridge fixing screw	Shell locking bolt	Wewnch	Wewnch 1	Wewnch 2
TZF11050R*	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHMM3-10	FSHM10-40	T-15D	P-1.5	P-3
TZF11063R*, TZF11080R	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHMM3-10	-	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	0.039	●	●	●	0.375	0.375	0.156

● : 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

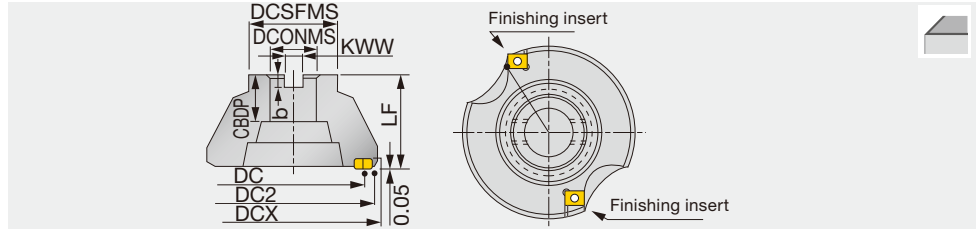


- High Feed Milling
- Face Milling
- Shoulder Milling
- Slot Milling
- Profile Milling
- Chamfering, Counterbore
- Finish Face Milling
- Approach angle
- 7°-25°
- 41°-45°
- 60°-70°
- 85°-88°
- 90°
- Others

## NMS09

High precision finishing face mill

GAMP = 10°, GAMF = -30°

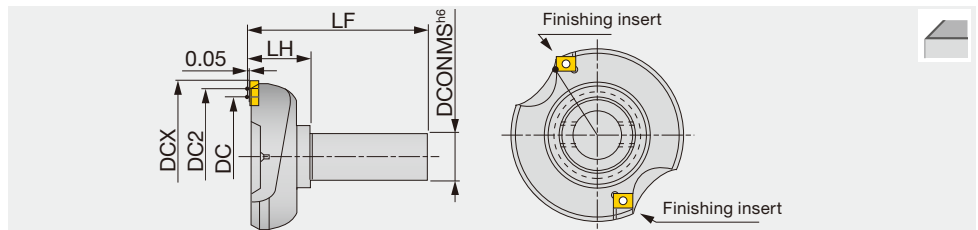


Metric	APMX	DC	CICT	DC2	DCX	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
NMS09080R	0.2	80	2	92	100.7	50	25.4	26	9.5	6	1.49	LNCQ0906...
NMS09100R	0.2	100	2	112	120.7	50	31.75	32	12.7	8	2.1	LNCQ0906...
NMS09125R	0.2	125	2	137	145.7	63	38.1	38	15.9	10	4.07	LNCQ0906...
NMS09160R	0.2	160	2	172	180.7	63	50.8	38	19	11	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°



Metric	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

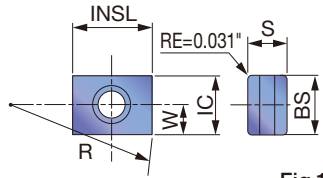


Fig.1

## LNCQ0906-50S

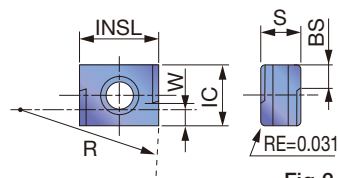


Fig.2

<b>P</b> Steel	☆			★	
<b>M</b> Stainless	★			★	
<b>K</b> Cast iron	★	★			
<b>N</b> Non-ferrous					
<b>S</b> Superalloys					
<b>H</b> Hard materials					

★ : First choice  
☆ : Second choice

Designation	APMX	Coated		Cermet	IC	INSL	S	R	W	BS	Fig.
		AH120	GH110	NS740							
LNCQ0906N-100L	0.008	●	●	●	0.375	0.500	0.250	3.937	0.188	0.311	1
LNCQ0906N-50L	0.008	●	●	●	0.375	0.500	0.250	1.969	0.188	0.311	1
LNCQ0906R-50S	0.008	●	●	●	-	0.500	0.250	1.969	0.091	0.157	2

●: Line up

# STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Grade	Cutting speed Vc (sfm)	LNCQ0906N-100(50)L		LNCQ0906R-50S	
					Depth of cut APMX (in)	Feed per tooth f (ipr)	Depth of cut APMX (in)	Feed per tooth f (ipr)
<b>P</b>	Mild steels	< 180	NS740	656 - 984	< 0.008	0.079 - 0.236	≤ 0.008	0.039 - 0.098
	Carbon steels	< 300	NS740	492 - 820				
	Alloy steels	< 300	NS740	394 - 656				
	Die steels	< 300	NS740	328 - 492				
<b>M</b>	Stainless steels	< 250	AH120 NS740	492 - 722	< 0.008	0.079 - 0.236	≤ 0.008	0.039 - 0.098
<b>K</b>	Cast irons	150 - 250	GH110 AH120	394 - 656	< 0.008	0.079 - 0.236	≤ 0.008	0.039 - 0.098

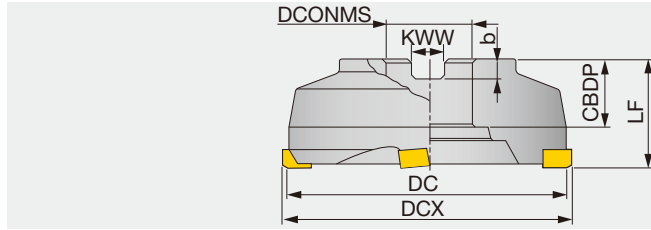




# MS

## High precision finishing face mill

GAMP = -5°, GAMF = -30°



Right hand (R) shown.

Metric	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...

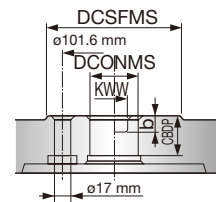
### SPARE PARTS

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

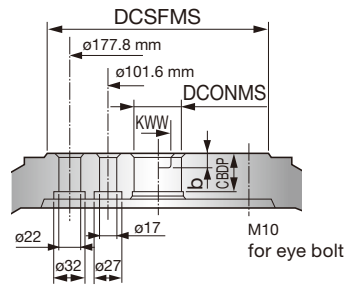
Recommended clamping torque: 3.5 N·m

## Arbor type

### MS08, 10R/L

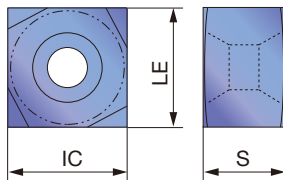


### MS12R/L



## INSERT

### SNA A56FTR



<b>P</b> Steel	★	
<b>M</b> Stainless		
<b>K</b> Cast iron		
<b>N</b> Non-ferrous		
<b>S</b> Superalloys		
<b>H</b> Hard materials	☆	

★ : First choice  
☆ : Second choice

Designation	APMX	Cermets			LE	IC	S
		X407					
SNA A56FTR	0.004	●			0.309	0.625	0.375

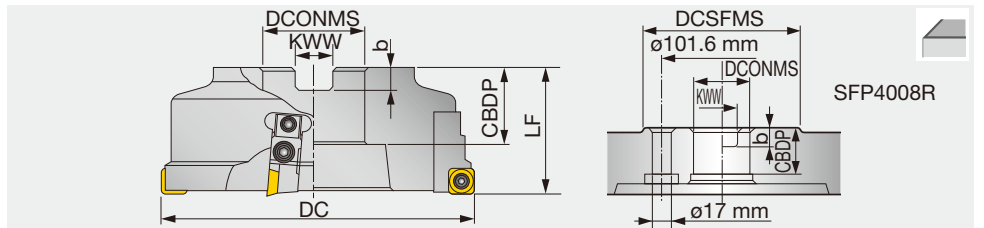
● : Line up

# STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Depth of cut APMX (in)
<b>P</b>	Mild steels	< 180 HB	X407	853 - 984	≤ 0.236	≤ 0.004
	Carbon steels	< 300 HB	X407	394 - 591	≤ 0.236	≤ 0.004
	Alloy steels	< 300 HB	X407	394 - 591	≤ 0.236	≤ 0.004
	Die steels	< 30 HRC	X407	394 - 591	≤ 0.236	≤ 0.004
<b>H</b>	Carbon steel	40 - 50 HRC	X407	492 - 656	≤ 0.118	≤ 0.002

## SFP4000R

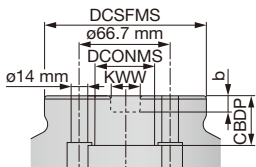
High precision finishing face mill, with adjustable structure



Metric	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



### SPARE PARTS

Designation	Clamping screw	Locator	Adjusting screw	Locator fixing screw1	Locator fixing screw2	Wedge	Wrench	Washer1	Washer2	Wrench
SFP40...	CSTA-5S	LW400R	FDS-8S	CM5X0.8X16	CM5X0.8X18	FW-305	T-15D	5S	L5	P-4

Recommended clamping torque: 3.5 N·m

Reference pages: Inserts, Standard cutting conditions → **H268**



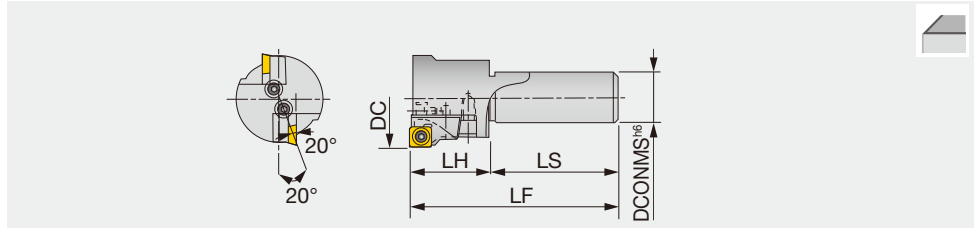




# EFP4000R

High precision finishing endmill, shank type, with adjustable structure

GAMP = +5°, GAMF = -20°



Metric	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.

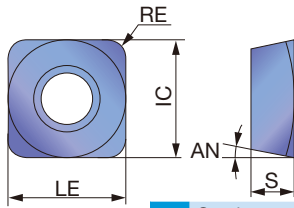
## SPARE PARTS

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

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Cermet		Uncoated		IC	LE	S	AN
			N308	TH10						
SPHA435FNW	0.079	0.004	●	●			0.500	0.500	0.187	11°

● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Grade	Cutting speed Vc (sfm)	Feed per revolution: f (ipr)		Depth of cut APMX (in)
					SFP	EFP	
P	Mild steels	< 180	N308	591 - 820	≤ 0.236	≤ 0.157	≤ 0.004
	Carbon steels	< 300	N308	492 - 656	≤ 0.236	≤ 0.157	≤ 0.004
	Alloy steels	< 300	N308	492 - 656	≤ 0.236	≤ 0.157	≤ 0.004
M	Stainless steels	< 250	N308	525 - 656	≤ 0.157	≤ 0.118	≤ 0.004
K	Cast irons	150 - 250	TH10	328 - 492	≤ 0.197	≤ 0.118	≤ 0.008
N	Non-ferrous metals	-	TH10	656 - 1640	≤ 0.236	≤ 0.157	≤ 0.004

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).

**TUNGMEISTER**  
VEH...  
4 flute, roughing - finishing, variable helix and pitch

Model	AH715	AH725	NOF	FHA	DC	DCSFM5	APMX	RE	CRKS	LF	Wrench
VEH00L06.0R1004S05	●	●	●	●	8	7.7	5	1	505	10	KEYV-S05
VEH00L06.0R1004S05	●	●	●	●	8	7.7	5	1	505	10	KEYV-S05
VEH00L07.0R1004S08	●	●	●	●	10	9.7	7	1	508	13	KEYV-S08
VEH00L07.0R1004S08	●	●	●	●	10	9.7	7	1	508	13	KEYV-S08
VEH120L06.0R1004S08	●	●	●	●	12	9.3	9	1	508	14.3	KEYV-S08
VEH120L06.0R1004S08	●	●	●	●	12	11.7	9	0.5	508	16.5	KEYV-S08
VEH120L06.0R1004S08	●	●	●	●	12	11.7	9	1	508	16.5	KEYV-S08
VEH140L12.0R1004S10	●	●	●	●	16	15.3	12	0.5	510	20.5	KEYV-S10
VEH140L12.0R1004S10	●	●	●	●	16	15.3	12	1	510	20.5	KEYV-S10
VEH00L15.0R1004S12	●	●	●	●	20	18.3	15	0.5	512	25.5	KEYV-S12
VEH00L15.0R1004S12	●	●	●	●	20	18.3	15	1	512	25.5	KEYV-S12

Torque: Recommended clamping torque: N m  
7 pieces per package

**TUNGMEISTER**  
VEH...  
4 flutes, roughing - finishing, long edge, variable helix and pitch

Model	AH715	NOF	FHA	DC	DCSFM5	APMX	RE	CRKS	LF	Wrench	
VEH00L12.0R0204S05	●	●	●	●	8	7.7	12	0.5	505	18	M
VEH00L12.0R1004S05	●	●	●	●	8	7.7	12	1	505	18	M
VEH00L15.0R0204S06	●	●	●	●	10	9.7	15	0.5	506	22	M
VEH00L15.0R1004S06	●	●	●	●	10	9.7	15	1	506	22	M
VEH120L15.0R0204S08	●	●	●	●	12	11.7	18	0.5	508	27	M
VEH120L15.0R1004S08	●	●	●	●	12	11.7	18	1	508	27	M

### Method 2.

Select the tool series name on I004 - I005 and check the details on the product page.

Main products

Exchangeable Head Endmill

TUNGMEISTER  
Endmills with exchangeable heads for reduced tool change time  
ø8.250" - ø1.000" (ø5 mm - ø32 mm)

I004 tungaloy.com/us

### Method 3.

Select the application and the cutting edge shape from Quick Guide on I008 - I011, and see the details on each page.

Quick Guide TUNGMEISTER

Square, Face mill, High feed (Inch)

Head geometry	Designation	Appearance	Application	Tool dia.	No. of cutting edges	Cutting edge length		Outer geometry	Helix angle	Pitch	CRKS	Workpiece material				Remarks	Page
						L/D	APMX					M	N	S	H		
VEE**04L	VEE**04L	...	...	ø8.250" - ø1.000" (ø5 - 32 mm)	4	0.200" (5.08 mm)	0.200" (5.08 mm)	R	30/45	Variable	S10-S15	★	★	★	★	General	I013
VEE**L...	VEE**L...	...	...	ø8.312" - ø1" (ø212 - 25.4 mm)	4	0.6" (15.24 mm)	0.6" (15.24 mm)	RV	30/45	Variable	S05-S15	★	★	★	★	For key way	I015
VEE**03...	VEE**03...	...	...	ø8.312" - ø1" (ø212 - 25.4 mm)	3	0.500" (12.7 mm)	0.514" (13 mm)	Strip edge	30/45	Variable	S05-S15	★	★	★	★	For key way	I016
VEE**A02...	VEE**A02...	...	...	ø8.375" - ø1" (ø218.75 - 25.4 mm)	2	0.710" (18 mm)	0.710" (18 mm)	R	45	Variable	S05-S15	★	★	★	★	For key way	I017
VEE**R...	VEE**R...	...	...	ø8.312" - ø1" (ø212 - 25.4 mm)	4	0.6" (15.24 mm)	0.200" (5.08 mm)	Chamfered	45	Variable	S05-S15	★	★	★	★	Semifinished cutting edge	I018
VEE**C...	VEE**C...	...	...	ø8.312" - ø1" (ø212 - 25.4 mm)	4	0.6" (15.24 mm)	0.200" (5.08 mm)	Chamfered	45	Variable	S05-S15	★	★	★	★	Semifinished cutting edge	I019
VED**06...	VED**06...	...	...	ø8.312" - ø1" (ø212 - 25.4 mm)	6	0.6" (15.24 mm)	0.514" (13 mm)	RV	30/30	Variable	S10-S15	★	★	★	★	Small width of cut	I020
VED**08...	VED**08...	...	...	ø8.375" - ø1" (ø218.75 - 25.4 mm)	8	0.6" (15.24 mm)	0.6" (15.24 mm)	RV	30/30	Variable	S10-S15	★	★	★	★	Small width of cut	I021
VFX**02...	VFX**02...	...	...	ø8.375" - ø1" (ø218.75 - 25.4 mm)	2	0.500" (12.7 mm)	0.200" (5.08 mm)	Chamfered	30	Variable	S05-S15	★	★	★	★	Small width of cut	I022

Square, Face mill, High feed (Metric)

Head geometry	Designation	Appearance	Application	Tool dia.	No. of cutting edges	Cutting edge length		Outer geometry	Helix angle	Pitch	CRKS	Workpiece material				Remarks	Page
						L/D	APMX					M	N	S	H		
VEH...	VEH...	...	...	ø8 - ø20 mm	4	0.6" (15.24 mm)	5 - 15 mm	R	Variable	Variable	S05-S15	★	★	★	★	Long edge	I012
VEH...	VEH...	...	...	ø8 - ø20 mm	4	1.2" (30.48 mm)	12 - 38 mm	R	Variable	Variable	S05-S15	★	★	★	★	Long edge	I012
VEH**R...	VEH**R...	...	...	ø8 - ø20 mm	4	1.500" (38.1 mm)	12 - 37 mm	Chamfered	47	Variable	S05-S15	★	★	★	★	Semifinished cutting edge	I018
VED**0708...	VED**0708...	...	...	ø8 - ø20 mm	7, 9	1.500" (38.1 mm)	12 - 37 mm	R	Variable	Variable	S05-S15	★	★	★	★	Small width of cut	I021
VFM...	VFM...	...	...	ø12 - ø20 mm	6	0.300" (7.62 mm)	3.8 - 7.5 mm	R	-	Variable	S05-S10	★	★	★	★	With coolant hole	I023
VFX**0406...	VFX**0406...	...	...	ø12 - ø16 mm	4	0.550" (13.97 mm)	6 - 10 mm	-	Variable	Variable	S05-S10	★	★	★	★	With coolant hole	I025

I008 tungaloy.com/us

## Icon

### Head geometry



Square



Ball nose



Radius



Chamfering



Slotting



Threading

### No. of cutting edges

2 2

3 3

4 4

5 5

6 or more 6 or more

### Application



Shoulder milling



Deep shoulder milling



Shoulder milling (with radius)



Face milling



Slotting



Slotting (with radius)



Side slotting



Side milling



Pocketing



Ramping



Profiling



Plunging



Hole enlarging



Hole making



Counterboring



Hole chamfering



Chamfering



Cutting-off

**4** TUNGMEISTER VEH...  
4 flutes, roughing - finishing, variable helix and pitch

**7**

**6** **Metric**

Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque	Fig.
VEH06L05.0R1004505	●	4	41°-45°	5	7.7	5	0.5	S05	10	KEYV-S05	7	1
VEH06L05.0R1004506	●	4	41°-45°	8	7.7	5	1	S05	10	KEYV-S05	7	2
VEH06L07.0R1004505	●	4	41°-45°	10	9.7	7	0.5	S06	13	KEYV-S06	10	1
VEH06L07.0R1004506	●	4	41°-45°	10	9.7	7	1	S06	13	KEYV-S06	10	2
VEH06L09.0R1004505	●	4	41°-45°	12	9.3	9	1	S08	14.3	KEYV-S08	15	1
VEH06L09.0R1004506	●	4	41°-45°	12	11.7	9	0.5	S08	16.5	KEYV-S08	15	2
VEH06L09.0R1004508	●	4	41°-45°	12	11.7	9	1	S08	16.5	KEYV-S08	15	3
VEH06L12.0R1004505	●	4	41°-45°	16	15.3	12	0.5	S10	20.5	KEYV-S10	28	1
VEH06L12.0R1004506	●	4	41°-45°	16	15.3	12	1	S10	20.5	KEYV-S10	28	2
VEH06L12.0R1004510	●	4	41°-45°	16	15.3	12	0.5	S10	20.5	KEYV-S10	28	3
VEH06L15.0R1004512	●	4	41°-45°	20	18.3	15	0.5	S12	25.5	KEYV-S12	28	1
VEH06L15.0R1004515	●	4	41°-45°	20	18.3	15	1	S12	25.5	KEYV-S12	28	2

Torque: Recommended clamping torque: N·m  
2 pieces per package

**5**

**8** **Metric**

Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque	Fig.
VEH06L12.0R1004505	●	4	41°-45°	8	7.7	12	0.5	S05	18	KEYV-S05	7	1
VEH06L12.0R1004506	●	4	41°-45°	8	7.7	12	1	S05	18	KEYV-S05	7	2
VEH06L15.0R1004505	●	4	41°-45°	10	9.7	15	0.5	S06	22	KEYV-S06	10	1
VEH06L15.0R1004506	●	4	41°-45°	10	9.7	15	1	S06	22	KEYV-S06	10	2
VEH06L18.0R1004505	●	4	41°-45°	12	11.7	18	0.5	S08	27	KEYV-S08	15	1
VEH06L18.0R1004506	●	4	41°-45°	12	11.7	18	1	S08	27	KEYV-S08	15	2
VEH06L24.0R1004510	●	4	41°-45°	16	15.3	24	0.5	S10	33.5	KEYV-S10	28	1
VEH06L24.0R1004512	●	4	41°-45°	16	15.3	24	1	S10	33.5	KEYV-S10	28	2
VEH06L30.0R1004512	●	4	41°-45°	20	18.45	30	0.5	S12	41	KEYV-S12	28	1
VEH06L37.0R1004515	●	4	41°-45°	25	23.9	37	0.5	S15	52.5	KEYV-W50	40	1
VEH06L37.0R1004516	●	4	41°-45°	25	23.9	37	1	S15	52.5	KEYV-W50	40	2
VEH06L38.0R1004521	●	4	41°-45°	32	30	38	-	S21	55	KS-24	110	1
VEH06L38.0R1004521	●	4	41°-45°	32	30	38	-	S21	55	KS-24	110	2

Torque: Recommended clamping torque: N·m  
VEH50 - VEH150: 2 pieces per package  
VEH500 - VEH550: 1 piece per package

**10** Reference pages: Standard cutting conditions → 1022 - 1023

1012 tungaloy.com/us

**9** 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 Vc (m/min)	Feed per tooth: fz (µm)						Depth of cut ap (mm)	Width of cut ae (mm)	
				0.250°	0.312°	0.375°	0.500°	0.625°	0.750°			1.000°
P	Low carbon steels 1045, 1050, etc.	300 HB	260 - 590	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
		41-40, S120, etc.	300 HB	200 - 400	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
M	Stainless steels S30403, S31603, etc.	300 HB	130 - 330	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC	
		Gray cast iron No.2002, No.3005, etc.	150 - 250 HB	260 - 660	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
K	Ductile cast iron 60-40-18, etc.	150 - 250 HB	260 - 660	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC	
		Aluminum alloys Si<13%	60 - 120 HB	660 - 2290	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
N	Aluminum alloys Si>13%	300 - 380 HB	130 - 300	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC	
		Titanium alloys Ti-6Al-4V, etc.	130 - 260 HB	900 - 1100	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
S	Heat-resistant alloys Inconel 718, etc.	40 - 50 HRC	130 - 260	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC	
		Hardened steel H13, etc.	40 - 50 HRC	130 - 260	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
H	Hardened steel G2, etc.	50 - 65 HRC	66 - 200	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	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 Vc (m/min)	Feed per tooth: fz (µm)						Depth of cut ap (mm)	Width of cut ae (mm)
				0.250°	0.312°	0.375°	0.500°	0.625°	0.750°		
S	Titanium alloys Ti-6Al-4V, etc.	300 HB	130 - 300	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
		Heat-resistant alloys Inconel 718, etc.	100 - 200 HB	660 - 2290	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC
H	Hardened steel H13, etc.	40 - 50 HRC	130 - 300	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC	0.25 x DC
		Hardened steel G2, etc.	50 - 65 HRC	66 - 200	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.021 - 0.033	0.6 x DC

1022 tungaloy.com/us

- 1 : Application
- 2 : Cutting edge shape
- 3 : Number of cutting edges
- 4 : Endmill series name
- 5 : Dimension table
- 6 : Endmill designation
- 7 : Dimension drawing (conforming to ISO13399)
- 8 : Spare parts
- 9 : Standard cutting conditions
- 10 : Reference page



Workpiece material

- P** Steel
- M** Stainless steel
- K** Cast iron
- N** Non-ferrous metal
- S** Superalloy
- H** Hard material

When ordering

- Please specify the designation and quantity for TungMeister heads.  
e.g. **VEE031L20C004-U06S05** ... 2 (two heads per package)
- Please specify the designation and quantity for TungMeister shanks.  
e.g. **VSS031L300S05UC** ... 1 (one shank per package)

\*Wrenches for TungMeister are sold separately.

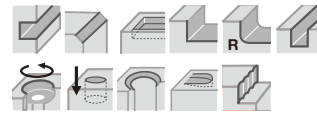
# Main products

## Exchangeable Head Endmill



**TUNGMEISTER**

Endmills with exchangeable heads  
for reduced tool change time  
ø0.250" - ø1.000" (ø5 mm - ø32 mm)



I006 -

**P M K N S H**

Inch  Metric

# Threading Endmill

			Inch	Metric
	<b>THREADMILLING</b>  	I056	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>SOLIDTHREAD</b> Solid threading tool series for machining small diameters, such as M1x0.25 and 0-80UNF.	I057 -	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>TUNGMEISTER</b> Head-changeable milling tool for less down-time than solid tapping tools.	I006 -	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<b>Indexable thread milling cutter</b> Many different types of inserts for various threading diameters and pitches, leading to the tool integration and reduced tool cost.	I074 -	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Optimal tool combination for maximum productivity

Significantly reduced tool indexing time improves machining efficiency



### 1 Wide range of geometries

45 different types 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

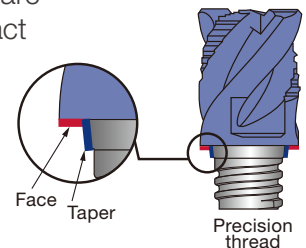
### High accuracy and repeatability

Repeatability and accuracy are maintained due to full contact of both taper and face.

Head exchange accuracy

Height:  $\pm 20 \mu\text{m}$   
( $\pm 0.0008''$ )

Run out:  
 $\leq 20 \mu\text{m}$   
( $\leq 0.0008''$ )



Face  
Taper

Precision  
thread

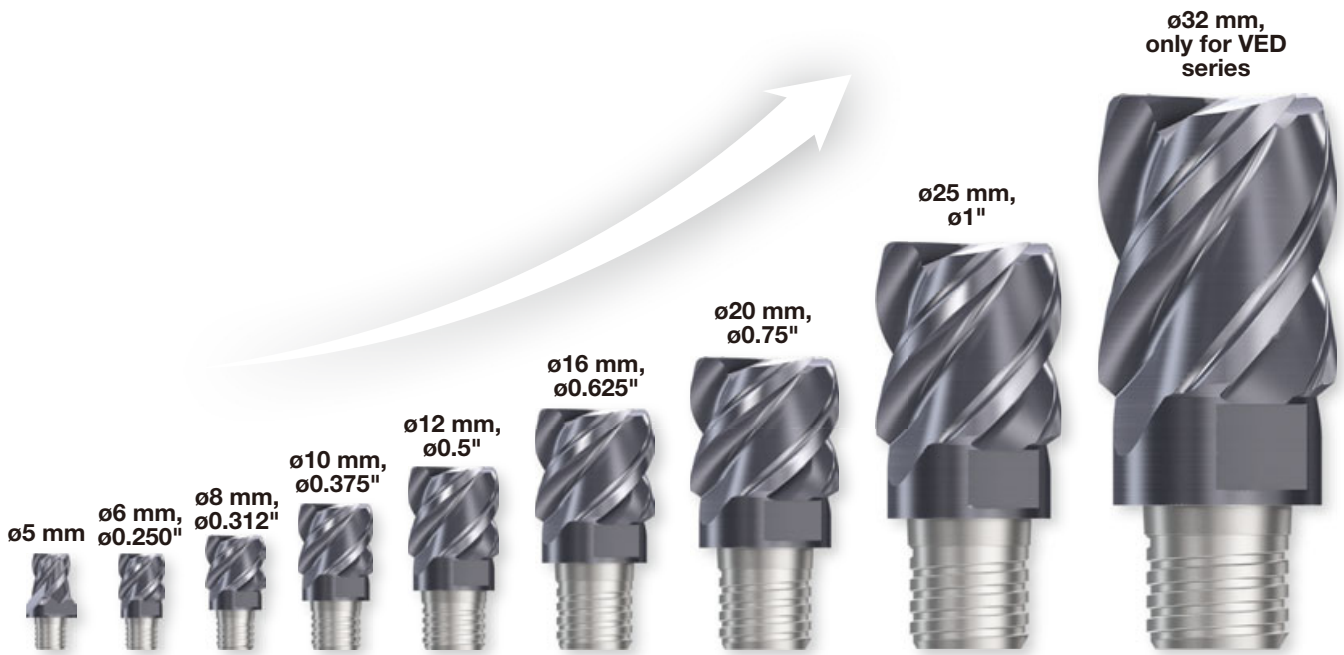




## VEH, VEE, VED

Extensive tool diameter range from 5 to 32 mm, 0.250" to 1".

Covers a broad range of applications from precision machining to large size parts.



## VMT

Threading

### Thread milling heads

With multiple teeth for ISO, Unified, and Whitworth threads



ISO metric  
VMT\*\*\*IS

Unified  
VMT\*\*\*UN

Whitworth  
VMT\*\*\*W



## VTR

Threading

### Thread milling heads

With single tooth for ISO and Whitworth threads



ISO metric  
60° partial profile  
VTR\*\*\*IS

Whitworth  
55° partial profile  
VTR\*\*\*W













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 (Inch)

★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Application			No. of cutting edges	Cutting edge length		Corner geometry	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page	
			Roughing	Semifinishing	Finishing		Tool dia.	L/D					APMX	P	M	K	N	S			H
 Square	<b>VEE**-04...</b> <b>VED**-04...</b>		✓	✓	✓	4	0.8XD	0.200" - 0.620" (4 - 15 mm)	R	30/45	Regular	S04 - S12	★	★	★	☆	★	☆	General	1013	
	<b>VEE**I...</b>		✓	✓	✓	4	0.6 - 0.8XD	0.220" - 0.866" (5 - 22 mm)	R/ Chamfered	38	Variable	S05 - S15	★	★	★	☆	★	☆		1015	
	<b>VEE**-03...</b>		✓	✓	✓	3	0.5XD	0.200" - 0.374" (4 - 12 mm)	Sharp edge	38/45	Regular	S05 - S12	★	★	★	☆	★	☆	For key way	1016	
	<b>VEE**A02...</b>		✓	✓	✓	2	0.7XD	0.270" - 0.374" (7 - 9 mm)	R	45	Regular	S06 - S08				☆	★			1016	
	<b>VEE**A03...</b>		✓	✓	✓	3	0.6XD	0.200" - 0.500" (5 - 12 mm)	R	45	Regular	S05 - S12				☆	★			1017	
	<b>VEE**R...</b>		✓			4, 5, 6	0.6 - 0.8XD	0.200" - 0.866" (5 - 22 mm)	Chamfered	45	Regular	S05 - S15	★	★	★	☆	★	☆	Serrated cutting edge	1018	
	<b>VEE**C...</b>		✓	✓		4	0.6 - 0.8XD	0.200" - 0.620" (5 - 22 mm)	Chamfered	45	Regular	S05 - S15	★	★	★	☆	★	☆	Rough/ Finish combination geometry	1019	
	<b>VED**-06...</b> <b>VEE**-06...</b>		✓	✓	✓	6	0.6 - 0.8XD	0.200" - 0.374" (5 - 9 mm)	R/ Chamfered	30/45/ 50	Regular	S05 - S08	☆	☆	☆		★	★	Small width of cut	1020	
	<b>VED**-08/10...</b> <b>VEE**-08/10...</b>		✓	✓	✓	8, 10	0.8XD	0.470" - 0.866" (12 - 22 mm)	R/ Chamfered	30/50	Regular	S10 - S15	☆	☆	☆		★	★	Small width of cut	1021	
 High feed	<b>VFX**-02...</b>		✓			2	0.06XD	0.020" - 0.059" (0.6 - 1.5 mm)	-	-	Regular	S06 - S12	★	★	★	☆	★	★		1024	











## Square, Face mill, High feed (Metric)

★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Application			No. of cutting edges	Cutting edge length		Corner geometry	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page	
			Roughing	Semifinishing	Finishing		Tool dia.	L/D					APMX	P	M	K	N	S			H
 Square	<b>VEH...</b>		✓	✓	✓	4	0.6 - 0.8XD	5 - 15 mm	R	Variable	Variable	S05 - S12	★	★	★	☆	★	☆		1012	
	<b>VEH...</b>		✓	✓	✓	4	1.2 - 1.5XD	12 - 38 mm	R	Variable	Variable	S05 - S21	★	★	★	☆	★	☆	Long edge	1012	
	<b>VED**R...</b>		✓			4, 5, 6	1.5XD	12 - 37 mm	Chamfered	47	Regular	S05 - S15	★	★	★	☆	★	☆	Serrated cutting edge/ Long edge	1018	
	<b>VED**-07/09...</b>		✓	✓	✓	7, 9	1.5XD	12 - 37 mm	R	Variable	Variable	S05 - S15	☆	☆	☆		★	★	Small width of cut/Long edge	1021	
 Face mill	<b>VFM...</b>		✓	✓	✓	6	0.3XD	3.6 - 7.5 mm	R	-	Variable	S05 - S10	★	★	★	☆	★	☆		1023	
 High feed	<b>VFX**-04/06...</b>		✓			4, 6	0.05XD	0.6 - 1.05 mm	-	-	Regular	S08 - S10	★	★	★	☆	★	★	With coolant hole	1025	








## Profiling (ball, radius, barrel) (Inch)

★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Application			Tool dia.	No. of cutting edges	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
			Roughing	Semifinishing	Finishing						P	M	K	N	S	H		
 Ball	VBB**-BM...		✓	✓		ø0.312" - ø0.625" (ø8 - ø16 mm)	2	0	Regular	S05 - S10	★	★	★	☆	★	★	Economical type	1026
	VBB**-BG...				✓	ø0.312" - ø0.625" (ø8 - ø16 mm)	2	0	Regular	S05 - S10	★	★	★	☆	★	★	High accuracy h7	1026
	VBD**-BG...		✓	✓		ø0.312" - ø0.625" (ø8 - ø16 mm)	2	30	Regular	S05 - S10	★	★	★	☆	★	★	Low cutting force	1027
	VBD**-BG-04... VBE**-BG-04...		✓	✓	✓	ø0.250" - ø1" (ø5 - ø20 mm)	4	30/38	Regular	S04 - S15	★	★	★	☆	★	★	Low cutting force	1027
	VBB**-SG...		✓	✓	✓	ø0.375" - ø0.750" (ø10 - ø20 mm)	2	0	Regular	S05 - S10	★	★	★	☆	★	★	High accuracy h7/ Sphere cutting edge	1028
	VBE**-BGA...		✓	✓	✓	ø0.312" - ø0.750" (ø8 - ø20 mm)	2	45	Regular	S05 - S12				☆	★			1028
 Radius	VRB**-02... VRC**-02...		✓	✓		ø0.625" - ø0.750" (ø10 - ø20 mm)	2	0/15	Regular	S06 - S12	★	★	★	☆	★	☆	Economical type	1030
	VRD**-06...		✓	✓		ø0.312" - ø0.625" (ø8 - ø16 mm)	6	30	Regular	S05 - S10	★	★	★	☆	★	☆		1030

## Profiling (ball, radius, barrel) (Metric)





★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Application			Tool dia.	No. of cutting edges	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
			Roughing	Semifinishing	Finishing						P	M	K	N	S	H		
 Barrel	VBO...		✓	✓		ø8 - ø16 mm	4, 5	30	Regular	S05 - S10	★	★	★	☆	★	☆	Profiling/ Long edge	1032
	VBO...		✓	✓		ø10 - ø16 mm	4	30	Regular	S06 - S10	★	★	★	☆	★	☆	Profiling/ Short edge	1032
 Bull nose	VBN...		✓	✓		ø10 - ø16 mm	6	35	Regular	S06 - S10	★	★	★	☆	★	☆	Profiling	1032
 Lens	VBL...		✓	✓		ø8 - ø16 mm	6	30	Regular	S05 - S10	★	★	★	☆	★	☆	Profiling	1033

# Quick Guide **TUNGMEISTER**




## Inch

### Multi-function (chamfering, spot drill, center hole, counterboring) ★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Center edge (Z-feed capability)	Tool dia.	No. of cutting edges	Chamfering angle	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
										P	M	K	N	S	H		
 <b>Chamfering</b>	<b>VCA**-04/06...</b>		Without	ø0.375" (ø10 - ø20 mm)	4, 6	45	0	Regular	S06 - S12	★	★	★	☆	★	☆		<b>1035</b>
 <b>Counterboring</b>	<b>VGC**-02...</b>		With	ø0.312" - ø0.625" (ø7.8 - ø16 mm)	2	-	10	Regular	S05 - S10	★	★	★	☆	★	☆	For counterboring	<b>1039</b>

## Slotting (Inch)

### ★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Groove width	Tool dia.	No. of cutting edges	Edge shape	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
										P	M	K	N	S	H		
 <b>Slotting</b>	<b>VTB**-06...</b>		0.056" - 0.312" (2 - 8 mm)	ø0.500" - ø1" (ø13.5 - ø25 mm)	6	R	0	Regular	S05 - S10	★	★	★	☆	★	☆		<b>1042</b>
	<b>VTB**-C006...</b>		0.062", 0.078" (2 mm)	ø0.500" (ø13.5 mm)	6	Chamfered	0	Regular	S05	★	★	★	☆	★	☆	With 45° chamfer	<b>1043</b>

## Metric





### Multi-function (chamfering, spot drill, center hole, counterboring) ★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Center edge (Z-feed capability)	Tool dia.	No. of cutting edges	Chamfering angle	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
										P	M	K	N	S	H		
 <b>Chamfering</b>	<b>VCW**-02...</b>		Without	ø11.8 mm	2	45	0	Regular	S06	★	★	★	☆	★	☆	Back chamfering capability	<b>1035</b>
	<b>VCR**-02...</b>		Without	ø8 - ø20 mm	2	R	0	Regular	S05 - S12	★	★	★	☆	★	☆		<b>1035</b>
 <b>Chamfering Spot drill</b>	<b>VCP**-02...</b>		With	ø8 - ø16.5 mm	2	30/45/60	0	Regular	S05 - S10	★	★	★	☆	★	☆		<b>1036</b>
	<b>VDS...</b>		With	ø8 - ø16 mm	2	45	10	Regular	S05 - S10	★	★	★	☆	★	☆	Low cutting force	<b>1037</b>
 <b>Center hole</b>	<b>VDP**-02...</b>		With	ø1.07 - ø6.46 mm	2	-	0	Regular	S04 - S12	★	★	★	☆	★	☆	For center hole	<b>1038</b>

## Metric







### Slotting (Metric)

★ : First choice ☆ : Second choice








Head geometry	Designation	Appearance	Groove width	Tool dia.	No. of cutting edges	Edge shape	Helix angle	Pitch	CRKS	Workpiece material						Remarks	Page
										P	M	K	N	S	H		
	<b>VST**-3...</b>		1.2 - 3.17 mm	ø15.7 - ø17.7 mm	3	R	0	Regular	S06	★	★	★	☆	★	☆		I040
	<b>VST**-4/6...</b>		0.76 - 10 mm	ø21.7 - ø27.7 mm	4, 6	R	0	Regular	S08, S10	★	★	★	☆	☆	☆		I041
	<b>VST**A45...</b>		3.4 - 5.5 mm	ø17.7 - ø21.7 mm	3, 4	Chamfered	0	Regular	S06, S08	★	★	★	☆	★	☆	For chamfering, 45° chamfer angle	I041

### Threading

★ : First choice ☆ : Second choice

Head geometry	Designation	Appearance	Feature	Wiper edge	No. of cutting edges	Tool dia.	Internal/ External	Thread type	Min. thread size	CRKS	Workpiece material						Page
											P	M	K	N	S	H	
	<b>VMT***IS</b>		Full profile	With	3 - 6	ø10 - ø16 mm	Internal	ISO metric	M12X0.75	S05 - S08	★	★	★	☆	★	☆	I044
	<b>VMT***UN</b>		Full profile	With	3, 4, 5	ø10 - ø16 mm	Internal	Unified	9/16-24 UNEF	S05 - S08	★	★	★	☆	★	☆	I044
	<b>VMT***W</b>		Full profile	With	4	ø10, ø16 mm	Internal/ External	Whitworth	G1/4	S05, S08	★	★	★	☆	★	☆	I045
	<b>VTR***IS</b>		Partial profile	Without	3, 4	ø15.7 - ø21.7 mm	Internal/ External	60° partial profile	M20X0.5	S06, S08	★	★	★	☆	★	☆	I045
	<b>VTR***W</b>		Partial profile	Without	4	ø21.7 mm	Internal/ External	55° partial profile	G3/4	S08	★	★	★	☆	★	☆	I045

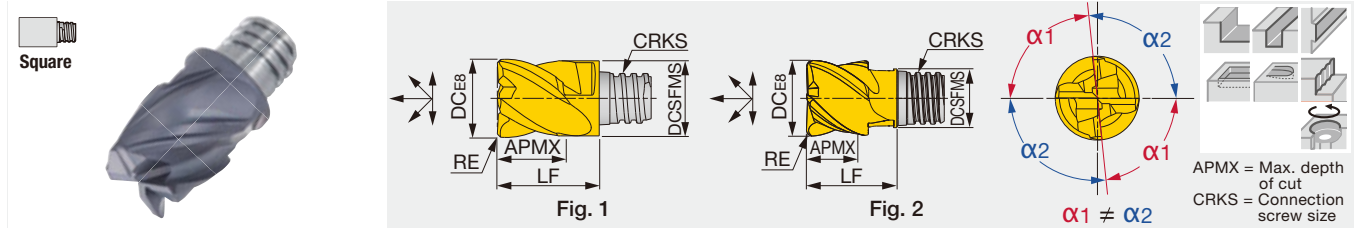
### Shank

Shank	Neck	Appearance	Material				Page
			Steel	Carbide	Carbide (with coolant hole)	Tungsten (with coolant hole)	
Straight	Straight		✓	✓	✓	✓	I048 - I050
Weldon	Straight		✓	-	-	-	I050
Straight	Taper		✓	✓	-	✓	I051, I052
High rigidity shank			✓	✓	-	-	I048
Straight (slotting)			✓	✓	✓	-	I053
Adaptor for TungFlex			✓	-	-	-	I053
ER collet			✓	-	-	-	I054

# TUNGMEISTER

## VEH...

4 flute, roughing - finishing, variable helix and pitch



Metric	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

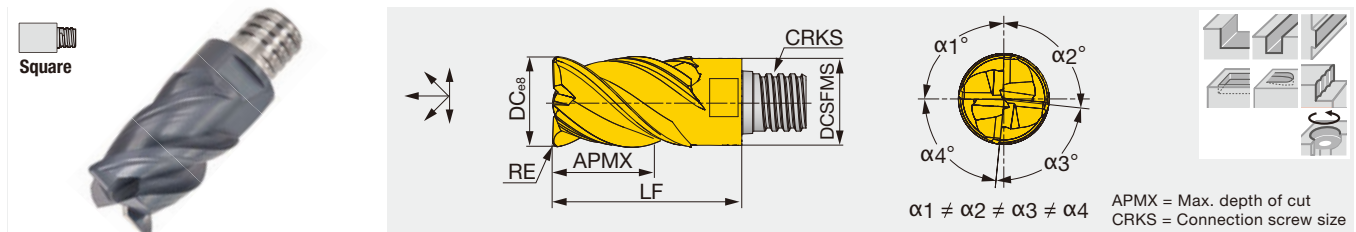
Torque: Recommended clamping torque: N·m  
2 pieces per package

● : Line up



## VEH...

4 flute, roughing - finishing, long edge, variable helix and pitch



Metric	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

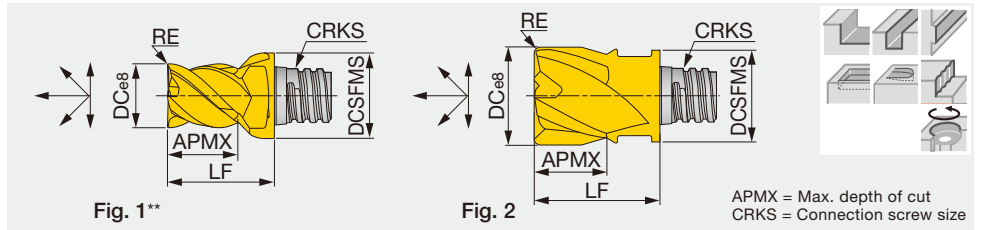
● : Line up

Reference pages: Standard cutting conditions → **I022 - I023**



# VEE\*\*-04..., VED\*\*-04...

4 flute, roughing - finishing, general



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque	Fig.
VEE025L20R000-U04S05	●	4	45°	0.250	0.300	0.200	-	S05	0.390	KEYV-S05	5.16	1
VED031L20R015-U04S05	●	4	30°	0.312	0.300	0.200	0.015	S05	0.390	KEYV-S05	5.16	2
VED031L20R031-U04S05	●	4	30°	0.312	0.300	0.200	0.031	S05	0.390	KEYV-S05	5.16	2
VED031L20R062-U04S05	●	4	30°	0.312	0.300	0.200	0.062	S05	0.390	KEYV-S05	5.16	2
VEE031L20R000-U04S05	●	4	45°	0.312	0.300	0.200	-	S05	0.390	KEYV-S05	5.16	2
VEE031L20R015-U04S05	●	4	45°	0.312	0.300	0.200	0.015	S05	0.390	KEYV-S05	5.16	2
VEE031L20R031-U04S05	●	4	45°	0.312	0.300	0.200	0.031	S05	0.390	KEYV-S05	5.16	2
VEE031L20R062-U04S05	●	4	45°	0.312	0.300	0.200	0.062	S05	0.390	KEYV-S05	5.16	2
VED037L27R015-U04S06	●	4	30°	0.375	0.370	0.275	0.015	S06	0.512	KEYV-S06	7.38	2
VED037L27R031-U04S06	●	4	30°	0.375	0.370	0.275	0.031	S06	0.512	KEYV-S06	7.38	2
VEE037L27R000-U04S06	●	4	45°	0.375	0.370	0.275	-	S06	0.512	KEYV-S06	7.38	2
VEE037L27R015-U04S06	●	4	45°	0.375	0.370	0.275	0.015	S06	0.512	KEYV-S06	7.38	2
VEE037L27R030-U04S06	●	4	45°	0.375	0.370	0.275	0.031	S06	0.512	KEYV-S06	7.38	2
VEE037L27R062-U04S06	●	4	45°	0.375	0.370	0.275	0.062	S06	0.512	KEYV-S06	7.38	2
VEE037L47R000-U04S06	●	4	45°	0.375	0.370	0.470	-	S06	0.748	KEYV-S06	7.38	2
VED050L37R015-U04S08	●	4	30°	0.500	0.488	0.374	0.015	S08	0.650	KEYV-S08	11.06	2
VED050L37R031-U04S08	●	4	30°	0.500	0.488	0.374	0.031	S08	0.650	KEYV-S08	11.06	2
VEE050L37R000-U04S08	●	4	45°	0.500	0.488	0.374	-	S08	0.650	KEYV-S08	11.06	2
VEE050L37R015-U04S08	●	4	45°	0.500	0.488	0.374	0.015	S08	0.650	KEYV-S08	11.06	2
VEE050L37R031-U04S08	●	4	45°	0.500	0.488	0.374	0.031	S08	0.650	KEYV-S08	11.06	2
VEE050L37R062-U04S08	●	4	45°	0.500	0.488	0.374	0.062	S08	0.650	KEYV-S08	11.06	2
VED062L47R015-U04S10	●	4	30°	0.625	0.600	0.470	0.015	S10	0.810	KEYV-S10	20.65	2
VED062L47R031-U04S10	●	4	30°	0.625	0.600	0.470	0.031	S10	0.810	KEYV-S10	20.65	2
VED062L47R062-U04S10	●	4	30°	0.625	0.600	0.470	0.062	S10	0.810	KEYV-S10	20.65	2
VEE062L47R000-U04S10	●	4	45°	0.625	0.600	0.470	-	S10	0.810	KEYV-S10	20.65	2
VEE062L47R031-U04S10	●	4	45°	0.625	0.600	0.470	0.031	S10	0.810	KEYV-S10	20.65	2
VED075L62R015-U04S12	●	4	30°	0.750	0.720	0.620	0.015	S12	1.000	KEYV-S12	20.65	2
VED075L62R031-U04S12	●	4	30°	0.750	0.720	0.620	0.031	S12	1.000	KEYV-S12	20.65	2
VED075L62R062-U04S12	●	4	30°	0.750	0.720	0.620	0.062	S12	1.000	KEYV-S12	20.65	2
VEE075L62R000-U04S12	●	4	45°	0.750	0.720	0.620	-	S12	1.000	KEYV-S12	20.65	2
VEE075L62R031-U04S12	●	4	45°	0.750	0.720	0.620	0.031	S12	1.000	KEYV-S12	20.65	2

Torque: Recommended clamping torque: lbs-ft

\*\*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



Exchangeable Head Endmill
Threading Endmill
Milling Insert
Square
Ball
Radius
Chamfering
Slotting
Threading
Others

Metric	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

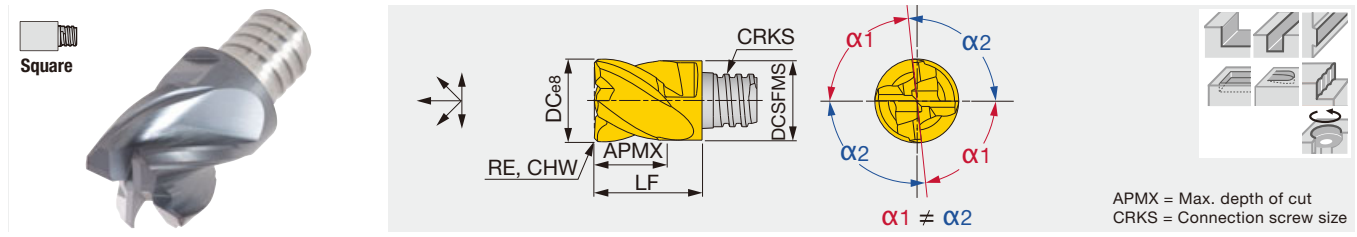
● : Line up

2
3
4
5
6 or more

Reference pages: Standard cutting conditions → **I022 - I023**

VEE\*\*-I...

4 flute, roughing - finishing, variable pitch



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CHW	CRKS	LF	Wrench	Torque
VEE031L22C012IU04S05	●	4	38°	0.312	0.303	0.220	-	0.012	S05	0.393	KEYV-S05	5.16
VEE037L29C016IU04S06	●	4	38°	0.375	0.370	0.299	-	0.016	S06	0.512	KEYV-S06	7.38
VEE050L37C020IU04S08	●	4	38°	0.500	0.488	0.374	-	0.020	S08	0.650	KEYV-S08	11.06
VEE062L50C024IU04S10	●	4	38°	0.625	0.602	0.500	-	0.024	S10	0.810	KEYV-S10	20.65
VEE075L62C024IU04S12	●	4	38°	0.750	0.726	0.629	-	0.024	S12	1.004	KEYV-S12	20.65
VEE100L86C024IU04S15	●	4	38°	1.000	0.940	0.863	-	0.024	S15	1.456	KEYV-W20	29.5
VEE100L86R000IU04S15	●	4	38°	1.000	0.941	0.866	-	-	S15	1.457	KEYV-W20	29.5
VEE100L86R015IU04S15	●	4	38°	1.000	0.941	0.866	0.015	-	S15	1.457	KEYV-W20	29.5
VEE100L86R031IU04S15	●	4	38°	1.000	0.941	0.866	0.031	-	S15	1.457	KEYV-W20	29.5
VEE100L86R062IU04S15	●	4	38°	1.000	0.941	0.866	0.062	-	S15	1.457	KEYV-W20	29.5
VEE100L86R125IU04S15	●	4	38°	1.000	0.941	0.866	0.125	-	S15	1.457	KEYV-W20	29.5

Metric	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: lbs-ft (\*N·m)  
 VEE031 - VEE100 / VEE080 - VEE200: 2 pieces per package  
 VEE250: 1 piece per package

● : Line up

Reference pages: Standard cutting conditions → I022 - I023

Grade  
A

Insert  
B

Ext. Toolholder  
C

Int. Toolholder  
D

Threading  
E

Grooving  
F

Miniature tool  
G

Milling cutter  
H

Endmill  
I

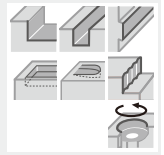
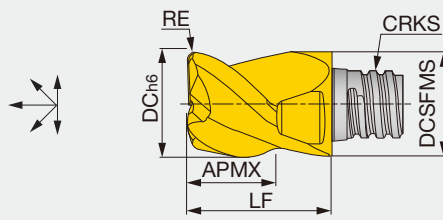
Drilling tool  
J

Tooling System  
K

User's Guide  
L

Index  
M

3 flute, roughing - finishing, general, for key way



APMX = Max. depth of cut  
CRKS = Connection screw size

Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VEE031L20R000-U03S05	●	3	45°	0.312	0.300	0.200	-	S05	0.390	KEYV-S05	5.16
VEE037L27R000-U03S06	●	3	45°	0.375	0.370	0.275	-	S06	0.512	KEYV-S06	7.38
VEE050L37R000-U03S08	●	3	45°	0.500	0.488	0.374	-	S08	0.650	KEYV-S08	11.06

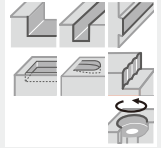
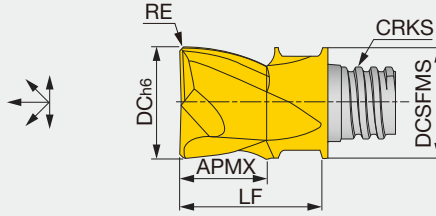
Metric	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque*
VEE077L04.0R02-03S05	●	●	3	38°	7.7	7.7	4	0.2	S05	10	KEYV-S05	7
VEE080L05.0R00-03S05	●	●	3	45°	8	7.7	5	-	S05	10	KEYV-S05	7
VEE097L05.0R03-03S06	●	●	3	38°	9.7	9.7	5	0.3	S06	13	KEYV-S06	10
VEE100L07.0R00-03S06	●	●	3	45°	10	9.7	7	-	S06	13	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: lbs-ft (\*N·m)  
2 pieces per package

● : Line up

## VEE\*\*A02...

2 flute, roughing - finishing, for non-ferrous metal, general



APMX = Max. depth of cut  
CRKS = Connection screw size

Inch	KS15F	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VEE037L27R000AU02S06	●	2	45°	0.375	0.360	0.270	-	S06	0.510	KEYV-S06	7.38
VEE037L27R020AU02S06	●	2	45°	0.375	0.360	0.270	0.02	S06	0.512	KEYV-S06	7.38
VEE050L37R000AU02S08	●	2	45°	0.500	0.488	0.374	-	S08	0.650	KEYV-S08	11.06
VEE050L37R020AU02S08	●	2	45°	0.500	0.488	0.374	0.02	S08	0.650	KEYV-S08	11.06

Metric	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

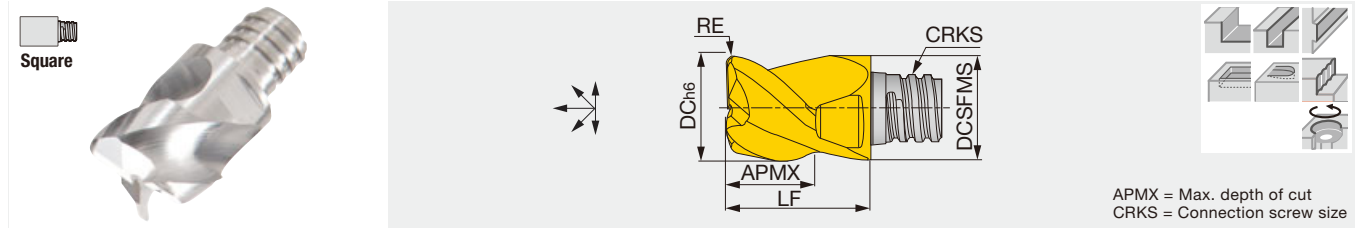
Torque: Recommended clamping torque: lbs-ft (\*N·m)  
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → **I022 - I023**

# VEE\*\*A03...

3 flute, roughing - finishing, for non-ferrous metal, general



Inch	KS15F	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VEE031L20R020AU03S05	●	3	45°	0.312	0.300	0.200	0.020	S05	0.390	KEYV-S05	5.16
VEE037L23R031AU03S06	●	3	45°	0.375	0.360	0.230	0.031	S06	0.510	KEYV-S06	7.38
VEE037L23R062AU03S06	●	3	45°	0.375	0.360	0.230	0.062	S06	0.510	KEYV-S06	7.38
VEE050L31R031AU03S08	●	3	45°	0.500	0.488	0.315	0.031	S08	0.650	KEYV-S08	11.06
VEE050L31R062AU03S08	●	3	45°	0.500	0.488	0.315	0.062	S08	0.650	KEYV-S08	11.06
VEE050L31R094AU03S08	●	3	45°	0.500	0.488	0.315	0.094	S08	0.650	KEYV-S08	11.06
VEE050L31R125AU03S08	●	3	45°	0.500	0.488	0.315	0.125	S08	0.650	KEYV-S08	11.06
VEE062L39R000AU03S10	●	3	45°	0.625	0.600	0.390	-	S10	0.810	KEYV-S10	20.65
VEE062L39R031AU03S10	●	3	45°	0.625	0.600	0.390	0.031	S10	0.810	KEYV-S10	20.65
VEE062L39R062AU03S10	●	3	45°	0.625	0.600	0.390	0.062	S10	0.810	KEYV-S10	20.65
VEE062L39R094AU03S10	●	3	45°	0.625	0.600	0.390	0.094	S10	0.810	KEYV-S10	20.65
VEE062L39R125AU03S10	●	3	45°	0.625	0.600	0.390	0.125	S10	0.810	KEYV-S10	20.65
VEE075L47R062AU03S12	●	3	45°	0.750	0.720	0.470	0.062	S12	1.000	KEYV-S12	20.65
VEE075L47R094AU03S12	●	3	45°	0.750	0.720	0.470	0.094	S12	1.000	KEYV-S12	20.65
VEE075L47R125AU03S12	●	3	45°	0.750	0.720	0.470	0.125	S12	1.000	KEYV-S12	20.65
VEE075L50R008AU03S12	●	3	45°	0.750	0.720	0.500	0.008	S12	1.000	KEYV-S12	20.65
VEE075L50R020AU03S12	●	3	45°	0.750	0.720	0.500	0.020	S12	1.000	KEYV-S12	20.65

Metric	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: lbs-ft (\*N-m)  
2 pieces per package

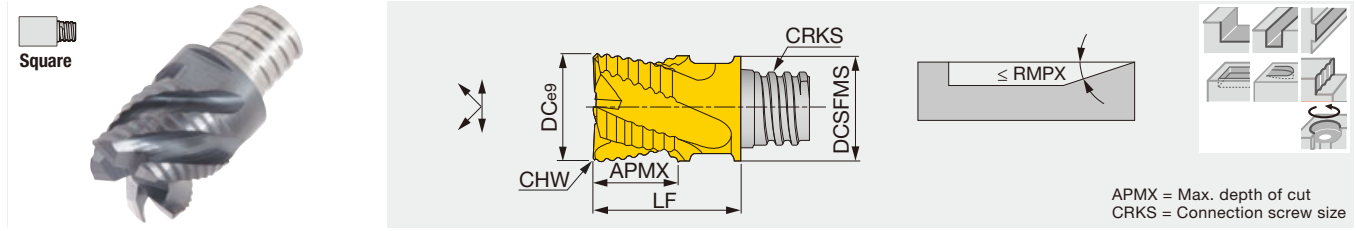
● : Line up



# TUNGMEISTER

## VEE\*\*R...

4, 5, 6 flute, roughing, serrated cutting edge



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	CHW	CRKS	LF	RMPX	Wrench	Torque
VEE031L20C012RU04S05	●	4	45°	0.312	0.300	0.200	0.012	S05	0.390	-	KEYV-S05	5.16
VEE037L27C012RU04S06	●	4	45°	0.375	0.360	0.270	0.012	S06	0.512	-	KEYV-S06	7.38
VEE050L37C016RU04S08	●	4	45°	0.500	0.488	0.374	0.016	S08	0.650	-	KEYV-S08	11.06
VEE062L47C024RU05S10	●	5	45°	0.625	0.600	0.470	0.024	S10	0.800	-	KEYV-S10	20.65
VEE075L59C024RU06S12	●	6	45°	0.750	0.720	0.590	0.024	S12	1.000	3°	KEYV-S12	20.65
VEE100L86C020RU06S15	●	6	45°	1.000	0.941	0.866	0.020	S15	1.457	3°	KEYV-W15	29.50

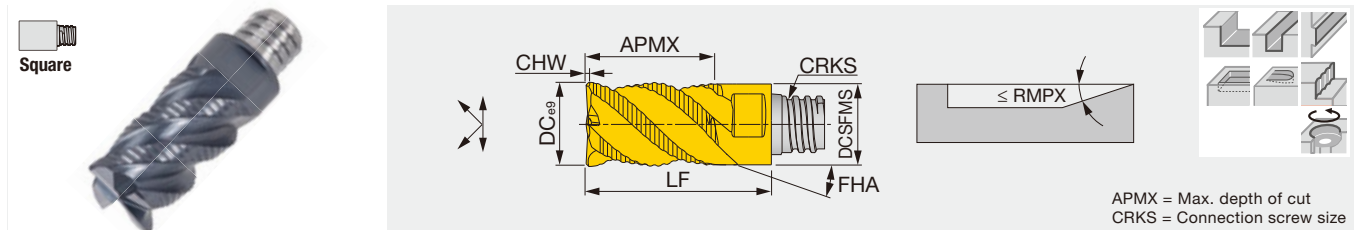
Metric	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	CHW	CRKS	LF	RMPX	Wrench	Torque*
VEE080L05.0C25R04S05	●	●	4	45°	8	7.7	5	0.25	S05	10	5°	KEYV-S05	7
VEE100L07.0C30R04S06	●	●	4	45°	10	9.7	7	0.3	S06	13	5°	KEYV-S06	10
VEE120L09.0C35R04S08	●	●	4	45°	12	11.7	9	0.35	S08	16.5	5°	KEYV-S08	15
VEE160L12.0C40R05S10	●	●	5	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: lbs-ft (\*N-m)  
 VEE031 ~ VEE075 / VEE080 ~ VEE200: 2 pieces per package  
 VEE100 / VEE250: 1 piece per package

● : Line up

## VED\*\*R...

4, 5, 6 flute, roughing, long cutting edge, serrated cutting edge



Metric	AH725	NOF	FHA	DC	DCSFMS	APMX	CHW	CRKS	LF	RMPX	Wrench	Torque
VED080L12.0C25R04S05	●	4	47°	8	7.7	12	0.25	S05	18	5°	KEYV-S05	7
VED100L15.0C30R04S06	●	4	47°	10	9.6	15	0.3	S06	22	5°	KEYV-S06	10
VED120L18.0C35R04S08	●	4	47°	12	11.7	18	0.35	S08	27	5°	KEYV-S08	15
VED160L24.0C40R05S10	●	5	47°	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
VED250L37.0C50I06S15	●	6	47°	25	23.9	37	0.5	S15	52.5	3°	KEYV-W20	40

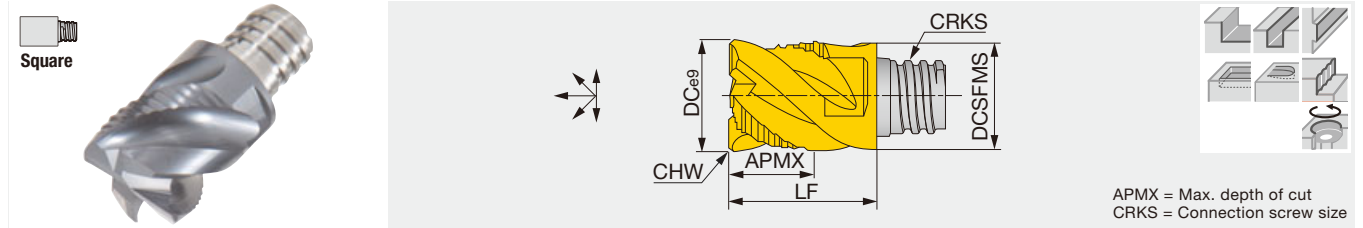
Torque: Recommended clamping torque: N-m  
 VED080 ~ VED160: 2 pieces per package  
 VED200, VED250: 1 piece per package

● : Line up

Reference pages: Standard cutting conditions → **I022 - I023**

# VEE\*\*C...

4 flute, roughing - semi finishing, roughing and finishing edge combination



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	CHW	CRKS	LF	Wrench	Torque
VEE031L20C012CU04S05	●	4	45°	0.312	0.300	0.200	0.012	S05	0.390	KEYV-S05	5.16
VEE037L27C012CU04S06	●	4	45°	0.375	0.360	0.275	0.012	S06	0.510	KEYV-S06	7.38
VEE050L36C016CU04S08	●	4	45°	0.500	0.488	0.369	0.016	S08	0.650	KEYV-S08	11.06
VEE062L47C024CU04S10	●	4	45°	0.625	0.600	0.470	0.024	S10	0.800	KEYV-S10	20.65
VEE075L62C024CU04S12	●	4	45°	0.750	0.720	0.620	0.024	S12	1.000	KEYV-S12	20.65

Metric	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

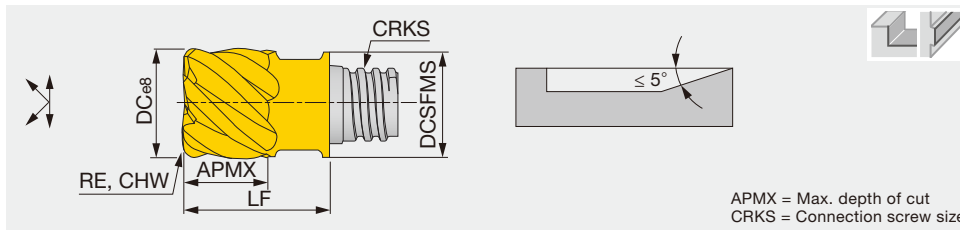
Torque: Recommended clamping torque: lbs-ft (\*N-m)  
 VEE031 - VEE075 / VEE080 - VEE200: 2 pieces per package  
 VEE250: 1 piece per package

● : Line up

6 flute, roughing - finishing, small width of cut



Square



Inch	AH725	AH750	NOF	FHA	DC	DCSFMS	APMX	RE	CHW	CRKS	LF	Wrench	Torque
VED031L20R015-U06S05	●		6	30°	0.312	0.300	0.200	0.015	-	S05	0.390	KEYV-S05	5.16
VEE031L20R000-U06S05	●		6	45°	0.312	0.300	0.200	-	-	S05	0.390	KEYV-S05	5.16
VEE031L20R031-U06S05	●		6	45°	0.312	0.300	0.200	0.031	-	S05	0.390	KEYV-S05	5.16
VEE031L20C004-U06S05		●	6	50°	0.312	0.300	0.200	-	0.004	S05	0.390	KEYV-S05	5.16
VED037L27R015-U06S06	●		6	30°	0.375	0.370	0.275	0.015	-	S06	0.512	KEYV-S06	7.38
VED037L27R031-U06S06	●		6	30°	0.375	0.370	0.275	0.031	-	S06	0.512	KEYV-S06	7.38
VEE037L27R000-U06S06	●		6	45°	0.375	0.370	0.275	-	-	S06	0.512	KEYV-S06	7.38
VEE037L27R015-U06S06	●		6	45°	0.375	0.370	0.275	0.015	-	S06	0.512	KEYV-S06	7.38
VEE037L27R031-U06S06	●		6	45°	0.375	0.370	0.275	0.031	-	S06	0.512	KEYV-S06	7.38
VEE037L27R062-U06S06	●		6	45°	0.375	0.370	0.275	0.062	-	S06	0.512	KEYV-S06	7.38
VEE037L27C004-U06S06		●	6	50°	0.375	0.370	0.270	-	0.004	S06	0.510	KEYV-S06	7.38
VED050L37R015-U06S08	●		6	30°	0.500	0.488	0.374	0.015	-	S08	0.650	KEYV-S08	11.06
VED050L37R031-U06S08	●		6	30°	0.500	0.488	0.374	0.031	-	S08	0.650	KEYV-S08	11.06
VEE050L37R000-U06S08	●		6	45°	0.500	0.488	0.374	-	-	S08	0.650	KEYV-S08	11.06
VEE050L37R015-U06S08	●		6	45°	0.500	0.488	0.374	0.015	-	S08	0.650	KEYV-S08	11.06
VEE050L37R031-U06S08	●		6	45°	0.500	0.488	0.374	0.031	-	S08	0.650	KEYV-S08	11.06
VEE050L37R062-U06S08	●		6	45°	0.500	0.488	0.374	0.062	-	S08	0.650	KEYV-S08	11.06
VEE050L37C004-U06S08		●	6	50°	0.500	0.488	0.374	-	0.004	S08	0.650	KEYV-S08	11.06

Metric	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
VEE120L09.0R10-06S08	●		6	30°	12	11.7	9	1	-	S08	16.5	KEYV-S08	15
VEE120L09.0R15-06S08	●		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: lbs-ft (\*N-m)  
2 pieces per package

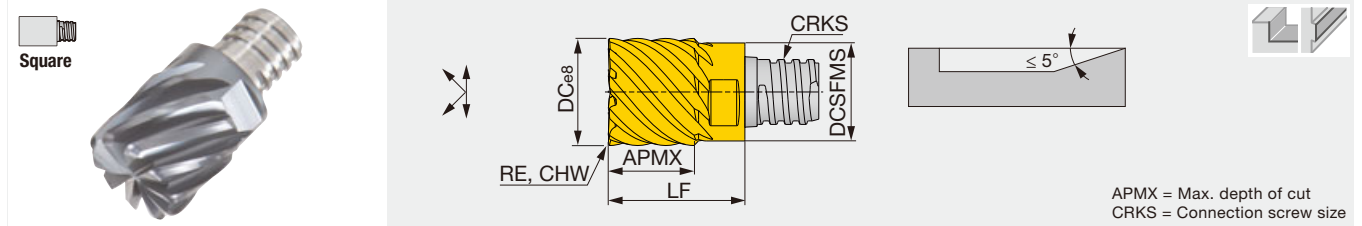
● : Line up

Reference pages: Standard cutting conditions → **I022 - I023**



## VED\*\*-08/10..., VEE\*\*-08/10...

8, 10 flute, roughing - finishing, small width of cut



Inch	AH725	AH750	NOF	FHA	DC	DCSFMS	APMX	RE	CHW	CRKS	LF	Wrench	Torque
VED062L47R000-U08S10	●		8	30°	0.625	0.600	0.470	-	-	S10	0.810	KEYV-S10	20.65
VED062L47R015-U08S10	●		8	30°	0.625	0.600	0.470	0.015	-	S10	0.810	KEYV-S10	20.65
VED062L47R031-U08S10	●		8	30°	0.625	0.600	0.470	0.031	-	S10	0.810	KEYV-S10	20.65
VED062L47R062-U08S10	●		8	30°	0.625	0.600	0.470	0.062	-	S10	0.810	KEYV-S10	20.65
VEE062L47C008-U08S10		●	8	50°	0.625	0.600	0.470	-	0.008	S10	0.810	KEYV-S10	20.65
VED075L62R031-U10S12	●		10	30°	0.750	0.720	0.620	0.031	-	S12	1.000	KEYV-S12	20.65
VED075L62R062-U10S12	●		10	30°	0.750	0.720	0.620	0.062	-	S12	1.000	KEYV-S12	20.65
VEE075L62C008-U10S12		●	10	50°	0.750	0.720	0.620	-	0.008	S12	1.000	KEYV-S12	20.65
VED100L86R031-U10S15	●		10	30°	1.000	0.941	0.866	0.031	-	S15	1.457	KEYV-W20	29.50
VED100L86R062-U10S15	●		10	30°	1.000	0.941	0.866	0.062	-	S15	1.457	KEYV-W20	29.50

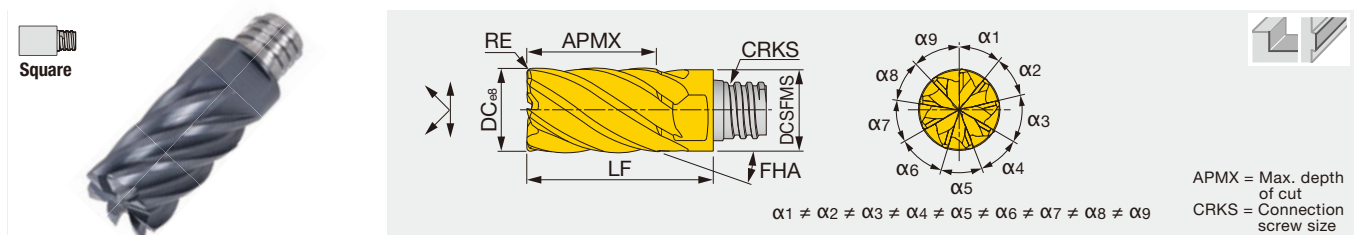
Metric	AH715	AH725	AH750	NOF	FHA	DC	DCSFMS	APMX	RE	CHW	CRKS	LF	Wrench	Torque*
VED160L12.0R05-08S10		●		8	30°	16	15.3	12	0.5	-	S10	20.5	KEYV-S10	28
VED160L12.0R10-08S10	●	●		8	30°	16	15.3	12	1	-	S10	20.5	KEYV-S10	28
VED160L12.0R16-08S10		●		8	30°	16	15.3	12	1.6	-	S10	20.5	KEYV-S10	28
VED160L12.0R20-08S10		●		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: lbs-ft (\*N·m)  
 VED/VEE062 ~ VED/VEE075 / VEE/VED160 ~ VED/VEE200: 2 pieces per package  
 VED100 / VED250: 1 piece per package

● : Line up

## VED\*\*-07/09...

7, 9 flute, roughing - finishing, long edge, variable helix and pitch, small width of cut



Metric	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 → **I022 - I023**

# 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 Vc (sfm)	Feed per tooth: fz (ipt)							Depth of cut ap (in)	Width of cut ae (in)
				Tool diameter: DC (in)								
				0.250"	0.312"	0.375"	0.500"	0.625"	0.750"	1.000"		
<b>P</b>	Low carbon steels 1045, 1055, etc.	- 300 HB	260 - 590	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	High carbon steels 4140, 5120, etc.	- 300 HB	200 - 460	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	200 - 400	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
<b>M</b>	Stainless steels S30400, S31600, etc.	- 200 HB	130 - 330	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
<b>K</b>	Grey cast irons No.250B, No.300B, etc.	150 - 250 HB	260 - 660	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	Ductile cast irons 60-40-18, etc.	150 - 250 HB	260 - 660	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
<b>N</b>	Aluminum alloys Si < 13%	-	660 - 2297	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	Aluminum alloys Si ≥ 13%	-	330 - 980	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	-	130 - 260	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	Heat-resistant alloys Inconel 718, etc.	-	66 - 130	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
<b>H</b>	Hardened steel H13, etc.	40 - 50 HRC	130 - 260	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.25 x DC
	Hardened steel D2, etc.	50 - 60 HRC	66 - 200	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	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 Vc (sfm)	Feed per tooth: fz (ipt)						Depth of cut ap (in)	Width of cut ae (in)
				Tool diameter: DC (in)							
				0.312"	0.375"	0.500"	0.625"	0.750"	1.000"		
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	-	200 - 400	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.02 x DC
	Heat-resistant alloys Inconel 718, etc.	-	100 - 200	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.02 x DC
<b>H</b>	Hardened steel H13, etc.	40 - 50 HRC	260 - 530	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.02 x DC
	Hardened steel D2, etc.	50 - 60 HRC	130 - 300	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.6 x DC	0.02 x DC

## Slotting

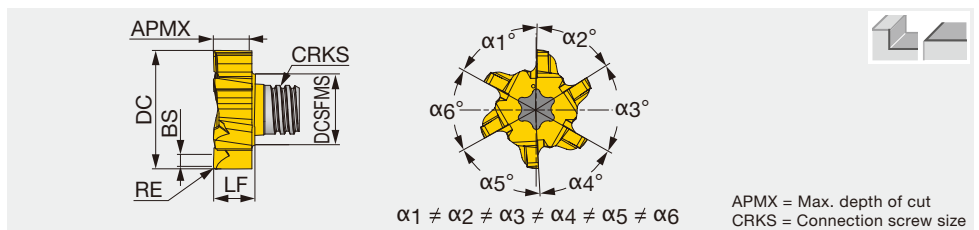
VEH, VEE: 3 flutes, VED/VEE: 4 flutes, VEE-A, VEE-I, VEE-R, VEE-C

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)							Depth of cut ap (in)
				Tool diameter: DC (in)							
				0.250"	0.312"	0.375"	0.500"	0.625"	0.750"	1.000"	
P	Low carbon steels 1045, 1055, etc.	- 300 HB	260 - 590	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	High carbon steels 4140, 5120, etc.	- 300 HB	200 - 460	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	200 - 400	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
M	Stainless steels S30400, S31600, etc.	- 200 HB	130 - 330	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
K	Grey cast irons No.250B, No.300B, etc.	150 - 250 HB	260 - 660	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	Ductile cast irons 60-40-18, etc.	150 - 250 HB	260 - 660	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
N	Aluminum alloys Si < 13%	-	660 - 2297	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	Aluminum alloys Si ≥ 13%	-	330 - 980	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	130 - 260	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	Heat-resistant alloys Inconel 718, etc.	-	66 - 130	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
H	Hardened steel H13, etc.	40 - 50 HRC	130 - 260	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC
	Hardened steel D2, etc.	50 - 60 HRC	66 - 200	0.001 - 0.003	0.001 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.003 - 0.004	0.5 x DC

# TUNGMEISTER

VFM...

6 flute, roughing - finishing, for face milling



Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	BS	CRKS	LF	Wrench	Torque
VFM120L03.6R02I06S05	●	6	10°	12	7.7	3.6	0.2	1.2	S05	4.4	KEYV-T20	7
VFM160L04.8R04I06S06	●	6	10°	16	9.7	4.8	0.4	2	S06	5.6	KEYV-T25	10
VFM200L06.0R04I06S08	●	6	10°	20	11.7	6	0.4	2	S08	7	KEYV-T40L	15
VFM250L07.5R04I06S10	●	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

Reference pages: Standard cutting conditions → I024



# STANDARD CUTTING CONDITIONS

## Face milling

### VFM

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)				Depth of cut ap (in)	Width of cut ae (in)
				Tool diameter: DC					
				ø12 mm	ø16 mm	ø20 mm	ø25 mm		
P	Low carbon steels 1045, 1055, etc.	- 300 HB	262 - 591	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	High carbon steels 4140, 5120, etc.	- 300 HB	197 - 459	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	197 - 394	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
M	Stainless steels S30400, S31600, etc.	- 200 HB	131 - 328	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
K	Grey cast irons No.250B, No.300B, etc.	150 - 250 HB	262 - 656	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	Ductile cast irons 60-40-18, etc.	150 - 250 HB	262 - 656	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
N	Aluminum alloys Si < 13%	-	656 - 2297	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	Aluminum alloys Si ≥ 13%	-	328 - 984	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 262	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	Heat-resistant alloys Inconel 718, etc.	-	66 - 131	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
H	Hardened steel H13, etc.	40 - 50 HRC	131 - 262	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC
	Hardened steel D2, etc.	50 - 60 HRC	66 - 197	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.004 - 0.007	0.039	0.7 x DC

2

3

4

5

6 or more

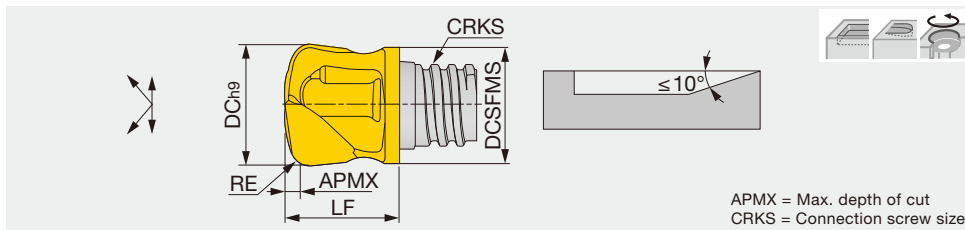
# TUNGMEISTER

## VFX\*\*-02...

### 2 flute, roughing



High feed



Metric	AH725	NOF	FHA	DC	DCSFMS	APMX	RE <sup>(1)</sup>	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.

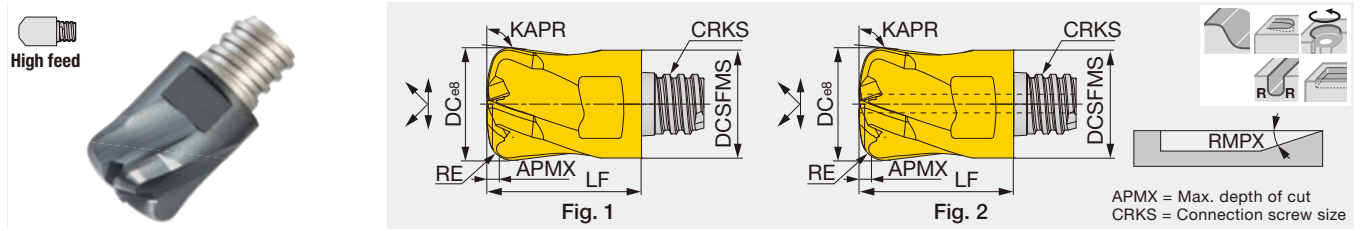
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → I025

# VFX\*\*-04/06...

4, 6 flute, roughing



Metric	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

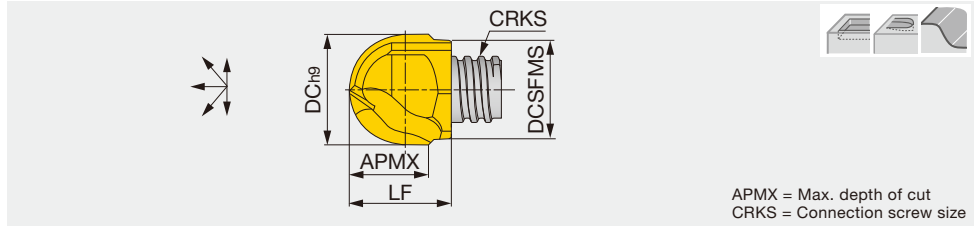
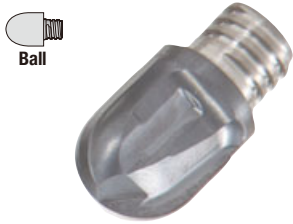
VFX: 2, 4, 6 flutes

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	ø10 mm		ø12 mm		ø16 mm		ø20 mm		Width of cut ae (in)
				Feed per tooth fz (ipt)	Depth of cut ap (in)	Feed per tooth fz (ipt)	Depth of cut ap (in)	Feed per tooth fz (ipt)	Depth of cut ap (in)	Feed per tooth fz (ipt)	Depth of cut ap (in)	
P	Low carbon steels 1045, 1055, etc.	- 300 HB	328 - 656	0.012 - 0.028	0.020	0.016 - 0.031	0.020	0.020 - 0.035	0.030	0.024 - 0.039	0.039	0.6 x DC
	Alloy steel 4140, 8620, etc.	- 300 HB	262 - 591	0.008 - 0.024	0.020	0.012 - 0.028	0.020	0.016 - 0.031	0.030	0.020 - 0.035	0.039	0.6 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	262 - 525	0.008 - 0.020	0.016	0.008 - 0.020	0.016	0.012 - 0.024	0.020	0.012 - 0.024	0.030	0.6 x DC
M	Stainless steels S30400, S31600, etc.	- 200 HB	197 - 328	0.008 - 0.024	0.016	0.008 - 0.024	0.016	0.012 - 0.028	0.020	0.012 - 0.028	0.030	0.6 x DC
K	Grey cast irons No.250B, No.300B, etc.	150 - 250 HB	328 - 722	0.012 - 0.028	0.020	0.016 - 0.031	0.030	0.020 - 0.035	0.030	0.024 - 0.039	0.039	0.6 x DC
	Ductile cast irons 60-40-18, etc.	150 - 250 HB	328 - 722	0.008 - 0.024	0.020	0.012 - 0.028	0.030	0.016 - 0.031	0.030	0.020 - 0.035	0.039	0.6 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 262	0.008 - 0.020	0.016	0.008 - 0.020	0.016	0.008 - 0.024	0.020	0.008 - 0.024	0.020	0.25 x DC
	Heat-resistant alloys Inconel 718, etc.	-	66 - 131	0.004 - 0.012	0.012	0.004 - 0.012	0.012	0.004 - 0.012	0.016	0.004 - 0.012	0.016	0.25 x DC
H	Hardened steel H13, etc.	40 - 50 HRC	131 - 262	0.008 - 0.016	0.012	0.008 - 0.016	0.012	0.012 - 0.020	0.016	0.012 - 0.020	0.016	0.45 x DC
	Hardened steel D2, etc.	50 - 60 HRC	66 - 197	0.004 - 0.008	0.008	0.004 - 0.008	0.008	0.004 - 0.012	0.012	0.004 - 0.012	0.012	0.25 x DC

Please note that the feed per tooth should not exceed the maximum feed per tooth for each product.



2 flute, roughing - semi finishing, economical



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	CRKS	LF	Wrench	Torque
VBB0312L31-BM-U02S05	●	2	0°	0.312	0.300	0.310	S05	0.390	KEYV-S05	5.16
VBB0375L38-BM-U02S06	●	2	0°	0.375	0.360	0.380	S06	0.478	KEYV-S06	7.38
VBB0500L50-BM-U02S08	●	2	0°	0.500	0.480	0.508	S08	0.646	KEYV-S08	11.06
VBB0625L63-BM-U02S10	●	2	0°	0.625	0.600	0.630	S10	0.750	KEYV-S10	20.65

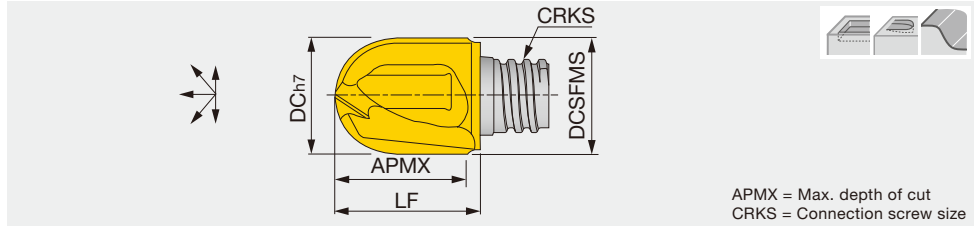
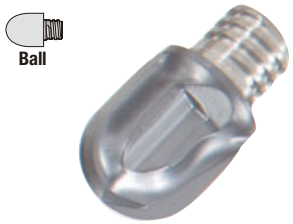
Metric	AH725	NOF	FHA	DC	DCSFMS	APMX	CRKS	LF	Wrench	Torque*
VBB080L08.0-BM-02S05	●	2	0°	8	7.6	8	S05	10	KEYV-S05	7
VBB100L10.0-BM-02S06	●	2	0°	10	9.5	10	S06	12.4	KEYV-S06	10
VBB120L12.0-BM-02S08	●	2	0°	12	11.5	11.5	S08	15.3	KEYV-S08	15
VBB160L16.0-BM-02S10	●	2	0°	16	15.2	16	S10	19.1	KEYV-S10	28

Torque: Recommended clamping torque: lbs-ft (\*N·m)  
2 pieces per package

● : Line up

## VBB\*\*-BG...

2 flute, finishing, high accuracy (h7 tolerance), for hardened steel



Inch	AH750	NOF	FHA	DC	DCSFMS	APMX	CRKS	LF	Wrench	Torque
VBB0312L31-BG-U02S05	●	2	0°	0.312	0.300	0.312	S05	0.390	KEYV-S05	5.16
VBB0375L38-BG-U02S06	●	2	0°	0.375	0.360	0.380	S06	0.480	KEYV-S06	7.38
VBB0500L50-BG-U02S08	●	2	0°	0.500	0.480	0.500	S08	0.640	KEYV-S08	11.06
VBB0625L63-BG-U02S10	●	2	0°	0.625	0.598	0.630	S10	0.752	KEYV-S10	20.65

Metric	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

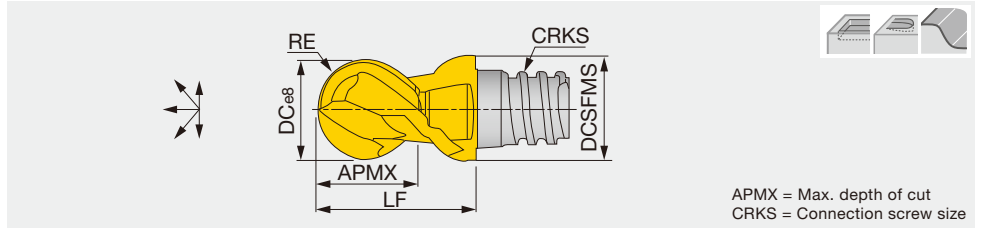
Torque: Recommended clamping torque: lbs-ft (\*N·m)  
2 pieces per package

● : Line up



## VBD\*\*-BG...

2 flute, semi finishing - finishing, helix cutting edge



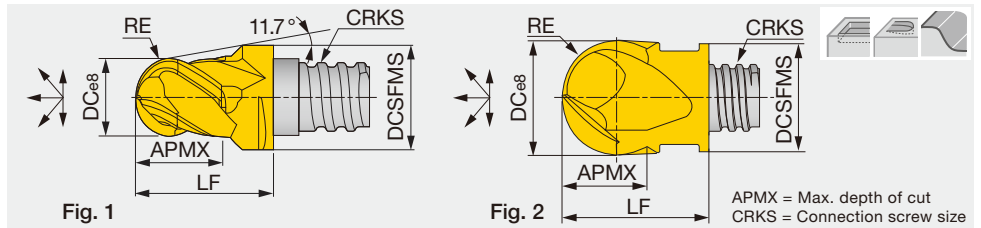
Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VBD0312L20-BG-U02S05	●	2	30°	0.312	0.300	0.200	0.156 <sup>(1)</sup>	S05	0.350	KEYV-S05	5.16
VBD0375L27-BG-U02S06	●	2	30°	0.375	0.360	0.275	0.188 <sup>(1)</sup>	S06	0.512	KEYV-S06	7.38
VBD0500L37-BG-U02S08	●	2	30°	0.500	0.488	0.374	0.249 <sup>(2)</sup>	S08	0.650	KEYV-S08	11.06
VBD0625L47-BG-U02S10	●	2	30°	0.625	0.600	0.470	0.313 <sup>(2)</sup>	S10	0.800	KEYV-S10	20.65
Metric	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque*
VBD080L05.0-BG-02S05	●	2	30°	8	7.7	5	3.982 <sup>(1)</sup>	S05	10	KEYV-S05	7
VBD100L07.0-BG-02S06	●	2	30°	10	9.7	7	4.982 <sup>(1)</sup>	S06	13	KEYV-S06	10
VBD120L09.0-BG-02S08	●	2	30°	12	11.7	9	5.978 <sup>(2)</sup>	S08	16.5	KEYV-S08	15
VBD160L09.5-BG-02S10	●	2	30°	16	15.3	9	7.978 <sup>(2)</sup>	S10	20.5	KEYV-S10	28

The tolerance of RE: (1) ± 0.0004", ± 0.01 mm (2) ± 0.0005", ± 0.012 mm  
 Torque: Recommended clamping torque: lbs-ft (\*N·m)  
 2 pieces per package

● : Line up

## VBD\*\*-BG-04..., VBE\*\*-BG-04...

4 flute, roughing - finishing, helix cutting edge



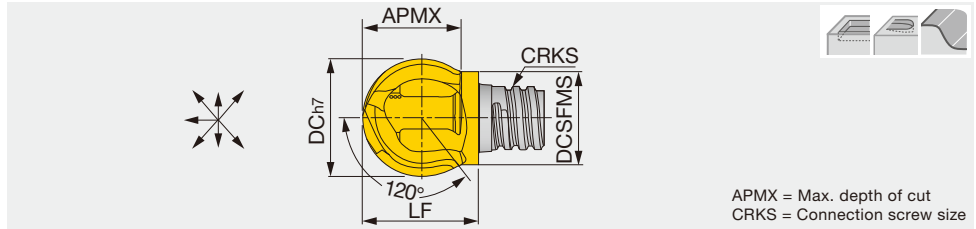
Inch	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque	Fig.
VBE0250L20-BG-U04S05	●	●	4	38°	0.250	0.300	0.200	0.124 <sup>(1)</sup>	S05	0.390	KEYV-S05	5.16	1
VBE0312L20-BG-U04S05	●	●	4	38°	0.312	0.300	0.200	0.156 <sup>(1)</sup>	S05	0.350	KEYV-S05	5.16	2
VBD0375L27-BG-U04S06	●	●	4	38°	0.375	0.360	0.275	0.188 <sup>(1)</sup>	S06	0.512	KEYV-S06	7.38	2
VBD0500L37-BG-U04S08	●	●	4	30°	0.500	0.488	0.374	0.249 <sup>(2)</sup>	S08	0.650	KEYV-S08	11.06	2
VBD0625L47-BG-U04S10	●	●	4	30°	0.625	0.600	0.470	0.313 <sup>(2)</sup>	S10	0.800	KEYV-S10	20.65	2
VBD0750L62-BG-U04S12	●	●	4	30°	0.750	0.720	0.620	0.374 <sup>(2)</sup>	S12	1.000	KEYV-S12	20.65	2
VBD100L86-BG-U04S15	●	●	4	30°	1.000	0.940	0.860	0.500 <sup>(3)</sup>	S15	1.450	KEYV-W20	29.5	2
Metric	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque*	Fig.
VBE050L04.0-BG-04S04	●	●	4	38°	5	6	4	2.487 <sup>(1)</sup>	S04	8.5	KEYV-S05	4	1
VBE060L04.0-BG-04S04	●	●	4	38°	6	5.8	4	2.987 <sup>(1)</sup>	S04	8.5	KEYV-S05	4	2
VBE060L05.5-BG-04S05	●	●	4	38°	6	8	5.5	2.987 <sup>(1)</sup>	S05	10	KEYV-S05	7	1
VBD080L05.0-BG-04S05	●	●	4	30°	8	7.7	5	3.982 <sup>(1)</sup>	S05	10	KEYV-S05	7	2
VBD100L07.0-BG-04S06	●	●	4	30°	10	9.7	7	4.982 <sup>(1)</sup>	S06	13	KEYV-S06	10	2
VBD120L09.0-BG-04S08	●	●	4	30°	12	11.7	9	5.978 <sup>(2)</sup>	S08	16.5	KEYV-S08	15	2
VBD160L12.0-BG-04S10	●	●	4	30°	16	15.3	12	7.978 <sup>(2)</sup>	S10	20.5	KEYV-S10	28	2
VBD200L15.0-BG-04S12	●	●	4	30°	20	18.3	15	9.972 <sup>(2)</sup>	S12	25.5	KEYV-S12	28	2

The tolerance of RE: (1) ± 0.0004", ± 0.01 mm (2) ± 0.0005", ± 0.012 mm (3) ± 0.0008"  
 Torque: Recommended clamping torque: lbs-ft (\*N·m)  
 2 pieces per package

● : Line up



2 flute, roughing - finishing, sphere cutting edge, high accuracy (h7 tolerance)



APMX = Max. depth of cut  
CRKS = Connection screw size

Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	CRKS	LF	Wrench	Torque
VBB0375L31-SG-U02S05	●	2	0°	0.375	0.300	0.315	S05	0.389	KEYV-S05	5.16
VBB0500L37-SG-U02S06	●	2	0°	0.500	0.378	0.378	S06	0.482	KEYV-S06	7.38
VBB0625L50-SG-U02S08	●	2	0°	0.625	0.480	0.508	S08	0.606	KEYV-S08	11.06
VBB0750L63-SG-U02S10	●	2	0°	0.750	0.600	0.634	S10	0.710	KEYV-S10	20.65

Metric	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: lbs-ft (\*N·m)

\*\*\* The wrench size for these heads is different from the ones for the other head types.

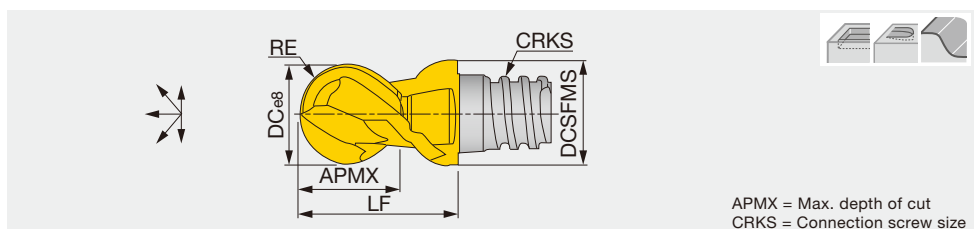
For pull-cutting on the vertical wall

2 pieces per package

● : Line up

## VBE\*\*-BGA...

2 flute, roughing - finishing, for non-ferrous metal, helix cutting edge



APMX = Max. depth of cut  
CRKS = Connection screw size

Inch	KS15F	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VBE0312L20-BGAU02S05	●	2	45°	0.312	0.300	0.200	0.156 <sup>(1)</sup>	S05	0.390	KEYV-S05	5.16
VBE0375L27-BGAU02S06	●	2	45°	0.375	0.360	0.270	0.187 <sup>(1)</sup>	S06	0.510	KEYV-S06	7.38
VBE0500L37-BGAU02S08	●	2	45°	0.500	0.488	0.374	0.250 <sup>(2)</sup>	S08	0.650	KEYV-S08	11.06
VBE0625L47-BGAU02S10	●	2	45°	0.625	0.600	0.470	0.312 <sup>(2)</sup>	S10	0.800	KEYV-S10	20.65
VBE0750L50-BGAU02S12	●	2	45°	0.750	0.720	0.500	0.374 <sup>(2)</sup>	S12	1.000	KEYV-S12	20.65

Metric	KS15F	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque*
VBE080L05.0-BGA02S05	●	2	45°	8	7.7	5	3.982 <sup>(1)</sup>	S05	10	KEYV-S05	7
VBE100L07.0-BGA02S06	●	2	45°	10	9.7	7	4.982 <sup>(1)</sup>	S06	13	KEYV-S06	10
VBE120L09.0-BGA02S08	●	2	45°	12	11.7	9	5.987 <sup>(2)</sup>	S08	16.5	KEYV-S08	15
VBE160L12.0-BGA02S10	●	2	45°	16	15.3	12	7.978 <sup>(2)</sup>	S10	20.5	KEYV-S10	28
VBE200L15.0-BGA02S12	●	2	45°	20	18.3	15	9.972 <sup>(2)</sup>	S12	25.5	KEYV-S12	28

The tolerance of RE : (1) ± 0.0004", ± 0.01 mm (2) ± 0.0005", ± 0.012 mm

Torque: Recommended clamping torque: lbs-ft (\*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 Vc (sfm)	Feed per tooth: fz (ipt)							Depth of cut ap (in)	Pick feed Pf (in)
				Tool diameter: DC (in)								
				0.250"	0.312"	0.375"	0.500"	0.625"	0.750"	1.000"		
P	Low carbon steels 1045, 1055, etc.	- 300 HB	328 - 656	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
	High carbon steels 4140, etc.	- 300 HB	262 - 591	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	262 - 525	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
M	Stainless steels 304, 316, etc.	- 200 HB	197 - 328	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
K	Grey cast irons 250, 300, etc.	150 - 250 HB	328 - 722	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
	Ductile cast irons 400-15S, etc.	150 - 250 HB	328 - 722	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
N	Aluminum alloys Si < 13%	-	656 - 2297	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
	Aluminum alloys Si ≥ 13%	-	328 - 984	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.4 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 262	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.2 x DC
	Heat-resistant alloys Inconel 718, etc.	50 - 60 HRC	66 - 131	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.2 x DC
H	Hardened steel SKD61, SKT4, etc. H13, etc.	-	131 - 262	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.2 x DC
	Hardened steel SKD11, SKH, etc. D2, etc.	50 - 60 HRC	66 - 197	0.001 - 0.003	0.002 - 0.003	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.003 - 0.006	0.003 - 0.006	0.3 x DC	0.2 x DC

## Profiling for semi-finishing and finishing

VBB-BM / BG / SG, VBD-BG, VBE-BGA

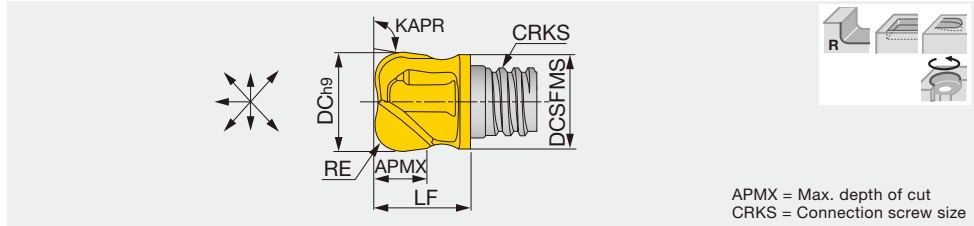
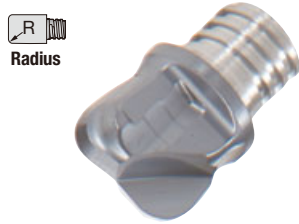
ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)							Depth of cut ap (in)	Pick feed Pf (in)
				Tool diameter: DC (in)								
				0.250"	0.312"	0.375"	0.500"	0.625"	0.750"	1.000"		
P	Low carbon steels 1045, 1055, etc.	- 300 HB	394 - 820	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
	High carbon steels 4140, etc.	- 300 HB	328 - 722	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	328 - 656	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
M	Stainless steels 304, 316, etc.	- 200 HB	262 - 394	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
K	Grey cast irons 250, 300, etc.	150 - 250 HB	394 - 919	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
	Ductile cast irons 400-15S, etc.	150 - 250 HB	394 - 919	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
N	Aluminum alloys Si < 13%	-	984 - 3281	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
	Aluminum alloys Si ≥ 13%	-	492 - 1312	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.1 x DC	0.15 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	164 - 328	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.08 x DC	0.1 x DC
	Heat-resistant alloys Inconel 718, etc.	50 - 60 HRC	98 - 164	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.08 x DC	0.1 x DC
H	Hardened steel SKD61, SKT4, etc. H13, etc.	-	164 - 328	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.08 x DC	0.1 x DC
	Hardened steel SKD11, SKH, etc. D2, etc.	50 - 60 HRC	98 - 262	0.001 - 0.003	0.001 - 0.004	0.002 - 0.004	0.002 - 0.004	0.002 - 0.005	0.002 - 0.007	0.004 - 0.007	0.08 x DC	0.1 x DC



# TUNGMEISTER

VRB\*\*-02..., VRC\*\*-02...

2 flute, roughing - semi finishing, economical



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	KAPR	CRKS	LF	Wrench	Torque
VRB062L31R187-U02S10	●	2	-	0.625	0.600	0.310	0.190	97°	S10	0.580	KEYV-S10	20.65
VRB075L45R250-U02S12	●	2	-	0.750	0.720	0.450	0.250	97°	S12	0.680	KEYV-S12	20.65
VRB075L45R312-U02S12	●	2	-	0.750	0.720	0.450	0.312	97°	S12	0.680	KEYV-S12	20.65

Metric	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: lbs-ft (\*N-m)

\*\*\* The wrench size for these heads is different from the ones for the other head types.

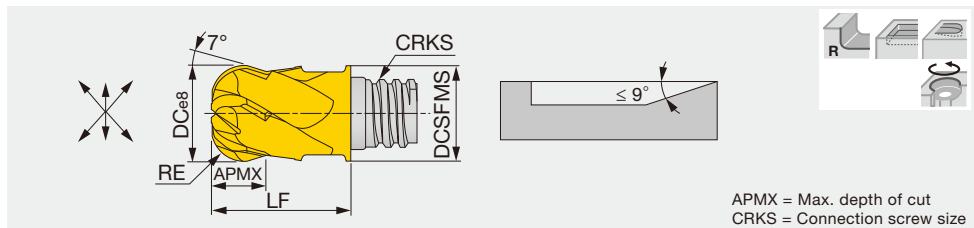
Suitable for contouring operation.

2 pieces per package

● : Line up

## VRD\*\*-06...

6 flute, semi finishing - finishing, helix cutting edge



Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VRD031L16R078-U06S05	●	6	30°	0.312	0.300	0.160	0.078	S05	0.390	KEYV-S05	5.16
VRD037L19R031-U06S06	●	6	30°	0.375	0.360	0.190	0.031	S06	0.510	KEYV-S06	7.38
VRD037L19R062-U06S06	●	6	30°	0.375	0.360	0.190	0.062	S06	0.510	KEYV-S06	7.38
VRD037L19R125-U06S06	●	6	30°	0.375	0.360	0.190	0.125	S06	0.510	KEYV-S06	7.38
VRD050L27R062-U06S08	●	6	30°	0.500	0.480	0.270	0.062	S08	0.650	KEYV-S08	11.06
VRD050L27R125-U06S08	●	6	30°	0.500	0.480	0.270	0.125	S08	0.650	KEYV-S08	11.06
VRD050L27R156-U06S08	●	6	30°	0.500	0.480	0.270	0.156	S08	0.650	KEYV-S08	11.06
VRD062L35R200-U06S10	●	6	30°	0.625	0.600	0.350	0.200	S10	0.807	KEYV-S10	20.65

Metric	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: lbs-ft (\*N-m)

2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → [I031](#)

# STANDARD CUTTING CONDITIONS

## Shoulder milling

VRB, VRC, VRD

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipr)					Depth of cut ap (in)	Width of cut ae (in)
				Tool diameter: DC (in)						
				0.312"	0.375"	0.500"	0.625"	0.750"		
P	Low carbon steels 1045, 1055, etc.	- 300 HB	262 - 591	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	High carbon steels 4140, etc.	- 300 HB	197 - 459	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	197 - 394	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
M	Stainless steels 304, 316, etc.	- 200 HB	131 - 328	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
K	Grey cast irons 250, 300, etc.	150 - 250 HB	262 - 656	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	Ductile cast irons 400-15S, etc.	150 - 250 HB	262 - 656	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
N	Aluminum alloys Si < 13%	-	656 - 2297	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	Aluminum alloys Si ≥ 13%	-	328 - 984	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 262	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	Heat-resistant alloys Inconel 718, etc.	-	66 - 131	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
H	Hardened steel SKD61, SKT4, etc. H13, etc.	40 - 50 HRC	131 - 262	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC
	Hardened steel SKD11, SKH, etc. D2, etc.	50 - 60 HRC	66 - 197	0.002 - 0.004	0.003 - 0.005	0.003 - 0.005	0.004 - 0.006	0.004 - 0.007	0.6 x DC	0.25 x DC

## Slotting

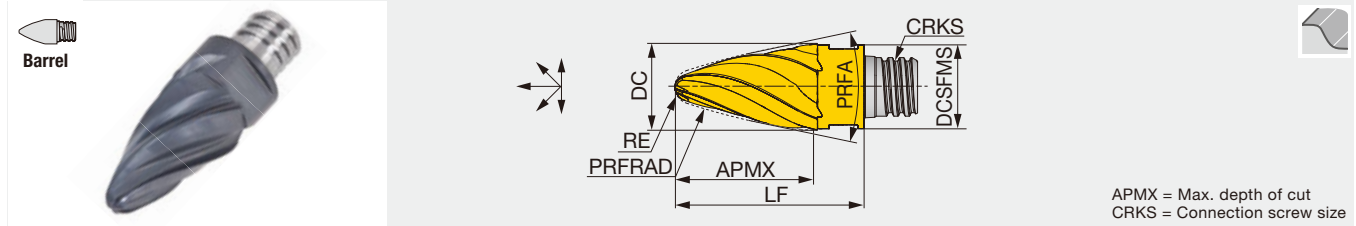
VRB, VRC, VRD

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipr)					Depth of cut ap (in)
				Tool diameter: DC (in)					
				0.312"	0.375"	0.500"	0.625"	0.750"	
P	Low carbon steels 1045, 1055, etc.	- 300 HB	164 - 230	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	High carbon steels 4140, etc.	- 300 HB	131 - 262	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	131 - 230	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
M	Stainless steels 304, 316, etc.	- 200 HB	98 - 197	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
K	Grey cast irons 250, 300, etc.	150 - 250 HB	164 - 394	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	Ductile cast irons 400-15S, etc.	150 - 250 HB	164 - 394	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
N	Aluminum alloys Si < 13%	-	427 - 1312	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	Aluminum alloys Si ≥ 13%	-	230 - 656	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
S	Titanium alloys Ti-6Al-4V, etc.	-	66 - 131	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	Heat-resistant alloys Inconel 718, etc.	-	33 - 66	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
H	Hardened steel SKD61, SKT4, etc. H13, etc.	40 - 50 HRC	82 - 197	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC
	Hardened steel SKD11, SKH, etc. D2, etc.	50 - 60 HRC	33 - 98	0.001 - 0.002	0.0016 - 0.002	0.002 - 0.0024	0.0024 - 0.0031	0.0028 - 0.0039	0.5 x DC



## VBO...

4, 5 flute, semi finishing - finishing, long edge, high productive profiling



APMX = Max. depth of cut  
CRKS = Connection screw size

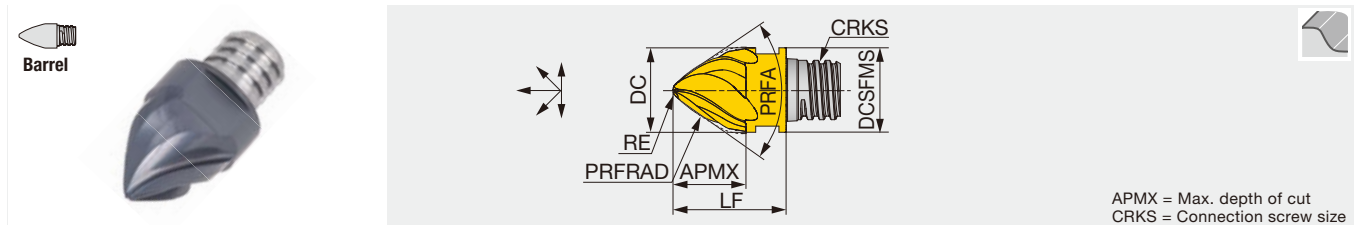
Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	PRFRAD	PRFA	CRKS	LF	Wrench	Torque
VBO080L12.0R900-4S05	●	4	30°	8	7.7	12	1	90	33.6°	S05	18	KEYV-S05	7
VBO100L15.0R850-5S06	●	5	30°	10	9.7	15	2	85	27.3°	S06	22	KEYV-S06	10
VBO120L19.0R800-5S08	●	5	30°	12	11.7	19	2	80	29.3°	S08	27	KEYV-S08	15
VBO160L25.0R750-5S10	●	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



APMX = Max. depth of cut  
CRKS = Connection screw size

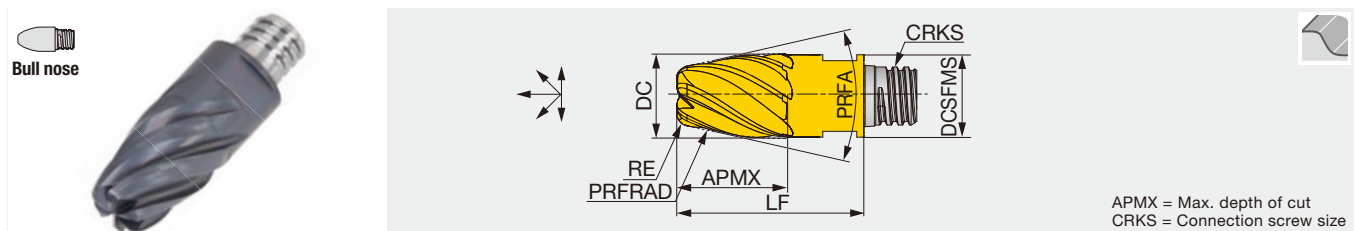
Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	PRFRAD	PRFA	CRKS	LF	Wrench	Torque
VBO100L08.0R250-4S06	●	4	30°	10	9.7	8	0.8	25	70.8°	S06	13	KEYV-S06	10
VBO120L09.0R300-4S08	●	4	30°	12	11.7	9	1.2	30	71.6°	S08	16.5	KEYV-S08	15
VBO160L13.0R400-4S10	●	4	30°	16	15.3	13	1.6	40	70.3°	S10	20.5	KEYV-S10	28

Torque: Recommended clamping torque: N·m  
2 pieces per package

● : Line up

## VBN...

6 flute, semi finishing - finishing, high productive profiling



APMX = Max. depth of cut  
CRKS = Connection screw size

Metric	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

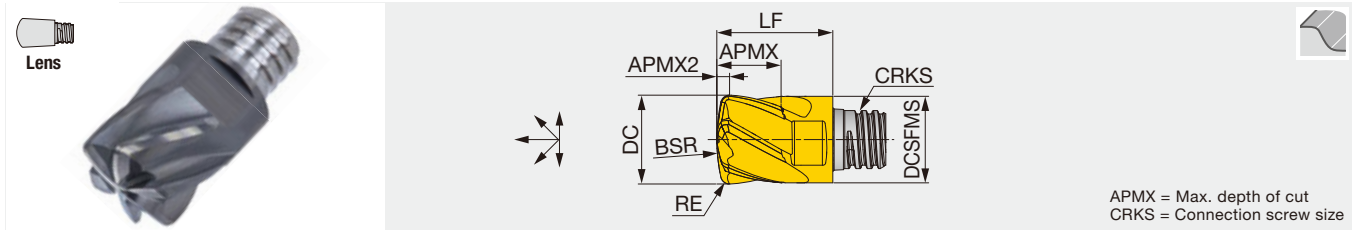
Torque: Recommended clamping torque: N·m  
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → **I034**

## VBL...

6 flute, semi finishing - finishing, high productive profiling



Metric	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.





## STANDARD CUTTING CONDITIONS

### Profiling

VBO, VBN, VBL

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth: fz (ipt)			Cusp height (in)
				Tool diameter: DC (in)			
				10 mm	12 mm	16 mm	
P	Low carbon steels 1045, 1055, etc.	- 300 HB	328 - 656	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	High carbon steel 4140, etc.	- 300 HB	262 - 591	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	262 - 525	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
M	Stainless steels 304, 316, etc.	- 200 HB	197 - 328	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
K	Gray cast irons 250, 300, etc.	150 - 250 HB	328 - 722	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	Ductile cast irons 400-15S, etc.	150 - 250 HB	328 - 722	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
N	Aluminum alloys Si < 13%	-	656 - 2297	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	Aluminum alloys Si ≥ 13%	-	328 - 984	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 262	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	Heat-resistant alloys Inconel718, etc.	-	66 - 131	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
H	Hardened steel H13, etc.	40 - 50 HRC	131 - 262	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
	Hardened steel D2, etc.	50 - 60 HRC	66 - 197	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004

## TIPS FOR USING ON 3-AXIS MACHINES

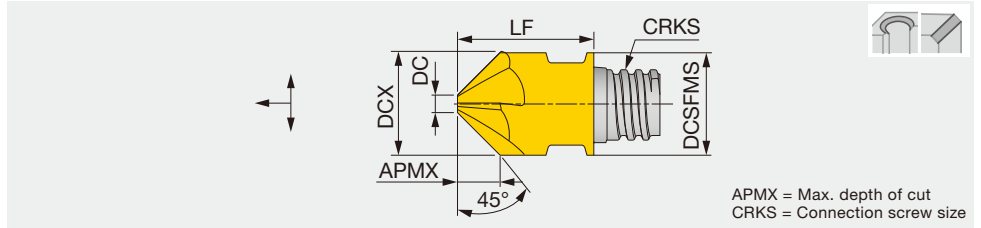
The **VBO/VBN** milling heads are designed for the use on 5-axis machines. However, they are also effective on 3-axis machining centers when either of the following conditions is satisfied.

- The angled walls or curved surfaces to be machined have tilt angles within the range specified in the chart on the right.
- 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°



4, 6 flute, chamfering angle: 45°



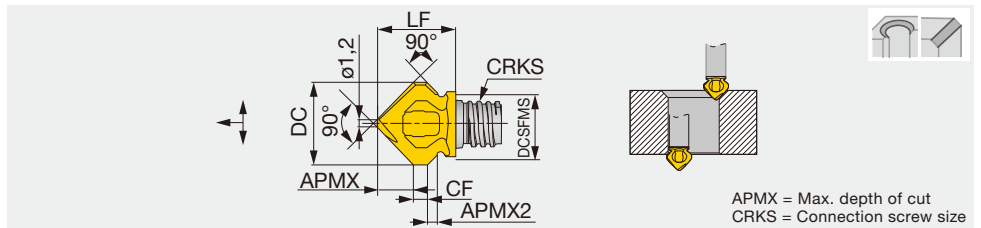
Inch	AH725	NOF	FHA	DCX	DCSFMS	APMX	DC	CRKS	LF	Wrench	Torque	
VCA0375L16A45-U04S06	●	4	0°	0.375	0.375	0.150	0.073	S06	0.512	KEYV-S06	7.38	
Metric	AH715	AH725	NOF	FHA	DCX	DCSFMS	APMX	DC	CRKS	LF	Wrench	Torque*
VCA100L04.0A45-04S06	●	●	4	0°	10	10	4	1.95	S06	13	KEYV-S06	10
VCA120L05.0A45-04S08	●	●	4	0°	12	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: lbs-ft (\*N-m)  
2 pieces per package

● : Line up

## VCW\*\*-02...

2 flute, chamfering angle: 45°, back chamfering capability



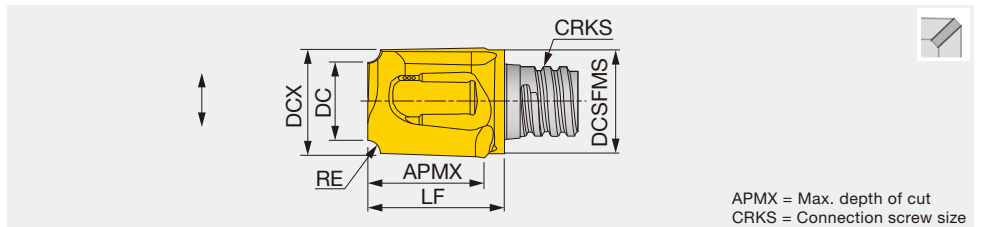
Metric	AH715	AH725	NOF	FHA	DC	DCSFMS	APMX	APMX2	CF	CRKS	LF	Wrench	Torque
VCW118L05.0A45-02S06	●	●	2	0°	11.8	9.3	5	1.2	2	S06	11.2	***KEYV-S08	10

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



Metric	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 → I036

# STANDARD CUTTING CONDITIONS

## Chamfering and countersinking (Milling, Z-feed chamfering)

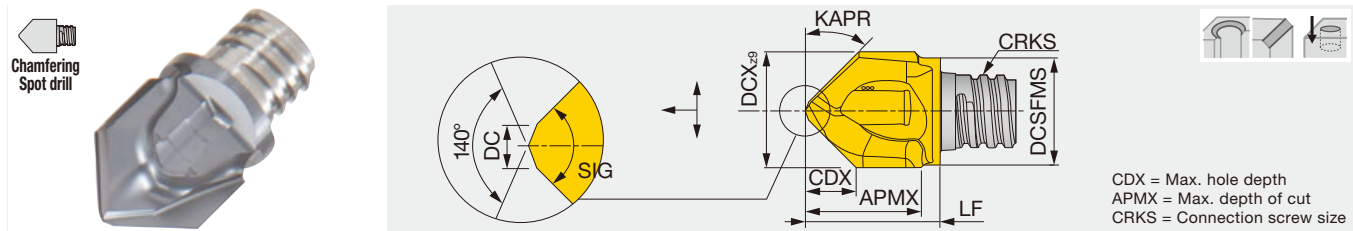
VCA, VCW, VCR

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steels 1045, 1055, etc.	- 300 HB	197 - 328	0.0024 - 0.0047
	High carbon steels 4140, etc.	- 300 HB	164 - 262	0.0024 - 0.0047
	Prehardened steel PX5, NAK80 etc	30 - 40 HRC	131 - 230	0.0024 - 0.0047
M	Stainless steels SUS304, SUS316, etc. 304, 316, etc.	- 200 HB	98 - 164	0.0024 - 0.0047
K	Grey cast irons 250, 300, etc.	150 - 250 HB	262 - 394	0.0024 - 0.0047
	Ductile cast irons 400-15S, etc.	150 - 250 HB	262 - 394	0.0024 - 0.0047
N	Aluminum alloys	-	328 - 656	0.0031 - 0.0059
S	Titanium alloys Ti-6Al-4V, etc.	-	98 - 164	0.0020 - 0.0039
	Heat-resistant alloys Inconel 718, etc.	-	66 - 131	0.0016 - 0.0031
H	Hardened steel H13, etc.	40 - 50 HRC	98 - 164	0.0020 - 0.0039
	Hardened steel D2, etc.	50 - 60 HRC	66 - 131	0.0016 - 0.0031

# TUNGMEISTER

VCP\*\*-02...

2 flute, chamfering angle: 30°, 45°, 60°



Metric	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

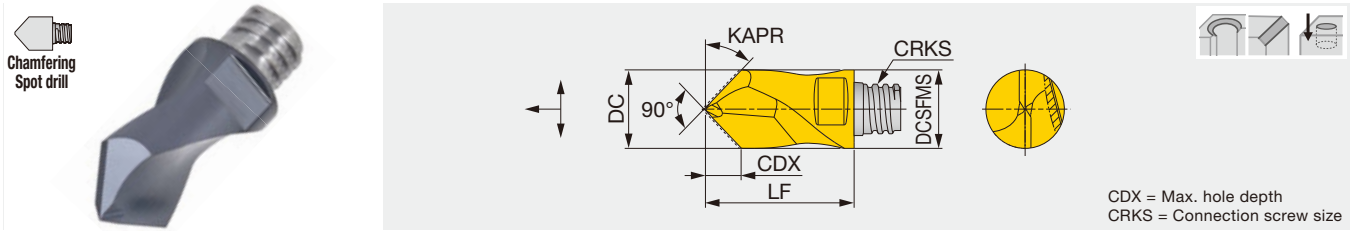
Torque: Recommended clamping torque: N·m  
2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → I037

## VDS...

2 flute, chamfering angle: 45°, helix cutting edge



Metric	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 (sfm)	Feed f (ipr)
P	Carbon steel 1045, 1055, etc.	- 300 HB	197 - 328	0.0024 - 0.0047
	Alloy steel 4140, 8620, etc.	- 300 HB	164 - 262	0.0024 - 0.0047
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	131 - 230	0.0024 - 0.0047
M	Stainless steels 304, 316, etc.	- 200 HB	98 - 164	0.0024 - 0.0047
K	Gray cast irons 250, 300, etc.	150 - 250 HB	262 - 394	0.0024 - 0.0047
	Ductile cast irons 400-15S, etc.	150 - 250 HB	262 - 394	0.0024 - 0.0047
N	Aluminum alloys	-	328 - 656	0.0031 - 0.0063
S	Titanium alloys Ti-6Al-4V, etc.	-	98 - 164	0.002 - 0.0039
	Heat-resistant alloys Inconel 718, etc.	-	66 - 131	0.0016 - 0.0031
H	Hardened steel H13, etc.	40 - 50 HRC	98 - 164	0.002 - 0.0039
	Hardened steel D2, etc.	50 - 60 HRC	66 - 131	0.0016 - 0.0031

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

Index

2 flute, A/B type center

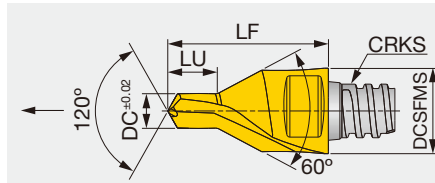


Fig. 1 Type A

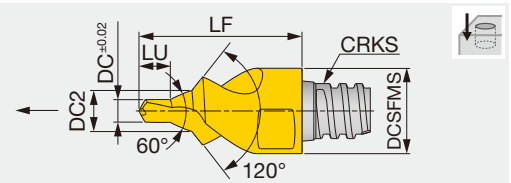


Fig. 2 Type B

CRKS = Connection screw size

Metric	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

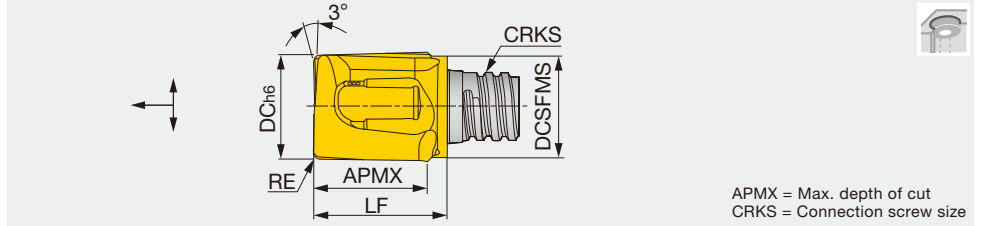
## STANDARD CUTTING CONDITIONS

### Center drill

### VDP

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed : f (ipt)						
				VDP107	VDP165	VDP207	VDP324 / VDP328	VDP409 / VDP412	VDP509 / VDP513	VDP641
<b>2</b>	Carbon steel 1045, 1055, etc.	- 300 HB	131 - 262	0.0008 - 0.0016	0.001 - 0.002	0.001 - 0.002	0.0016 - 0.0031	0.002 - 0.0039	0.002 - 0.0039	0.0024 - 0.0047
<b>3</b>	Alloy steel 4140, 8620, etc.	- 300 HB	98 - 164	0.0008 - 0.0016	0.001 - 0.002	0.001 - 0.002	0.0016 - 0.0031	0.002 - 0.0039	0.002 - 0.0039	0.0024 - 0.0047
<b>4</b>	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	66 - 98	0.0008 - 0.0016	0.001 - 0.002	0.001 - 0.002	0.0016 - 0.0031	0.002 - 0.0039	0.002 - 0.0039	0.0024 - 0.0047
<b>M</b>	Stainless steels 304, 316, etc.	- 200 HB	49 - 82	0.0006 - 0.0012	0.0008 - 0.0016	0.0008 - 0.0016	0.0016 - 0.0031	0.002 - 0.0039	0.002 - 0.0039	0.0024 - 0.0047
<b>K</b>	Gray cast irons 250, 300, etc.	150 - 250 HB	197 - 328	0.0008 - 0.0016	0.001 - 0.002	0.001 - 0.002	0.002 - 0.0035	0.0028 - 0.0005	0.0028 - 0.0047	0.0047 - 0.0071
	Ductile cast irons 400-15S, etc.	150 - 250 HB	197 - 328	0.0008 - 0.0016	0.001 - 0.002	0.001 - 0.002	0.0016 - 0.0031	0.002 - 0.0039	0.002 - 0.0039	0.0039 - 0.0059
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	-	49 - 82	0.0004 - 0.0008	0.0004 - 0.0008	0.0006 - 0.0012	0.0016 - 0.0028	0.0016 - 0.0028	0.0016 - 0.0028	0.0016 - 0.0028
	Heat-resistant alloys Inconel 718, etc.	-	33 - 66	0.0004 - 0.0008	0.0004 - 0.0008	0.0006 - 0.0012	0.0012 - 0.0024	0.0012 - 0.0024	0.0012 - 0.0024	0.0012 - 0.0024
<b>H</b>	Hardened steel H13, etc.	40 - 50 HRC	49 - 82	-	-	-	0.0016 - 0.0028	0.0016 - 0.0028	0.0016 - 0.0028	0.0016 - 0.0028
	Hardened steel D2, etc.	50 - 60 HRC	33 - 66	-	-	-	0.0012 - 0.0024	0.0012 - 0.0024	0.0012 - 0.0024	0.0012 - 0.0024

2 flute, for counterboring (can be used for milling)



APMX = Max. depth of cut  
CRKS = Connection screw size

Inch	AH725	NOF	FHA	DC	DCSFMS	APMX	RE	CRKS	LF	Wrench	Torque
VGC031L31R016-U02S05	●	2	10°	0.312	0.297	0.310	0.016	S05	0.390	KEYV-S05	5.16
VGC037L38R016-U02S06	●	2	10°	0.375	0.360	0.380	0.016	S06	0.485	KEYV-S06	7.38
VGC050L43R016-U02S08	●	2	10°	0.500	0.453	0.433	0.016	S08	0.600	KEYV-S08	11.06
VGC056L46R016-U02S08	●	2	10°	0.562	0.450	0.460	0.016	S08	0.590	KEYV-S08	11.06
VGC062L60R016-U02S10	●	2	10°	0.625	0.600	0.600	0.016	S10	0.750	KEYV-S10	20.65
VGC062L60R032-U02S10	●	2	10°	0.625	0.600	0.600	0.032	S10	0.750	KEYV-S10	20.65

Metric	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: lbs-ft (\*N·m)  
2 pieces per package

● : Line up

## STANDARD CUTTING CONDITIONS

### Counterboring

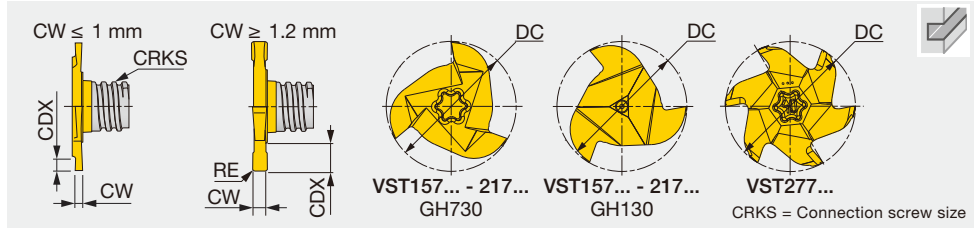
### VGC

ISO	Workpiece material	Hardness	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steels 1045, 1055, etc.	HB 300 -	131 - 262	0.002 - 0.003
	High carbon steels 4140, etc.	HB 300 -	98 - 164	0.002 - 0.003
	Prehardened steel PX5, NAK80 etc	HRC 40 - 30	66 - 98	0.002 - 0.003
M	Stainless steels 304, 316, etc.	HB 200 -	49 - 82	0.002 - 0.003
K	Grey cast irons 250, 300, etc.	HB 250 - 150	197 - 328	0.002 - 0.004
	Ductile cast irons 400-15S, etc.	HB 250 - 150	197 - 328	0.002 - 0.003
S	Titanium alloys Ti-6Al-4V etc	-	49 - 82	0.002 - 0.003
	Heat-resistant alloys Inconel 718 etc	-	33 - 66	0.001 - 0.002
H	Hardened steel SKD61, SKT4 etc H13, etc.	HRC 50 - 40	49 - 82	0.002 - 0.003
	Hardened steel SKD11, SKH etc D2, etc.	HRC 60 - 50	33 - 66	0.001 - 0.002

• When drilling, the step feed (pecking) operation should be applied with the depth of 0.011" - 0.019" per step.  
• Apply the same cutting conditions as the VEE type head when conducting shoulder milling or slotting operations.



### 3 flute, for slotting



Metric	GH730	AH735	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 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST157W1.57R020-3S06	●		3	0°	15.7	1.57	0.2	S06	2.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST157W2.00R020-3S06	●		3	0°	15.7	2	0.2	S06	2.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST157W2.39R020-3S06	●		3	0°	15.7	2.39	0.2	S06	2.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST157W2.50R020-3S06	●		3	0°	15.7	2.5	0.2	S06	2.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST157W3.00R020-3S06	●		3	0°	15.7	3	0.2	S06	2.8	KEYV-177 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	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 <sup>(1)</sup>	0.05	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W1.40R005-3S06	●		3	0°	17.7	1.4 <sup>(1)</sup>	0.05	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W1.50R010-3S06	●		3	0°	17.7	1.5	0.1	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W1.57R020-3S06	●		3	0°	17.7	1.57	0.2	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W1.70R005-3S06	●		3	0°	17.7	1.7 <sup>(1)</sup>	0.05	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W2.00R020-3S06	●		3	0°	17.7	2	0.2	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	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 <sup>(2)</sup> / KEYV-T20 <sup>(3)</sup>	10
VST177W3.00R020-3S06	●	▲	3	0°	17.7	3	0.2	S06	3.8	KEYV-177 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	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

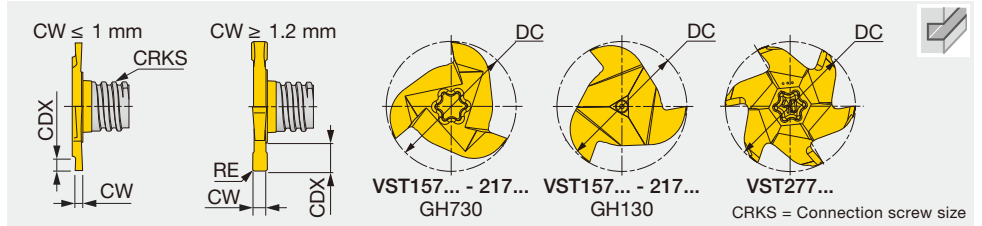
▲ : To be discontinued





## VST\*\*-4/6...

4, 6 flute, for slotting



Metric	GH730	AH735	NOF	FHA	DC	CW±0.02	RE	CRKS	CDX	Wrench	Torque
VST217W0.76R000-4S08	●		4	0°	21.7	0.76 <sup>(1)</sup>	-	S08	1.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W0.86R000-4S08			4	0°	21.7	0.86 <sup>(1)</sup>	-	S08	1.7	KEYV-217	15
VST217W0.96R000-4S08	●		4	0°	21.7	0.96 <sup>(1)</sup>	-	S08	1.9	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.00R005-4S08	●		4	0°	21.7	1	0.05	S08	2	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.20R005-4S08	●		4	0°	21.7	1.2 <sup>(1)</sup>	0.05	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.40R005-4S08	●		4	0°	21.7	1.4 <sup>(1)</sup>	0.05	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.57R000-4S08	●		4	0°	21.7	1.57	-	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.70R010-4S08	●		4	0°	21.7	1.7 <sup>(1)</sup>	0.1	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W1.95R020-4S08	●		4	0°	21.7	1.95 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W2.00R020-4S08	●		4	0°	21.7	2	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W2.25R020-4S08	●		4	0°	21.7	2.25 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W2.39R020-4S08	●		4	0°	21.7	2.39	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W2.50R020-4S08	●	▲	4	0°	21.7	2.5	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W2.75R020-4S08	●		4	0°	21.7	2.75 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T25 <sup>(3)</sup>	15
VST217W3.00R020-4S08	●	▲	4	0°	21.7	3	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W3.17R020-4S08	●		4	0°	21.7	3.17	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W3.25R020-4S08	●		4	0°	21.7	3.25 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W4.00R020-4S08	●		4	0°	21.7	4	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W4.25R020-4S08	●		4	0°	21.7	4.25 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W4.75R020-4S08	●		4	0°	21.7	4.75	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	15
VST217W5.25R020-4S08	●		4	0°	21.7	5.25 <sup>(1)</sup>	0.2	S08	4.5	KEYV-217 <sup>(2)</sup> / KEYV-T30L <sup>(3)</sup>	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 <sup>(1)</sup>	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

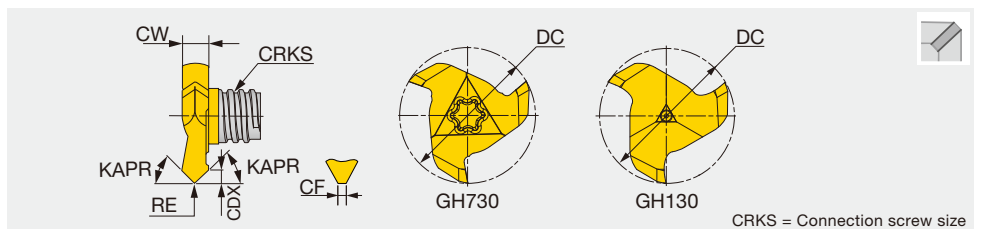
Torque: Recommended clamping torque: N·m

2 pieces per package

● : Line up  
▲ : To be discontinued

## VST\*\*A45...

3, 4 flute, for slotting with 45° chamfer



Metric	GH730	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 <sup>(1)</sup> / KEYV-T25 <sup>(2)</sup>	10
VST217L01.70A45-4S08	●	4	0°	21.7	5.5	45°	S08	1.7	1.5	-	KEYV-217 <sup>(1)</sup> / KEYV-T30L <sup>(2)</sup>	15

(1) Applicable for GH130

(2) Applicable for GH730

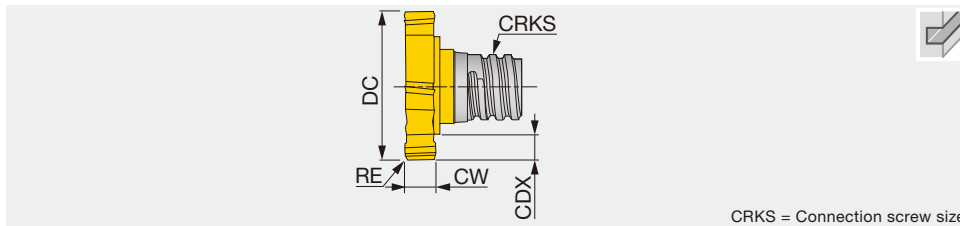
Torque: Recommended clamping torque: N·m

2 pieces per package

● : Line up

Reference pages: Standard cutting conditions → I043





CRKS = Connection screw size

Inch	GH730	AH735	GH130	NOF	FHA	DC - 0.002 <sup>0</sup>	CW ±0.0008 <sup>±1</sup>	CDX	CRKS	RE	Wrench	Torque
VTB05W125R016-U06S05	●	▲	▲	6	0°	0.500	0.125	0.088	S05	0.016	KEYV-T20	5.16
VTB06W056R016-U06S06	●		▲	6	0°	0.625	0.056	0.125	S06	0.016	KEYV-T20	7.38
VTB06W063R016-U06S06	●		▲	6	0°	0.625	0.063	0.125	S06	0.016	KEYV-T20	7.38
VTB06W068R016-U06S06	●		▲	6	0°	0.625	0.068	0.125	S06	0.016	KEYV-T20	7.38
VTB06W078R016-U06S06	●		▲	6	0°	0.625	0.078	0.125	S06	0.016	KEYV-T20	7.38
VTB06W086R016-U06S06	●		▲	6	0°	0.625	0.086	0.125	S06	0.016	KEYV-T25	7.38
VTB06W105R016-U06S06	●		▲	6	0°	0.625	0.105	0.125	S06	0.016	KEYV-T25	7.38
VTB06W125R016-U06S06	●		▲	6	0°	0.625	0.125	0.125	S06	0.016	KEYV-T25	7.38
VTB06W156R016-U06S06	●		▲	6	0°	0.625	0.156	0.125	S06	0.016	KEYV-T25	7.38
VTB07W156R016-U06S08	●		▲	6	0°	0.750	0.156	0.120	S08	0.016	KEYV-T30L	11.06
VTB07W187R016-U06S08	●		▲	6	0°	0.750	0.187	0.120	S08	0.016	KEYV-T30L	11.06
VTB07W250R016-U06S08	●		▲	6	0°	0.750	0.250	0.120	S08	0.016	KEYV-T30L	11.06
VTB08W187R016-U06S08	●	▲	▲	6	0°	0.875	0.187	0.190	S08	0.015	KEYV-T40L	11.06
VTB08W250R016-U06S08	●		▲	6	0°	0.875	0.250	0.190	S08	0.015	KEYV-T40L	11.06
VTB08W312R016-U06S08	●		▲	6	0°	0.875	0.312	0.190	S08	0.015	KEYV-T40L	11.06
VTB10W187R016-U06S10	●		▲	6	0°	1.000	0.187	0.177	S10	0.015	KEYV-T50L	20.65
VTB10W250R016-U06S10	●		▲	6	0°	1.000	0.250	0.177	S10	0.015	KEYV-T50L	20.65

Metric	GH730	AH735	GH130	NOF	FHA	DC - 0.002 <sup>0</sup>	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

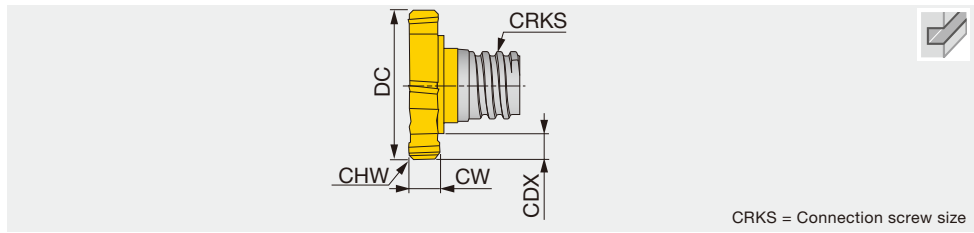
Torque: Recommended clamping torque: lbs-ft (\*N·m)  
2 pieces per package

● : Line up  
▲ : To be discontinued

Reference pages: Standard cutting conditions → **I043**

# VTB\*\*-C006..., VTB\*\*C15-06...

6 flute, for T-slotting with 45° chamfer



CRKS = Connection screw size

Inch	GH730	GH130	NOF	FHA	DC $-0.002^0$	CW $\pm 0.0008^0$	CDX	CRKS	CHW	Wrench	Torque
VTB05W062C006-U06S05	●	▲	6	0°	0.500	0.062	0.089	S05	0.006	KEYV-T20	5.16
VTB05W078C006-U06S05	●	▲	6	0°	0.500	0.078	0.089	S05	0.006	KEYV-T20	5.16

Metric	GH730	GH130	NOF	FHA	DC $-0.002^0$	CW $\pm 0.02$	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: lbs-ft (\*N-m)  
2 pieces per package

● : Line up  
▲ : To be discontinued

## STANDARD CUTTING CONDITIONS

### Slotting

VST, VTB

ISO	Workpiece material	Hardness	VST		VTB	
			Cutting speed Vc (sfm)	Feed per tooth fz (ipt)	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steels 1045, 1055, etc.	- 300 HB	262 - 591	0.002 - 0.006	262 - 591	0.003 - 0.007
	High carbon steels 4140, etc.	- 300 HB	197 - 394	0.002 - 0.005	197 - 394	0.002 - 0.006
M	Stainless steels 304, 316, etc.	- 200 HB	164 - 394	0.002 - 0.005	164 - 394	0.002 - 0.006
K	Grey cast irons 250, 300, etc.	150 - 250 HB	328 - 656	0.002 - 0.006	328 - 656	0.003 - 0.007
	Ductile cast irons 400-15S, etc.	150 - 250 HB	328 - 656	0.002 - 0.005	328 - 656	0.002 - 0.006
N	Aluminum alloys Si < 13%	-	656 - 1969	0.002 - 0.006	656 - 1969	0.003 - 0.007
	Aluminum alloys Si ≥ 13%	-	328 - 984	0.001 - 0.005	328 - 984	0.002 - 0.006
S	Titanium alloys Ti-6Al-4V, etc.	-	131 - 197	0.002 - 0.003	131 - 197	0.002 - 0.006
	Heat-resistant alloys Inconel 718, etc.	-	49 - 115	0.001 - 0.004	49 - 115	0.001 - 0.004

### 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



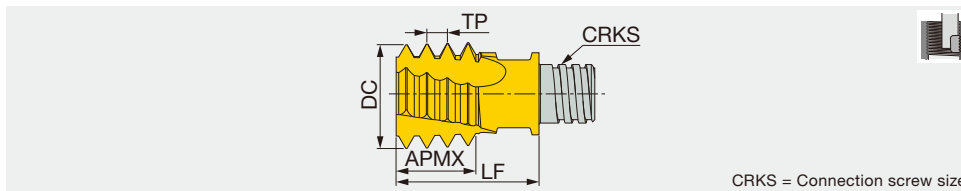
## ISO metric (M)

VMT\*\*\*IS

3 - 6 flute, full profile, for internal thread



Threading



CRKS = Connection screw size

Metric	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



Square



Ball



Radius



Chamfering



Slotting



Threading



Others



2



3



4



5



6 or more

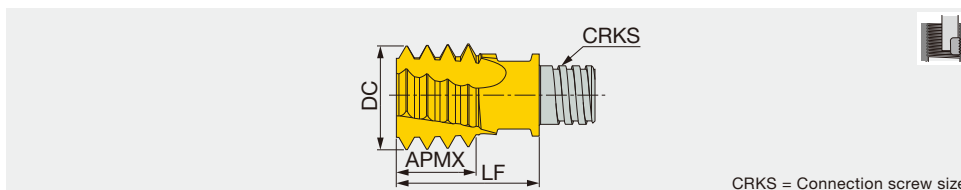
## Unified (UN, UNC, UNF, UNEF, UNS)

VMT\*\*\*UN

3, 4, 5 flute, full profile, for internal thread



Threading



CRKS = Connection screw size

Metric	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

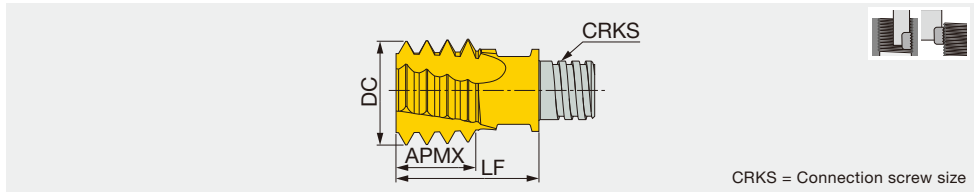
● : Line up

Reference pages: Standard cutting conditions → I046

# Whitworth (G, Rp, BSP, PF, PS)

## VMT\*\*\*W

4 flute, full profile, for internal/external thread



CRKS = Connection screw size

Metric	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

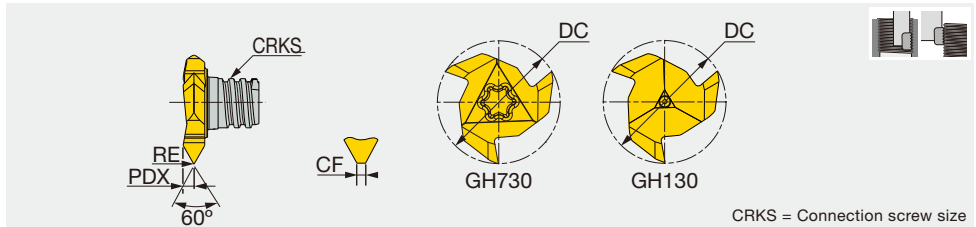
Torque: Recommended clamping torque: N·m  
2 pieces per package

● : Line up

# 60° partial profile

## VTR\*\*\*IS

3, 4 flute, partial profile, for internal/external thread



CRKS = Connection screw size

Metric	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 <sup>(1)</sup> / KEYV-T25 <sup>(2)</sup> 10
VTR160L12IS15-3S06	●	▲	1.5	2	M22	15.7	3	0.05	-	1.4	S06	KEYV-177 <sup>(1)</sup> / KEYV-T25 <sup>(2)</sup> 10
VTR220L28IS30-4S08	●	▲	3	4.5	M36	21.7	4	0.2	-	2.8	S08	KEYV-217 <sup>(1)</sup> / KEYV-T30L <sup>(2)</sup> 15

(1) Applicable for GH130  
(2) Applicable for GH730

Torque: Recommended clamping torque: N·m  
2 pieces per package

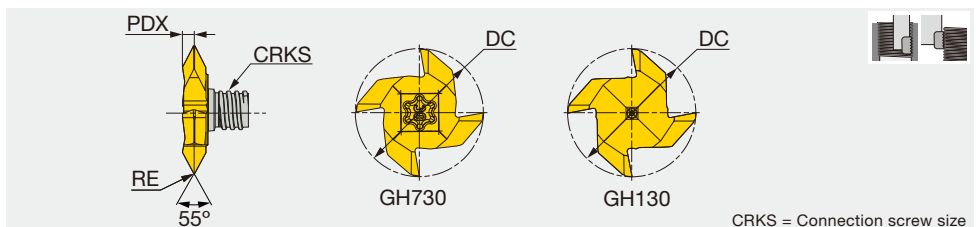
● : Line up

▲ : To be discontinued

# 55° partial profile

## VTR\*\*\*W

4 flute, partial profile, for internal/external thread



CRKS = Connection screw size

Metric	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 <sup>(1)</sup> / KEYV-T30L <sup>(2)</sup> 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 → [I046](#)

# STANDARD CUTTING CONDITIONS

## Threading

### VMT, VTR

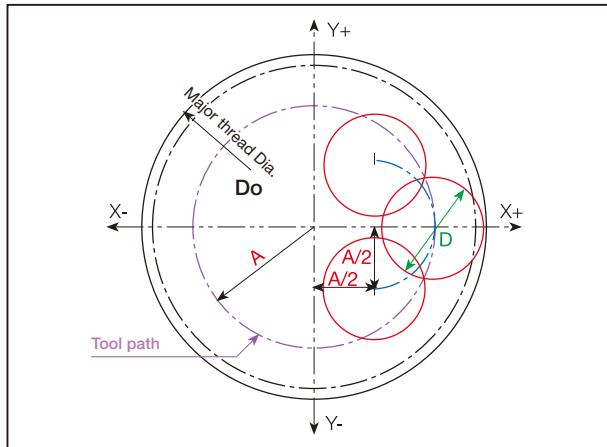
ISO	Material	Condition	Tensile strength [N/mm <sup>2</sup> ]	Hardness HB	Cutting speed (sfm)	Tool dia. (in)						
						Feed (ipt)						
						ø10 (0.394")	ø12 (0.472")	ø15.4 (0.606"), ø15.7 (0.618"), ø16 (0.630")	ø21.7 (0.787")			
<b>P</b>	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	328 - 820	0.0031	0.0035	0.0047	0.0059		
		≥ 0.25 %C	Annealed	650	190	262 - 689	0.0031	0.0035	0.0047	0.0059		
		< 0.55 %C	Quenched and tempered	850	250	213 - 558	-	-	-	-		
		≥ 0.55 %C	Annealed	750	220	361 - 591	0.0028	0.0031	0.0039	0.0047		
	Low alloy steel and cast steel (less than 5% of alloying elements)	Quenched and tempered		1000	300	312 - 525	0.0028	0.0031	0.0039	0.0047		
		Annealed		600	200	295 - 525	0.002	0.002	0.0028	0.0031		
		Quenched and tempered		930	275	213 - 656	0.002	0.002	0.0028	0.0031		
				1000	300	230 - 689	0.002	0.002	0.0028	0.0031		
				1200	350	312 - 525	0.002	0.002	0.0028	0.0031		
		High alloyed steel, cast steel, and tool steel		Annealed	680	200	427 - 558	0.002	0.002	0.0028	0.0031	
Quenched and tempered		1100	325	246 - 328	0.002	0.002	0.0028	0.0031				
		Stainless steel and cast steel		Ferritic/martensitic	680	200	361 - 558	0.002	0.002	0.0028	0.0031	
		Martensitic	820	240	230 - 509	0.002	0.002	0.0028	0.0031			
<b>M</b>	Stainless steel	Annealed	600	180	279 - 328	0.002	0.002	0.0028	0.0031			
<b>K</b>	Cast iron nodular (GGG)	Ferritic/martensitic		-	180	394 - 525	0.0031	0.0035	0.0047	0.0059		
		Pearlitic		-	260	246 - 525	0.0031	0.0035	0.0047	0.0059		
	Gray cast iron (GG)	Ferritic		-	160	230 - 492	0.0031	0.0035	0.0047	0.0059		
		Pearlitic		-	250	361 - 459	0.0031	0.0035	0.0047	0.0059		
	Malleable cast iron		Ferritic	-	130	394 - 525	0.0031	0.0035	0.0047	0.0059		
		Pearlitic	-	230	361 - 459	0.0031	0.0035	0.0083	0.0059			
<b>N</b>	Aluminum-wrought alloy		Not cureable		-	60	525 - 984	0.0031	0.0035	0.0047	0.0059	
			Cured		-	100	-	-	-	-		
	Aluminum-cast, alloyed	≤12% Si		Not cureable		-	75	492 - 1148	0.0031	0.0035	0.0047	0.0059
				Cured		-	90	-	-	-	-	
	Copper alloys	>12% Si		High temperature		-	130	328 - 820	0.002	0.002	0.0028	0.0031
		>1% Pb		Free cutting		-	110	-	-	-	-	
				Brass		-	90	-	-	-	-	
	Non-metallic		Electrolytic copper		-	100	-	-	-	-		
Duroplastics, fiber plastics			-	-	328 - 1312	0.0043	0.0047	0.0059	0.0071			
		Hard rubber		-	-	-	-	-	-			
<b>S</b>	Fe based		Annealed		-	200	-	-	-	-		
			Cured		-	280	-	-	-	-		
	High temp. alloys	Ni or Co based		Annealed		-	250	66 - 262	0.0012	0.0012	0.0016	0.0016
				Cured		-	350	-	-	-	-	
		Cast		-	320	-	-	-	-			
	Titanium Ti alloys				RM 400	-	-	-	-	-		
		Alpha+beta alloys cured		RM 1050	-	66 - 262	0.0012	0.0012	0.0016	0.0016		
<b>H</b>	Hardened steel		Hardened		-	55 HRC	180 - 213	-	-	-		
			Hardened		-	60 HRC	148 - 180	-	-	-		
	Chilled cast iron		Cast		-	400	295 - 344	-	-	-		
	Cast iron		Hardened		-	55 HRC	180 - 213	-	-	-		

## 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
```



### Internal Thread

Example: M20x2.0 IN-RH (Thread depth 20 mm)

Tool : MTEC1010C27 2.0ISO

(Cutting dia. 10 mm)

$A = (D_o - D) / 2 = (20 - 10) / 2 = 5$

$A/2 = 2.5$

(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
%
```

$$A = \frac{D_o - D}{2}$$

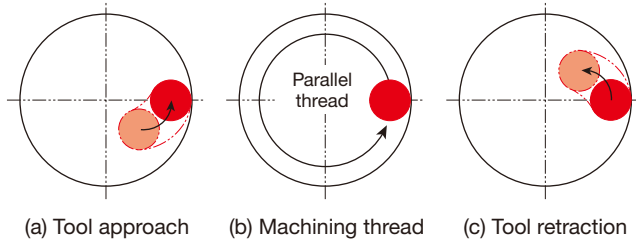
A = Radius of tool path  
Do = Major thread diameter  
D = Cutting diameter

$$F \text{ (Center of tool)} = n \times f \times z$$

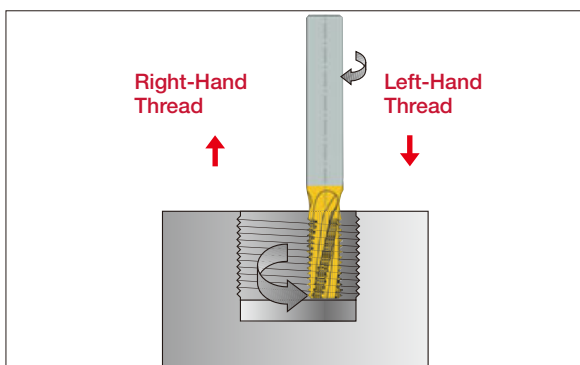
$$F \text{ (Cutting edge)} = \frac{D_o - D}{D_o} \times n \times f \times z$$

n : Number of revolutions  
f : rev / tooth  
z : Number of edge

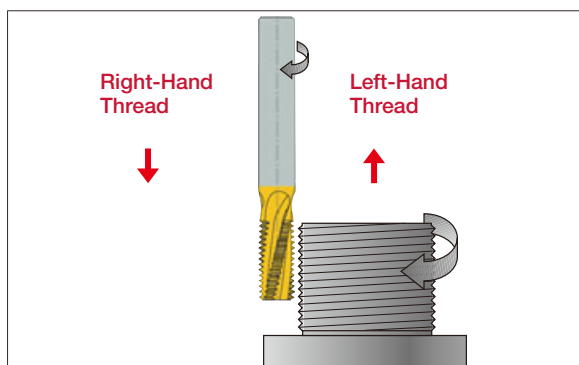
### Machining procedure



### Internal Thread



### External Thread

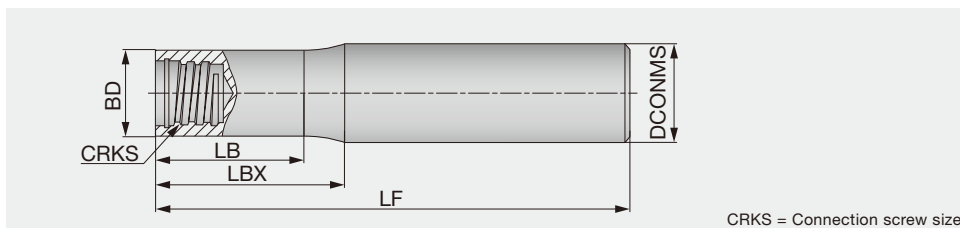


A thread milling operation is applicable for thread cutting in non-symmetrical parts utilizing the advantage of helical interpolation programs on modern machining centers.



For more details, please check ThreadMilling advisor.

## Straight neck and cylindrical shank



CRKS = Connection screw size

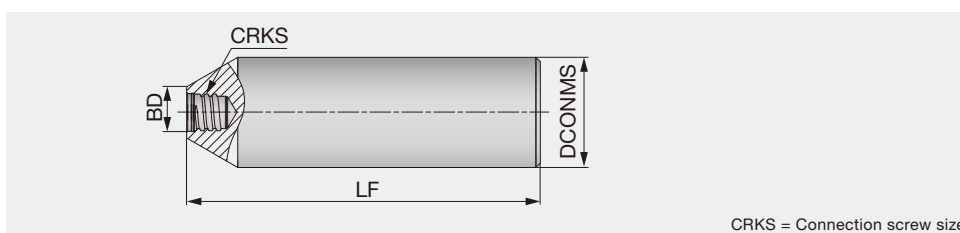
Inch	DCONMS	BD	LF	LBX	LB	CRKS	Shank shape	Shank material
VSS031L250S05US	0.312	0.300	2.500	0.590	0.567	S05	Cylindrical	Steel
VSS031L300S05UC	0.312	0.300	3.000	1.000	0.950	S05	Cylindrical	Carbide
VSS031L350S05UC	0.312	0.300	3.500	1.500	1.450	S05	Cylindrical	Carbide
VSS031L400S05UC	0.312	0.300	4.000	2.000	1.950	S05	Cylindrical	Carbide
VSS031L300S05UW	0.312	0.299	3.000	1.000	0.978	S05	Cylindrical	Tungsten
VSS031L450S05UW	0.312	0.299	4.500	2.000	1.978	S05	Cylindrical	Tungsten
VSS037L300S06US	0.375	0.364	3.000	0.787	0.768	S06	Cylindrical	Steel
VSS037L400S06UC	0.375	0.364	4.000	1.250	1.200	S06	Cylindrical	Carbide
VSS037L475S06UC	0.375	0.364	4.750	2.000	1.950	S06	Cylindrical	Carbide
VSS037L355S06UW	0.375	0.364	3.550	0.750	0.680	S06	Cylindrical	Tungsten
VSS050L350S08US	0.500	0.480	3.540	0.630	0.530	S08	Cylindrical	Steel
VSS050L400S08UC	0.500	0.480	4.000	1.500	1.400	S08	Cylindrical	Carbide
VSS050L550S08UC	0.500	0.480	5.500	2.500	2.450	S08	Cylindrical	Carbide
VSS050L425S08UW	0.500	0.480	4.252	0.630	0.594	S08	Cylindrical	Tungsten
VSS062L400S10US	0.625	0.598	4.000	0.787	0.744	S10	Cylindrical	Steel
VSS062L325S10UC	0.625	0.600	3.250	1.250	1.180	S10	Cylindrical	Carbide
VSS062L450S10UC	0.625	0.600	4.500	2.500	2.430	S10	Cylindrical	Carbide
VSS062L550S10UC	0.625	0.600	5.500	3.500	3.430	S10	Cylindrical	Carbide
VSS062L700S10UC	0.625	0.600	7.000	5.000	4.930	S10	Cylindrical	Carbide
VSS075L500S12US	0.750	0.720	5.000	1.000	0.880	S12	Cylindrical	Steel
VSS075L400S12UC	0.750	0.720	4.000	1.500	1.430	S12	Cylindrical	Carbide
VSS075L550S12UC	0.750	0.720	5.500	3.000	2.930	S12	Cylindrical	Carbide
VSS075L800S12UC	0.750	0.720	8.000	4.500	4.430	S12	Cylindrical	Carbide
VSS100L537S15US	1.000	0.957	5.375	1.375	1.313	S15	Cylindrical	Steel
VSS100L475S15UC	1.000	0.957	4.750	2.375	2.313	S15	Cylindrical	Carbide
VSS100L675S15UC	1.000	0.957	6.750	4.000	3.938	S15	Cylindrical	Carbide
VSS100L1000S15UC	1.000	0.957	10.000	6.000	5.938	S15	Cylindrical	Carbide



Others

## VSSD...

### High rigidity shank



CRKS = Connection screw size

Metric	DCONMS	BD	LF	CRKS	Shank shape	Shank material
VSSD06L050S04-S	6	5.8	50	S04	Cylindrical	Steel
VSSD06L060S04-C	6	5.8	60	S04	Cylindrical	Carbide
VSSD08L050S04-S	8	5.8	50	S04	Cylindrical	Steel
VSSD08L060S04-C	8	5.8	60	S04	Cylindrical	Carbide
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

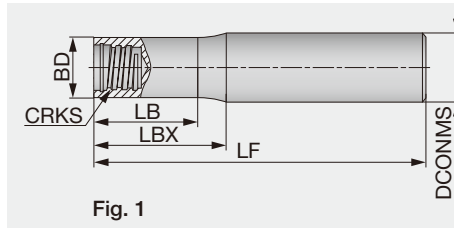


Fig. 1

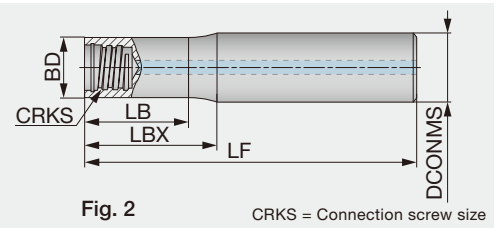


Fig. 2

CRKS = Connection screw size

Metric	DCONMS	BD	LF	LBX	LB	CRKS	Shank shape	Shank material	Fig.
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

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

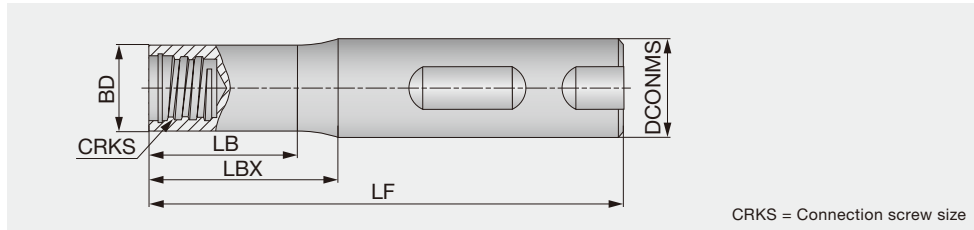
Tooling System

User's Guide

Index



### Straight neck and weldon shank

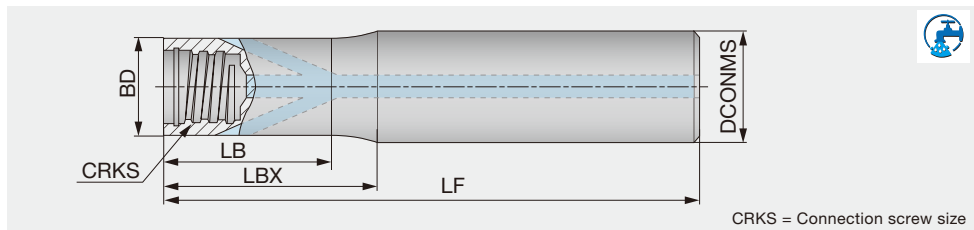


Inch	DCONMS	BD	LF	LBX	LB	CRKS	Shank shape	Shank material
VSS050L218W05US	0.500	0.299	2.185	0.174	-	S05	Weldon	Steel
VSS062L258W06US	0.625	0.366	2.559	0.226	-	S06	Weldon	Steel
VSS062L258W08US	0.625	0.480	2.559	0.125	-	S08	Weldon	Steel
VSS075L275W10US	0.750	0.598	2.756	0.131	-	S10	Weldon	Steel
VSS100L300W12US	1.000	0.720	3.000	0.283	-	S12	Weldon	Steel

Metric	DCONMS	BD	LF	LBX	LB	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

### VSSD\*\*-W-A...

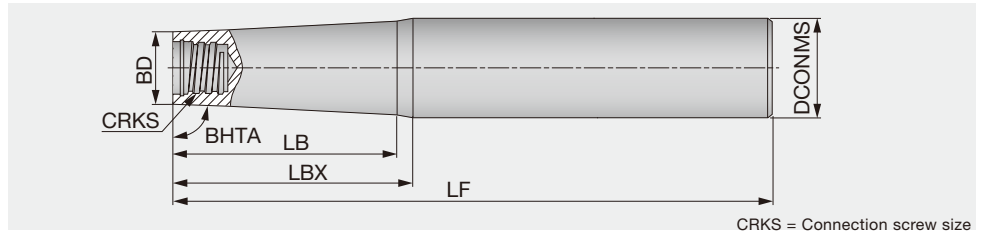
### Straight shank and neck with coolant hole



Metric	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

# VTS...

## Tapered neck and cylindrical shank



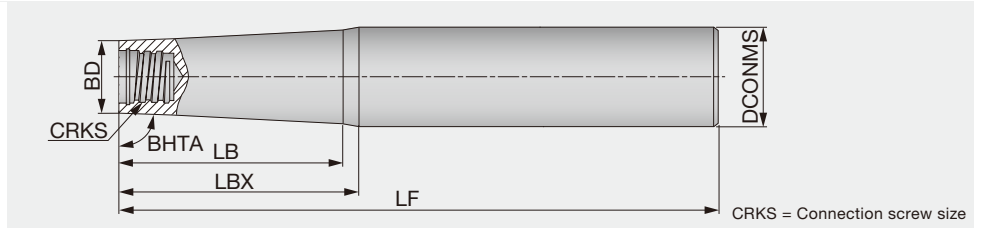
CRKS = Connection screw size

Inch	BHTA	DCONMS	BD	LF	LBX	LB	CRKS	Shank material
VTS050L300S05US	85°	0.500	0.300	3.000	1.000	0.930	S05	Steel
VTS050L400S05US	89°	0.500	0.300	4.000	1.500	1.300	S05	Steel
VTS062L500S06US	85°	0.625	0.370	5.000	1.380	1.283	S06	Steel
VTS062L630S06US	89°	0.625	0.364	6.300	2.170	1.750	S06	Steel
VTS062L550S08US	85°	0.625	0.480	5.500	0.870	0.770	S08	Steel
VTS075L650S08US	89°	0.750	0.480	6.500	3.150	2.770	S08	Steel
VTS075L550S10US	85°	0.750	0.598	5.500	0.880	-	S10	Steel
VTS100L670S10US	89°	1.000	0.598	6.700	2.295	-	S10	Steel
VTS075L750S10US	89°	0.750	0.600	7.500	3.150	2.950	S10	Steel
VTS100L630S12US	89°	1.000	0.720	6.300	1.600	-	S12	Steel
VTS100L800S12US	89°	1.000	0.720	8.000	3.750	3.400	S12	Steel
VTS125L600S15US	85°	1.250	0.957	6.000	1.750	1.594	S15	Steel
VTS125L750S12US	89°	1.250	0.720	7.500	3.150	-	S12	Steel
VTS037L350S05UC	89°	0.375	0.300	3.500	1.500	-	S05	Carbide
VTS050L450S05UC	89°	0.500	0.300	4.500	2.500	2.354	S05	Carbide
VTS062L600S05UC	89°	0.625	0.300	6.000	4.000	3.900	S05	Carbide
VTS050L550S06UC	89°	0.500	0.364	5.500	2.500	2.470	S06	Carbide
VTS062L650S06UC	89°	0.625	0.364	6.500	3.500	3.380	S06	Carbide
VTS062L650S08UC	89°	0.625	0.480	6.500	3.500	3.440	S08	Carbide
VTS075L700S08UC	89°	0.750	0.480	7.000	4.000	3.900	S08	Carbide
VTS075L650S10UC	89°	0.750	0.600	6.500	4.000	-	S10	Carbide
VTS075L880S10UC	89°	0.750	0.600	8.800	6.300	6.240	S10	Carbide
VTS100L1000S12UC	89°	1.000	0.720	10.000	5.500	-	S12	Carbide
VTS125L1000S15UC	89°	1.250	0.957	10.000	6.000	-	S15	Carbide
VTS125L1200S15UC	89°	1.250	0.941	12.000	8.000	-	S15	Carbide
VTS075L550S06UW	85°	0.750	0.370	5.500	2.240	-	S06	Tungsten
VTS062L670S06UW	89°	0.625	0.364	6.700	2.180	1.770	S06	Tungsten
VTS075L670S08UW	89°	0.750	0.480	6.700	3.150	2.770	S08	Tungsten

Grade  
Insert  
Toolholder  
Ext. Toolholder  
Int. Toolholder  
Threading  
Grooving  
Grooving tool  
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

### Taper neck and straight shank

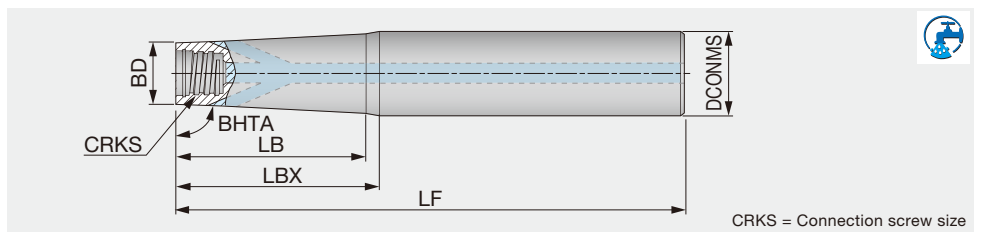


CRKS = Connection screw size

Metric	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

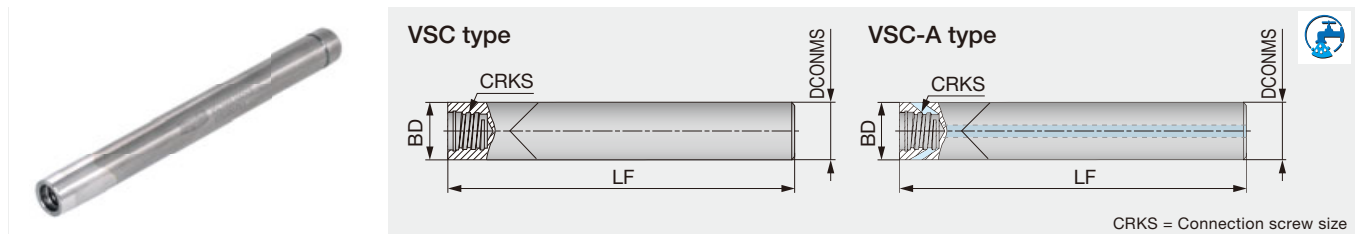


CRKS = Connection screw size

Metric	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



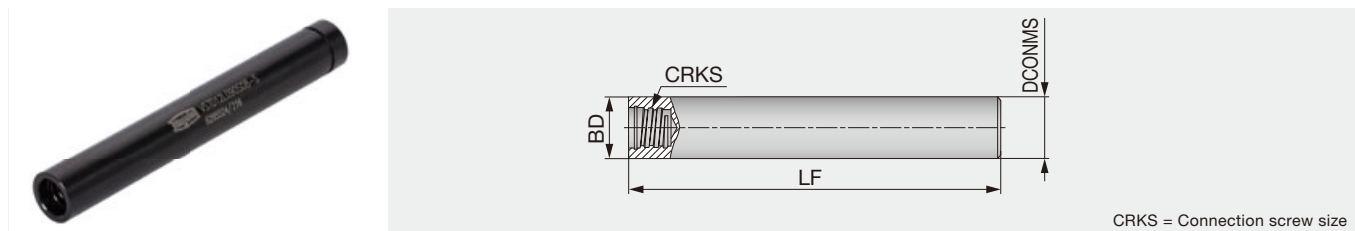
Inch	DCONMS	BD	LF	CRKS	Air hole	Shank material
VSC095L080S06-C	0.375	0.375	3.150	S06	without	Carbide
VSC127L120S08-C-A	0.500	0.500	4.724	S08	with	Carbide
Metric	DCONMS	BD	LF	CRKS	Air hole	Shank material
VSC100L100S06-C	10	10	100	S06	without	Carbide
VSC120L100S08-C-A	12	12	100	S08	with	Carbide

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



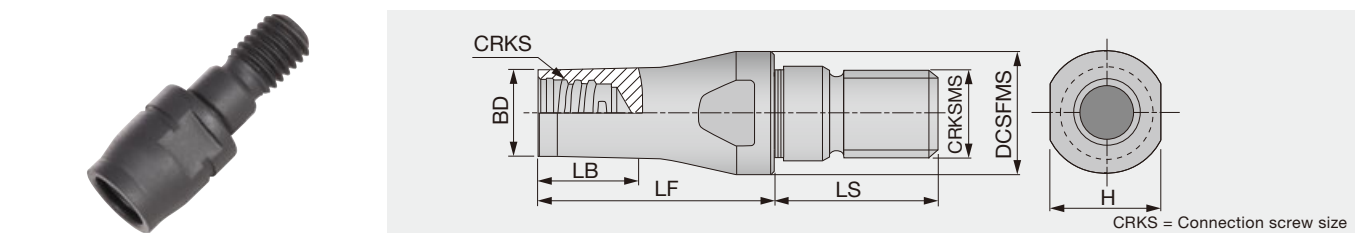
Inch	DCONMS	BD	LF	CRKS	Shank material
VST031L275S05US	0.312	0.312	2.750	S05	Steel
VST037L325S06US	0.375	0.375	3.250	S06	Steel
VST050L375S08US	0.500	0.500	3.750	S08	Steel
VST062L400S10US	0.625	0.625	4.000	S10	Steel
Metric	DCONMS	BD	LF	CRKS	Shank material
VSTD06L070S04-S	6	6	70	S04	Steel
VSTD08L070S05-S	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.

## VAD\*\*-M...

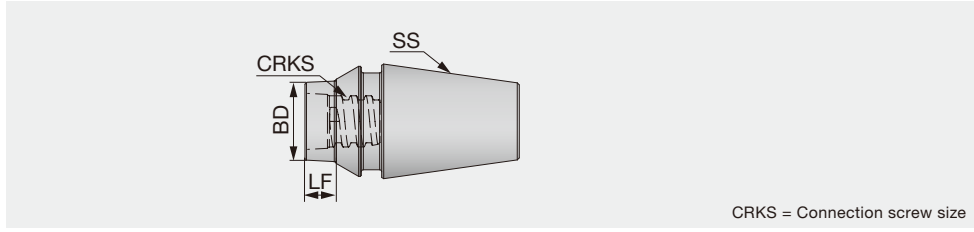
### TungFlex conversion adaptor



Metric	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

Metric	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



Others

WRENCHES

Appearance	Designation	Connection screw size	Torque (lb·ft)	Torque (N·m)	Applicable head
	KEYV-S05	S04	2.95	4	Square Ball Radius Drilling Chamfering Counterboring Barrel Lens Bull nose Indexable modular head
		S05	5.16	7	
	KEYV-S06	S06	7.38	10	
	KEYV-S08	S08	11.06	15	
	KEYV-S10	S10	20.65	28	
	KEYV-W20	S15	29.50	40	
	KS-24	S21	81.13	110	Square
	KEYV-177	S06	7.38	10	Slotting VST Threading VTR
	KEYV-217	S08	11.06	15	
	KEYV-T20	S05	5.16	7	Slotting VTB Face mill
		S06	7.38	10	
	KEYV-T25	S06	7.38	10	
	KEYV-T30L	S08	11.06	15	Slotting VST, VTB Face mill
		S10	20.65	28	
KEYV-T40L	S08	11.06	15	Slotting VTB Face mill	
	S10	20.65	28		

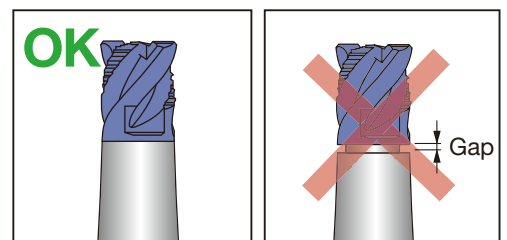
Note: Wrenches are sold separately.

# TORQUE WRENCHES

Appearance		Designation	Stock	Connection screw size	TM Head description	Torque (lb-ft)	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	5.16	7
		TM-WRENCH-8-06	●	S06		7.38	10
		TM-WRENCH-10-08	●	S08		11.06	15
		TM-WRENCH-13-10	●	S10		20.65	28
		TM-WRENCH-16-12	●	S12		20.65	28
		TM-WRENCH-20-15	●	S15		29.50	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	5.16	7
		TM-WRENCH-5E-06	●	S06		7.38	10
		TM-WRENCH-7E-08	●	S08		11.06	15
		TM-WRENCH-8E-10	●	S10		20.65	28
		TM-WRENCH-9E-12	●	S12		20.65	28
90° adaptor for Torx bits		INSERT-TOOL-9X12MM	●	-	-	-	-
Torx bits sockets		BIT-SOCKET-T20-DRIVE	●	S05, S06	VFM120, VTB135, VTB160W2.00, VTB165W2.00	5.16, 7.38	7, 10
		BIT-SOCKET-T25-DRIVE	●	S06	VFM160, VTB160W3.00, VTB160W4.00, VTB165W3.00, VTB165W4.00	7.38	10
		BIT-SOCKET-T30-DRIVE	●	S08	VTB195	11.06	15
		BIT-SOCKET-T40-DRIVE	●	S08, S10	VFM200, VST277, VTB225	11.06, 20.65	15, 28
		BIT-SOCKET-T50-DRIVE	●	S08, S10	VFM250, VTB250	11.06, 20.65	15, 28

## CAUTIONARY POINTS IN USE

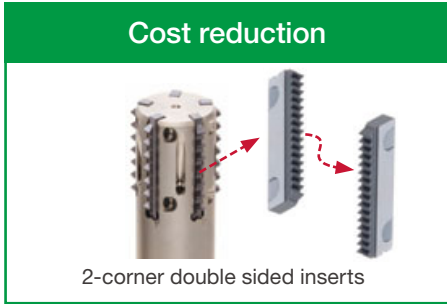
- The cutting heads specified by Tungaloy must be used. Avoid using alternate heads that are not Tungaloy products as this will damage the shank and can cause severe accident or injury.
- Before setting the head, clean the connection screw with an air blast or a wiping cloth to remove chips and other 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.



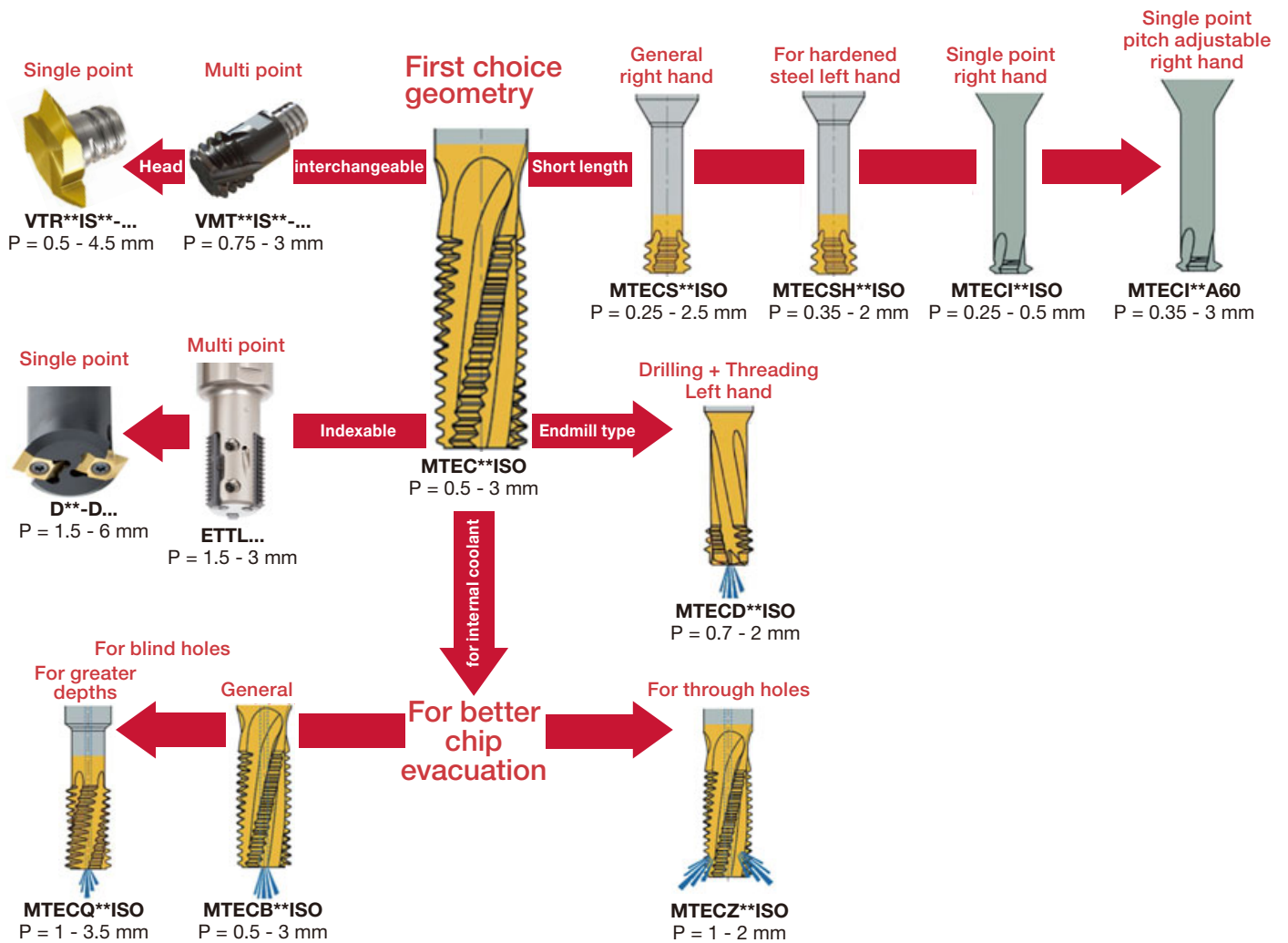


# THREADMILLING

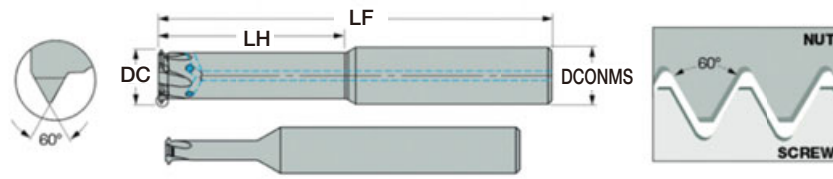
Highly economical tool design



## Tool selection guide for internal ISO metric threads



Reference pages: **I057 - I079**



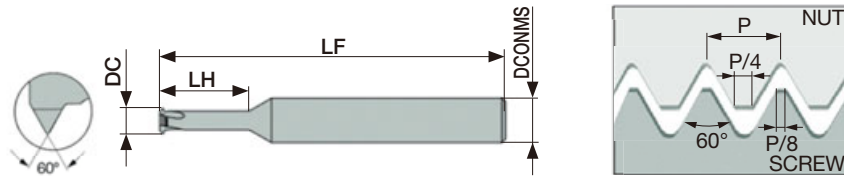
Designation	ISO Metric				Unified				DCONMS (mm)	DC (mm)	NOF	LH (mm)	LF (mm)	Coolant hole	Grade	
	Internal		External		Internal		External									
	Pitch (mm) min. max.	Application range	Pitch (mm) min. max.	TPI min. max.	Pitch (mm) min. max.	TPI min. max.	Pitch (mm) min. max.	TPI min. max.								
MTECI03019C5A60	0.35	0.6	≥M2.5x0.35 ≥M2.5x0.4 ≥M2.5x0.45 ≥M3x0.5 ≥M3x0.6	0.35	0.6	40	72	≥#8-48UN ≥#8-44UN ≥#8-40UN ≥#8-36UN ≥#8-48UN ≥#10-28UN ≥#10-24UN	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	≥#3-72UN ≥#3-64UN ≥#3-56UN ≥#3-48UN ≥#4-44UN ≥#4-40UN	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

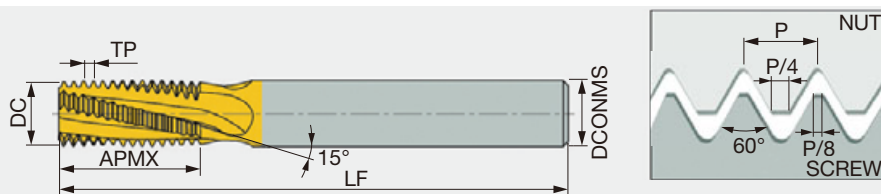
Solid carbide internal threading endmill, for ISO metric profile



Metric	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

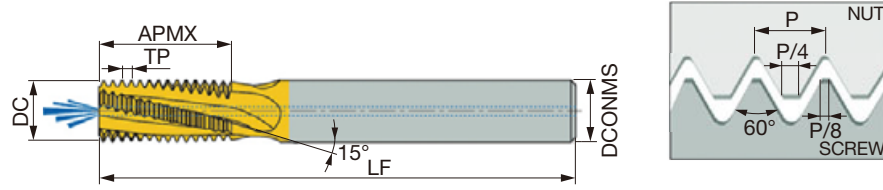


Metric	TP	Application range	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTEC06022C50.5ISO	0.5	≥ M3	6	2.2	3	5.3	58	Without	AH725
MTEC06038C100.5ISO	0.5	≥ M5	6	3.8	3	10.3	58	Without	AH725
MTEC06031C70.7ISO	0.7	≥ M4	6	3.1	3	7.4	58	Without	AH725
MTEC06045C100.75ISO	0.75	≥ M6	6	4.5	3	10	58	Without	AH725
MTEC06036C90.8ISO	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 → [I070 - I072](#)

# MTECB-ISO

Solid carbide internal threading endmill, with coolant hole, for ISO metric profile



Metric	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

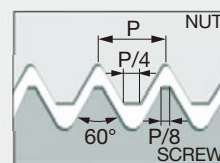
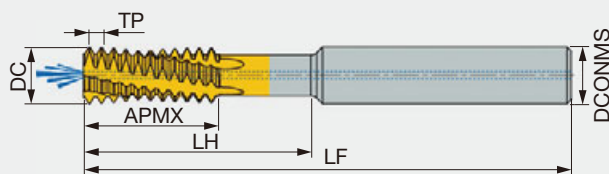
Reference pages: Standard cutting conditions → [I070 - I072](#)



# SOLIDTHREAD

## MTECQ-ISO

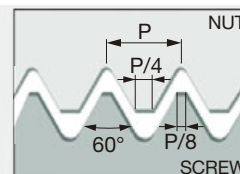
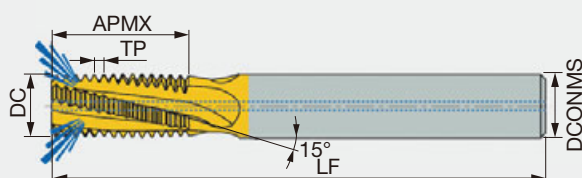
Solid carbide deep internal threading endmill, with internal coolant hole, for ISO metric profile



Metric	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



Metric	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

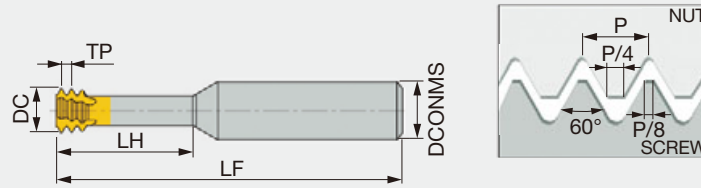


or more

Reference pages: Standard cutting conditions → [I070 - I072](#)

# MTECS-ISO

Small diameter solid carbide internal threading endmill, short edge type, for ISO metric profile



Metric	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 → [I070 - I072](#)

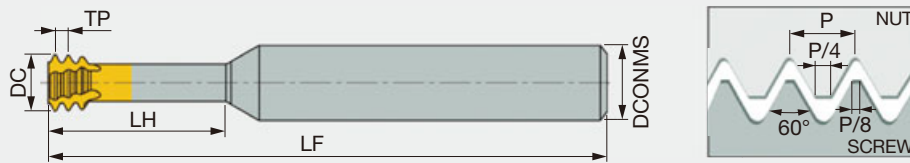




# SOLID THREAD

## MTECSH-ISO

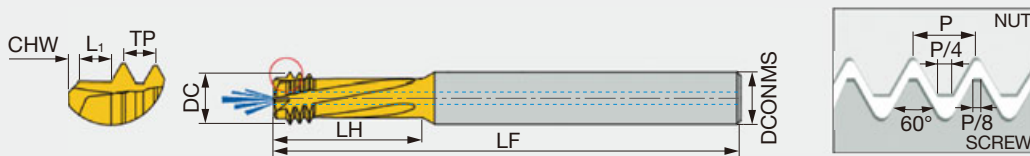
Small diameter solid carbide internal threading endmill, short edge type, left hand cutting, for ISO metric profile



Metric	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

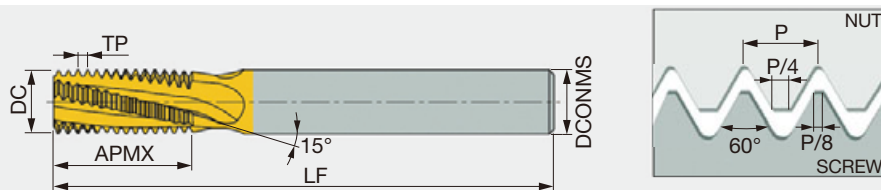
Small diameter solid carbide endmill for internal threading, drilling, and chamfering, short edge type, left hand cutting, for ISO metric profile



Metric	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



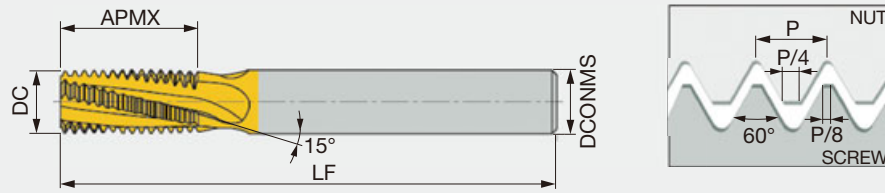
Metric	TP	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTECE1010D161.0ISO	1	10	10	4	16.5	73	Without	AH725
MTECE1010D161.25ISO	1.25	10	10	4	16.9	73	Without	AH725
MTECE1010D151.5ISO	1.5	10	10	4	15.8	73	Without	AH725
MTECE1212D201.5ISO	1.5	12	12	4	20.3	84	Without	AH725
MTECE1212D201.75ISO	1.75	12	12	4	20.1	84	Without	AH725
MTECE1212D212.0ISO	2	12	12	4	21	84	Without	AH725



# Unified (UN, UNC, UNF, UNFE, UNS)

## MTEC-UN

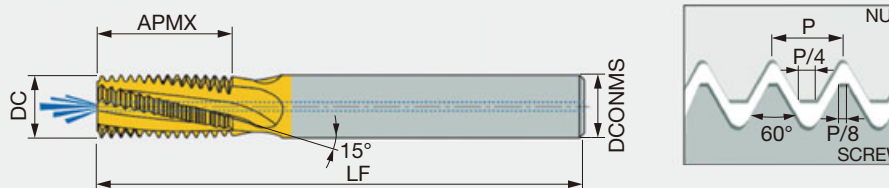
Solid carbide internal threading endmill, for UN profile



Metric	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



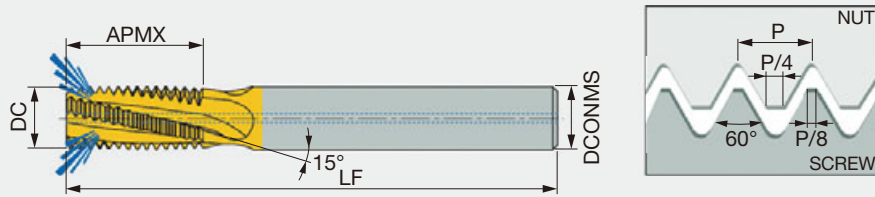
Metric	TPI	Application range	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTECB06032C632UN	32	≥ #8 (0.164)	6	3.2	3	6.8	58	With	AH725
MTECB0606C1432UN	32	≥ 5/16	6	6	3	16	58	With	AH725
MTECB0605C1128UN	28	≥ 1/4	6	5	3	11.3	58	With	AH725
MTECB08066C1424UN	24	≥ 5/16	8	6.6	3	14.3	64	With	AH725
MTECB0808D2124UN	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 → [I070](#) - [I072](#)

# SOLIDTHREAD

## MTECZ-UN

Solid carbide internal threading endmill, with coolant hole in the flute, for UN profile



Metric	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



Metric	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 → [I070](#) - [I072](#)

## MTECSH-UN

Small diameter solid carbide internal threading endmill, short edge type, left hand cutting, for UN profile, for hardened steel



Metric	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



Metric	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

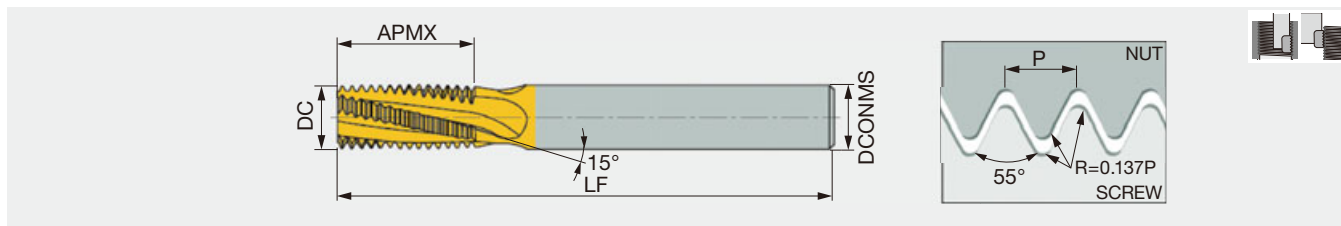
Reference pages: Standard cutting conditions → [I070](#) - [I072](#)

# SOLIDTHREAD

## Whitworth parallel pipe thread (G, Rp, BSP, PF, PS)

### MTEC-W

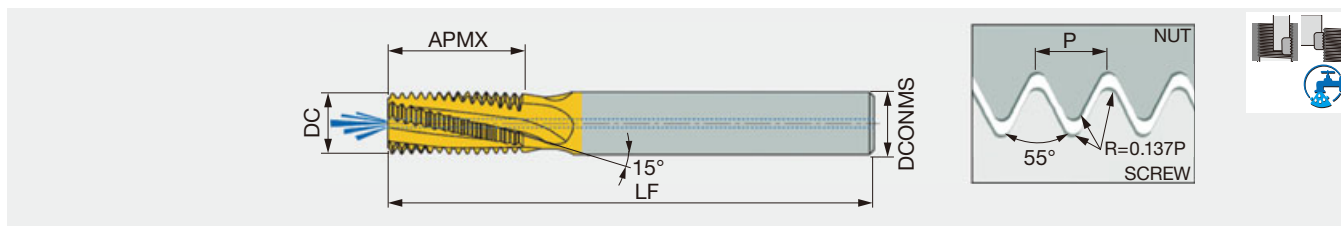
Solid carbide internal and external threading endmill, for G, BSP profile



Metric	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

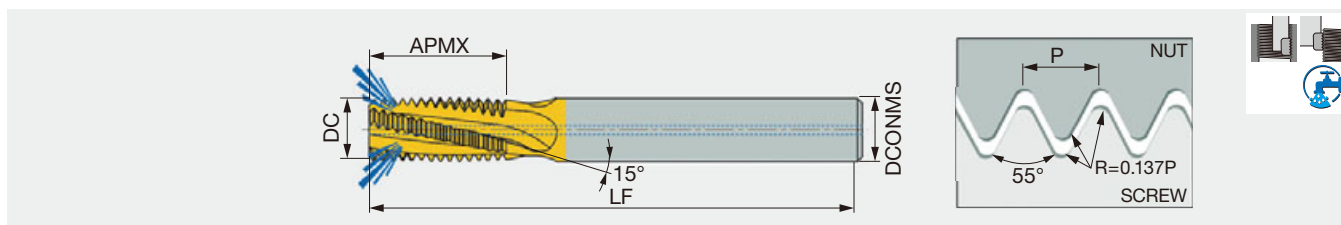
Solid carbide internal and external threading endmill, with coolant hole, for G, BSP profile



Metric	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

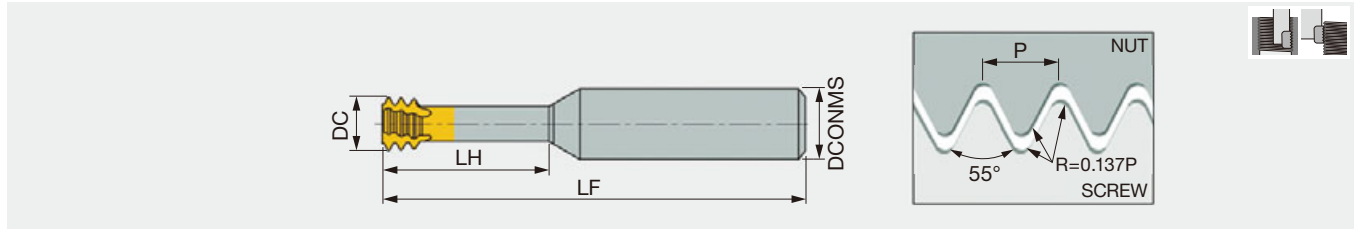


Metric	TPI	Application range	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTECZ08078C1428W	28	1/8	8	7.8	3	14.1	64	With	AH725
MTECZ1010D1619W	19	1/4, 3/8	10	10	4	16.7	73	With	AH725
MTECZ1616E2614W	14	1/2, 5/8, 3/4, 7/8	16	16	5	26.3	101	With	AH725

Reference pages: Standard cutting conditions → [I070](#) - [I072](#)

## MTECS-W

Solid carbide internal and external threading endmill, short edge type, for G, BSP profile

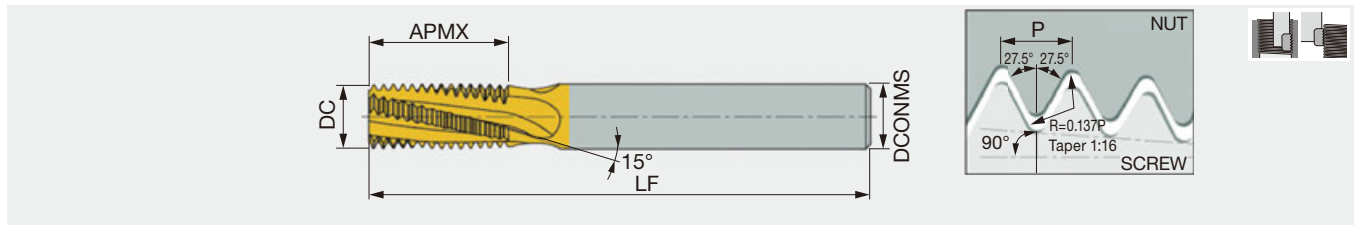


Metric	TPI	Application range	DCONMS	DC	NOF	LH	LF	Coolant hole	Grade
MTECS08078C1928W	28	1/8	8	7.8	3	19.5	64	Without	AH725
MTECS1010D3019W	19	1/4, 3/8	10	10	4	30	73	Without	AH725
MTECS1212D3714W	14	1/2, 5/8, 3/4, 7/8	12	12	4	37	84	Without	AH725

## Tapered pipe thread (R, Rc, RT, BSPT)

### MTEC-BSPT

Solid carbide internal and external threading endmill. for R, RC, BSPT profile



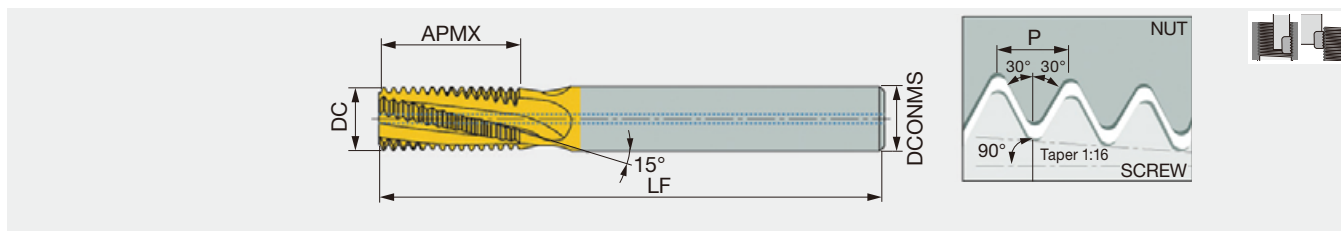
Metric	TPI	Application range	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTEC0606C928BSPT	28	1/8	6	6	3	9.5	58	Without	AH725
MTEC0808C1419BSPT	19	1/4, 3/4	8	8	3	14	64	Without	AH725
MTEC1212D1914BSPT	14	1/2, 7/8	12	12	4	19.1	84	Without	AH725
MTEC1616D2811BSPT <sup>(1)</sup>	11	1, 1 1/4, 1 1/2, 2, 2 1/2	16	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

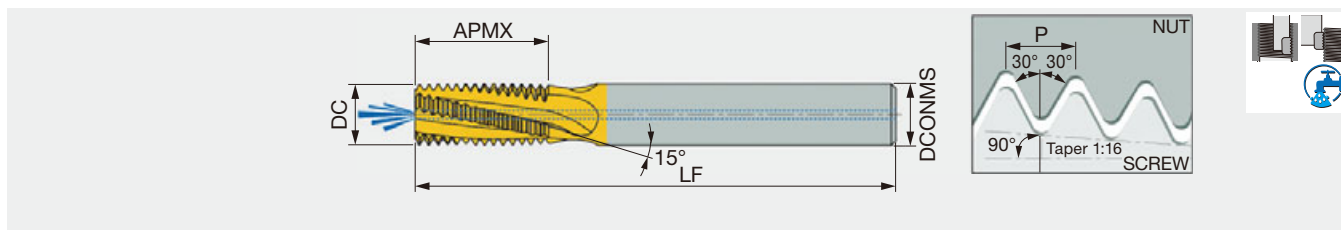
Solid carbide internal and external threading endmill. for NPT profile



Metric	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 <sup>(1)</sup>	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



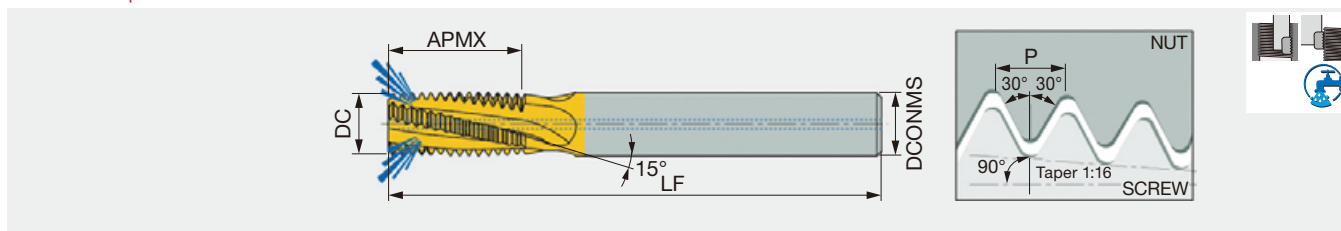
Metric	TPI	Application range	DCONMS	DC	NOF	APMX	LF	Coolant hole	Grade
MTECB08076C1027NPT	27	1/8	8	7.6	3	10.8	64	With	AH725
MTECB1010D1618NPT	18	1/4, 3/8	10	10	4	16.2	73	With	AH725
MTECB16155D2214NPT	14	1/2, 3/4	16	15.5	4	22.7	105	With	AH725



## NPTF

### MTECZ-NPTF

Solid carbide internal and external threading endmill for through hole, with coolant hole in the flute, for NPTF profile



Metric	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



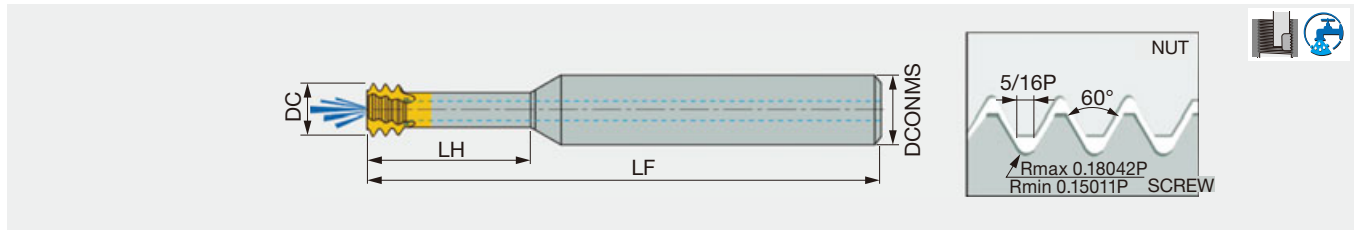
Reference pages: Standard cutting conditions → [I070 - I072](#)



# MJ

## MTECS-MJ

Small diameter solid carbide internal threading endmill, short edge type, with coolant hole, for MJ profile

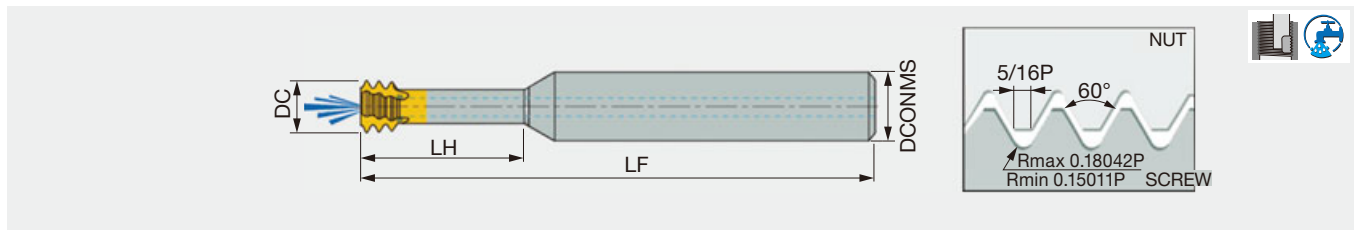


Metric	TP	Application range	DCONMS	DC	NOF	LH	LF	Coolant hole	Grade
MTECS06032C100.7MJ	0.7	≥ 4	6	3.2	3	10	58	Without	AH725
MTECS06039C120.8MJ	0.8	≥ 5	6	3.9	3	12.5	58	Without	AH725
MTECS06048C151.0MJ	1	≥ 6	6	4.8	3	15	58	Without	AH725
MTECS08061C201.25MJ	1.25	≥ 8	8	6.1	3	20	64	With	AH725
MTECS0808C251.5MJ	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



Metric	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 → [I070 - I072](#)



# THREADMILLING

## STANDARD CUTTING CONDITIONS

ISO	Material	Condition	Tensile strength [N/mm <sup>2</sup> ]	Hardness HB	Cutting speed (sfm)		
					AH725		
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	328 - 820	
		≥ 0.25 %C	Annealed	650	190	262 - 689	
		< 0.55 %C	Quenched and tempered	850	250	213 - 558	
		≥ 0.55 %C	Annealed	750	220	361 - 591	
	Low alloy steel and cast steel (less than 5% of alloying elements)		Quenched and tempered	1000	300	312 - 525	
			Annealed	600	200	295 - 525	
				930	275	213 - 656	
			Quenched and tempered	1000	300	230 - 689	
				1200	350	312 - 525	
High alloyed steel, cast steel, and tool steel		Annealed	680	200	427 - 558		
		Quenched and tempered	1100	325	246 - 328		
Stainless steel and cast steel		Ferritic/martensitic	680	200	361 - 558		
		Martensitic	820	240	230 - 509		
M	Stainless steel	Annealed	600	180	279 - 328		
K	Cast iron nodular (GGG)		Ferritic/martensitic	-	180	394 - 525	
			Pearlitic	-	260	246 - 525	
	Gray cast iron (GG)		Ferritic	-	160	230 - 492	
			Pearlitic	-	250	361 - 459	
	Malleable cast iron		Ferritic	-	130	394 - 525	
			Pearlitic	-	230	361 - 459	
N	Aluminum- wrought alloy		Not cureable	-	60	525 - 984	
			Cured	-	100	-	
	Aluminum-cast, alloyed	≤12% Si	Not cureable	-	75	492 - 1148	
			Cured	-	90	-	
		>12% Si	High temperature	-	130	328 - 820	
	Copper alloys		>1% Pb	Free cutting	-	110	-
				Brass	-	90	-
	Non-metallic			Electrolitic copper	-	100	-
			Duroplastics, fiber plastics	-	-	328 - 1312	
			Hard rubber	-	-	-	
S	High temp. alloys	Fe based	Annealed	-	200	-	
			Cured	-	280	-	
		Ni or Co based	Annealed	-	250	66 - 262	
			Cured	-	350	-	
	Titanium Ti alloys		Cast	-	320	-	
				RM 400	-	-	
		Alpha+beta alloys cured	RM 1050	-	66 - 262		
H	Hardened steel		Hardened	-	55 HRC	180 - 213	
			Hardened	-	60 HRC	148 - 180	
	Chilled cast iron		Cast	-	400	295 - 344	
	Cast iron		Hardened	-	55 HRC	180 - 213	



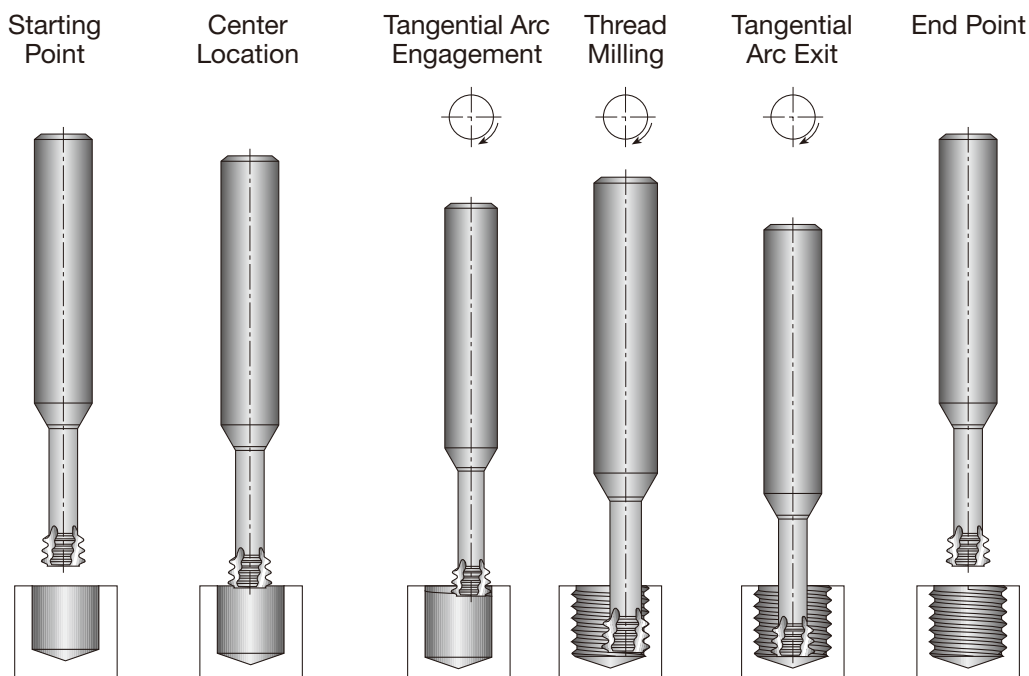
Tool dia. : mm (in)											
Feed (ipr)											
ø2 (0.079")	ø3 (0.118")	ø4 (0.157")	ø6 (0.236")	ø8 (0.315")	ø10 (0.394")	ø12 (0.472")	ø14 (0.551")	ø16 (0.630")	ø20 (0.787")	ø25 (0.984")	ø30 (1.181")
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
-	-	-	-	-	-	-	-	-	-	-	-
0.0008	0.0012	0.0012	0.002	0.0024	0.0028	0.0031	0.0035	0.0039	0.0047	0.0059	0.0071
0.0008	0.0012	0.0012	0.002	0.0024	0.0028	0.0031	0.0035	0.0039	0.0047	0.0059	0.0071
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0043
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
-	-	-	-	-	-	-	-	-	-	-	-
0.0012	0.0016	0.0016	0.0024	0.0028	0.0031	0.0035	0.0043	0.0047	0.0059	0.0071	0.0083
-	-	-	-	-	-	-	-	-	-	-	-
0.0008	0.0008	0.0012	0.0012	0.0016	0.002	0.002	0.0024	0.0028	0.0031	0.0039	0.0047
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0.002	0.0024	0.0028	0.0035	0.0039	0.0043	0.0047	0.0051	0.0059	0.0071	0.0087	0.0098
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0.0008	0.0008	0.0008	0.0012	0.0012	0.0012	0.0012	0.0016	0.0016	0.0016	0.002	0.002
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0.0008	0.0008	0.0008	0.0012	0.0012	0.0012	0.0012	0.0016	0.0016	0.0016	0.002	0.002
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

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

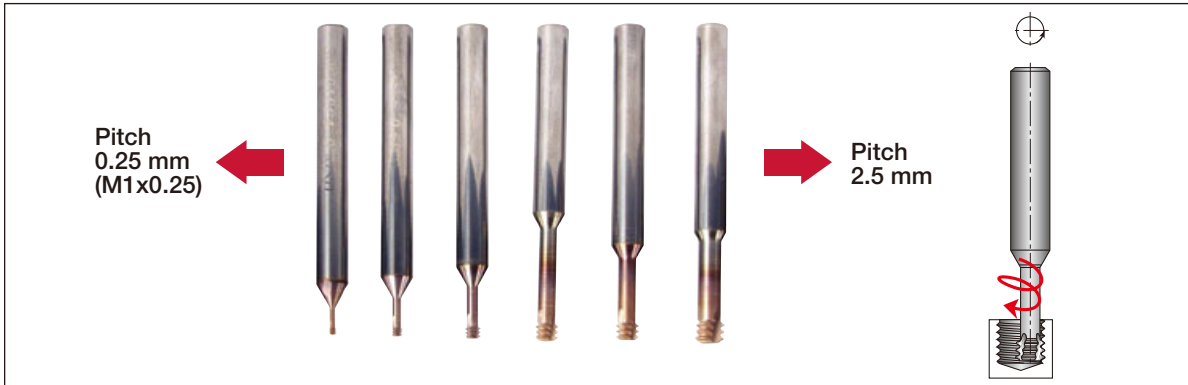


### STANDARD CUTTING CONDITIONS

ISO	Material	Cutting speed (sfm)	Feed (ipr)													
			ø0.059" (ø1.5 mm)	ø0.079" (ø2 mm)	ø0.118" (ø3 mm)	ø0.157" (ø4 mm)	ø0.197" (ø5 mm)	ø0.236" (ø6 mm)	ø0.276" (ø7 mm)	ø0.315" (ø8 mm)	ø0.354" (ø9 mm)	ø0.394" (ø10 mm)	ø0.472" (ø12 mm)	ø0.551" (ø14 mm)	ø0.591" (ø15 mm)	
P	Low & medium carbon steels	197 - 394	0.002	0.002	0.0028	0.0035	0.0043	0.0051	0.0055	0.0059	0.0063	0.0063	0.0067	0.0071	0.0071	
	High carbon steels	197 - 295	0.0016	0.002	0.0024	0.0031	0.0035	0.0039	0.0047	0.0051	0.0055	0.0055	0.0063	0.0067	0.0071	
	Alloy steels, treated steels	164 - 262	0.0016	0.0016	0.002	0.002	0.0024	0.0028	0.0028	0.0031	0.0035	0.0039	0.0047	0.0051	0.0055	
	Cast steels	230 - 295	0.0016	0.0016	0.002	0.002	0.0024	0.0028	0.0028	0.0031	0.0035	0.0039	0.0047	0.0051	0.0055	
M	Stainless steels	197 - 295	0.0012	0.0012	0.0016	0.002	0.0024	0.0024	0.0028	0.0031	0.0035	0.0039	0.0043	0.0047	0.0051	
K	Cast iron	131 - 262	0.002	0.002	0.0028	0.0035	0.0043	0.0051	0.0055	0.0059	0.0063	0.0063	0.0067	0.0071	0.0071	
N	Aluminum	262 - 492	0.002	0.002	0.0028	0.0035	0.0043	0.0051	0.0055	0.0059	0.0063	0.0063	0.0067	0.0071	0.0071	
	Synthetics, duroplastics, thermoplastics	164 - 656	0.0039	0.0043	0.0047	0.0055	0.0063	0.0071	0.0075	0.0075	0.0075	0.0075	0.0075	0.0079	0.0079	
S	Nickel alloys, titanium alloys	66 - 131	0.0012	0.0012	0.0016	0.0016	0.002	0.0024	0.0024	0.0024	0.0028	0.0028	0.0028	0.0031	0.0031	

## 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

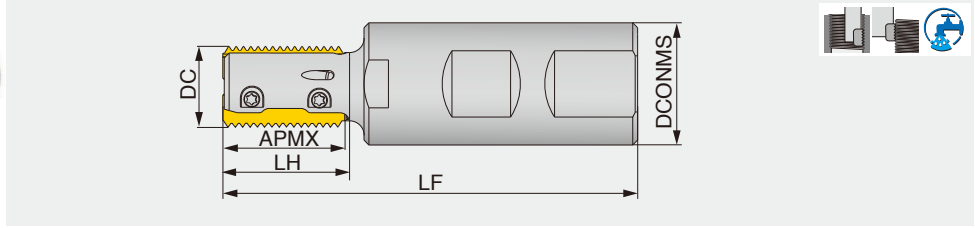
- Minimum thread size of MTECS: **M1x0.25** (0.75 mm pre hole diameter) up to M20x2.50
- 2xD and 3xD threading lengths
- High cutting speeds
- Short cycle time
- Low cutting forces due to the short contact profile resulting in accurate and parallel thread
- Prevents oval threads near thin walls
- No 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



Metric	DC	APMX	CICT	DCONMS	LH	LF	Oil hole	Insert
ETTL25M017W25.0F026R02 <sup>(1)</sup>	17	25	2	25	26	85	with	TL25D...
ETTL25M017W25.0F036R02 <sup>(1)</sup>	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...

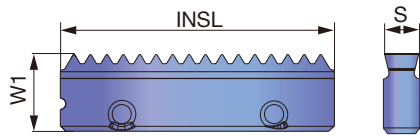
(1) Inserts with a thread pitch of  $\geq 3$  mm or  $\geq 9$ TPI are not mountable.

#### SPARE PARTS

Designation	Clamping screw	Wrench
ETTL25...	SSTM4-3.6P	T-8D

## INSERT

### TL25D...



<b>P</b>	Steel	★
<b>M</b>	Stainless	☆
<b>K</b>	Cast iron	☆
<b>N</b>	Non-ferrous	☆
<b>S</b>	Superalloys	★
<b>H</b>	Hard materials	★

★ : First choice  
☆ : Second choice

Thread type	Application	Designation	Pitch (mm)	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	●		0.984	0.276	0.122	≥ M19	≥ M21	≥ M23	≥ M24	≥ M32
		TL25DIR2.0ISO	2	-	12	●		0.984	0.276	0.122	≥ M20	≥ M22	≥ M23	≥ M25	≥ M33
		TL25DIR3.0ISO <sup>(2)</sup>	3	-	8	●		0.984	0.276	0.122	-	≥ M23	≥ M25	≥ M26	≥ M34
Unified	Internal	TL25DIR20UN	-	20	19	●		0.984	0.276	0.122	≥ 3/4	≥ 7/8	≥ 7/8	≥ 15/16	≥ 15/16
		TL25DIR12UN	-	12	11	●		0.984	0.276	0.122	≥ 13/16	≥ 7/8	≥ 15/16	≥ 1	≥ 15/16
		TL25DIR9UN <sup>(2)</sup>	-	9	8	●		0.984	0.276	0.122	-	≥ 7/8	≥ 15/16	≥ 1	≥ 13/8
		TL25DIR8UN <sup>(2)</sup>	-	8	7	●		0.984	0.276	0.122	-	≥ 15/16	≥ 1	≥ 11/16	≥ 13/8
Whitworth (parallel pipe)	Internal and external	TL25DEIR14W	-	14	13	●		0.984	0.276	0.122	≥ G1/2	≥ G5/8	≥ G3/4	≥ G3/4	-
		TL25DEIR11W	-	11	10	●		0.984	0.276	0.122	≥ G1	≥ G1	≥ G1	≥ G1	≥ G1

Do not use this tool when the hole depth to be threaded exceeds the cutter's LH value.

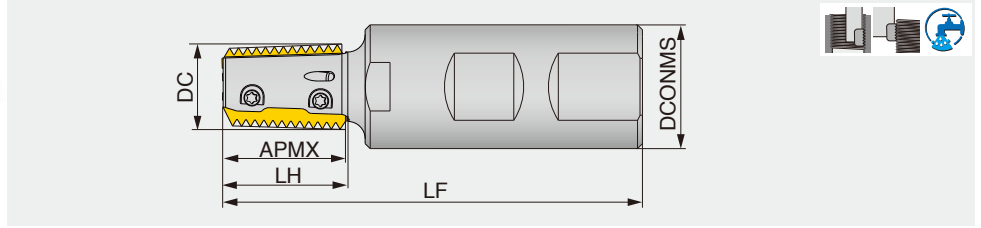
(2) Does not fit the DC = 17 mm holder

●: Line up

Reference pages: Standard cutting conditions → **I077**

# Thread milling cutter

## Indexable thread milling cutter, long edge type

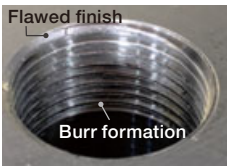


Metric	DC	APMX	CICT	DCONMS	LH	LF	Oil hole	Insert
ETTL25M017W25.0F026R02-PT	17.47	25	2	25	25.5	85	with	TL25SEIR...
ETTL25M022W25.0F043R03-PT	22.2	25	3	25	43	102	with	TL25SEIR...

### SPARE PARTS

Designation	Clamping screw	Wrench
ETTL...-PT	SSTM4-3.6P	T-8D

### Excellent surface finish



Helical tap  
(of HSS)

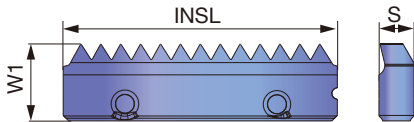


**THREADMILLING**  
ETTL25M017W25.0F026R02-PT,  
TL25SEIR11BSPT

Machine: BT50  
Thread: Rc1

### INSERT

#### TL25SEIR...



<b>P</b>	Steel	★
<b>M</b>	Stainless	☆
<b>K</b>	Cast iron	☆
<b>N</b>	Non-ferrous	☆
<b>S</b>	Superalloys	★
<b>H</b>	Hard materials	★

★ : First choice  
☆ : Second choice

Thread type	Application	Designation	Pitch (mm)	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	●		0.984	0.276	0.122	1/2, 3/4	3/4
		TL25SEIR11BSPT	-	11	10	●		0.984	0.276	0.122	≥ 1 <sup>(1)</sup>	≥ 1 <sup>(1)</sup>
NPT	Internal and external	TL25SEIR14NPT	-	14	13	●		0.984	0.276	0.122	1/2, 3/4	3/4
		TL25SEIR11.5NPT	-	11.5	11	●		0.984	0.276	0.122	1, 1 1/4, 1 1/2, 2 <sup>(1)</sup>	1, 1 1/4, 1 1/2, 2 <sup>(1)</sup>
NPTF	Internal and external	TL25SEIR14NPTF	-	14	13	●		0.984	0.276	0.122	1/2, 3/4	3/4

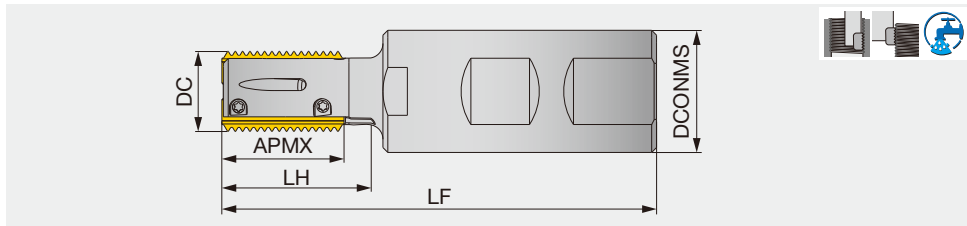
(1) Do not use this insert when the hole depth to be threaded exceeds the cutter's LH.

●: Line up

# THREADMILLING

## Thread milling cutter

Indexable thread milling cutter, long edge type



Metric	DC	APMX	CICT	DCONMS	LH	LF	Coolant hole	Insert
ETLN25M017W25.0F026R02 <sup>(1)</sup>	17	25	2	25	26	85	With	LN25....
ETLN25M017W25.0F036R02 <sup>(1)</sup>	17	25	2	25	36	95	With	LN25....
ETLN25M019W25.0F032R02	19	25	2	25	32	92	With	LN25....
ETLN25M019W25.0F044R02	19	25	2	25	44	104	With	LN25....
ETLN25M021W25.0F037R03	20.5	25	3	25	37	96	With	LN25....
ETLN25M021W25.0F044R03	20.5	25	3	25	44	103	With	LN25....
ETLN25M022W25.0F043R03	22	25	3	25	43	102	With	LN25....
ETLN25M022W25.0F055R03	22	25	3	25	55	114	With	LN25....
ETLN25M030W25.0F055R05	30	25	5	25	55	115	With	LN25....

(1) Inserts with a thread pitch of  $\geq 3$  mm or  $\geq 8$  TPI do not fit.

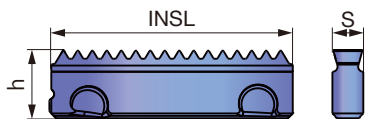
### SPARE PARTS

Designation	Clamping screw	Wrench
ETLN25...	SSTM3-3	T-6F

Recommended clamping torque: 1 N·m

## INSERT

### LN25...



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

★ : First choice  
☆ : Second choice

Thread type	Application	Designation	Pitch (mm)	Threads per inch	Coated			INSL	h	S
					AH725					
ISO Metric	Internal	LN25DIR1.5ISO	1.5	-	●			0.984	0.276	0.122
		LN25DIR2.0ISO	2	-	●			0.984	0.276	0.122
		LN25DIR3.0ISO <sup>(2)</sup>	3	-	●			0.984	0.276	0.122
Unified	Internal	LN25DIR20UN	-	20	●			0.984	0.276	0.122
		LN25DIR12UN	-	12	●			0.984	0.276	0.122
		LN25DIR8UN <sup>(2)</sup>	-	8	●			0.984	0.276	0.122
Whitworth	Internal and external	LN25DEIR14W	-	14	●			0.984	0.276	0.122
		LN25DEIR11W	-	11	●			0.984	0.276	0.122

(2) Does not fit the DC 17 holder

●: Line up

Reference pages: Standard cutting conditions → [I077](#)



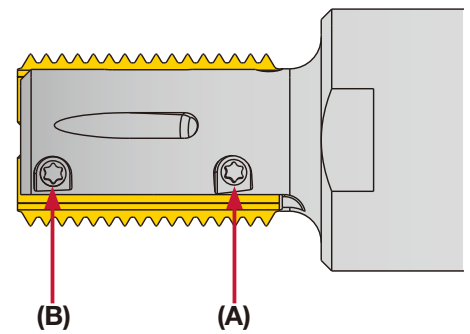
## STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel	AH725	328 - 656	0.004 - 0.012
	High carbon steel	AH725	230 - 492	0.004 - 0.012
	High carbon steel	AH725	230 - 558	0.004 - 0.012
	Cast steel	AH725	230 - 558	0.004 - 0.012
<b>M</b>	Stainless steel	AH725	295 - 459	0.004 - 0.012
<b>K</b>	Cast iron	AH725	197 - 427	0.002 - 0.012
<b>N</b>	Aluminum	AH725	262 - 1312	0.004 - 0.016
<b>S</b>	Heat-resistant alloys	AH725	33 - 98	0.001 - 0.004
	Titanium alloy	AH725	66 - 295	0.001 - 0.004

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.



Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

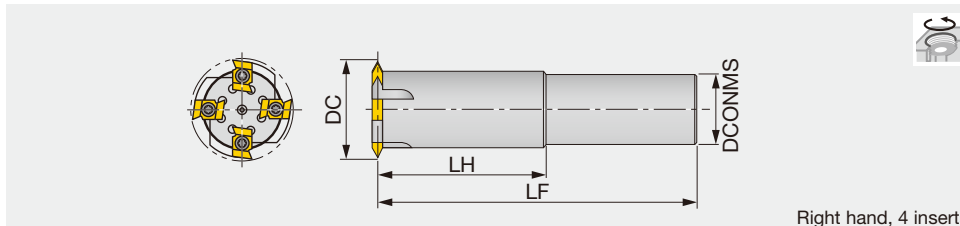
User's Guide

Index

# THREADMILLING

## Thread milling cutter

Indexable thread milling cutter, single tooth



Right hand, 4 inserts

Metric	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

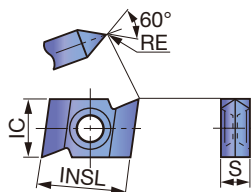


Designation	Clamping screw	Wrench
D23-D25... - D50-D42...	CSTB-4	T-15F
D55-D42... - D80-D42...	CSTB-5	T-20F

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

### INSERT

T\*-R...



<b>P</b> Steel	★									
<b>M</b> Stainless	★									
<b>K</b> Cast iron										
<b>N</b> Non-ferrous										
<b>S</b> Superalloys										
<b>H</b> Hard materials										

★ : First choice  
☆ : Second choice

Designation	RE	Coated									INSL	IC	S
		GH330											
T1-R14	0.006	●									0.567	0.375	0.187
T1-R28	0.011	●									0.567	0.375	0.187
T2-R14	0.006	●									0.701	0.500	0.250
T2-R28	0.011	●									0.701	0.500	0.250

●: Line up

Reference pages: Standard cutting conditions → [I079](#)

# STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Mild steels , Unhardened steels	≥ 200 HB	GH330	490 - 660	0.012 - 0.016
	Carbon steels, Alloy steels	≥ 300 HB	GH330	490 - 660	0.007 - 0.010
	Die steels	≥ 50 HRC	GH330	100 - 160	0.006 - 0.008
<b>M</b>	Stainless steels	≥ 300 HB	GH330	490 - 660	0.002 - 0.005

Climb milling is recommended.

When threading a blind hole, use a right hand cutter in right-hand rotation. Cut up from the bottom to prevent chip recutting.

When machining internal threads from the mouth, use the left-hand cutter in left-hand rotation.

# 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...
	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...
	ADMT17T308PR-MJ	●	●	●					
	ADMT210408PR-MJ	●	●	●					

## ● AECW\*\*PEFR, AECW\*\*PESR, AEMW\*\*PEFR, AEMW\*\*PETR

Shape	Designation	Coated		Cermet	Uncoated				Applicable mill
		AH120	GH330		NS740	UX30			
	AECW1403PEFR					●			EPE4000/5000/ 6000...
	AECW1403PESR	●	●	●		●			
	AECW16T3PEFR					●			
	AECW16T3PESR	●	●	●		●			
	AECW1804PEFR					●			
	AECW1804PESR	●	●	●		●			
	AEMW1403PEFR					●			
	AEMW1403PETR		●	●		●			
	AEMW16T3PEFR					●			
	AEMW16T3PETR		●	●		●			
	AEMW1804PEFR					●			
	AEMW1804PETR		●	●	●	●			

## ● ANEA542TN, ANEA642TN

Shape	Designation	Uncoated						Applicable mill
		UX30						
	ANEA542TN	●						VSN...
	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	
 -MJ	ANMT09T3PPPR-MJ	●	●	●	EPN09 EPN14... TPN14...
	ANMT09T3PPPR-ML	●			
	ANMT1404PPPR-MJ	●	●	●	
	ANMT1404PPPR-ML	●			
 -ML					

## ● APMT\*\*PN-MJ

Shape	Designation	Coated				Applicable mill
		AH120	AH140	GH330	T3130	
 -MJ	APMT070308PN-MJ	●	●	●	●	ELP07/09/12...
	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	
 -MJ	ASMT170504PDPR-MJ	●			●	●			TPS17... EPS17...
	ASMT170508PDPR-MJ	●			●	●			
	ASMT170512PDPR-MJ	●				●			
	ASMT170516PDPR-MJ	●				●	●		
	ASMT170520PDPR-MJ	●				●			
	ASMT170530PDPR-MJ	●				●			
 -MS	ASMT170532PDPR-MJ	●				●			
	ASMT170508PDPR-MS		●	●					
 -AJ	ASGT170504PDFR-AJ						●		
	ASGT170508PDFR-AJ						●	●	


●: Line up

## Milling Insert (Old item)


## ● CPMW\*\*-EN, CPMT\*\*-EN

Shape	Designation	Coated					Uncoated					Applicable mill
		GH330					UX30					
	CPMW050208EN	●					●					EVP1000
	CPMW06T208EN	●					●					
	CPMT080308EN	●					●					


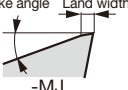

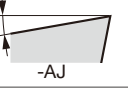
## ● EDKW53ZTR

Shape	Designation	Coated					Uncoated					Applicable mill
		GH330					UX30					
	EDKW53ZTR	●					●					ESD5000


## ● ENEQ\*\*TN-T

Shape	Designation	Coated					Uncoated					Applicable mill
		AH120										
	ENEQ090508TN-T	●										VSNE09... VSNE10... VSNE13... VSNE16...
	ENEQ100508TN-T	●										
	ENEQ130608TN-T	●										
	ENEQ160608TN-T	●										

## ● GDMT\*\*PDPR-MJ, GDGT\*\*PDFR-AJ

Shape	Designation	Coated					Uncoated							Applicable mill
		AH120	AH140	AH330	T3130	DS1100	UX30	TH10						
 Rake angle Land width  -MJ  Rake angle  -AJ	GDMT10H3PDPR-MJ	●	●	●	●		●						TSD10/17... ESD10/17... HSD10/17...	
	GDMT17X6PDPR-MJ	●	●	●	●		●							
	GDGT10H3PDFR-AJ					●		●						
	GDGT17X6PDFR-AJ					●		●						


## ● HEHN532FN

Shape	Designation	Uncoated										Applicable mill
		TH10										
	HEHN532FN	●										QYE5300


●: Line up

# Milling Insert (Old item)


## ● HPKN532FN

Shape	Designation	Uncoated					Applicable mill
		TH10					
	HPKN532FN	●					QYP5300


## ● LNCA64ZTR

Shape	Designation	Coated	Uncoated				Applicable mill
		T3130	UX30				
	LNCA64ZTR	●	●				VSN6000I



## ● RDCA2004TN, RDCN2004TN, RDKN2004...

Shape	Designation	Coated	Uncoated				Applicable mill
		AH120	UX30 TH10				
	RDCA2004TN		●				TRD6000 ERD6000
	RDCN2004TN		●				
	RDKN2004FN		●				
	RDKN2004TN	●	●				

## ● RDCM1203TN, RDMA1203TN

Shape	Designation	Uncoated					Applicable mill
		UX30					
	RDCM1203TN	●					ERD4000
	RDMA1203TN	●					

## ● RDMT\*\*ZDPN-MJ, RDMW\*\*ZDSN

Shape	Designation	Coated					Uncoated				Applicable mill
		AH120	AH130	AH140	AH330	T3130	UX30				
  Rake angle Land width -MJ	RDMT1204ZDPN-MJ	●		●	●	●	●				TRD12/16... ERD12/16...
	RDMW1204ZDSN	●		●	●	●	●				
	RDMT1606ZDPN-MJ	●	●	●	●	●	●				
	RDMW1606ZDSN	●		●	●	●	●				

●: Line up


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




## Milling Insert (Old item)


## ● RFEN2004ZFTN, RFEN2004M0TN

Shape	Designation	Coated		Uncoated		Applicable mill
		AH120	GH330	UX30	KS20	
	RFEN2004ZFTN	●	●	●	●	TRF6000 ERF6000
	RFEN2004M0TN		●	●	●	

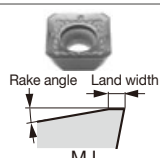
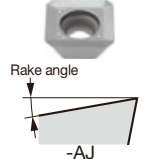
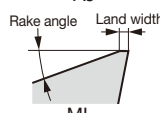
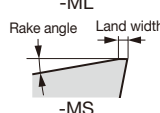
## ● SDCN1504ZDSR, SDEN1504ZDSR, SDNN1504ZDSR

Shape	Designation	Coated				Applicable mill
		AH120	AH140	T1115	T3130	
	SDCN1504ZDSR	●	●	●	●	<b>MILLFEED</b> TXD15...
	SDEN1504ZDSR	●	●	●	●	
	SDNN1504ZDSR	●	●	●	●	

## ● SDKN42EF..., SDEN42EFTR24

Shape	Designation	Coated	Cermet	Uncoated		Applicable mill
		T3130	NS740	TH10	UX30	
	SDKN42EFTR	●	●			TMD4100I
	SDKN42EFFR			●		
	SDEN42EFTR24		●		●	

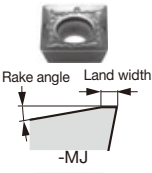
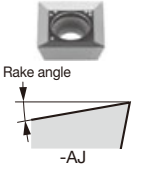
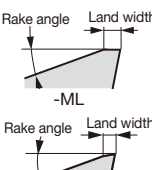
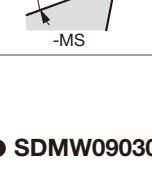
## ● SDMT1204AFPN-MJ, SDMT1204AFTN-MJ, SDMT1204AFPN-ML, SDMT1204AFPN-MS, SDGT1204AFTN-MJ, SDGT1204AFFN-AJ

Shape	Designation	Coated					Cermet	Uncoated		Applicable mill
		AH120	AH140	AH330	GH330	T3130	NS740	TH10		
 -MJ  -AJ  -ML  -MS	SDMT1204AFPN-MJ	●	●	●	●	●			TAD12... EAD12...	
	SDMT1204AFTN-MJ						●			
	SDMT1204AFPN-ML	●		●						
	SDMT1204AFPN-MS		●							
	SDGT1204AFTN-MJ	●		●			●			
	SDGT1204AFFN-AJ							●		


●: Line up

# Milling Insert (Old item)



## ● 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		
 -MJ  -AJ  -ML  -MS	SDMT1204PDSR-MJ	●	●	●	●	●				TPD12... EPD12...	
	SDMT1204PDTR-MJ						●				
	SDMT1204PDPR-ML	●		●							
	SDMT1204PDPR-MS			●							
	SDGT1204PDTR-MJ	●		●			●				
	SDGT1204PDFR-AJ								●		

## ● SDMW090308TN, SDMW120408TN

Shape	Designation	Uncoated							Applicable mill
		UX30							
	SDMW090308TN	●							ELD3000
	SDMW120408TN	●							ELD4000

## ● 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 QHE4000
	SECN422FN	SECN120308FN				●			
	SEEN422TN	SEEN120308TN	●	●	●				
	SEEN422FN	SEEN120308FN				●			
	SECN422FN-DIA	SECN120308FN-D					●		












DX140: Packing quantity = 1pc.

●: Line up




# Milling Insert (Old item)



- 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 EGE4400	
	SEKN42AFTN	SEKN1203AFTN	●	●	●	●			●		
	SEKN42AFFN	SEKN1203AFFN							●		
	SEKN42AFTN16	SEKN1203AFTN-16					●				
	SEKR42AFSR-MJ	SEKR1203AFSR-MJ				●	●				
	SEKR1203AFPN-MS				●						
	SEKR1203AFTN-MJ						●				
	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
	SEEN42EFTRCR	SEEN1203EFTR			●			
	SEKN42EFTR	SEKN1203EFTR	●	●	●			
	SEKN42EFFR	SEKN1203EFFR					●	

- SEKR1504AFSR-MJ

Shape	Designation	Coated							Applicable mill
		T3130							
 	SEKR1504AFSR-MJ	●							

●: 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



## ● SF\*N42ZFN, SFCN42ZFN-DIA

Shape	Designation	Uncoated		PCD						Applicable mill
		TH10		DX140						
 -DIA	SFCN42ZFN	●								THF4400RIA
	SFEN42ZFN	●								
	SFCN42ZFN-DIA			●						

DX140: Packing quantity = 1pc.

## ● SF\*N53ZFN, SFCN53ZFN-DIA

Shape	Designation	Uncoated		PCD						Applicable mill
		TH10		DX140						
 -DIA	SFCN53ZFN	●								THF5400RIA
	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
	SNCN43ZTN			●	●		●						
	SNKF43ZFN							●					
	SNKF43ZTN	●					●						
	SNKN43ZTN	●	●		●	●	●						

## ● SNEN12\*\*Z...

Shape	Designation	Uncoated								Applicable mill
		UX30	TH10							
	SNEN12T2ZFN		●							SVN4000
	SNEN12T2ZTN	●								
	SNEN1233ZFN		●							
	SNEN1233ZTN	●								


## ● SNMN1204\*\*TN

Shape	Designation	Coated			Cermic	Uncoated						Applicable mill
		AH120	T1115	T3130	FX105	UX30						
	SNMN120408TN				●							TGN4200R-A
	SNMN120412TN	●	●	●	●	●						
	SNMN120416TN				●							
	SNMN120420TN				●							
	SNMN120424TN				●							




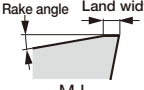


●: Line up

# Milling Insert (Old item)


## ● SPGN120412TN

Shape	Designation	Coated		Ceramic		Applicable mill
		T1115		FX105		
	<b>SPGN120412TN</b>	●		●		QFP4000



## ● SPMR1605PPTR-MJ, SPMR1605PPPR-ML, SPMR1605PPTR-MH

Shape	Designation	Coated			Uncoated		Applicable mill
		GH330	T1115	T3130	UX30		
	<b>SPMR1605PPTR-MJ</b>	●	●	●	●	TPP16...	
	<b>SPMR1605PPPR-ML</b>	●					
	<b>SPMR1605PPTR-MH</b>	●		●	●		
 -MJ							
 -ML							
 -MH							

## ● TDMN\*\*N

Shape	Designation	Cermet		Uncoated		Applicable mill
		NS740		TH10	UX30	
	<b>TDMN110304TN</b>	●			●	ESD2000
	<b>TDMN110304FN</b>			●		
	<b>TDMN110308TN</b>	●			●	

## ● TNKF64ZTR

Shape	Designation	Uncoated						Applicable mill
		UX30						
	<b>TNKF64ZTR</b>	●						TPN64001
								


●: 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

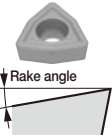
## ●TPCA43ZTRW1, TPMA432TNW1

Shape	Designation	Cermet		Uncoated					Applicable mill
		NS740		UX30	TH10				
	TPCA43ZTRW1				●				PES1500...
	TPMA432TNW1	●		●	●				


## ●TPMN\*\*TN

Shape	Designation	Cermet							Applicable mill
		NS740							
	TPMN110304TN	●							
	TPMN110308TN	●							
	TPMN160308TN	●							
	TPMN160312TN	●							
	TPMN220408TN	●							
	TPMN220412TN	●							

## ●WCMT\*\*-D4

Shape	Designation	Coated							Applicable mill
		AH120	AH140						
	WCMT050308-D4	●	●						EVX... HVX...
	WCMT06T308-D4	●	●						

## ●WFCN\*\*ZFR-DIA



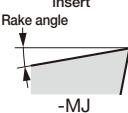
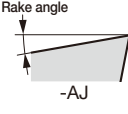
Shape	Designation	PCD							Applicable mill
		DX140							
	WFCN42ZFR-DIA	●							THF4400RIA THF5400RIA
	WFCN53ZFR-DIA	●							

DX140: Packing quantity = 1pc.


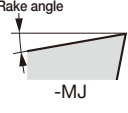
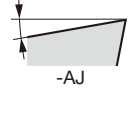
●: Line up

# 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...
	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

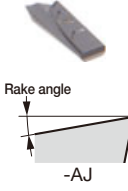
Shape	Designation	Coated							Applicable mill	
		AH730	DS1200							
  Rake angle -MJ  Rake angle -AJ	XHGR110202ER-MJ	●							HYBRIDTACMILL EPH11/13/18...	
	XHGR110204ER-MJ	●								
	XHGR110205ER-MJ	●								
	XHGR110208ER-MJ	●								
	XHGR110210ER-MJ	●								
	XHGR110212ER-MJ	●								
	XHGR110215ER-MJ	●								
	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

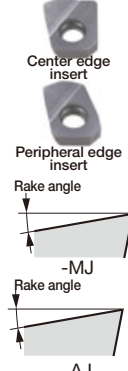


# Milling Insert (Old item)



## ● XHGR\*\*ER-MJ, XHGR\*\*FR-AJ

Shape	Designation	Coated								Applicable mill
		AH730	DS1200							
 <p>Rake angle -AJ</p>	XHGR130212FR-AJ		●							HYBRIDTACMILL EPH11/13/18...
	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...
	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...
	YDEN1505ADFR-WD	●								
 <p>Wiper edge</p>										



DX140: Packing quantity = 1pc.

●: Line up






## Milling Insert (Old item)

## ● YDEN1505PDFR-D, YDEN1505PDFR-WD

Shape	Designation	PCD					Applicable mill
		DX140					
 Regular edge	YDEN1505PDFR-D	●					DPD15... EDPD15...
	YDEN1505PDFR-WD	●					
 Wiper edge							


DX140: Packing quantity = 1pc.

## ● YDEN2405PDFR-D, YDEN2405PDFR-WD, YDEN2405PDFR-BD

Shape	Designation	PCD					Applicable mill
		DX140					
 Regular edge	YDEN2405PDFR-D	●					DPD24...
	YDEN2405PDFR-WD	●					
	YDEN2405PDFR-BD	●					
 Wiper edge							
 Wiper for burr removal							

DX140: Packing quantity = 1pc.

## ● ZDCA\*\*TN

Shape	Designation	Uncoated					Applicable mill
		UX30					
	ZDCA0804TN	●					TBF1000
	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	H112
1QP-SECW12X4ZETR-W	TFE insert	H112
2QP-SECW12X412ZETR	TFE insert	H112

A		
AOGT□□□□□PDFR-AJ	TungRec insert	H167
AOGT070204PDFR-AJ	TungRec insert	H167
AOMT□□□□□PDFR-MJ	TungRec insert	H167
AOMT070208PDFR-HJ	TungRec insert	H167
APMR190616PR-MJ	TZP19 insert	H262
APMT120416PR-MJ	TZP12 insert	H261
ASG□□N...	TungMini-Slit side cutter	H211
ASGT11T□□□PDFR-AJ	TungRec insert	H167
ASGW11T30□PDFR-D	TungRec insert	H167
ASMT11T□□□PDFR-MJ	TungRec insert	H167
ASMT11T304PDFR-MS	TungRec insert	H167
ASN□□R□□□M...	TecTangential-Slot axial drive slot mill	H220
ASV□□N...	TungThinSlit axial drive slot mill	H215
ASW□□N...	TungUniversalSlot axial drive slot mill	H217
AVGT□□□□□PBER-MJ	TungForce-Rec insert	H141
AVGT□□□□□PBER-AJ	TungForce-Rec insert	H141
AVGT□□□□□PDFR-AM	TungForce-Rec insert	H141
AVMT□□□□□PDER-MM	TungForce-Rec insert	H141
AVMT□□□□□PPER-MM	TungForce-Rec insert	H141

C		
C□TLA15M□□□R□□L...	Tung-Tri roughing cutter with TungCap connection	H151

D		
D□□-D□□-□□R	Indexable threading cutter	I078
DCMW□□□□04TN	EBP insert	H241
DPCW11T3ZFR	TZF11 insert	H263
DPD09...	DPD09 cutter body	H114

E		
EASD05M□□□C...	TungQuad chamfering cutter	H244
EAW13R□□□M...	TungMill face endmill, shank type	H072
EBB□□□MS	EBB endmill	H242
EBD...	EBD endmill	H243
EBFM□□□□□C...	BallFinishNose endmill, shank type	H225
EBFM□□□□□S...	BallFinishNose endmill, shank type	H225
EBFU□□□S□□□C...	BallFinishNose endmill, shank type	H225
EBFU□□□T□□□S...	BallFinishNose endmill, shank type	H225
EBP...	EBP endmill	H240
EBRM□□T□□S...	BallRoughNose endmill, shank type	H234
EBRU□□□W□□□S...	BallRoughNose endmill, shank type	H234
ECC31005R-...	Chamfering cutter	H248
ECC31005RU-...	Chamfering cutter	H248
ECP44□□R	Chamfering cutter	H247

Designation	Product name	Page
ECP44□□R-U	Chamfering cutter	H247
EDPD09063R	EDPD09 endmill, shank type	H114
EEN09R□□□M...	DoPent endmill, shank type	H076
EEN09R□□□U0125W...	DoPent endmill, shank type	H076
EFE12050R	TFE endmill, shank type	H110
EFE12050RU	TFE endmill, shank type	H110
EFP40□□R	EFP4000R endmill, shank type	H268
EGD44□□R	EGD4400 endmill, shank type	H125
ELD05R□□□M...	TungQuad roughing endmill, shank type	H170
ELD05R□□□U□□□□W...	TungQuad roughing endmill, shank type	H170
ELS11R□□□M...	TungRec roughing endmill, shank type	H164
ELS11R□□□U□□□□W...	TungRec roughing endmill, shank type	H164
EMD4403RI-S32	EMD4400RI endmill, shank type	H120
EME44□□R...	EME4400 endmill, shank type	H117
EMS09080R	EMS09 endmill, shank type	H264
EPA□□R□□□M...	Tung-Tri endmill, shank type	H146, H147
EPA□□R□□□U□□□□-□□N	Tung-Tri endmill, shank type	H146
EPA□□R□□□U□□□□W...	Tung-Tri endmill, shank type	H146
EPAV□□□□□C...	TungForce-Rec endmill, shank type	H136, H137
EPAV□□□□□C□□□□R...	TungForce-Rec endmill, shank type	H136
EPAV□□□□□□□□□□R...	TungForce-Rec endmill, shank type	H136
EPD05R□□□M...	TungQuad chamfering cutter	H169
EPD05R□□□□□□□□-...	TungQuad chamfering cutter	H169
EPD05R□□□□□□□□W...	TungQuad chamfering cutter	H169
EPM11R□□□M...	TecMill square shoulder endmill, shank type	H189
EPM11R□□□□□□□□W...	TecMill square shoulder endmill, shank type	H189
EPO□□R□□□M...	TungRec endmill, shank type	H158, H159
EPO□□R□□□□□□□□-...	TungRec endmill, shank type	H158
EPO□□R□□□□□□□□W...	TungRec endmill, shank type	H158
EPQ□□R□□□M...	DoRec endmill, shank type	H175
EPQ□□R□□□□□□□□W...	DoRec endmill, shank type	H175
EPTC16M□□□C...	TungTri-Shred endmill, shank type	H197
EPTC16U2.00W1.25R04	TungTri-Shred endmill, shank type	H197
EPTN□□□M□□□C...	DoForce-Tri endmill, shank type	H171
EPTN□□□□□□□□C...	DoForce-Tri endmill, shank type	H171
EPV16R□□□M...	Tung-AluMill endmill, shank type	H183
EPV16R□□□□□□□□W...	Tung-AluMill endmill, shank type	H183
EPW13R□□□M...	TungMill endmill, shank type	H194
EPYD06M050C32.0R...	TungSpeed-Mill endmill, shank type	H105
EPYD06U2.00C1.25R08	TungSpeed-Mill endmill, shank type	H105
EPYP12M□□□□C...	TungSpeed-Mill cutter body	H180
ERC□□R□□□M...	RoundSplit endmill, shank type	H081
ERC□□R□□□□□□□□-...	RoundSplit endmill, shank type	H081
ERC□□R□□□□□□□□W...	RoundSplit endmill, shank type	H081
ERP□□R□□□M...	FixRMill endmill, shank type	H088
ERP□□R□□□□□□□□-...	FixRMill endmill, shank type	H088
ERRQ12M040C32.0R04	FixRMill -New design- endmill, shank type	H086
ESE30□□R	ESE3000R endmill, shank type	H202
ESE40□□R...	ESE4000R endmill, shank type	H204
ETLN25M□□□W25.0F□□□R...	Indexable threading cutter	I076
ETTL25M□□□W25.0F□□□R...	Indexable threading cutter	I074

Designation	Product name	Page
ETTL25M□□□W25.0F□□□R□□-PT	Indexable threading cutter	I075
EVLX□□□M□□□□□□□□.0R...	DoMultiRec endmill	H255
EVLX□□□U□□□□□□□□.0R...	DoMultiRec endmill	H255
EVLX□□□U□□□W□□□□.0R...	DoMultiRec endmill	H255
EVX...	Endmill with central cutting edge, shank type	H259
EVX□□□□□□□□...U	Endmill with central cutting edge, shank type	H259
EWD□□□□□□R	EWD05/07/10 endmill, shank type	H236
EWD□□□□□□RU	EWD05/07/10 endmill, shank type	H236
EXLN□□□M□□□□C...	DoTwistBall endmill, shank type	H048
EXLN□□□U□□□□□□□□R...	DoTwistBall endmill, shank type	H048
EXLS02M□□□□C...	TungForceFeed endmill, shank type	H040
EXLS02U□□□□C...	TungForceFeed endmill, shank type	H040
EXN02R□□□□M...	AddDoFeed endmill, shank type	H020
EXN02R□□□□U...	AddDoFeed endmill, shank type	H020
EXN03R□□□□M...	DoFeed endmill, shank type	H024, H025
EXN03R□□□□R...	DoFeed endmill, shank type	H024
EXN06R□□□□M...	DoFeed endmill, shank type	H025
EXN06R□□□□U...	DoFeed endmill, shank type	H025
EXP□□□□□□R...	MillFeed endmill, shank type	H053
EXP□□□□□□R...U	MillFeed endmill, shank type	H053
EXSW09M□□□□C...	MillQuadFeed cutter head	H060
EXSW09U□□□□C...	MillQuadFeed cutter head	H060
EXWX03M□□□□C...	DoFeedTri endmill, shank type	H044
EXWX03U□□□□C...	DoFeedTri endmill, shank type	H044
<b>H</b>		
HBFM□□□M...	BallFinishNose cutter head	H226
HBRM□□□M...	BallRoughNose cutter head	H234
HFWX04M□□□□M...	DoMini-Mill cutter head	H233
HFZN10M□□□□M□□R...	AddForceBarrel cutter head	H231
HPA□□□R□□□□MM...	Tung-Tri cutter head	H147
HPAV□□□M□□□□M...	TungForce-Rec cutter head	H139
HPAV06M□□□□S...	TungForce-Rec cutter head	H138
HPO□□□R□□□□MM...	TungRec cutter head	H160
HRP□□□R□□□□MM...	FixRMill cutter head	H089
HVLX□□□M□□□□M□□R02	DoMultiRec cutter head	H256
HWD07R□□□□MM...	HWD07 Cutter head	H236
HXLN□□□M□□□□M...	DoTwistBall cutter head	H048
HXLS02M□□□□M...	TungForceFeed cutter head	H040
HXN02R□□□□M...	AddDoFeed cutter head	H020
HXN03R□□□□MM...	DoFeed cutter head	H026
HXSW09M□□□□M...	MillQuadFeed cutter head	H061
HXWX03M□□□□C...	DoFeedTri cutter head	H044
<b>L</b>		
LMEU□□□□□□□ZNER-MJ	TecTangential-Slot insert	H222
LMMU□□□□□□□□PNER-MJ	TecMill insert	H192
LN25D...	Insert for threading cutter	I076
LNCQ0906□-...	NMS09 / EMS09 insert	H265
LNGU0303ZER-MH	DoFeed 03insert	H031
LNGU06X5ZER-MH	DoFeed 06insert	H031
LNGU06X5ZER-W	DoFeed 06insert	H031
LNMU0202ZER-MM	AddDoFeed 02insert	H021
LNMU0303□ER-MJ	DoFeed 03insert	H031
LNMU0303□ER-ML	DoFeed 03insert	H031
LNMU0303ZER-MS	DoFeed 03insert	H031
LNMU06X5ZER-MJ	DoFeed 06insert	H031
LNMU06X5ZER-ML	DoFeed 06insert	H031
LNMX□□□□□□□R-MJ	DoTwistBall insert	H050
LNMX□□□□□□□R-ML	DoTwistBall insert	H050
LNMX□□□□□□ZER-HJ	DoTwistBall insert	H050
LNMX0405ZER-HL	DoTwistBall insert	H050
LPTC16□□□□□B...	TungTri-Shred roughing cutter	H199
LPTC16U□□□□□B...	TungTri-Shred roughing cutter	H199
LQMU□□□□□□□□P□ER-MJ	DoRec insert	H177
LSMT0202R2-MM	TungForceFeed insert	H041
LSMT0202ZER-HM	TungForceFeed insert	H041
LXMU□□□□□□□□PER-MM	DoMultiRec insert	H257
<b>M</b>		
MS□□□R/L	MS cutter body	H266
MTEC□□□□□□□□□□□ISO	60° solid carbide threading endmill	I058
MTEC□□□□□□□□□□BSPT	BSPT solid carbide threading endmill	I067
MTEC□□□□□□□□□□UN	60° solid carbide threading endmill	I063
MTEC□□□□□□□□□□NPT	BSPT solid carbide threading endmill	I068
MTEC□□□□□□□□□□W	BSPT solid carbide threading endmill	I066

Designation	Product name	Page
MTECB□□□□□□□□□□□ISO	ISO solid carbide threading endmill, with coolant hole	I059
MTECB□□□□□□□□□□□NPT	NPT solid carbide threading endmill, with coolant hole	I068
MTECB□□□□□□□□□□□UN	ISO solid carbide threading endmill, with coolant hole	I063
MTECB□□□□□□□□□□□W	NPT solid carbide threading endmill, with coolant hole	I066
MTECD□□□□□□□□□□□ISO	ISO solid carbide thread mill for boring, threading, chamfering	I062
MTECE□□□□□□□□□□□ISO	ISO solid carbide external threading endmill	I062
MTECE□□□□□□□□□□□UN	ISO solid carbide external threading endmill	I065
MTECI□□□□□□□□□□□ISO	60° solid carbide threading endmill	I058
MTECI□□□□□□□□□□□A60	60° solid carbide threading endmill	I057
MTECI□□□□□□□□□□□A60	60° solid carbide threading endmill	I057
MTECI□□□□□□□□□□□A60	60° solid carbide threading endmill	I057
MTECQ□□□□□□□□□□□ISO	ISO solid carbide deep threading endmill, with coolant hole, with coolant hole	I060
MTECS□□□□□□□□□□□ISO	ISO small diameter solid carbide threading endmill, short edge type	I061
MTECS□□□□□□□□□□□ISOL	ISO small diameter solid carbide threading endmill, short edge type	I061
MTECS□□□□□□□□□□□MJ	MJ small diameter solid carbide threading endmill, short edge type, with coolant hole	I069
MTECS□□□□□□□□□□□MJ	MJ small diameter solid carbide threading endmill, short edge type, with coolant hole	I069
MTECS□□□□□□□□□□□UN-L	ISO small diameter solid carbide threading endmill, short edge type	I064
MTECS□□□□□□□□□□□UNJ	MJ small diameter solid carbide threading endmill, short edge type, with coolant hole	I069
MTECS□□□□□□□□□□□UN	ISO small diameter solid carbide threading endmill, short edge type	I064
MTECS□□□□□□□□□□□UNJ	MJ small diameter solid carbide threading endmill, short edge type, with coolant hole	I069
MTECS□□□□□□□□□□□W	Whitworth solid carbide thread mill for threading, short edge type	I067
MTECS06047C1920UN-L	ISO small diameter solid carbide threading endmill, short edge type	I064
MTECSH□□□□□□□□□□□ISO	ISO solid carbide thread mill for machining, short edge type, left hand	I062
MTECSH□□□□□□□□□□□UN	ISO solid carbide thread mill for machining, short edge type, left hand	I065
MTECZ□□□□□□□□□□□ISO	ISO solid carbide threading endmill, with coolant hole	I060
MTECZ□□□□□□□□□□□UN	ISO solid carbide threading endmill, with coolant hole	I064
MTECZ□□□□□□□□□□□W	NPT solid carbide threading endmill, with coolant hole	I066
MTECZ08076C1027NPTF	NPT solid carbide threading endmill, with coolant hole	I068
MTECZ1010D1618NPTF	NPT solid carbide threading endmill, with coolant hole	I068
<b>N</b>		
NMS09□□□R	NMS09 cutter body	H264
<b>O</b>		
ON□U0507ANEN-MJ	DoTriple-Mill insert	H097
ON□U0705AN□N-ML	DoOcto insert	H103
ON□U0705ANPN-MJ	DoOcto insert	H103
ONGU0507ANEN-W	DoTriple-Mill insert	H097
ONHU0705ANPR-W	DoOcto insert	H103
OWHT05T3C07AFER-MM	TungEight-Mill insert	H093
OWHT05T3C07AFER-MW	TungEight-Mill insert	H093
OWMT05T3AFER-MM	TungEight-Mill insert	H093
OWMT0807AAER-ML	DoOcto insert	H103
OWMT0807ZNER-HJ	DoOcto insert	H103
<b>P</b>		
PN□U0905GNE□-MJ	DoPent insert	H079
PNCU0905GNEN-ML	DoPent insert	H079
PNCU0905GNER-W	DoPent insert	H079
PNCU0905GNFR-AJ	DoPent insert	H079
<b>Q</b>		
QA□□□K/M	Adapter for TAC mill/QC system	H132

# Alphanumeric Index

Designation	Product name	Page
QACB-□□MR/L	A-type set bolt for TAC mill/QC system	H133
<b>R</b>		
R1.□□-...	TungMini-Slit drive flange set for side cutter	H213
RCMT□□□□EN-MJ	RoundSplit insert	H084
RCMT□□□□EN-NMJ	RoundSplit insert	H084
RCMT□□□□FN-NAJ	RoundSplit insert	H084
RDMW□□□□M0	Insert for EWD/HWD	H237
RNGN120700...	CeramicSpeed-Mill insert	H116
RNMU1307ZNER-MJ	DoTriple-Mill insert	H097
RPMT□□□□EN-MJ	FixRMill insert	H090
RPMT□□□□EN-ML	FixRMill insert	H090
RQMT1204ENC□-MM	FixRMill -New design- insert	H087
<b>S</b>		
SCMT□□□□08-23	EBD insert	H243
SD□□42Z...	TMD4400R/LI, EMD4400RI insert	H122, H126
SD□□42Z□N...	TGD4400-A, EGD4400 insert	H122, H126
SD□N42ZTNCR	TGD4400-A, EGD4400 insert	H122, H126
SD□N53Z□N...	TMD5401RI insert	H124
SD□RI203AETN-MJ	TMD4400R/LI, EMD4400RI, TGD4400-A, EGD4400 insert	H122, H126
SD□R42ZSR-MJ	TMD4400R/LI, EMD4400RI, TGD4400-A, EGD4400 insert	H122, H126
SDCN42ZFN-DIA	TMD4400R/LI, EMD4400RI insert	H122, H126
SDHT050204FN-AJ	TungQuad insert	H170, H244
SDKR42ZPN-MS	TMD4400R/LI, EMD4400RI, TGD4400-A, EGD4400 insert	H122, H126
SDKR53ZSR-MJ	TMD5401RI insert	H124
SDMT050204PN-MJ	TungQuad insert	H170, H244
SE□N1203AG□N	TME4400R/LI, TME4400RB, EME4400 insert	H118
SE□N1203AG□N-T	TME4400R/LI, TME4400RB, EME4400 insert	H118
SE□N1203AGTNCR	TME4400R/LI, TME4400RB, EME4400 insert	H118
SE□N1504AG□N	TME5400RI insert	H119
SE□N42ZFR	THE4000RIA insert	H201
SECN42ZFR-DIA	THE4000RIA insert	H201
SEEN1203AGTNCR-14	TME4400R/LI, TME4400RB, EME4400 insert	H118
SEGT12X4ZEFR-AJ	TFE insert	H112
SEGW12X4ZE□R	TFE insert	H112
SEGW12X4ZEFR-BD	TFE insert	H112
SEGW12X4ZEFR-D	TFE insert	H112
SEGW12X4ZEFR-WD	TFE insert	H112
SEKN1504AGTN-T	TME5400RI insert	H119
SEKR1203AGPN-MS	TME4400R/LI, TME4400RB, EME4400 insert	H118
SEKR1203AGSR-MJ	TME4400R/LI, TME4400RB, EME4400 insert	H118
SEKR1504AGSR-MJ	TME5400RI insert	H119
SFP40□□R	SFP4000R cutter body	H267
SM□□-L...	TungFlex Steel modular shank	H038
SM□□-L□□□C□□-H	TungFlex carbide modular shank	H039
SM□□-L□□□C□□-H-N	TungFlex carbide modular shank	H039
SNAA56FTR	MS insert	H266
SN□U1307ANEN-MJ	DoTriple-Mill insert	H097
SN□U1706ANPR-MJ	DoOcto insert	H103
SN□U1706ANTR-ML	DoOcto insert	H103
SNGU1307ANEN-MH	DoTriple-Mill insert	H097
SNGU1307ANEN-W	DoTriple-Mill insert	H097
SNHU1706ANFN-W	DoOcto insert	H103
SNMU1206□□EN-MM	DoQuad-Mill insert	H182
SNMU120608HNEN-MM	DoQuad-Mill insert	H182
SP□N423□N	TGP4200R-A insert	H127, H128
SP□N42S...	TGP4100RIA/BA insert	H127
SP□N42Z...	TGP4200R-A insert	H128
SP□N53S...	TGP5100RIA insert	H129
SPGN120312TN	TGP4100RIA/BA insert	H127
SPHA431FNW	TFP4000IA insert	H209
SPHA435FNW	SFP4000R, EFP4000R insert	H268
SPKN53STR20	TGP5100RIA insert	H129
SPKR42SSR-MJ	TGP4100RIA/BA insert	H127
SPKR53SSR-MJ	TGP5100RIA insert	H129
SPMA422□N	ECP insert	H247
SPMM□□□ERD	TCB insert	H253
SPMP□□□-CG	TCB insert	H253
SPMP□□□ER-CG	TCB insert	H253
SPMP□□□ERD	TCB insert	H253
SPMP831DS	TCB insert	H253
SQMU1206ZSR-MJ	DoFeedQuad insert	H068
SSG□□R...	TungMini-Slit side cutter	H211

Designation	Product name	Page
SSM□□N	TungMini-Slit insert	H212
SSS□□N	TungMini-Slit insert	H212
SW□□-...	TungMini-Slit drive shank for side cutter	H213
SW□T1304PDDR-MJ	TungMill insert	H196
SW□T13T3AFPR-MJ	TungMill insert	H075
SW1.□□-...	TungMini-Slit drive shank for side cutter	H213
SWG1304PDFR-AJ	TungMill insert	H196
SWG13T3AFFR-AJ	TungMill insert	H075
SWMT0904□ER-MM	MillQuadFeed insert	H063
SWMT1304PDER-ML	TungMill insert	H196
SWMT1304PDDR-MS	TungMill insert	H196
SWMT13T3AFER-ML	TungMill insert	H075
SWMT13T3AFPR-HJ	TungMill insert	H075
SWMT13T3AFPR-MS	TungMill insert	H075
SWMT1506□ER-MM	MillQuadFeed insert	H063
SWMT1506ZMER-MT	MillQuadFeed insert	H063
SWMW13T3AFTR	TungMill insert	H075
<b>T</b>		
T□-R...	Insert for threading cutter	I078
TAOW05M□□□B...	TungEight-Mill cutter body	H092
TAOW05U□□□B□□R...	TungEight-Mill cutter body	H092
TAN07R□□□M...	DoOcto cutter body	H100, H102
TAN07R□□□U...	DoOcto cutter body	H099, H101
TASN13M□□□B...	DoTriple-Mill cutter body	H096
TASN13J□□□B...	DoTriple-Mill cutter body	H096
TASN13U□□□B...	DoTriple-Mill cutter body	H095
TASN13U4.00B1.50R□□LF2.5	DoTriple-Mill cutter body	H095
TAW13R□□□M...	TungMill cutter body	H074
TAW13R□□□U...	TungMill cutter body	H073
TBN□□□□S	TBN1000 endmill	H238
TCB-...	Boring cutter	H250
TCB□□□-□□□F32	Boring cutter, cartridge type	H251
TCB□□□F...	Boring cutter	H250
TCGT1606□□PDER-MJ	TungTri-Shred insert	H200
TCGT1606□□PDER-NMJ	TungTri-Shred insert	H200
TE□N32□□R	TSE3000R, ESE3000Rinsert	H203
TE□N43Z□R	TSE4000RIA, ESE4000R insert	H206
TECN32ZFR-DIA	TSE3000R, ESE3000R insert	H203
TECN43ZFR-DIA	TSE4000RIA, ESE4000R insert	H206
TEKR1603PEPR-MS	TSE3000R, ESE3000R insert	H203
TEKR2204PEPR-MS	TSE4000RIA, ESE4000R insert	H206
TEN09R/L□□□M...	DoPent cutter body	H078
TEN09R□□□U...	DoPent cutter body	H077
TFE12□□□R	TFE cutter body	H110
TFE12□□□RU	TFE cutter body	H110
TFE12R□□□M...	TFE cutter body	H111
TFMRN□□□-□□R-12FL	CeramicSpeed-Mill cutter body	H116
TFMRN□□□-12...	CeramicSpeed-Mill cutter body	H116
TFP40□□□RIA	TFP4000IA cutter body	H208
TGD44□□R-A	TGD4400-A cutter body	H125
TGM16R□□□M□□□-□□SA	TecMill 60° face mill	H191
TGM16R□□□M□□□E□□SA	TecMill 60° face mill	H191
TGP41□□□RBA	TGP4100RIA/RBA/RBAE cutter body	H127
TGP41□□□RBAE	TGP4100RIA/BA/BAE cutter body	H127
TGP41□□□RIA	TGP4100RIA/RBA/RBAE cutter body	H127
TGP42□□□R-A	TGP4200R-A cutter body	H128
TGP51□□□RIA	TGP5100RIA cutter body	H129
THE400□□RIA	THE4000RIA cutter body	H201
THSN12J□□□B...	DoQuad-Mill cutter body	H181
THSN12M□□□B...	DoQuad-Mill cutter body	H181
THSN12U□□□B...	DoQuad-Mill cutter body	H181
TL25D...	Insert for threading cutter	I074
TL25SEIR...	Insert for threading cutter	I075
TLA10R□□□L054M...	Tung-Tri roughing cutter	H149
TLA10R□□□L213U...	Tung-Tri roughing cutter	H149
TLA15R□□□L□□□□□S	Tung-Tri roughing cutter, subunit	H150
TLA15R□□□L110A□□S	Tung-Tri roughing cutter, subunit	H150
TLA15R□□□L□□□BT50-0□M	Tung-Tri roughing cutter with BT shank	H151
TLA15R□□□L□□□M...	Tung-Tri roughing cutter, main unit	H150
TLA15R□□□L□□□U...	Tung-Tri roughing cutter, main unit	H150
TLM11R□□□M...	TecMill roughing cutter	H192
TLS11R050M22.0E04	TungRec roughing cutter	H164
TLS11R200U0075A04	TungRec roughing cutter	H164
TMD44□□R...	TMD4400R/LI cutter body	H121
TMD44□□RI-U	TMD4400R/LI cutter body	H121
TMD54□□RI...	TMD5400RI cutter body	H123



Designation	Product name	Page
TMD54□□RI-U	TMD5400RI cutter body	H123
TME44□□R...	TME4400R/LI cutter body	H117
TME54□□RI	TME5400RI cutter body	H119
TN□U□□□□□□PER-MJ	DoForce-Tri insert	H173
TNMU120708PER-NMJ	DoForce-Tri insert	H173
TNMU1207R□□PER-MJ	DoForce-Tri insert	H173
TO□T□□□□□□PDER-MJ	Tung-Tri insert	H153
TOGT□□□□□□PDR-AJ	Tung-Tri insert	H153
TOMT0402□□PXER-MM	Tung-Tri insert	H153
TOMT150604PDER-NMJ	Tung-Tri insert	H153
TP□N43Z...	TFP4000IA insert	H209
TPA□□R□□□M...	Tung-Tri cutter body	H148
TPA□□R□□□U...	Tung-Tri cutter body	H148
TPAV□□M□□□B...	TungForce-Rec cutter body	H140
TPAV12U□.□□B...	TungForce-Rec cutter body	H140
TPD05R□□□M...	TungQuad cutter body	H169
TPD05R□□□U...	TungQuad cutter body	H169
TPEN432TRCR	TFP4000IA insert	H209
TPKR43ZSR-MJ	TFP4000IA insert	H209
TPM□□R□□□M...	TecMill square cutter body	H190
TPM□□R□□□U...	TecMill square cutter body	H190
TPM16R□□□M□□.□.□□SA	TecMill square cutter body with shims	H191
TPM16R□□□M□□.□.□.□SA	TecMill square cutter body with shims	H191
TPMR2204PDSR-MJ	TFP4000IA insert	H209
TPO□□R□□□M...	TungRec cutter body	H162
TPO□□R□□□U...	TungRec cutter body	H162
TPQ□□R□□□M...	DoRec cutter body	H176
TPQ□□R□□□U...	DoRec cutter body	H176
TPTC16M□□□B...	TungTri-Shred cutter body	H198
TPTC16U□.□□B...	TungTri-Shred cutter body	H198
TPTN□□J□□□B...	DoForce-Tri cutter body	H172
TPTN□□M□□□B...	DoForce-Tri cutter body	H172
TPTN□□U□.□□B...	DoForce-Tri cutter body	H172
TPV16R□□□M...	Tung-AluMill cutter body	H185
TPV16R□□□U...	Tung-AluMill cutter body	H185
TPW13R□□□M...	TungMill cutter body	H195
TPW13R□□□U...	TungMill cutter body	H194
TPYD06J□□□B...	TungSpeed-Mill cutter body	H106
TPYD06M□□□B...	TungSpeed-Mill cutter body	H106
TPYD06U□.□□B...	TungSpeed-Mill cutter body	H106
TPYP12□□□□B...	TungSpeed-Mill cutter body	H108
TPYP12M□□□B...	TungSpeed-Mill cutter body	H108
TRC□□R□□□M...	RoundSplit cutter body	H082
TRC□□R□□□U...	RoundSplit cutter body	H082
TRP□□R□□□M...	FixRMill cutter body	H089
TRP□□R□□□U...	FixRMill cutter body	H089
TRRQ12M□□□B...	FixRMill -New design- cutter body	H086
TSE30□□R	TSE3000R cutter body	H202
TSE30□□R-E	TSE3000R cutter body	H202
TSE30□□RIA	TSE3000R cutter body	H202
TSE40□□RIA	TSE4000RIA cutter body	H204
TSE40□□RIA-U	TSE4000RIA cutter body	H204
TSN□□R□□□M...	TecTangential-Slot radial drive slot mill	H221
TSP40□□RIA	TSP4000IA cutter body	H207
TSP400□RIA-U	TSP4000IA cutter body	H207
TSW□□R...	TungUniversalSlot radial drive slot mill	H218
TSW□□R□□□-U...	TungUniversalSlot radial drive slot mill	H218
TVKX□□□□□□FN-MJ	TungThinSlit insert	H216
TVKX□□□□□□TN-MJ	TungThinSlit insert	H216
TXLN□□M□□□B...	DoTwistBall cutter body	H049
TXLN□□U□.□□B...	DoTwistBall cutter body	H049
TXN03R□□□M...	DoFeed cutter body	H027
TXN03R□□□U...	DoFeed cutter body	H027
TXN06R□□□M...	DoFeed cutter body	H028
TXN06R□□□U...	DoFeed cutter body	H028
TXP□□□□□R...	MillFeed cutter body	H054
TXP□□□□□RU...	MillFeed cutter body	H054
TXP□□□□□RBU	MillFeed cutter body	H054
TXQ12R□□□M...	DoFeedQuad cutter body	H067
TXQ12R□□□U...	DoFeedQuad cutter body	H067
TXSW□□□□□□B...	MillQuadFeed cutter body	H062
TXSW□□M□□□B...	MillQuadFeed cutter body	H062
TXSW□□U□.□□B...	MillQuadFeed cutter body	H062
TXWX03M□□□B...	DoFeedTri cutter body	H045
TXWX03U□.□□B...	DoFeedTri cutter body	H045
TZF110...	TZF11 cutter body	H263
TZP120...	TZP12 cutter body	H261

Designation	Product name	Page
TZP19□□□R	TZP19 cutter body	H262
<b>V</b>		
VAD□□□L□□□□S08-S-M...	TungMeister adapter for TungFlex connection	I053
VBB□□□L□□.□-BG-02S...	TungMeister head	I026
VBB□□□L□□-BG-U02S...	TungMeister head	I026
VBB□□□L□□.□-BM-02S...	TungMeister head	I026
VBB□□□L□□-BM-U02S...	TungMeister head	I026
VBB□□□L□□.□-SG-02S...	TungMeister head	I028
VBB□□□L□□-SG-U02S...	TungMeister head	I028
VBD□□□L□□.□-BG-02S...	TungMeister head	I027
VBD□□□L□□-BG-U02S...	TungMeister head	I027
VBD□□□L□□.□-BG-04S...	TungMeister head	I027
VBD□□□L□□-BG-U04S...	TungMeister head	I027
VBE□□□L□□.□-BG-04S...	TungMeister head	I027
VBE□□□L□□-BG-U04S...	TungMeister head	I027
VBE□□□L□□.□-BGA02S...	TungMeister head	I028
VBE□□□L□□-BGAU02S...	TungMeister head	I028
VBL□□□L□□.□R□□□-6S...	TungMeister head	I033
VBN□□□L□□.□R□□□-6S...	TungMeister head	I032
VBO□□□L□□.□R□□□-4S...	TungMeister head	I032
VBO□□□L□□.□R□□□-5S...	TungMeister head	I032
VCR□□□L□□.□R□□□-02S...	TungMeister head	I035
VCA□□□□L□□.□A45-04S...	TungMeister head	I035
VCA□□□□L□□.□A45-06S...	TungMeister head	I035
VCA0375L16A45-U04S06	TungMeister head	I035
VCP□□□L□□.□A□□-02S...	TungMeister head	I036
VCW118L05.0A45-02S06	TungMeister head	I035
VDP□□□L□□.□□A30-02S...	TungMeister head	I038
VDP□□□L□□.□A30-02S...	TungMeister head	I038
VDP□□□L□□.□B30-02S...	TungMeister head	I038
VDS□□□A45-02S...	TungMeister head	I037
VED□□□L□□.□C□□R04S...	TungMeister head	I018
VED□□□L□□.□C□□R05S...	TungMeister head	I018
VED□□□L□□.□C□□R06S...	TungMeister head	I018
VED□□□L□□.□C□□RU04S...	TungMeister head	I018
VED□□□L□□.□C□□RU05S...	TungMeister head	I018
VED□□□L□□.□C□□RU06S...	TungMeister head	I018
VED□□□L□□.□R□□□-04S...	TungMeister head	I014
VED□□□L□□R□□□-U04S...	TungMeister head	I013
VED□□□L□□.□R□□□-06S...	TungMeister head	I020
VED□□□L□□R□□□-U06S...	TungMeister head	I020
VED□□□L□□.□R□□□-08S...	TungMeister head	I021
VED□□□L□□R□□□-U08S...	TungMeister head	I021
VED□□□L□□.□R□□□-10S...	TungMeister head	I021
VED□□□L□□R□□□-U10S...	TungMeister head	I021
VED□□□L□□.□R□□□I07S...	TungMeister head	I021
VED□□□L□□.□R□□□I09S...	TungMeister head	I021
VED250L37.0C50I06S15	TungMeister head	I018
VEE□□□L□□.□C□□□-06S...	TungMeister head	I020
VEE□□□L□□C□□□-U06S...	TungMeister head	I020
VEE□□□L□□.□C□□□-08S...	TungMeister head	I021
VEE□□□L□□C□□□-U08S...	TungMeister head	I021
VEE□□□L□□.□C□□□-10S...	TungMeister head	I021
VEE□□□L□□C□□□-U10S...	TungMeister head	I021
VEE□□□L□□.□C□□□C04S...	TungMeister head	I019
VEE□□□L□□C□□□CU04S...	TungMeister head	I019
VEE□□□L□□.□C□□□I04S...	TungMeister head	I015
VEE□□□L□□C□□□IU04S...	TungMeister head	I015
VEE□□□L□□.□C□□□R04S...	TungMeister head	I018
VEE□□□L□□C□□□RU04S...	TungMeister head	I018
VEE□□□L□□.□C□□□R05S...	TungMeister head	I018
VEE□□□L□□C□□□RU05S...	TungMeister head	I018
VEE□□□L□□.□C□□□R06S...	TungMeister head	I018
VEE□□□L□□C□□□RU06S...	TungMeister head	I018
VEE□□□L□□.□R□□□-03S...	TungMeister head	I016
VEE□□□L□□R□□□-U03S...	TungMeister head	I016
VEE□□□L□□.□R□□□-04S...	TungMeister head	I014
VEE□□□L□□R□□□-U04S...	TungMeister head	I013
VEE□□□L□□.□R□□□-06S...	TungMeister head	I020
VEE□□□L□□R□□□-U06S...	TungMeister head	I020
VEE□□□L□□.□R□□□A02S...	TungMeister head	I016
VEE□□□L□□R□□□AU02S...	TungMeister head	I016
VEE□□□L□□.□R□□□A03S...	TungMeister head	I017
VEE□□□L□□R□□□AU03S...	TungMeister head	I017
VEE□□□L□□.□R□□□I04S...	TungMeister head	I015
VEE□□□L□□R□□□IU04S15	TungMeister head	I015



# Alphanumeric Index

Designation	Product name	Page
VEH□□□L□□.□R□□I04S...	TungMeister head	I012
VER□□AL□□□S□□-S	TungMeister adapter for ER collet connection	I054
VFM□□□L□□.□R□□I06S...	TungMeister head	I023
VFX□□□L□□.□R□□E04S...	TungMeister head	I025
VFX□□□L□□.□R□□E06S...	TungMeister head	I025
VFX□□□L□□.□R□□H04S...	TungMeister head	I025
VFX□□□L□□.□R□□-02S...	TungMeister head	I024
VGC□□□L□□.□R□□-02S...	TungMeister head	I039
VGC□□□L□□R□□□-U02S...	TungMeister head	I039
VMT□□□L□□IS□□-...	TungMeister head	I044
VMT□□□L□□UN□□-...	TungMeister head	I044
VMT□□□L□□W□□-...	TungMeister head	I045
VRB□□□L□□.□R□□-02S...	TungMeister head	I030
VRB□□□L□□R□□□-U02S...	TungMeister head	I030
VRC□□□L□□.□R□□-02S...	TungMeister head	I030
VRD□□□L□□.□R□□-06S...	TungMeister head	I030
VRD□□□L□□R□□□-U06S...	TungMeister head	I030
VSC□□□L□□□S□□-...	TungMeister shank	I053
VSSD□□L□□□LS□□-C-A	TungMeister shank	I049
VSSD□□L□□□LS□□-S-A	TungMeister shank	I049
VSSD□□L□□□S□□-C	TungMeister shank	I048, I049
VSSD□□L□□□S□□-C-A	TungMeister shank	I049
VSSD□□L□□□S□□-S	TungMeister shank	I048, I049
VSSD□□L□□□S□□-S-A	TungMeister shank	I049
VSSD□□L□□□S□□-W-A	TungMeister shank	I050
VSSD□□L□□□W□□-S	TungMeister shank	I050
VSSD□□L□□□W□□US	TungMeister shank	I050
VSTD□□L□□□S□□-S	TungMeister shank	I053
VST□□□L□□□S□□US	TungMeister shank	I053
VST□□□L□□.□□A45-□S...	TungMeister head	I041
VST□□□W□□.□R□□□-3S06	TungMeister head	I040
VST□□□W□□.□R□□□-4S08	TungMeister head	I041
VST□□□W□□.□R□□□-6S10	TungMeister head	I041
VTB□□□W□□.□R□□04-06S...	TungMeister head	I042
VTB□□□W□□□R016-U06S...	TungMeister head	I042
VTB135W2.00C15-06S05	TungMeister head	I043
VTB05W□□□C006-U06S05	TungMeister head	I043
VTR□□□L□□IS□□-□S...	TungMeister head	I045
VTR220L24W14-4S08	TungMeister head	I045
VTS□□□L□□□S□□UC	TungMeister shank	I051
VTS□□□L□□□S□□US	TungMeister shank	I051
VTS□□□L□□□S□□UW	TungMeister shank	I051
VTSD□□L□□□S□□-C	TungMeister shank	I052
VTSD□□L□□□S□□-S	TungMeister shank	I052
VTSD□□L□□□S□□-W-A	TungMeister shank	I052

W		
WCMT□□□□□□-D4	EVX insert	H260
WDCN42ZFR-DIA	TMD4400R/LI, EMD4400RI, TGD4400-A, EGD4400 insert	H122, H126
WECN42ZFR-DIA	THE4000RIA insert	H201
WNGU□□□□□□TN-MJ	TungUniversalSlot insert	H219
WPAN42SFR	TGP4100RIA/BA insert	H127
WPAN42SFRS	TGP4100RIA/BA insert	H127
WPAN42ZFR	TGP4200R-A insert	H128
WPMT□□□□□□ZPR-DML	MillFeed insert	H056
WPMT□□□□□□ZPR-MH	MillFeed insert	H056
WPMT□□□□□□ZPR-ML	MillFeed insert	H056
WPMW□□□□□□ZPR	MillFeed insert	H056
WPMT080615ZSR	MillFeed insert	H056
WPMT090725ZSR	MillFeed insert	H056
WWCW13T3AF□R-WS	TungMill insert	H075
WWCW13T3AFFR-WD	TungMill insert	H075
WXHU0403□□R-MJ	DoMini-Mill insert	H233
WXMU0303ZER-MM	DoFeedTri insert	H045

X		
XCET310404ER	ECC insert	H248
XVCT16□□□□R-AJ	Tung-AluMill insert	H186
XVCT16□□□□PEFR-AM	Tung-AluMill insert	H186
XXMU□□□□□□PR-MJ	EVX insert	H260

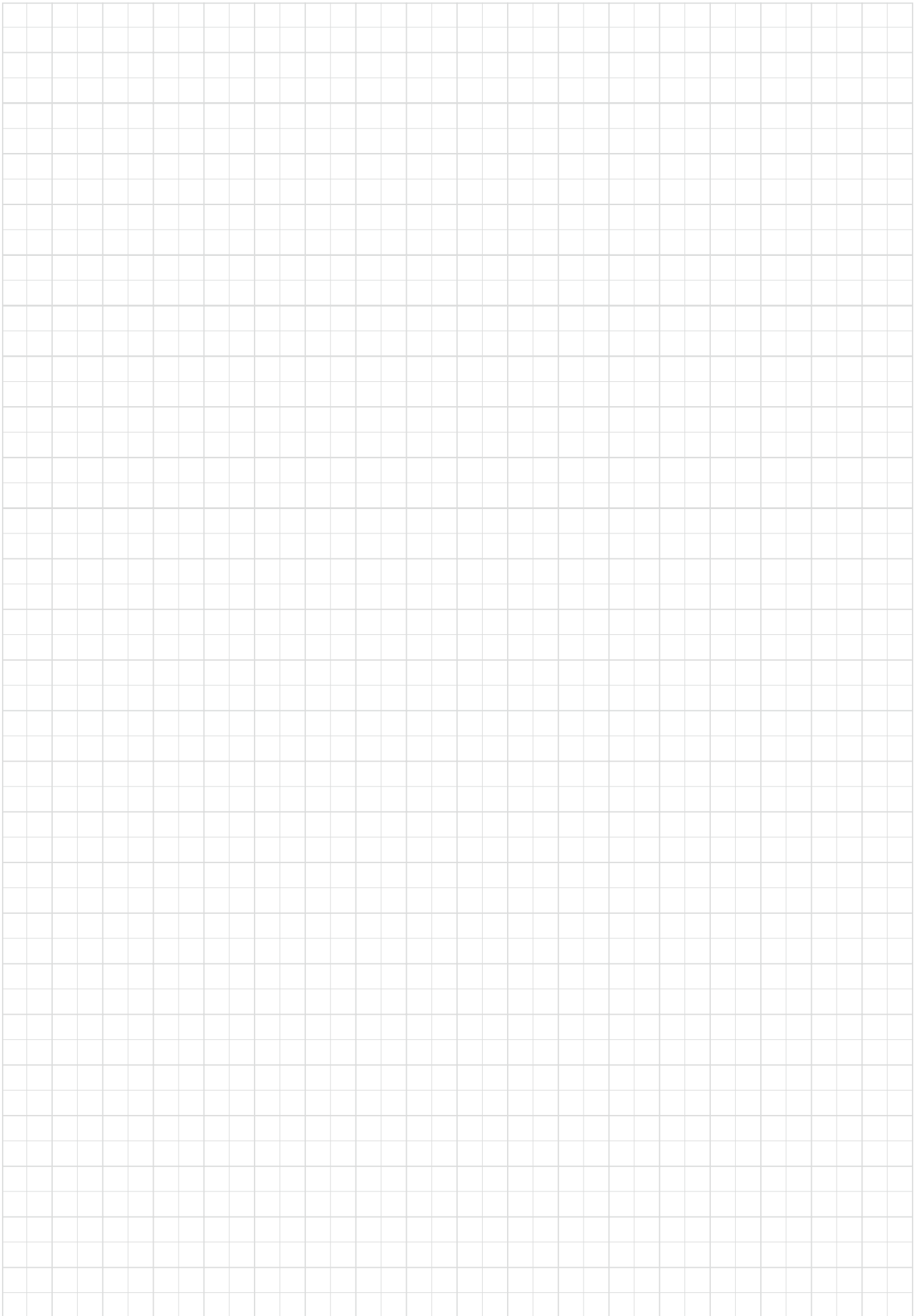
Y		
YDEN0603□□PDFR-D	TungSpeed-Mill insert	H107
YDEN0603PD□R-D	TungSpeed-Mill insert	H107
YDEN0603PDCR-LD	TungSpeed-Mill insert	H107
YDEN0603PDFR-BD	TungSpeed-Mill insert	H107

Designation	Product name	Page
YDEN0603PDFR-WD	TungSpeed-Mill insert	H107
YDEN0905PDFR-BD	DPD09 / EDPD09 insert	H115
YDEN0905PDFR-D	DPD09 / EDPD09 insert	H115
YDEN0905PDFR-WD	DPD09 / EDPD09 insert	H115
YPEB12X3-□□□□R-D	TungSpeed-Mill insert	H109

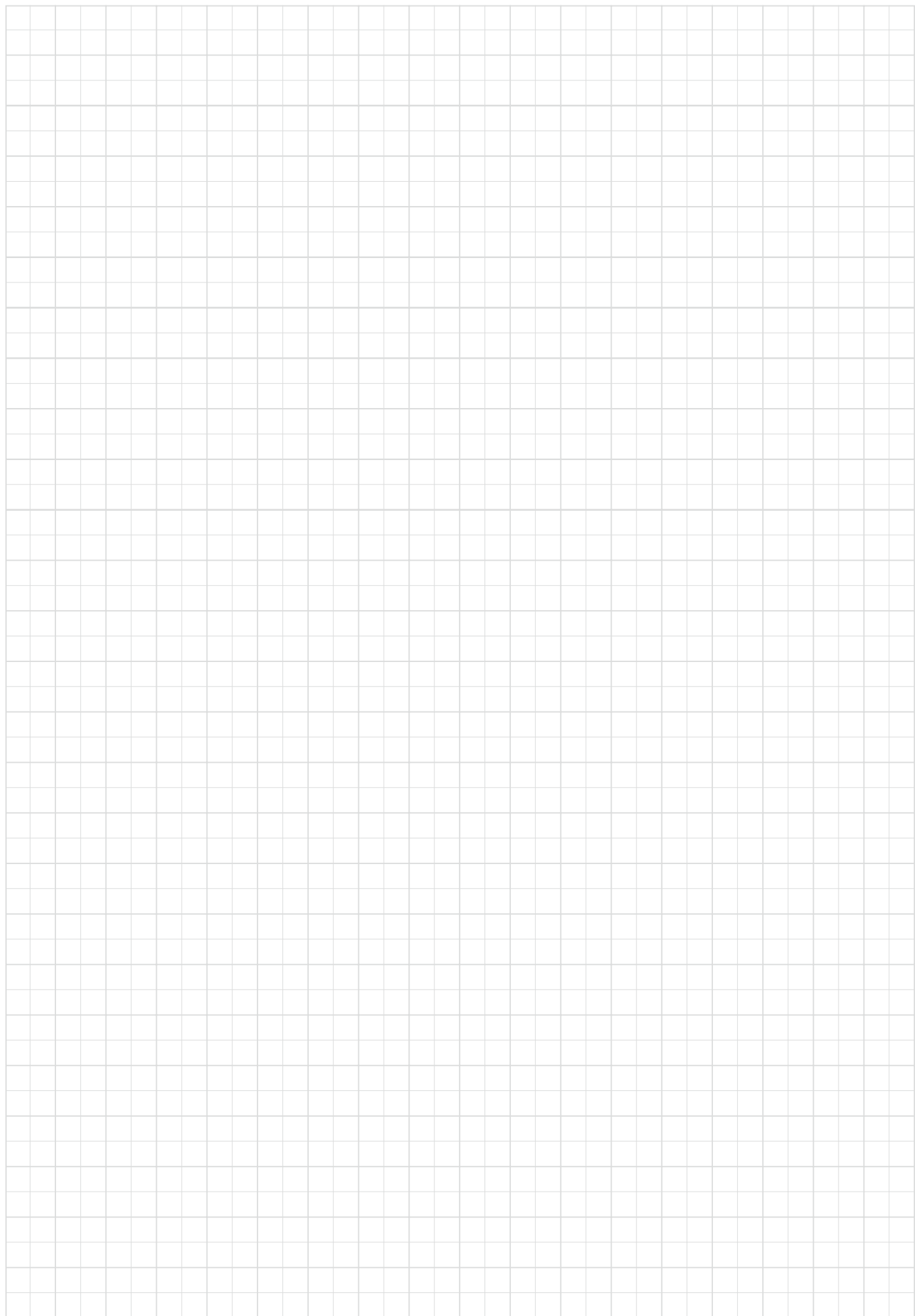
Z		
ZDMT□□□□-MJ	EBD insert	H243
ZFBM□□□□R00-MJ	BallFinishNose insert	H228
ZFBU□□□□R00-MJ	BallFinishNose insert	H227
ZFBU□□□□R00-ML	BallFinishNose insert	H227
ZFCBM□□□□R□□□-MM	BallFinishNose insert	H228
ZFRM□□□□R□□-MJ	BallFinishNose insert	H228
ZFRU□□□□R□□□-MJ	BallFinishNose insert	H227
ZNCA□□□□FN	TBN1000 insert	H238
ZNCA1002FN2	TBN1000 insert	H238
ZNHU1003R□□-MM	AddForceBarrel insert	H231
ZNMM□□□□EN	TBN1000 insert	H238
ZPCW□□□□-QBN	EBB insert	H242
ZPET□□□□-MJ	EBP insert	H241
ZPET□□□□U-MJ	EBP insert	H241
ZRBM□□□□-MM	BallRoughNose insert	H235
ZRBU□□□□-MM	BallRoughNose insert	H235



# MEMO



MEMO



# Worldwide Network



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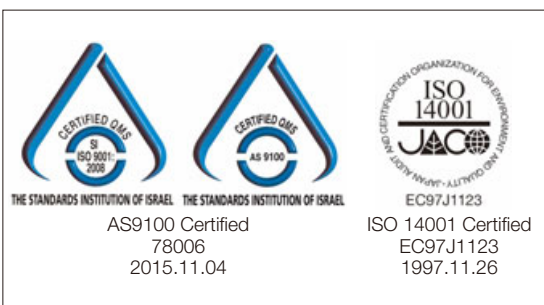
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