Milling Cutter



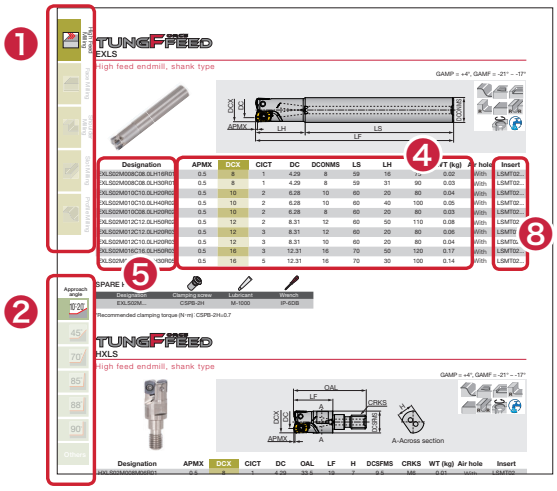
Milling Cutter - Content structure

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

How to use the page

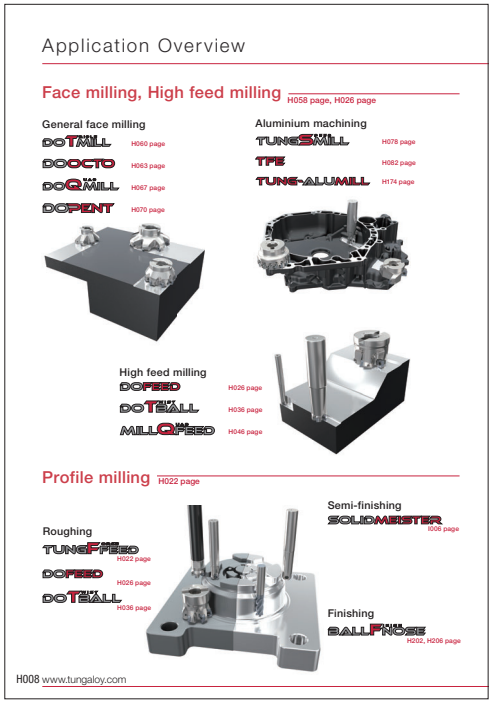
Method ①

Select the application (❶) and the approach angle (❷) at the left end of each page and choose a designation you need (❺) in the dimension table (❹). Applicable inserts are shown in (❽).



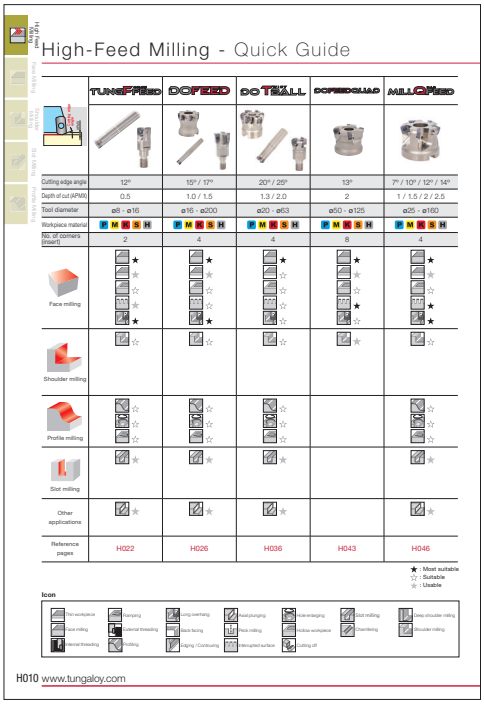
Method ②

Select the tool series name on H008 – H009 and check the details on the product page.



Method ③

Select the tool series or the tool specification on H010 - H019 and see the details on each page.



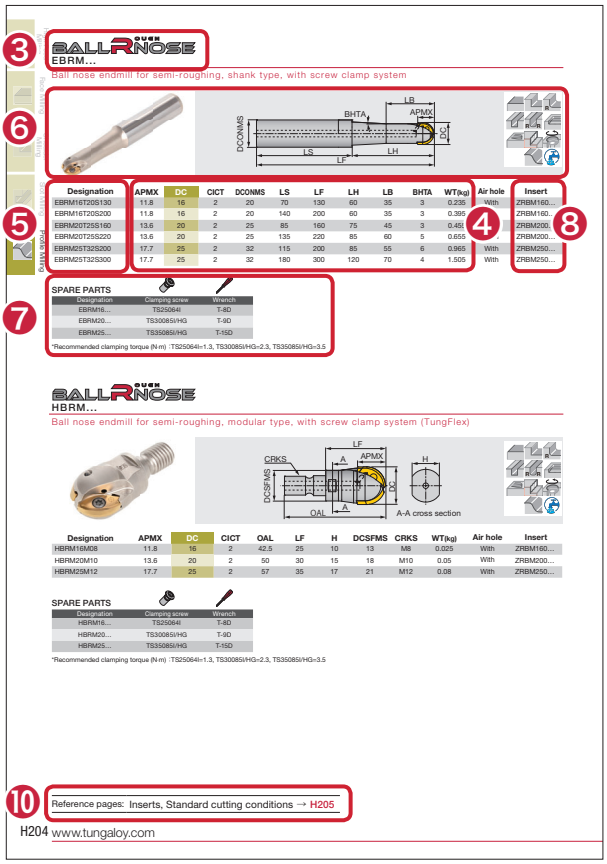
Icon

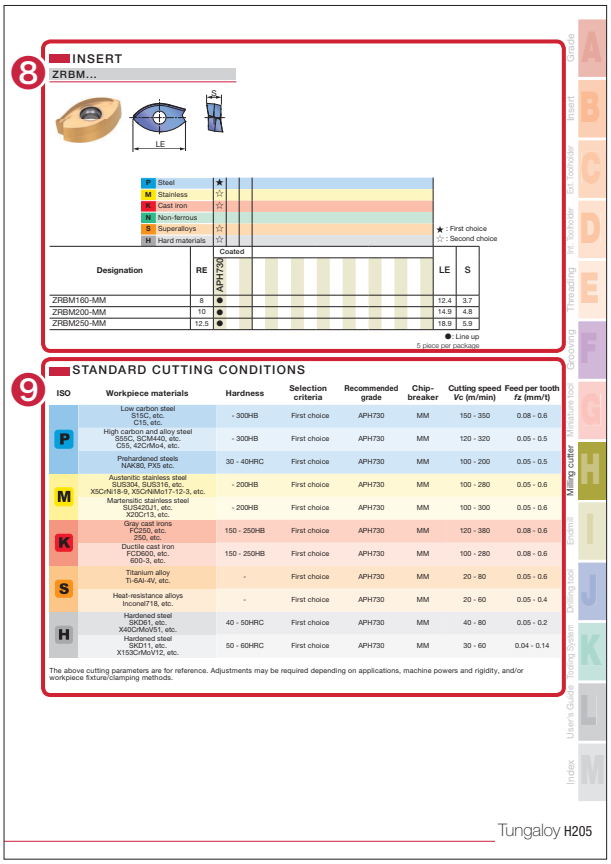
Approach angle

10°-20°	10° ~ 20°
45°	45°
70°	70°
85°	85°
88°	88°
90°	90°

Application

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





❶ : Application
❷ : Approach angle
❸ : Tool series name
❹ : Dimension table
❺ : Mill designation
❻ : Dimension drawing (conforming to ISO13399)
❼ : Spare parts
❽ : Insert
❾ : Standard cutting conditions
❿ : Reference page

Machining accuracy

F	Finishing
M	Medium cutting
R	Roughing
	Coolant hole

Workpiece material

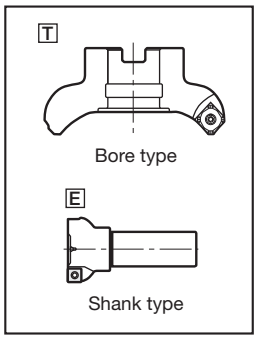
P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloys
H	Hard material

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

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

Designation system

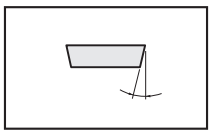
TAC Mills [New products]



Symbol	Type
T	Bore type
E	Shank type

① Type

H	Hybrid TAC Mill Series



Symbol	Relief angle
C	7°
P	11°
D	15°
E	20°
F	25°
N	0°
Others	Special

③ Relief angle

Symbol	Hand
R	Right
L	Left

⑤ Direction of cut

Symbol	Unit
M	mm
U	in

⑦ Unit

Symbol	Type
T~: General type	
–	JIS
E	ISO
A	ANSI
E~: Shank type	
–	Cylindrical
W	Weldon
C	Combination

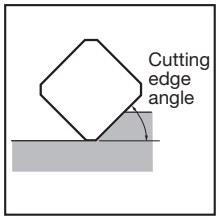
⑨ Attachment specification

Symbol	Type
W	Wedge clamp
L	Long shank
LE	Long edge
CS	Carbide shank

⑪ Additional feature

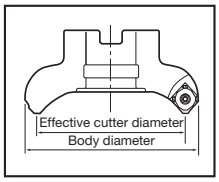
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
T	A	W	13	R	080	M	25.4	-	06	--
E	V	H	07	R	012	M	12.0	-	02	L

② Angle, Category	
Symbol	Cutting edge angle
P	90° ~ 80°
E	80° ~ 70°
D	60° ~ 50°
A	50° ~ 40°
L	With long cutting edge
Others	Special



④ Cutting edge length	
Symbol	Size (ℓ)
S	
T	
R	
H	
A	

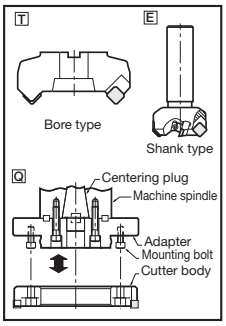
⑥ Effective cutter diameter	
Symbol	Size
M: Unit in mm	
080	80 mm
200	200 mm
I: Unit in inch	
200	2 in
10H	10 in

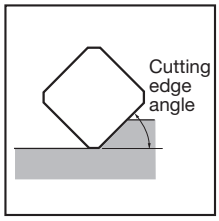


⑧ Attachment size	
Symbol	Size
M: Unit in mm Hole diameter	
20.0	20 mm
25.4	25.4 mm
31.7	31.75 mm
47.6	47.625 mm
I: Unit in inch Hole diameter	
0075	0.75 in
0125	1.25 in
0200	2 in
E~: Shank type Shank diameter	
10.0	10 mm
12.0	12 mm
16.0	16 mm
25.0	25 mm
32.0	32 mm

⑩ Number of inserts

TAC Mills [Previous products]





Symbol	Type
V	Vertical insert
Q	Quick change
E	Shank
T	Bore
S	Special
D	All PCD tipped
Q	All PCBN tipped

① Type

Symbol	Cutting edge angle
X	Others
Z	Others
V	Others
P	90° ~ 80°
E	80° ~ 70°
D	60° ~ 50°
A	50° ~ 40°

② Angle

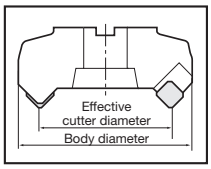
Symbol	Relief angle
C	7°
D	15°
E	20°
F	25°
N	0°
P	11°
X	Others



③ Relief angle

R		S		C		T		Inscribed circle dia. (mm)
Symbol	Size	Symbol	Size	Symbol	Size	Symbol	Size	
		06	6.35	06	6.5	11	11	6.35
		07	7.94	08	8.1	13	13.8	7.94
09	9.525	09	9.525	09	9.7	16	16.5	9.525
10	10	–	–	–	–	–	–	10
12	12	–	–	–	–	–	–	12
12	12.7	12	12.7	12	12.9	22	22	12.7
15	15.875	15	15.875	16	16.1	27	27.5	15.875
16	16	–	–	–	–	–	–	16
19	19.05	19	19.05	19	19.3	33	33	19.05
20	20	–	–	–	–	–	–	20
25	25	–	–	–	–	–	–	25
25	25.4	25	25.4	25	25.8	44	44	25.4
31	31.75	31	31.75	32	32.2	55	55	31.75

④ Cutting edge length



Symbol	Effective diameter (mm)
050	50
063	63
080	80
100	100
125	125
160	160
200	200
250	250
315	315
355	355
400	400

⑤ Effective cutter diameter

Example

Metric system

①	②	③	④	⑤	⑥
T	F	E	12	063	R

Example

Inch system

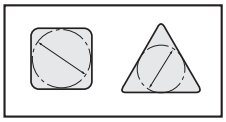
①	⑧	③	⑨	⑩	⑪	⑥	⑦
T	M	D	4	4	06	R	I

⑧ Application, etc.

Symbol	Application, geometry etc.
M	For machining centers
F	For finishing
G	General purpose
S	For square shoulder milling
H	High rake geometry
P	Negative axial, positive radial rake geometry
R	Use round inserts
U	For difficult to cut materials
C	For chamfering
L	Long edge type
T	For threading

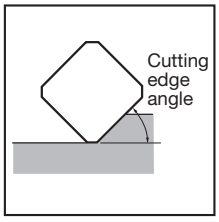
⑨ Size of applicable insert

Symbol	I. C. (mm)
3	9.525
4	12.7
5	15.875
6	19.05
7	22.225
8	25.4
9	31.75



⑩ Angle

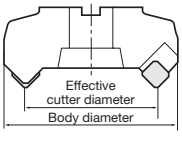
Symbol	Cutting edge angle
0	90° ~ 80°
1	80° ~ 70°
2	70° ~ 60°
3	60° ~ 50°
4	50° ~ 40°
5	40° ~ 30°
6	30° ~ 20°
7	20° ~ 10°



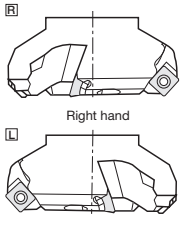
⑪ Effective cutter diameter

Symbol	Effective diameter (mm)
50	50
63	63
03	80
04	100
05	125
06	160
08	200
10	250
12	315
14	355
16	400

Note: For diameter of less than 80mm,nominal dimensions (mm) of effective diameter are shown

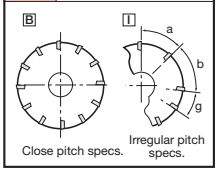


⑥ Direction of cut



⑦ Additional feature

B	Close pitch
I	Irregular pitch
A(-A)	Modified type
S	For distinguishing shank size
L	Long shank



Note: The above nomenclature is not applicable for VSN6000I, MS cutter, TCB, PES1500 and TBN etc.

Designation system for Insert

Symbol	Hole	Shape of hole	Chipbreaker	Shape
N	Without	–	Without	
R			Single-sided	
F			Double-sided	
W	With	Partly cylindrical hole, single-side 40° ~ 60° Counter sink	Without	
T			Single-sided	
Q		Partly cylindrical hole, double-side 40° ~ 60° Counter sink	Without	
U			Double-sided	
B		Partly cylindrical hole, single-side 70° ~ 90° Counter sink	Without	
H			Single-sided	
C		Partly cylindrical hole, double-side 70° ~ 90° Counter sink	Without	
J			Double-sided	
X	–	–	–	

④ Groove and hole

Shape	Cutting edge length (ℓ)
S	
T	
R	
H	
A	

⑤ Cutting edge length

Symbol	Thickness (mm)
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

Thickness

⑥ Thickness

(Example)

Metric

①	②	③	④	⑤
P	N	C	U	09

(Example)

Inch

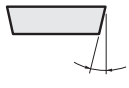
①	②	③	④	⑤
S	D	K	N	4

① Shape

Symbol	Shape	Nose angle (degree)	Figure
H	Hexagonal	120°	
S	Square	90°	
T	Triangular	60°	
C	Rhombic	80°	
E		75°	
G		70°	
L	Rectangular	90°	
A	Parallelogram	85°	
R	Round		
W	Wiper	80°	
W	Special	–	
O	Octagonal	135°	
P	Pentagonal	108°	
X	Special	Others	
Y	Special		
Z	Special		

② Relief angle

Symbol	Relief angle
C	7°
D	15°
E	20°
F	25°
G	30°
M	Others
N	0°
P	11°
Q	Other applications
O	Other applications
X	Other applications
S	Other applications
W	2-step relief

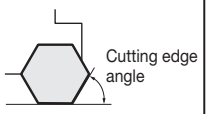


③ Accuracy (mm)

Symbol (class)	Corner height (m)	Thickness (s)	I. C. dia. (ød)
A	± 0.005	± 0.025	± 0.025
C	± 0.013	± 0.025	± 0.025
E	± 0.025	± 0.025	± 0.025
G	± 0.025	± 0.13	± 0.025
H	± 0.013	± 0.025	± 0.013
K	± 0.013	± 0.025	± 0.05 ~ ± 0.13
M	± 0.08 ~ ± 0.18	± 0.13	± 0.05 ~ ± 0.13
N	± 0.08 ~ ± 0.18	± 0.025	± 0.05 ~ ± 0.13

Standard I. C. dia.	I. C. dia. (ød) tolerance		Corner height (mm) tolerance	
	J, K, L, M, N	U	M, N	U
6.35	± 0.05	± 0.08	± 0.08	± 0.13
9.525				
12.7	± 0.08	± 0.13	± 0.13	± 0.2
15.875	± 0.1	± 0.18	± 0.15	± 0.27
19.05				
25.4	± 0.13	± 0.25	± 0.18	± 0.38

Symbol	Cutting edge angle
A	45°
D	60°
E	75°
F	85°
G	70°
H	87°
P	90°
U	Special, small entering angle
Z	Special, universal



⑦ Cutting edge angle

Symbol	Relief angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Special



⑧ Wiper relief angle

Symbol	Cutting edge	Shape
F	Sharp	
E	Round	
T	Chamfer	
S	Combination	
P	Combination	

⑨ Major cutting edge

Symbol	Hand of insert
R	Right
L	Left
N	Without

⑩ Hand of insert

Symbol	Description
HM	General-purpose high feed milling chipbreaker
MM	General-purpose milling chipbreaker
MW	Milling insert with wiper edge
B	Milling insert for burr removal
D	Insert with diamond sintered body
W	Wiper insert (multiple corners)
WS	Wiper insert (single corner)
WD	Wiper insert (with diamond sintered body)
BD	Wiper for burr removal (diamond sintered body)
MJ	General-purpose milling chipbreaker
MH	Milling chipbreaker with reinforced cutting edge
ML	Milling chipbreaker for low cutting force
MS	Milling chipbreaker for stainless steel
HJ	High feed milling chipbreaker
AJ	Milling chipbreaker for non-ferrous metal
NMJ	General-purpose milling chipbreaker with serration
NAJ	Milling chipbreaker with serration for non-ferrous metal

⑪ Supplementary symbol

⑥	⑦	⑧	⑨	⑩		⑪
05	G	N	E	R	-	MJ
2	Z		T	N		16
⑥	⑦		⑨	⑩		⑪

④ Groove and hole		
Symbol	Shape of hole	Hole
A	Without	With
F	Double side	Without
G	Double side	With
M	Single side	With
N	Without	With
U	Without	Without
W	Without	With

⑤ Inscribed circle (I. C.)		
Symbol		I. C. dia. (mm)
Inch	3	9.525
	4	12.7
	5	15.875
	6	19.05

⑥ Thickness		
Symbol		Thickness (mm)
Inch	2	3.18
	3	4.76
	4	6.35
	6	9.52

⑦ Corner radius	
Symbol	Corner radius (mm)
1	0.4 (0.397)
2	0.8 (0.794)
3	1.2 (1.191)
4	1.6 (1.588)
5	2.0 (1.984)
6	2.4 (2.381)
Symbol	Description
F	Special design (e.g. for MS cutter)
H	Chamfer for corner angle 60°
S	Chamfer for corner angle 15°
Z	Flat chamfer

*For wiper inserts, the designation uses “W” as the shape symbol of inch items. For metric items, the shape symbol is the same as that of regular inserts, and a supplementary symbol, such as W, WS, and WD, is at the end of each designation.

Application Overview

Face milling, High feed milling
H020 - H119 page

General face milling

DOTRIPLEMILL H060 page

DOOCTO H063 page

DOQUADMILL H067 page

DOPENT H070 page



Aluminium machining

TUNGSPEEDMILL H078 page

TFE H082 page

TUNG-ALUMILL H174 page

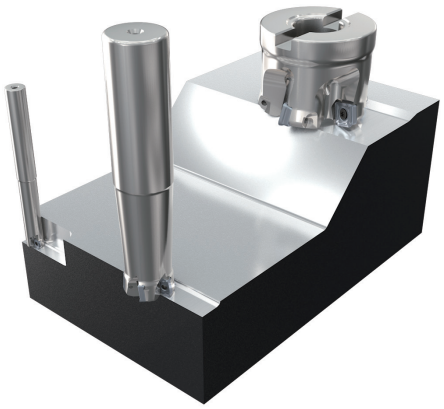


High feed milling

DOFEED H026 page

DOTWISTBALL H036 page

MILLQUADFEED H046 page



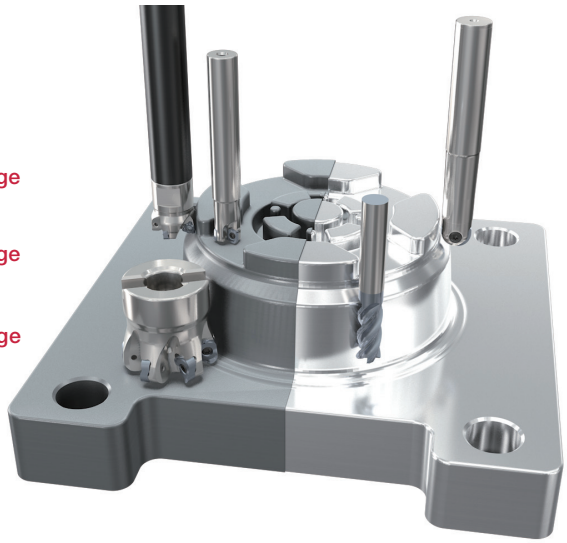
Profile milling
H202 - H236 page

Roughing

TUNGFORCEFEED H022 page

DOFEED H026 page

DOTWISTBALL H036 page



Semi-finishing

SOLIDMEISTER I006 page

Finishing

BALLFINISHNOSE H206 page

Shoulder milling

H121 - H188 page

Shoulder milling (double side)

DOFTRI H122 page

DOREC H167 page

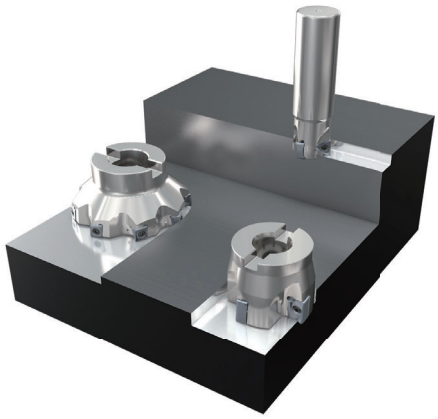
TECMILL H171 page

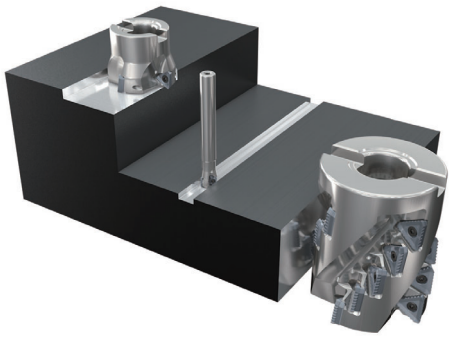
Shoulder milling (single side)

TUNG-TRI H125 page

TUNGTRISHRED H135 page

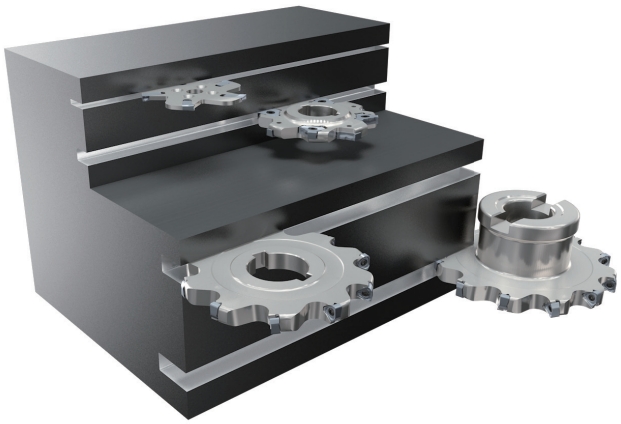
TUNGFREC H138 page





Other applications

H189 - H201 page



Slot milling

TUNGMINISLIT H190 page

TUNGTHINSLIT H194 page

TUNGUNIVERSALSLOT H196 page

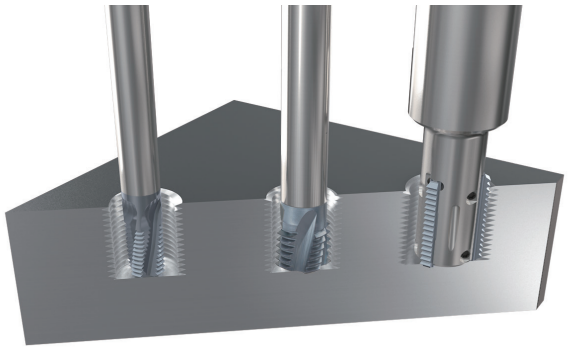
TECTANGENTIALSLOT H199 page

Thread milling

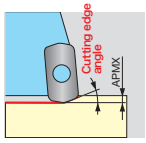
Thread milling cutter I122 page

THREADMILLING I102 page

TUNGMEISTER I060 page



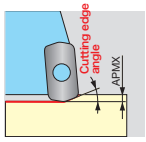
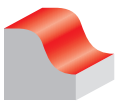
High-Feed Milling - Quick Guide

	TUNGFORCEFEED	DOFEED	DOTWISTBALL	DOFEEDQUAD	MILLQUADFEED
					
Cutting edge angle	12°	15° / 17°	20° / 25°	13°	7° / 10° / 12° / 14°
Depth of cut (APMX)	0.5	1.0 / 1.5	1.3 / 2.0	2	1 / 1.5 / 2 / 2.5
Tool diameter	ø8 - ø16	ø16 - ø200	ø20 - ø63	ø50 - ø125	ø25 - ø160
Workpiece material	P M K S H	P M K S H	P M K S H	P M K S H	P M K S H
No. of corners (insert)	2	4	4	8	4
Face milling	★ ★ ☆ ★ ★	★ ★ ☆ ☆ ★	★ ☆ ☆ ☆ ☆	★ ★ ☆ ★ ☆	★ ★ ☆ ★ ★
Shoulder milling	☆	☆	☆	★	☆
Profile milling	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆		☆ ☆ ☆
Slot milling	★	★	★		★
Other applications	★	★	★		★
Reference pages	H022 - H025	H026 - H035	H036 - H042	H043 - H045	H046 - H050

★ : Most suitable
☆ : Suitable
★ : Usable

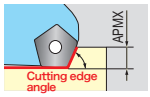
Icon

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

	MILLFEED TXP				
					
Cutting edge angle	10° / 15° / 20°				
Depth of cut (APMX)	1.5 / 3				
Tool diameter	ø20 - ø160				
Workpiece material	P M K H				
No. of corners (insert)	3				
 Face milling	★ ★ ☆ ★ ★				
 Shoulder milling	☆				
 Profile milling	☆ ☆ ☆				
 Slot milling	★				
Other applications	★				
Reference pages	H051 - H057				

★ : Most suitable
☆ : Suitable
★ : Usable

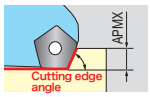
Face Milling - Quick Guide

	DO TRIPLE MILL	DOOCTO	DOPENT	DOQUAD MILL	TUNGMILL
					
Cutting edge angle	45°	44° / 45° / 15°	70°	88°	30°~45°
Depth of cut (APMX)	6 / 3.4	4.75 / 7.5 / 3.5 / 1.5	6.4	9.5	4 / 5 / 2
Tool diameter	ø50 - ø160	ø63 - ø315	ø32 - ø160	ø50 - ø100	ø25 - ø200
Workpiece material	P M K S H	P M K S H	P M K N S	P M K S H	P M K S N
No. of corners (insert)	8 / 16	8 / 16	10	8	4
Face milling	★ ☆ ★ ★	★ ★ ★ ★	★ ★ ☆ ☆	★ ★ ☆ ☆	★ ★ ★ ★
Shoulder milling				★	
Profile milling	★				
Slot milling				★	
Other applications	☆	☆			☆
Reference pages	H060 - H062	H063 - H066	H070 - H072	H067 - H069	H073 - H077

★ : Most suitable
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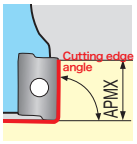
Icon

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Chamfering
Deep shoulder milling
Shoulder milling

	TFE	TUNGSMILL		DPD EDPD	NMS, EMS MS, SFP, EFP
					
Cutting edge angle	85°	90°	90°	90°	-
Depth of cut (APMX)	8 / 3.5 / 1.5	4.5	4 / 11	8	0.2
Tool diameter	ø63 - ø125	ø50 - ø160	ø25 - ø125	ø63 - ø160	ø80 - ø300
Workpiece material	P M K N	N	N	N	P M K S
No. of corners (insert)	4 / 1 / 2	1	1 / 2	1	4
Face milling	★ ★ ★ ☆	★ ★ ★ ☆	★ ★ ☆ ☆	★ ☆ ★ ☆	★ ☆ ★ ☆
Shoulder milling		★	★	★	
Profile milling					
Slot milling					
Other applications					
Reference pages	H082 - H085	H080 - H081	H078 - H079	H086 - H087	H114 - H119

★ : Most suitable
☆ : Suitable
★ : Usable

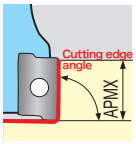
Shoulder milling - Quick Guide

	TUNGFREC	TUNGREC		TUNG-TRI	
			Roughing 		Roughing 
Cutting edge angle	90°	90°	90°	90°	90°
Depth of cut (APMX)	6	7 / 10.6 / 16.7	30.4 - 48.8	6 / 10 / 15	54 - 97 (-153)
Tool diameter	ø8 - ø40	ø12 - ø160	ø25 - ø50	ø12 - ø160	ø50 - ø100
Workpiece material	P M K N S H	P M K N S	P M K N S	P M K N S	P M K N S
No. of corners (insert)	2	2	2	3	3
Face milling	★ ☆ ★ ☆ ☆	☆ ☆ ★ ★ ★	★ ★ ★ ★ ★	★ ☆ ★ ☆ ☆	★ ★ ★ ☆ ☆
Shoulder milling	★ ★ ★	★ ☆ ★	★ ☆ ★	★ ★ ☆	★ ★ ★
Profile milling	★ ☆ ☆	★ ☆ ★	★ ★ ★	★ ★ ☆	★ ★ ★
Slot milling	★	☆		★	
Other applications	★	★		★	
Reference pages	H138 - H142	H143 - H156		H125 - H134	

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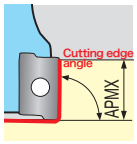
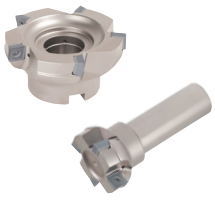
Icon

Thin workpiece
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	TUNGTSHRED		TUNGQUAD		TUNG-ALUMILL
		Roughing 		Roughing 	
Cutting edge angle	90°	90°	90°	90°	90°
Depth of cut (APMX)	16	61 - 76	4	20.3 - 24.2	13 - 16
Tool diameter	ø50 - ø100	ø63 - ø80	ø12 - ø40	ø20 - ø25	ø25 - ø125
Workpiece material	P M K S	P M K S	P M K N S	P M K N S	N
No. of corners (insert)	3	3	4	4	2
Face milling	☆ ★ ★ ☆ ★	★ ★ ★ ☆ ★	☆ ☆ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ☆
Shoulder milling	★ ★ ☆	☆ ★ ☆	★ ★ ☆	★ ☆ ★	★ ★ ★
Profile milling					★ ★ ★
Slot milling	★	★	★		★
Other applications			★		☆
Reference pages	H135 - H137	H135	H157 - H161		H174 - H176

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Shoulder milling - Quick Guide

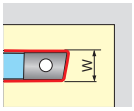
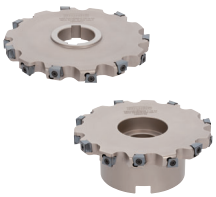
	TUNGMILL	DOFORCE TRI	DOREC	TECMILL	
					Roughing 
Cutting edge angle	90°	90°	90°	90°	90°
Depth of cut (APMX)	10	11	9.0 / 16	9.7 / 15.1	58.5 / 66.9
Tool diameter	ø32 - ø200	ø32 - ø125	ø25 - ø160	ø32 - ø125	ø50 - ø63
Workpiece material	P M K N S H	P M K S H	P M K S H	P M K S H	P M K S H
No. of corners (insert)	4	6	4	4	4
Face milling	☆ ☆ ★ ★ ★	★ ☆ ★ ★ ☆	★ ★ ★ ★ ★	☆ ★ ★ ★ ★	★ ★ ★ ★ ★
Shoulder milling	★ ★ ★	★ ★ ☆	★ ★ ☆	★ ★ ★	★ ☆ ☆
Profile milling			★ ★ ★		
Slot milling	★	☆	★		
Other applications	★	★	☆	☆	
Reference pages	H162 - H166	H122 - H124	H167 - H170	H171 - H173	

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Slot milling - Quick Guide

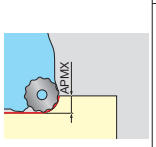
	TUNGMSLIT	TUNGTSLIT	TUNGUSLOT	TECTSLOT	
					
Depth of cut (W)	1.6 - 4.1	4 - 8	10 - 16	16 - 25	
Tool diameter	ø63 - ø125	ø80 - ø200	ø80 - ø160	ø100 - ø250	
Workpiece material	P M K	P M K S	P M K S	P M K S	
No. of corners (insert)	1	6	6	4	
Face milling	★ ★ ★ ★ ★	★ ★ ★ ★ ★	☆ ★ ★ ★ ☆	☆ ★ ★ ★ ☆	
Shoulder milling	★ ★	★ ★	☆ ☆ ★	☆ ☆ ★	
Profile milling					
Slot milling	★	★	★	★	
Other applications	★	★			
Reference pages	H190 - H193	H194 - H195	H196 - H198	H199 - H201	

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Shoulder milling

Profile milling - Quick Guide

	DO TWIST BALL	ROUNDSPLIT	BALL ROUGH NOSE	BALL FINISH NOSE	DO MINI MILL
					
Depth of cut (APMX)	4 / 5 / 6	6 / 8	11.8 / 13.6 / 17.7	4 - 16	1
Tool diameter	ø20 - ø63	ø32 - ø125	ø16 - ø25	ø8 - ø32	ø16 - ø25
Workpiece material	P M K S H	P M K N S	P M K S H	P M K N S H	P H
No. of corners (insert)	4	4 / 8	2	1	6
Face milling	☆ ☆ ☆	☆ ☆ ★	★ ☆ ☆	★ ★ ☆	★ ★ ☆
Shoulder milling	★	☆	☆	☆	☆
Profile milling	★ ★ ☆	★ ☆ ☆	★ ☆ ☆	★ ☆ ☆	★ ☆ ★
Slot milling	☆	☆	★	★	★
Other applications	★	★	★	★	☆
Reference pages	H036 - H042	H217 - H220	H204 - H205	H206 - H209	H211

★ : Most suitable
☆ : Suitable
★ : Usable

Icon

- Thin workpiece
- Face milling
- Internal threading
- Ramping
- External threading
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- Hole enlarging
- Hollow workpiece
- Cutting off
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- Deep shoulder milling
- Shoulder milling

Thread milling - Quick Guide

	SOLIDTHREAD	TUNGMEISTER	THREADMILLING	
			ETTL, ETLN	Thread milling cutter
				
Pitch	0.25 - 3.5	0.5 - 4.5	1 - 3	1.5 - 6
Tool diameter	ø0.7 - ø20	ø10 - ø21.7	ø17 - ø30	ø23 - ø80
Workpiece material	P M K S	P M K S	P M K S	P M K
No. of corners (insert)	-	-	1 / 2	2
Thread milling	★ ★	★ ★	★ ★	★ ★
Reference pages	I102 - I121	I116 - I117	I122 - I125	I126 - I127

★ : Most suitable
☆ : Suitable
★ : Usable

Icon

Thin workpiece
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DOFEED

Innovative high-feed cutters!

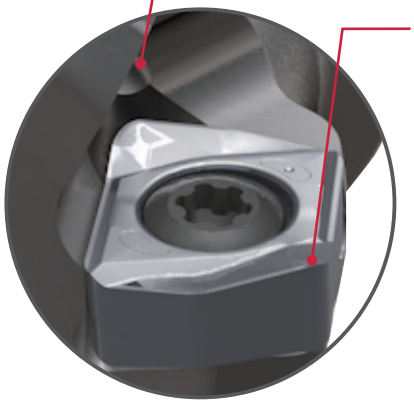
DoFeed offers outstanding productivity thanks to its close-pitch insert orientation and light cutting geometry. The rich lineup is suitable for a wide variety of applicaions.



Outstanding productivity

Excellent chip evacuation prevents chip packing





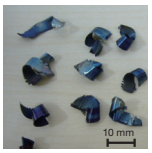
Optimized coolant jet delivery effectively removes chip and prevent it from re-cutting

Large inclination forms ideal chips and controls the chips flow



DOFEED

Good
Curl consistently at ideal length



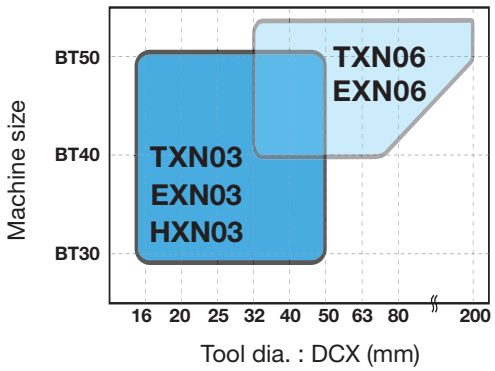
Competitor
Poor
Crushed or unstable

Steel	
Cutter	: TXN06R050M22.0E05
Insert	: LNMU06X5ZER-MJ
Grade	: AH725
Workpiece material	: Carbon steels (S55C / C55)
Cutting speed	: *Vc* =180 m/min
Feed per tooth	: *fz* = 1.8 mm/t
Depth of cut	: *ap* =1.0 mm
Coolant	: Dry
Machine	: Vertical M/C, BT50

Rich lineup of cutter bodies from ø16 to ø200 mm

Insert	Bore type	Shank type	Modular type
LN*U03  Max. ap = 1.0 mm	**TXN03** (DCX = 40 - 50 mm) 	**EXN03** (DCX = 16 - 40 mm) 	**HXN03** (DCX = 16 - 40 mm) 
LN*U06  Max. ap = 1.5 mm	**TXN06** (DCX = 50 - 200 mm) 	**EXN06** (DCX = 32 - 40 mm) 	

Applicable area



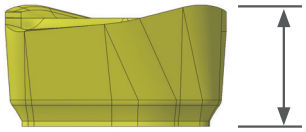
Reference pages: H026 - H035

TUNGFORCE FEED



Small-diameter high feed milling cutter with impressive machining efficiency and reliability

Built to perform at higher machining conditions



Thick insert corner
Max 10 % thicker
than competitors'

Strong insert corner for high feed operations

- Thick insert corner is designed to withstand fracturing force

Robust and easy-to-handle insert screws

- M2 screws reduce screw neck shears under high cutting forces. A larger screw enhances insert's fixation and easy handling.



TUNGFORCE FEED (M2)



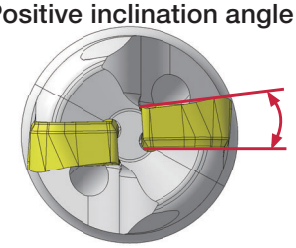
Competitor (M1.8)

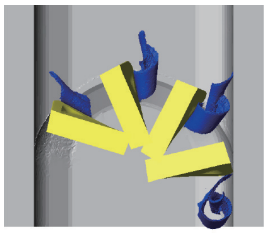
Proper chip formation assures a reliable machining process

Positive inclination angle of the insert promotes smooth chip evacuation

- The positive cutting edge position contributes to a controlled chip formation and easy chip evacuation when machining next to shoulder and slotting operation.

Positive inclination angle





Proper chip control eliminates recuts and premature insert failure

Chip formation

TUNGFORCE FEED



Ideal curled chips

Competitor



Crushed chips

P Steel

Cutter	: EXLS02M010C10.0LF20R02
Insert	: LSMT0202ZER-HM AH3225
Workpiece material	: S55C
Cutting speed	: *Vc* = 200 m/min
Application	: Slotting
Depth of cut	: *ap* = 0.5 mm × 20 passes
Coolant	: Dry
Machine	: Vertical M/C, BT40

Reference pages: H022 - H025

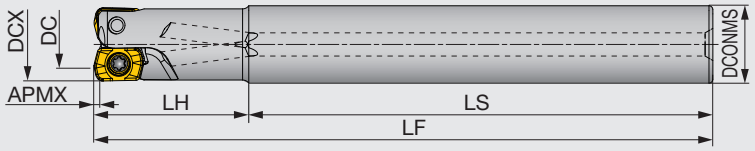
TUNGFORCE FEED

EXLS

High feed endmill, shank type

GAMP = +4°, GAMF = -21° ~ -17°





Designation	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	WT (kg)	Air hole	Insert
EXLS02M008C08.0LH16R01	0.5	8	1	4.29	8	59	16	75	0.02	With	LSMT02...
EXLS02M008C08.0LH30R01	0.5	8	1	4.29	8	59	31	90	0.03	With	LSMT02...
EXLS02M010C10.0LH20R02	0.5	10	2	6.28	10	60	20	80	0.04	With	LSMT02...
EXLS02M010C10.0LH40R02	0.5	10	2	6.28	10	60	40	100	0.05	With	LSMT02...
EXLS02M010C08.0LH20R02	0.5	10	2	6.28	8	60	20	80	0.03	With	LSMT02...
EXLS02M012C12.0LH50R02	0.5	12	2	8.31	12	60	50	110	0.08	With	LSMT02...
EXLS02M012C12.0LH20R03	0.5	12	3	8.31	12	60	20	80	0.06	With	LSMT02...
EXLS02M012C10.0LH20R03	0.5	12	3	8.31	10	60	20	80	0.04	With	LSMT02...
EXLS02M016C16.0LH50R03	0.5	16	3	12.31	16	70	50	120	0.17	With	LSMT02...
EXLS02M016C16.0LH30R05	0.5	16	5	12.31	16	70	30	100	0.14	With	LSMT02...

SPARE PARTS

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

*Recommended clamping torque (N·m):CSPB-2H=0.7

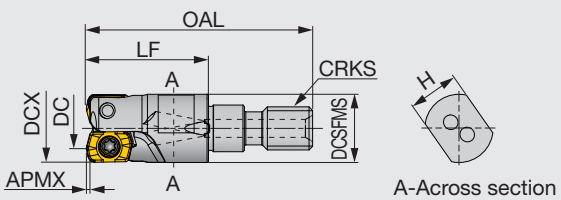
TUNGFORCE FEED

HXLS

High feed endmill, shank type

GAMP = +4°, GAMF = -21° ~ -17°





Designation	APMX	DCX	CICT	DC	OAL	LF	H	DCSFMS	CRKS	WT (kg)	Air hole	Insert
HXLS02M008M06R01	0.5	8	1	4.29	33.5	19	7	9.5	M6	0.01	With	LSMT02...
HXLS02M010M06R02	0.5	10	2	6.28	31.5	17	7	9.5	M6	0.01	With	LSMT02...
HXLS02M012M06R02	0.5	12	2	8.31	31.5	17	7	10	M6	0.01	With	LSMT02...
HXLS02M012M06R03	0.5	12	3	8.31	31.5	17	7	10	M6	0.01	With	LSMT02...
HXLS02M016M08R03	0.5	16	3	12.31	40	23	10	13	M8	0.03	With	LSMT02...
HXLS02M016M08R05	0.5	16	5	12.31	40	23	10	13	M8	0.03	With	LSMT02...

SPARE PARTS

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

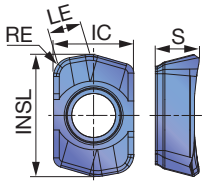
*Recommended clamping torque (N·m):CSPB-2H=0.7

Reference pages: Inserts → H023, Standard cutting conditions → H024 - H025, TungFlex → H210

INSERT

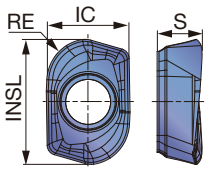
LSMT-HM (High feed)





LSMT-MM (Radius)





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

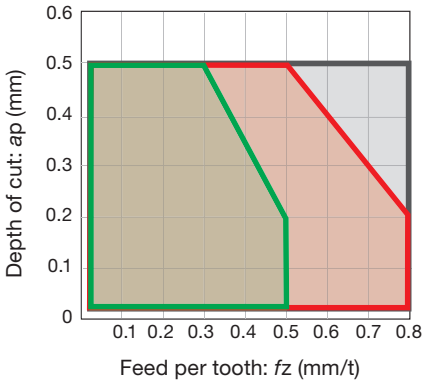
★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH3225	Coated AH8015	LE	INSL	IC	S
LSMT0202ZER-HM	1	0.5	●	●	1.7	6.4	4.2	2.3
LSMT0202R2-MM	2	2.0	●	●	-	6.4	4.3	2.3

●: Line up

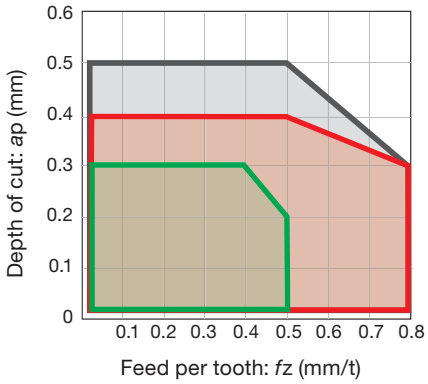
APPLICATION

LSMT02-HM



- For standard shanks in ≤ 3xD
- For long-neck shanks in ≥ 4xD
- For modular head shanks in ≥ 7xD

LSMT02-MM



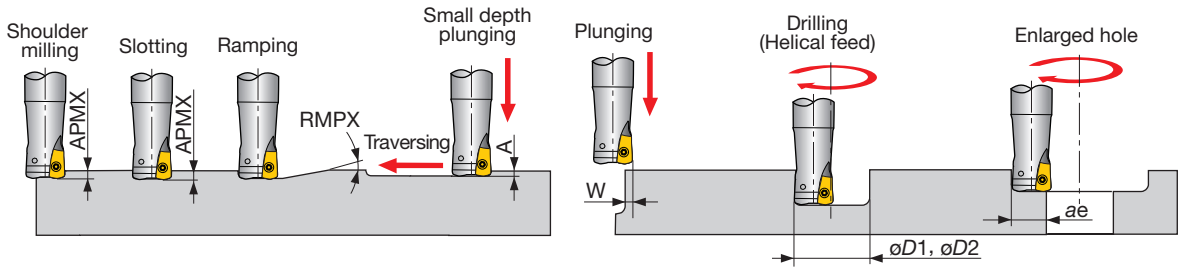
- For standard shanks in ≤ 3xD
- For long-neck shanks in ≥ 4xD
- For modular head shanks in ≥ 7xD

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

STANDARD CUTTING CONDITIONS

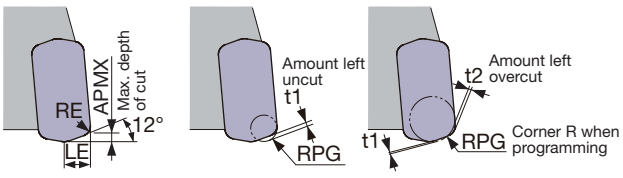
ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels S45C, S55C, etc. C45, C55, etc.		- 300HB	First choice	AH3225	100 - 300	0.2 - 0.8
			- 300HB	Wear resistance	AH8015	100 - 300	0.2 - 0.8
	Alloy steels SCM440, etc. 42CrMo4, etc.		- 300HB	First choice	AH3225	100 - 300	0.2 - 0.8
			- 300HB	Wear resistance	AH8015	100 - 300	0.2 - 0.8
	Prehardened steels NAK80, PX5, etc.		30 - 40HRC	First choice	AH8015	100 - 200	0.2 - 0.5
			30 - 40HRC	Fracture resistance	AH3225	100 - 200	0.2 - 0.5
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200HB	First choice	AH3225	100 - 150	0.2 - 0.5
K	Gray cast irons FC250, FC300, etc. 250, 300, etc.		150 - 250HB	First choice	AH8015	100 - 300	0.2 - 0.8
			150 - 250HB	Fracture resistance	AH3225	100 - 300	0.2 - 0.8
	Ductile cast irons FCD600, etc. 600-3, etc.		150 - 250HB	First choice	AH8015	80 - 200	0.2 - 0.8
			150 - 250HB	Fracture resistance	AH3225	80 - 200	0.2 - 0.8
S	Titanium alloy Ti-6Al-4V, etc		- 40HRC	First choice	AH3225	30 - 60	0.1 - 0.3
			- 40HRC	Wear resistance	AH8015	30 - 60	0.1 - 0.3
	Heat resistance alloy Inconel, Hastelloy, etc.		- 40HRC	First choice	AH8015	20 - 50	0.1 - 0.3
			- 40HRC	Fracture resistance	AH3225	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH8015	80 - 150	0.1 - 0.5
		SKD11, etc. X153CrMoV12, etc.	50~60HRC	First choice	AH8015	50 - 70	0.1 - 0.3

APPLICATION RANGE



Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Max. cutting width in plunging W	Min. machining *øD1*	Max. machining *øD2*	Max. cutting width in enlarged hole ae
E/HXLS02M008…	8	0.5	4°	0.2	2	10	15	5.9
E/HXLS02M010…	10	0.5	3.3°	0.2	2	14	19	7.9
E/HXLS02M012…	12	0.5	2°	0.2	2	18	23	9.9
E/HXLS02M016…	16	0.5	1.3°	0.2	2	26	31	13.9

Tool geometry on programming



LSMT02...-HM

Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0 *Recommend	0.162	0
1.5	0.07	0.14
2	0	0.34

Tool dia.: ø*D*c (mm), Number of revolutions: *n* (min-1), Feed speed: *V*f (mm/min), Max. depth of cut: *a*p = 0.5 mm, Number of teeth: CICT

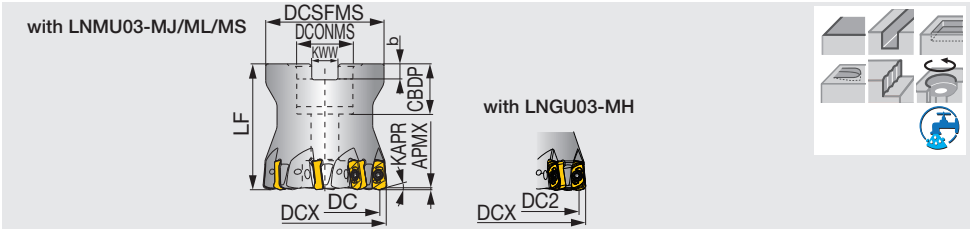
ø8, CICT = 1		ø10, CICT = 2		ø12			ø16		
n	*V*f	*n*	*V*f	*n*	*V*f		*n*	*V*f	
					CICT = 2	CICT = 3		CICT = 3	CICT = 5
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
5970	2390	4780	3820	3980	3180	4780	2990	3590	5980
				*V*c = 150 m/min, *f*z = 0.4 mm/t					
4780	1910	3820	3060	3190	2550	3830	2390	2870	4780
				*V*c = 120 m/min, *f*z = 0.4 mm/t					
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
5970	2990	4780	4780	3980	3980	5970	2990	4490	7480
				*V*c = 150 m/min, *f*z = 0.5 mm/t					
1590	320	1270	510	1060	420	640	800	480	800
				*V*c = 40 m/min, *f*z = 0.2 mm/t					
1190	240	1000	400	800	320	480	600	360	600
				*V*c = 30 m/min, *f*z = 0.2 mm/t					
4780	1430	3820	2290	3190	1910	2870	2390	2150	3590
				*V*c = 120 m/min, *f*z = 0.3 mm/t					
2390	480	1910	760	1590	640	950	1190	710	1190
				*V*c = 60 m/min, *f*z = 0.2 mm/t					

DOFEED
TXN03

High feed mill, for 4-corner double sided inserts

GAMP = +6°,GAMF = +12° ~ 13°





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

SPARE PARTS

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

*Recommended clamping torque (N·m):CSPB-2.5=1.3

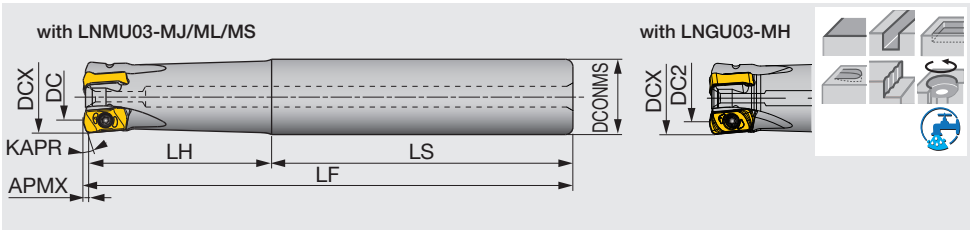
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

DOFEED
EXN03

High feed endmill, shank type, with center through coolant hole, for 4-corner double sided inserts

GAMP = +6°, GAMF = +5° ~ +11°





Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	With	LN*U03...
EXN03R016M16.0-02L	1	16	2	9.6	9.8	16	150	50	100	15°	0.2	With	LN*U03...
EXN03R018M16.0-02	1	18	2	11.5	11.7	16	100	30	70	17°	0.2	With	LN*U03...
EXN03R018M16.0-02L	1	18	2	11.5	11.7	16	150	25	125	17°	0.2	With	LN*U03...
EXN03R020M20.0-03	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-03L	1	20	3	13.5	13.6	20	160	80	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-04	1	20	4	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R022M20.0-03	1	22	3	15.5	15.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R022M20.0-03L	1	22	3	15.5	15.6	20	160	30	130	17°	0.4	With	LN*U03...
EXN03R022M20.0-04	1	22	4	15.5	15.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R025M25.0-04	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R025M25.0-04L	1	25	4	18.5	18.6	25	180	100	80	17°	0.6	With	LN*U03...
EXN03R025M25.0-05	1	25	5	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R028M25.0-04	1	28	4	21.5	21.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R028M25.0-04L	1	28	4	21.5	21.6	25	180	35	145	17°	0.7	With	LN*U03...
EXN03R028M25.0-05	1	28	5	21.5	21.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R030M32.0-04	1	30	4	23.5	23.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R030M32.0-04L	1	30	4	23.5	23.6	32	200	120	80	17°	0.9	With	LN*U03...
EXN03R030M32.0-05	1	30	5	23.5	23.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05L	1	32	5	25.5	25.6	32	200	120	80	17°	1.1	With	LN*U03...
EXN03R032M32.0-06	1	32	6	25.5	25.6	32	150	70	80	17°	0.9	With	LN*U03...
EXN03R035M32.0-05	1	35	5	28.5	28.6	32	150	35	115	17°	0.9	With	LN*U03...
EXN03R035M32.0-05L	1	35	5	28.5	28.6	32	200	35	165	17°	1.2	With	LN*U03...
EXN03R035M32.0-06	1	35	6	28.5	28.6	32	150	35	115	17°	0.9	With	LN*U03...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

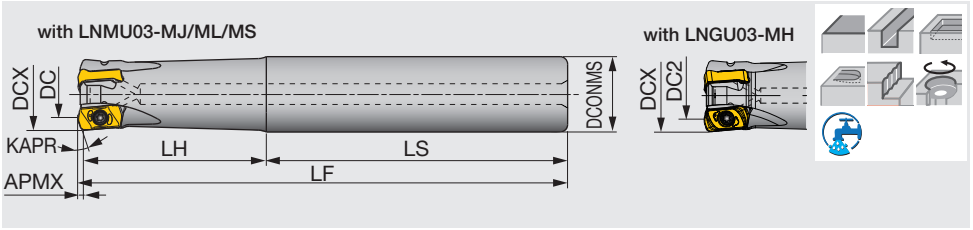
Reference pages: Inserts → H029, Standard cutting conditions → H030 - H031

DOFEED
EXN03-C

High feed endmill, shank type, with coolant directly to the tool tips, for 4-corner double sided inserts

GAMP = +6°,GAMF = +5° ~ +11°





Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02-C	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	With	LN*U03...
EXN03R016M16.0-02L-C	1	16	2	9.6	9.8	16	150	50	100	15°	0.2	With	LN*U03...
EXN03R020M20.0-03-C	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-03L-C	1	20	3	13.5	13.6	20	160	80	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-04-C	1	20	4	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R025M25.0-04-C	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R025M25.0-04L-C	1	25	4	18.5	18.6	25	180	100	80	17°	0.6	With	LN*U03...
EXN03R025M25.0-05-C	1	25	5	18.5	18.6	25	130	60	80	17°	0.5	With	LN*U03...
EXN03R032M32.0-05-C	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05L-C	1	32	5	25.5	25.6	32	200	120	80	17°	1.1	With	LN*U03...
EXN03R032M32.0-06-C	1	32	6	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R040M32.0-06-C	1	40	6	33.6	33.7	32	150	45	105	17°	1	With	LN*U03...
EXN03R040M32.0-06L-C	1	40	6	33.6	33.7	32	220	45	175	17°	1.4	With	LN*U03...

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

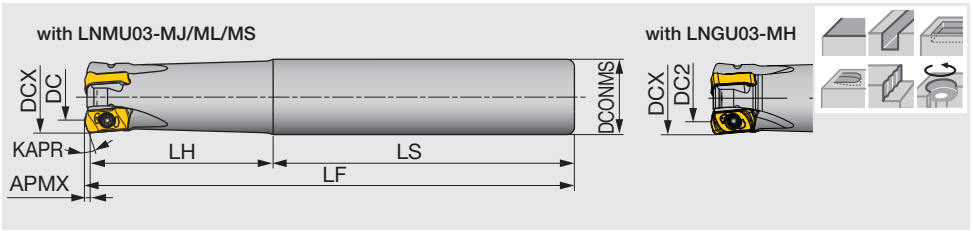
*Recommended clamping torque (N·m):CSPB-2.5=1.3

DOFEED
EXN03-N

High feed endmill (Eco), shank type, for double sided inserts

GAMP = +6°, GAMF = +5° ~ +11°





Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02N	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	Without	LN*U03...
EXN03R020M20.0-03N	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	Without	LN*U03...
EXN03R025M25.0-04N	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	Without	LN*U03...
EXN03R032M32.0-05N	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	Without	LN*U03...

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

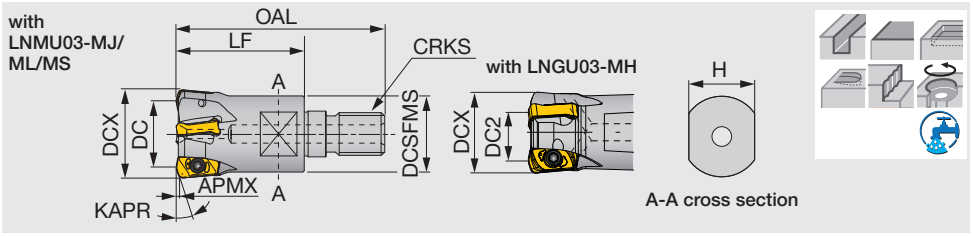
Reference pages: Inserts → H029, Standard cutting conditions → H030 - H031

DOFEED
HXN03

High feed endmill, modular type, with center through coolant hole (TungFlex)

GAMP= +6°,GAMF= +5° ~ +11°





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

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

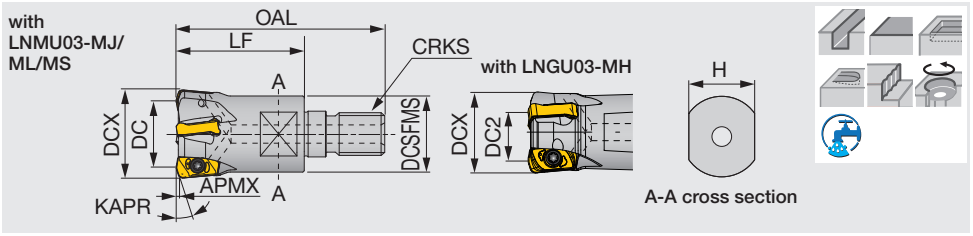
*Recommended clamping torque (N·m):CSPB-2.5=1.3

DOFEED
HXN03-C

High feed endmill, modular type, with coolant directly to the tool tips (TungFlex)

GAMP= +6°,GAMF= +5° ~ +11°





Designation	APMX	DCX	CICT	DC	DC2	OAL	LF	H	DCSFMS	KAPR	CRKS	WT(kg)	Air hole	Insert
HXN03R016MM08-02-C	1	16	2	9.6	9.8	42	25	10	12.8	15°	M8	0.03	With	LN*U03...
HXN03R020MM10-03-C	1	20	3	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R020MM10-04-C	1	20	4	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R025MM12-04-C	1	25	4	18.5	18.6	57	35	17	20.8	17°	M12	0.1	With	LN*U03...
HXN03R025MM12-05-C	1	25	5	18.5	18.6	57	35	17	20.8	17°	M12	0.1	With	LN*U03...
HXN03R032MM16-05-C	1	32	5	25.5	25.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R032MM16-06-C	1	32	6	25.5	25.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R040MM16-06-C	1	40	6	33.6	33.7	63	40	22	28.8	17°	M16	0.27	With	LN*U03...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS





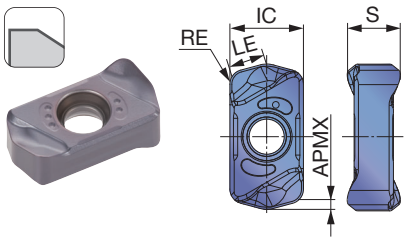
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

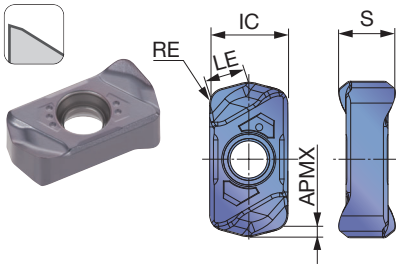
Reference pages: Inserts → **H029**, Standard cutting conditions → **H030 - H031**, TungFlex → **H210**

INSERT

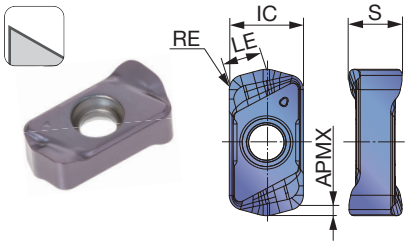
LNMU03-MJ (General purpose)



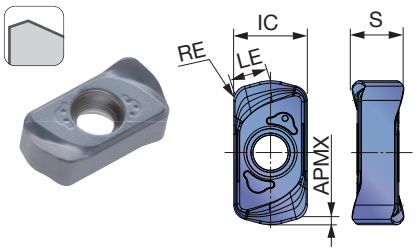
LNMU03-ML (Low cutting force)



LNMU03-MS (For stainless steel)



LNGU03-MH (Reinforced cutting edge)



		AH130	AH725	AH3035	AH8015	AH8005
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
			AH130	AH725	AH3035	AH8015	AH8005			
LNMU0303ZER-MJ	1.2	1	●	●	●	●		3.2	6	4.3
LNMU0303ZER-ML	1.2	1	●	●	●	●		3.2	6	4.3
LNMU0303ZER-MS	1.2	1	●					3.2	6	4.3
LNGU0303ZER-MH	1.2	1				●	●	3.2	6	4.3

●: Line up

STANDARD CUTTING CONDITIONS TXN03/EXN03/HXN03

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool dia.: DCX (mm) ø16 ~ ø22	ø25 ~ ø50	Plunging	ø16, CICT = 2 *n*	ø16, CICT = 2 *Vf*	ø18, CICT = 2 *n*	ø18, CICT = 2 *Vf*	ø20 *n*	ø20 *Vf* CICT = 3	ø20 *Vf* CICT = 4
P	Carbon steels S45C, S55C, etc. C45, C55, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
			Wear resistance	AH8015	MJ					*Vc* = 200 m/min, *fz* = 0.8 mm/t						
	Alloy steels SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
			Wear resistance	AH8015	MJ					*Vc* = 200 m/min, *fz* = 0.8 mm/t						
	Prehardened steels NAK80, PX5, etc.	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
		30 ~ 40HRC	Fracture resistance	AH3035	MJ	100 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
										Vc = 150 m/min, *fz* = 0.8 mm/t						
		30 ~ 40HRC	Wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-10, X5CrNiMo17-12-2, etc.	~ 200HB	First choice	AH130	MS	80 - 150	0.3 - 0.8	0.3 - 0.8	0.1	2,390	2,390	2,120	2,120	1,910	2,860	3,820
			Wear resistance	AH3035	ML											
			Fracture resistance	AH3035	MJ					*Vc* = 120 m/min, *fz* = 0.5 mm/t						
	Martensitic stainless steel and precipitation hardening stainless steel X20Cr13, X5CrNiCuNb16-4 ,etc.	~ 40HRC	First choice	AH3035	MJ	80 - 120	0.1 - 0.3	0.1 - 0.3	0.1	1,990	800	1,770	710	1590	950	1,270
										Vc = 100 m/min, *fz* = 0.2 mm/t						
			Fracture resistance	AH8015	MH		0.1 - 0.5	0.1 - 0.5	0.1	1,990	1,190	1,770	1,060	1590	1,430	1,910
										Vc = 100 m/min, *fz* = 0.3 mm/t						
K	Gray cast irons FC250, FC300, etc. GG25, GGG30, etc.	150 ~ 250HB	First choice	AH725	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
		150 ~ 250HB	Wear resistance	AH8015	MJ	100 - 300	0.5 - 0.7	0.5 - 1.0	0.1	3,980	4,780	3,540	4,250	3,180	5,720	7,630
										Vc = 200 m/min, *fz* = 0.6 mm/t						
	Ductile cast irons FCD400, etc. GGG40, etc.	150 ~ 250HB	First choice	AH725	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
			Wear resistance	AH8015	MJ					*Vc* = 150 m/min, *fz* = 0.8 mm/t						
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
			Fracture resistance	AH130	MJ					*Vc* = 40 m/min, *fz* = 0.4 mm/t						
	Heat-resistance alloy Inconel, Hasteroy, etc.	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
			Fracture resistance	AH725	MJ					*Vc* = 30 m/min, *fz* = 0.2 mm/t						
H	Hot mold steel SKD61, etc. X40CrMoV5-1, etc.	40 ~ 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.1 - 0.5	0.05	2,390	1,430	2,120	1,270	1,910	1,720	2,290
			Low resistance	AH8015	MJ					*Vc* = 120 m/min, *fz* = 0.3 mm/t						
	Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc.	40 ~ 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.1 - 0.3	0.05	1,590	640	1,420	570	1,270	760	1,020
			Fracture resistance	AH8015	MH					*Vc* = 80 m/min, *fz* = 0.2mm/t						
	Cold mold steel SKD11, etc. X153CrMoV12, etc.	55~ 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03 - 0.1	0.03	1,190	290	1,060	250	950	340	450
										Vc = 60 m/min, *fz* = 0.12 mm/t						
		55 ~ 60HRC	Fracture resistance	AH8015	MH	50 - 70	0.03 - 0.1	0.05 - 0.2	0.03	1,190	150	1,060	130	950	170	230
										Vc = 60 m/min, *fz* = 0.06 mm/t						

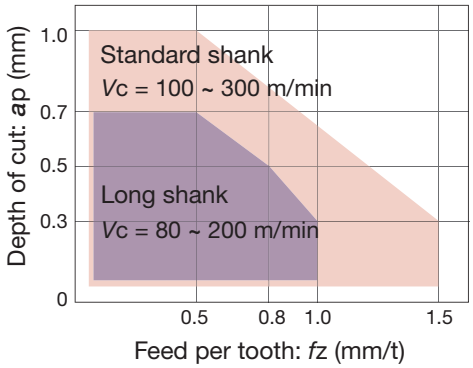
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

- 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.

Cautionary points in use

The use of a standard or long shank

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

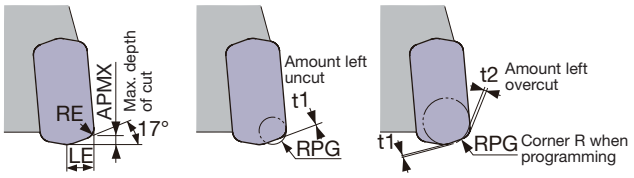


Tool dia.: DCX = ø16 ~ 35 mm
Workpeice: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

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



LNMU03-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.6	-
1.0	1.2	3.0	1.5	0.5	-
1.0	1.2	3.0	2.0	0.25	0.08
1.0	1.2	3.0	2.5	0.14	0.26

LNGU03-MH

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.45	-
1.0	1.2	3.0	1.5	0.35	-
1.0	1.2	3.0	2.0	0.2	0.1
1.0	1.2	3.0	2.5	0.08	0.29

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

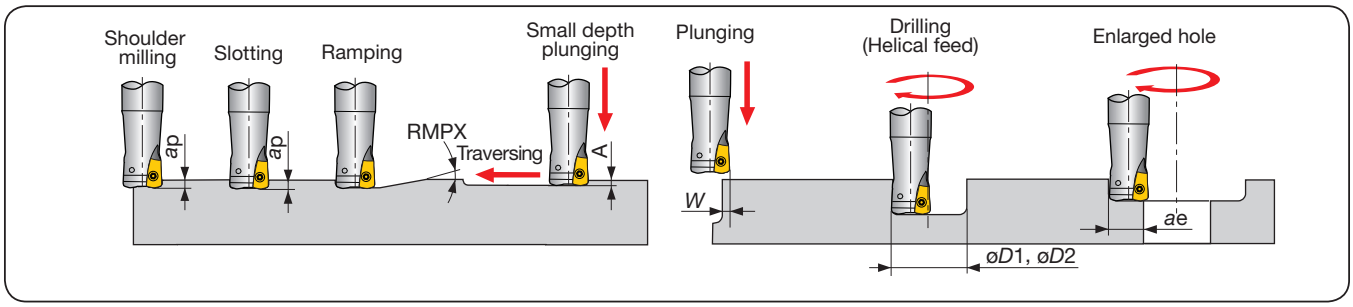
Tool dia.: ø*D*c (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *V*f (mm/min), Max. depth of cut: *a*p = 1.0 mm

ø22			ø25			ø28			ø30			ø32			ø35			ø40			ø50		
n	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f	
	CICT=3	CICT=4		CICT=4	CICT=5		CICT=4	CICT=5		CICT=4	CICT=5		CICT=5	CICT=6		CICT=5	CICT=6		CICT=5	CICT=6		CICT=5	CICT=8
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
2,170	5,210	6,940	1,910	7,640	9,550	1,710	6,840	8,550	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	7,600
Vc = 150 m/min, *fz* = 1.0 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
3,180	4,770	6,360	1,530	3,060	3,820	1,360	2,720	3,400	1,270	2,540	3,180	1,190	2,980	3,570	1,090	2,720	3,270	960	2.400	2,880	760	1.900	2,280
Vc = 120 m/min, *fz* = 0.5 mm/t																							
1,450	870	1,160	1,270	1,020	1,270	1,140	910	1,140	1,060	850	1,060	1,000	1,000	1,200	910	910	1,090	800	800	960	640	640	1,020
Vc = 100 m/min, *fz* = 0.2 mm/t																							
1,450	1,300	1,740	1,270	1,520	1,910	1,140	1.370	1,710	1,060	1,270	1,590	1,000	1,500	1,800	910	1,370	1,640	800	1,200	1,440	640	960	1,530
Vc = 100 m/min, *fz* = 0.3 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,890	5,200	6,940	2,550	6,110	7,640	2,270	5,460	6,820	2,120	6,780	8,480	1,990	7,960	9,550	1,820	7,280	8,740	1,590	6,360	7,630	1,270	5,080	8,130
Vc = 200 m/min, *fz* = 0.8 mm/t																							
2,170	5,210	6,940	1,910	6,110	7,640	1,710	5,460	6,820	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	5,700
Vc = 150 m/min, *fz* = 1.0 mm/t																							
580	700	930	510	820	1,020	450	730	910	420	840	1,050	400	1,000	1,200	360	900	1,080	320	800	960	250	630	1,000
Vc = 40 m/min, *fz* = 0.5 mm/t																							
430	260	340	380	230	290	340	200	260	320	260	320	300	300	360	270	270	320	240	240	290	190	190	300
Vc = 30 m/min, *fz* = 0.2 mm/t																							
1,740	1,570	2,090	1,530	1,840	2,300	1,360	1,630	2,040	1,270	1,520	1,910	1,190	1,790	2,140	1,090	1,640	1,960	950	1,430	1,710	760	1,140	1,820
Vc = 120 m/min, *fz* = 0.3 mm/t																							
1,160	700	930	1,020	820	1,020	910	730	910	850	680	850	800	800	960	730	730	880	640	640	770	510	510	820
Vc = 80 m/min, *fz* = 0.2mm/t																							
870	310	420	760	300	380	680	270	340	640	260	320	600	300	360	550	230	340	480	240	280	380	200	300
Vc = 60 m/min, *fz* = 0.1 mm/t																							
870	160	210	760	150	190	680	140	170	640	130	160	600	150	180	550	120	170	480	120	140	380	100	150
Vc = 60 m/min, *fz* = 0.06 mm/t																							

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. 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.

Applications



Designation	Tool dia. DCX	Max. depth of cut APMX	Max. ramping angle RMPX		Max. plunging depth A	Max. cutting width in plunging *W*		Min.machinable hole dia. ø*D*1		Max.machinable hole dia. ø*D*2	Max. cutting width in enlarged hole *ae*
			MJ/ML/MS	MH		MJ/ML/MS	MH	MJ/ML/MS	MH		
E/HXN03R016M...	ø16	1	2.1°	1.7°	0.3	3.5	3	22	23	30	12.5
E/HXN03R018M...	ø18	1	1.7°	1.6°	0.3	3.5	3	26	27	34	14.5
E/HXN03R020M...	ø20	1	1.4°	1.3°	0.3	3.5	3	30	31	38	16.5
E/HXN03R022M...	ø22	1	1.2°	1.1°	0.3	3.5	3	34	35	42	18.5
E/HXN03R025M...	ø25	1	1.0°	0.9°	0.3	3.5	3	40	41	48	21.5
E/HXN03R028M...	ø28	1	0.8°	0.8°	0.3	3.5	3	46	46	54	24.5
E/HXN03R030M...	ø30	1	0.7°	0.7°	0.3	3.5	3	50	50	58	26.5
E/HXN03R032M...	ø32	1	0.7°	0.7°	0.3	3.5	3	54	54	62	28.5
EXN03R035M...	ø35	1	0.6°	0.6°	0.3	3.5	3	60	60	68	31.5
E/H/TXN03R040M...	ø40	1	0.5°	0.5°	0.3	3.5	3	70	70	78	36.5
TXN03R050M...	ø50	1	0.4°	0.4°	0.3	3.5	3	90	90	98	46.5

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

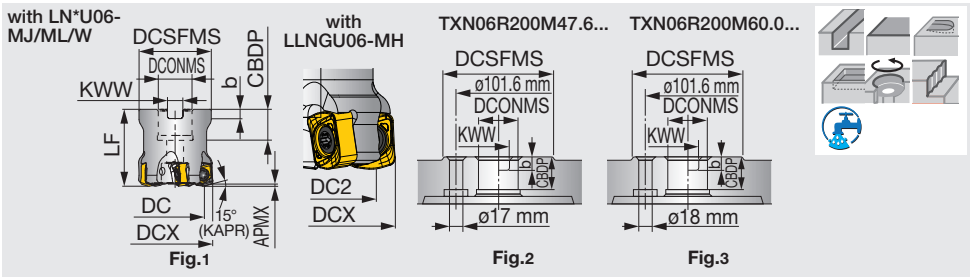
DOFEED

TXN06

High feed mill, for 4-corner double sided inserts

GAMP = +10°, GAMF = +2° ~ +6°





Designation	APMX	DCX	CICT	DC	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Fig.
TXN06R050M22.0E04	1.5	50	4	37.6	36.9	47	50	22	20	10.4	6.3	0.4	With	LN*U06...	1
TXN06R050M22.0E05	1.5	50	5	37.6	36.9	47	50	22	20	10.4	6.3	0.4	With	LN*U06...	1
TXN06R050M22.2-04	1.5	50	4	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R050M22.2-05	1.5	50	5	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R052M22.0E04	1.5	52	4	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R052M22.0E05	1.5	52	5	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R063M22.0E04	1.5	63	4	50.6	49.8	59	50	22	20	10.4	6.3	0.8	With	LN*U06...	1
TXN06R063M22.0E06	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	1.5	63	4	50.6	49.8	59	50	22.225	20	8	5	0.8	With	LN*U06...	1
TXN06R063M22.2-06	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

Approach angle

10°-20° 45° 70° 85° 88° 90° Others

SPARE PARTS








Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXN06R050M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R050M22.2-04	CSPB-5	H-TB2W	M-1000	-	CM10-30H	BLDIP20/S7
TXN06R050M22.2-05, TXN06R052M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R063M...	CSPB-5	H-TB2W	M-1000	-	CM10X30H	BLDIP20/S7
TXN06R066,080M27.0...	CSPB-5	H-TB2W	M-1000	-	CM12X30H	BLDIP20/S7
TXN06R080,100M31.7...	CSPB-5	H-TB2W	M-1000	-	CM16X40H	BLDIP20/S7
TXN06R125M...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/S7
TXN06R160M40.0...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/M7
TXN06R160M50.8...	CSPB-5	H-TB2W	M-1000	TMBA-M24H	-	BLDIP20/M7
TXN06R200M...	CSPB-5	H-TB2W	M-1000	-	-	BLDIP20/M7

*Recommended clamping torque (N·m) : CSPB-5=5

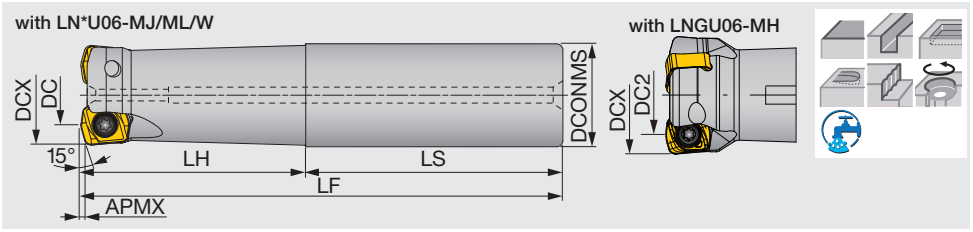
Reference pages: Inserts → H033, Standard cutting conditions → H034 - H035

EXN06

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

GAMP=+10°,GAMF= -2°~+6°





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

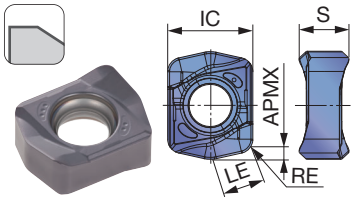
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXN06	CSPB-5	M-1000	IP-20D

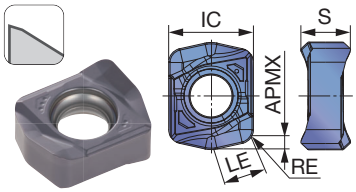
*Recommended clamping torque (N·m):CSPB-5=5

INSERT

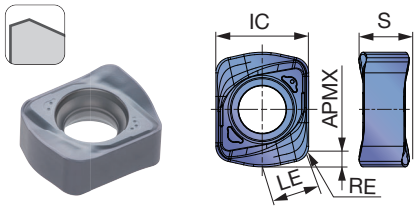
LNMU06-MJ



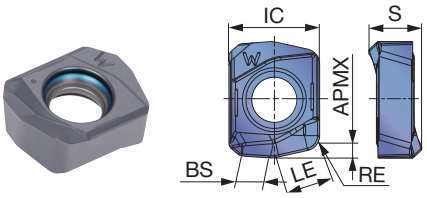
LNMU06-ML



LNGU06-MH



LNGU06-W (2 corners)



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	AH130	AH725	AH3035	AH8015	AH8005				
LNMU06X5ZER-MJ	2	1.5	●	●	●	●	●		6	12	7	-
LNMU06X5ZER-ML	2	1.5	●	●	●	●	●		6	12	7	-
LNGU06X5ZER-MH	2	1.5					●	●	6	12	7	-
LNGU06X5ZER-W	2	1.5			●				6	12	7	3.6

●: Line up

Reference pages: Standard cutting conditions → H034 - H035

STANDARD CUTTING CONDITIONS TXN06 / EXN06

ISO	Workpiece material	Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t) Tool dia: DCX (mm) ø32 ~ ø200	Feed when plunging *fz* (mm/t)	ø32, CICT = 2 *n*	ø32, CICT = 2 *Vf*	ø35, CICT = 2 *n*	ø35, CICT = 2 *Vf*	ø40, CICT = 3 *n*	ø40, CICT = 3 *Vf*
P	Carbon steels S45C, S55C etc. C45, C55, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
	Alloy steels SCM440, SCr415 etc. 42CrMo4, 17Cr3, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
	Prehardened steels NAK80, PX5, etc.	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
									Vc = 150 m/min, *fz* = 0.8 mm/t					
		30 ~ 40HRC	Fracture resistance	AH3035	MJ	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
									Vc = 150 m/min, *fz* = 1.0 mm/t					
		30 ~ 40HRC	Wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
									Vc = 150 m/min, *fz* = 0.8 mm/t					
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-10, etc. X5CrNiMo17-12-2, etc.	~ 200HB	First choice	AH3035	ML	100 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
			Fracture resistance	AH3035	MJ				*Vc* = 120 m/min, *fz* = 0.6 mm/t					
K	Gray cast irons FC250, FC300, etc. GG25, GGG30, etc.	150 ~ 250HB	First choice	AH120	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
		150 ~ 250HB	First choice	AH120	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
			Wear resistance	AH8015	MJ				*Vc* = 150 m/min, *fz* = 1.0 mm/t					
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
			Fracture resistance	AH130	MJ				*Vc* = 40 m/min, *fz* = 0.5 mm/t					
	Heat-resistance alloy Inconel, Hasteroy, etc.	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.05	300	120	270	110	240	140
			Fracture resistance	AH725	MJ				*Vc* = 30 m/min, *fz* = 0.2 mm/t					
H	Hot mold steel SKD61, etc. X40CrMoV5-1, etc.	40 ~ 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
			Low resistance	AH8015	MJ				*Vc* = 120 m/min, *fz* = 0.3mm/t					
	Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc	40 ~ 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.05	800	320	730	290	640	380
			Fracture resistance	AH8015	MH				*Vc* = 80 m/min, *fz* = 0.2mm/t					
	Cold mold steel SKD11, etc. X153CrMoV12, etc.	55 ~ 65HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03	600	120	550	110	480	140
									Vc = 60 m/min, *fz* = 0.1 mm/t					
		55 ~ 65HRC	Fracture resistance	AH8015	MH	50 - 70	0.03 - 0.1	0.03	600	60	550	55	480	70
									Vc = 60 m/min, *fz* = 0.05 mm/t					

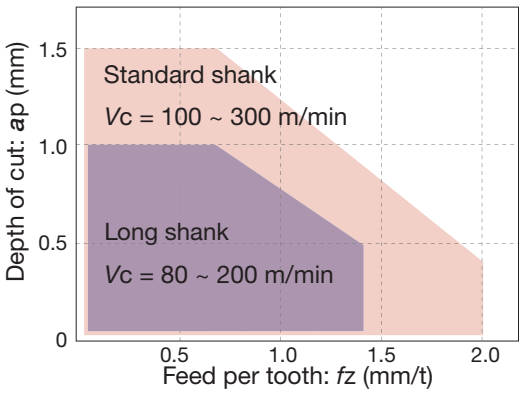
· The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

· 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.

Cautionary points in use

The use of a standard or long shank

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

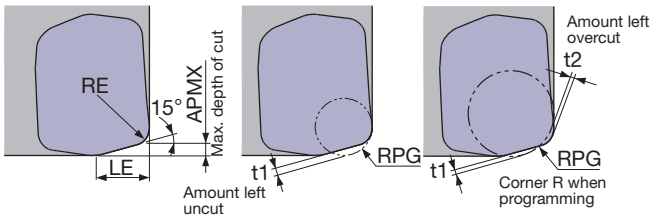


Tool dia.: DCX = ø32 ~ 40 mm
Workpiece: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 3.0 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU06-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	1.0	-
			3.0	0.77	-
			4.0	0.54	0.26

LNGU06-MH

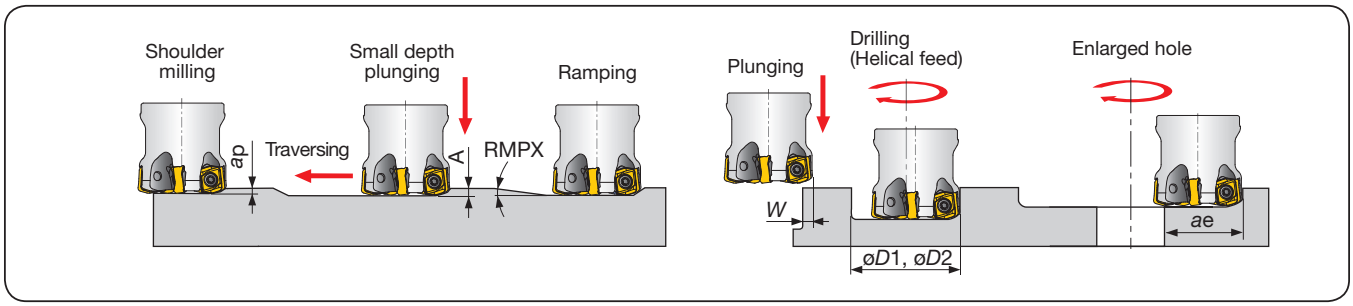
Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	0.9	-
			3.0	0.66	-
			4.0	0.41	0.26

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

Tool dia: DCX (mm), Number of revolution: *n* (min-1), Feed speed: *Vf* (mm/min), Max. depth of cut: *ap*=1.5mm, Number of teeth: CICT

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

Applications



Designation	Tool dia. DCX	Max. depth of cut APMX	Max. ramping angle RMPX		Max. plunging depth A		Max. cutting width in plunging *W*	Min.machinable hole dia. *øD1*	Max.machinable hole dia. *øD2*	Max. cutting width in enlarged hole *ae*
			MJ/ML	MH	MJ/ML	MH				
EXN06R032M...	ø32	1.5	2°	1.4°	0.5	0.4	6	47	59	25
EXN06R035M...	ø35	1.5	1.7°	1.1°	0.5	0.4	6	53	65	28
EXN06R040M...	ø40	1.5	1.3°	0.8°	0.5	0.4	6	63	75	33
TXN06R050M...	ø50	1.5	0.9°	0.7°	0.5	0.4	6	83	95	43
TXN06R052M...	ø52	1.5	0.8°	0.6°	0.5	0.4	6	87	99	45
TXN06R063M...	ø63	1.5	0.6°	0.5°	0.5	0.4	6	109	121	56
TXN06R066M...	ø66	1.5	0.5°	0.5°	0.5	0.4	6	115	127	59
TXN06R080M...	ø80	1.5	0.5°	0.3°	0.5	0.4	6	143	155	73
TXN06R100M...	ø100	1.5	0.34°	0.25°	0.5	0.4	6	183	195	93
TXN06R125M...	ø120	1.5	0.26°	0.2°	0.5	0.4	6	233	245	118
TXN06R160M...	ø160	1.5	0.2°	0.15°	0.5	0.4	6	303	315	153
TXN06R200M...	ø200	1.5	0.15°	0.11°	0.5	0.4	6	383	395	193

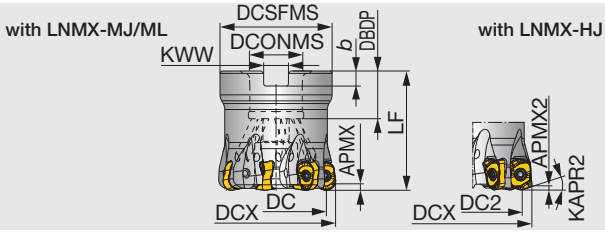
· For DCX above 100 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

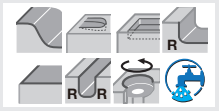
DO TWIST BALL
TXLN

Radius mill, for 4-corner double sided inserts

GAMP= +3°, GAMF= -13°







Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TXLN04M040B16.0R06	4	1.3	40	6	32.2	31.6	20	35	40	16	18	8.4	5.6	0.21	With	LNMX04...
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...
TXLN04M052B22.0R07	4	1.3	52	7	44.2	43.6	20	47	50	22	20	10.4	6.3	0.47	With	LNMX04...
TXLN04M063B22.0R07	4	1.3	63	7	55.2	54.6	20	59	50	22	20	10.4	6.3	0.76	With	LNMX04...
TXLN05M040B16.0R05	5	-	40	5	29.8	-	-	35	40	16	18	8.4	5.6	0.26	With	LNMX05...
TXLN05M050B22.0R06	5	-	50	6	39.8	-	-	47	50	22	20	10.4	6.3	0.50	With	LNMX05...
TXLN06M050B22.0R05	6	2	50	5	37.6	37.3	25	47	50	22	20	10.4	6.3	0.50	With	LNMX06...
TXLN06M052B22.0R05	6	2	52	5	39.6	39.3	25	49	50	22	20	10.4	6.3	0.55	With	LNMX06...
TXLN06M063B22.0R06	6	2	63	6	50.6	50.3	25	59	50	22	20	10.4	6.3	0.82	With	LNMX06...

Approach angle

10°-20° 45° 70° 85° 88° 90° Others

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
TXLN06M052B22.0R05	CSPB-5	BLDIP20/S7	H-TB2W	CM10X30H
TXLN06M063B22.0R06	CSPB-5	BLDIP20/S7	H-TB2W	CM10X30H

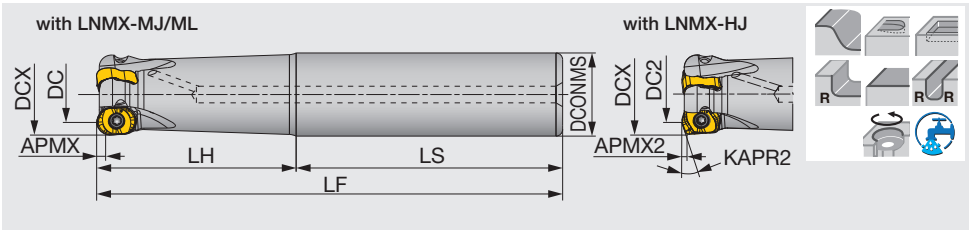
*Recommended clamping torque (N·m): CSPD-3=2.5, CSPB-4S=3.5, CSPB-5=5

Reference pages: Inserts → H038, Standard cutting conditions → H039 - H041

Radius endmill, shank type, for 4-corner double sided inserts

GAMP= +3°, GAMF= -12° ~ -14°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EXLN04M020C20.0R02	4	1.3	20	2	12.2	11.6	20°	20	80	50	130	0.28	With	LNMX04...
EXLN04M025C25.0R03	4	1.3	25	3	17.2	16.6	20°	25	80	60	140	0.46	With	LNMX04...
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...
EXLN05M025C25.0R02	5	-	25	2	15	-	-	25	90	60	150	0.54	With	LNMX05..
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	0.90	With	LNMX06..
EXLN06M040C32.0R04	6	2	40	4	27.6	27.3	25°	32	100	50	150	0.95	With	LNMX06..

SPARE PARTS






Designation	Clamping screw	Mono block wrench	Torx bit	Grip
EXLN04...	CSPD-3	IP-10D	-	-
EXLN05...	CSPB-4S	-	BLDIP15/S7	H-TB2W
EXLN06...	CSPB-5	-	BLDIP20/S7	H-TB2W

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

Reference pages: Inserts → H038, Standard cutting conditions → H039 - H041

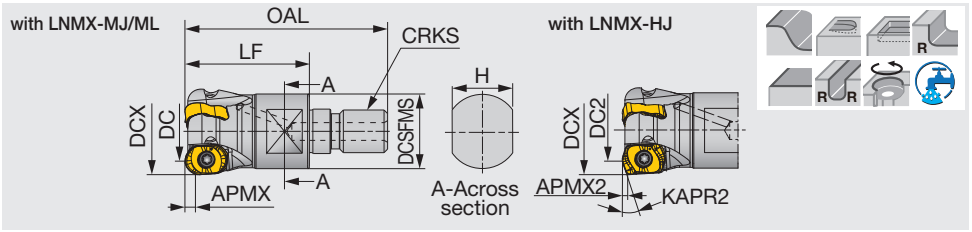
DO TWIST BALL

HXLN04-M

Radius endmill, modular type, for 4-corner double sided inserts (TungFlex)

GAMP= +3°, GAMF= -12° ~ -14°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HXLN04M020M10R02	4	1.3	20	2	12.2	11.6	20°	49	30	15	18	M10	0.07	With	LNMX04...
HXLN04M025M12R03	4	1.3	25	3	17.2	16.6	20°	57	35	17	21	M12	0.16	With	LNMX04...
HXLN04M032M16R04	4	1.3	32	4	24.2	23.6	20°	63	40	22	29	M16	0.20	With	LNMX04...
HXLN05M025M12R02	5	-	25	2	15	-	-	57	35	17	21	M12	0.10	With	LNMX05...
HXLN05M032M16R04	5	-	32	4	21.9	-	-	63	40	22	28.8	M16	0.20	With	LNMX05...
HXLN06M032M16R02	6	2	32	2	19.6	19.3	25°	63	40	22	28.8	M16	0.24	With	LNMX06...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS

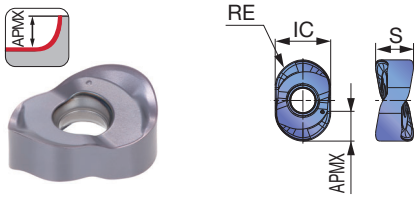
Designation	Clamping screw	Mono block wrench	Torx bit	Grip
HXLN04...	CSPD-3	IP-10D	-	-
HXLN05...	CSPB-4S	-	BLDIP15/S7	H-TB2W
HXLN06...	CSPB-5	-	BLDIP20/S7	H-TB2W

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

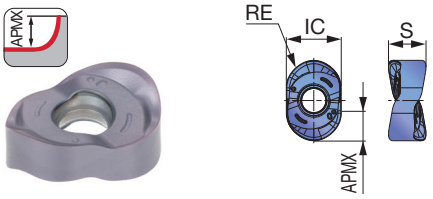
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

INSERT

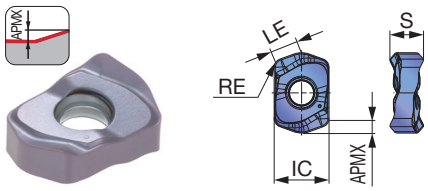
LNMX-MJ



LNMX-ML



LNMX-HJ



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH120	Coated AH3135	LE	IC	S
LNMX0405R4-MJ	4	4	●	●	-	8.2	5.6
LNMX0405R4-ML	4	4	●	●	-	8.2	5.6
LNMX0405ZER-HJ	1.3	1.3	●	●	4.3	8.2	5
LNMX0506R5-MJ	5	5	●	●	-	10.4	6.1
LNMX0607R6-MJ	6	6	●	●	-	12.6	7.4
LNMX0607ZER-HJ	2	2	●	●	6.7	12.7	7.2

●: Line up

Reference pages: Standard cutting conditions → **H039 - H041**, TungFlex → **H210**

STANDARD CUTTING CONDITIONS

For MJ,ML

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15, C20, etc.		- 200 HB	First choice	AH3135	MJ	100 - 300	0.2 - 0.6
			- 200 HB	Low cutting force	AH3135	ML	100 - 300	0.2 - 0.6
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.		- 300 HB	First choice	AH3135	MJ	100 - 250	0.2 - 0.6
			- 300 HB	Low cutting force	AH3135	ML	100 - 250	0.2 - 0.6
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	MJ	100 - 200	0.15 - 0.4
			30 - 40 HRC	Low cutting force	AH3135	ML	100 - 200	0.15 - 0.4
M	Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	First choice	AH3135	MJ	100 - 200	0.2 - 0.6
			- 200 HB	Low cutting force	AH3135	ML	100 - 200	0.2 - 0.6
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.		- 200 HB	First choice	AH3135	ML	100 - 300	0.2 - 0.6
			- 200 HB	Fracture resistance	AH3135	MJ	100 - 300	0.2 - 0.6
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	0.2 - 0.6
			150 - 250 HB	Low cutting force	AH120	ML	100 - 300	0.2 - 0.6
	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	80 - 250	0.2 - 0.6
			150 - 250 HB	Low cutting force	AH120	ML	80 - 250	0.2 - 0.6
S	Titanium alloy Ti-6Al-4V, etc.		-	First choice	AH3135	ML	30 - 60	0.15 - 0.6
			-	Fracture resistance	AH3135	MJ	30 - 60	0.15 - 0.6
	Superalloys Inconel718, etc.		-	First choice	AH120	ML	20 - 50	0.05 - 0.3
			-	Fracture resistance	AH120	MJ	20 - 50	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	50 - 150	0.1 - 0.3
			40 - 50 HRC	Wear resistance	AH120	MJ	50 - 150	0.1 - 0.3
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.05 - 0.15

STANDARD CUTTING CONDITIONS

LNMX04-HJ

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

LNMX06-HJ

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15, C20, etc.		- 300HB	First choice	AH3135	HJ	100 - 300	0.3 - 1.1
				Wear resistance	AH120			
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.		- 300HB	First choice	AH3135	HJ	100 - 250	0.3 - 1.1
				Wear resistance	AH120			
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	HJ	100 - 200	0.2 - 0.7
				Wear resistance	AH120			
M	Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200HB	First choice	AH3135	HJ	100 - 200	0.2 - 0.7
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.		- 200HB	First choice	AH3135	HJ	100 - 300	0.2 - 0.7
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250HB	First choice	AH120	HJ	100 - 300	0.3 - 1.1
				Fracture resistance	AH3135			
	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.		150 - 250HB	First choice	AH120	HJ	80 - 250	0.3 - 1.1
				Fracture resistance	AH3135			
S	Titanium alloy Ti-6Al-4V, etc.		150 - 250HB	First choice	AH3135	HJ	30 - 60	0.15 - 0.6
	Superalloys Inconel718, etc.		150 - 250HB	First choice	AH120	HJ	20 - 50	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH3135	HJ	50 - 150	0.1 - 0.3
				Wear resistance	AH120			
		SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	AH120	HJ	50 - 70	0.05 - 0.15

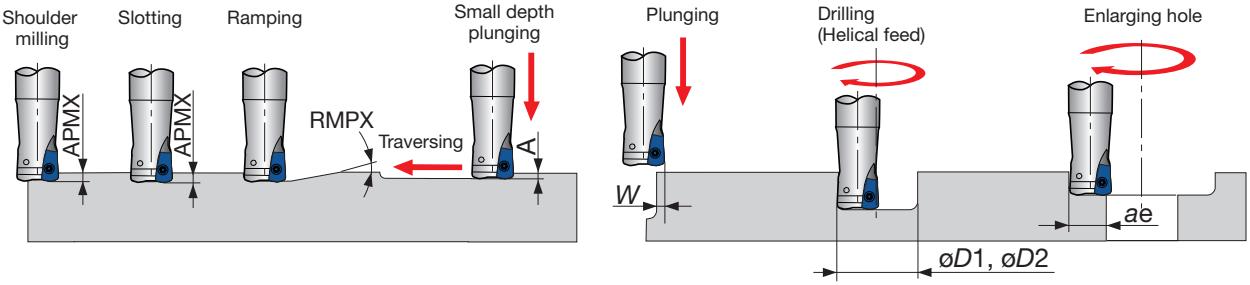
Tool dia: DCX (mm), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 1.3 mm, Number of teeth: z

ø20, CICT = 2		ø25, CICT = 3		ø32			ø40, CICT = 6		ø42, CICT = 6		ø50, CICT = 7		ø52, CICT = 7		ø63, CICT = 7	
n	*Vf*	*n*	*Vf*	*n*	*Vf* Coarse pitch (CICT = 4)	*Vf* Close pitch (CICT = 5)	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
3,180	5,720	2,550	6,890	1,990	7,160	8,960	1,590	8,590	1,520	8,210	1,270	8,000	1,220	7,690	1,010	6,360
Vc = 200 m/min, *fz* = 0.9 mm/t																
2,860	5,150	2,290	6,180	1,790	6,440	8,060	1,430	7,720	1,360	7,340	1,150	7,250	1,100	6,930	910	5,730
Vc = 180 m/min, *fz* = 0.9 mm/t																
2,390	3,350	1,910	4,010	1,490	4,170	5,220	1,190	5,000	1,140	4,790	950	4,660	920	4,510	760	3,720
Vc = 150 m/min, *fz* = 0.7 mm/t																
2,390	2,870	1,910	3,440	1,490	3,580	4,470	1,190	4,280	1,140	4,100	950	3,990	920	3,860	760	3,190
Vc = 150 m/min, *fz* = 0.6 mm/t																
3,180	3,820	2,550	4,590	1,990	4,780	5,970	1,590	5,720	1,520	5,470	1,270	5,330	1,220	5,120	1,010	4,240
Vc = 200 m/min, *fz* = 0.6 mm/t																
3,180	5,720	2,550	6,890	1,990	7,160	8,960	1,590	8,590	1,520	8,210	1,270	8,000	1,220	7,690	1,010	6,360
Vc = 200 m/min, *fz* = 0.9 mm/t																
2,550	4,590	2,040	5,510	1,590	5,720	7,160	1,270	6,860	1,210	6,530	1,020	6,430	980	6,170	810	5,100
Vc = 160 m/min, *fz* = 0.9 mm/t																
720	720	570	860	450	900	1,130	360	1,080	340	1,020	290	1,020	280	980	230	810
Vc = 45 m/min, *fz* = 0.5 mm/t																
480	190	380	230	300	240	300	240	290	230	280	190	270	180	250	150	210
Vc = 30 m/min, *fz* = 0.2 mm/t																
1,590	950	1,270	1,140	990	1,190	1,490	800	1,440	760	1,370	640	1,340	610	1,280	510	1,070
Vc = 100 m/min, *fz* = 0.3 mm/t																
950	240	760	290	600	300	380	480	360	450	340	380	330	370	320	300	260
Vc = 60 m/min, *fz* = 0.12 mm/t																

Tool dia: DCX (mm), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 2mm, Number of teeth: z

ø32, CICT = 2		ø40, CICT = 4		ø50, CICT = 5		ø52, CICT = 5		ø63, CICT = 6	
n	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
1,990	2,790	1,590	4,450	1,270	4,450	1,220	4,270	1,010	4,240
Vc = 200 m/min, *fz* = 0.7 mm/t									
1,790	2,510	1,430	4,000	1,150	4,030	1,100	3,850	910	3,820
Vc = 180 m/min, *fz* = 0.7 mm/t									
1,490	1,340	1,190	2,140	950	2,140	920	2,070	760	2,050
Vc = 150 m/min, *fz* = 0.45 mm/t									
1,490	1,340	1,190	2,140	950	2,140	920	2,070	760	2,050
Vc = 150 m/min, *fz* = 0.45 mm/t									
1,990	1,790	1,590	2,860	1,270	2,860	1,220	2,750	1,010	2,730
Vc = 200 m/min, *fz* = 0.45 mm/t									
1,990	2,790	1,590	4,450	1,270	4,450	1,220	4,270	1,010	4,240
Vc = 200 m/min, *fz* = 0.7 mm/t									
1,590	2,230	1,270	3,560	1,020	3,570	980	3,430	810	3,400
Vc = 160 m/min, *fz* = 0.7 mm/t									
450	320	360	500	290	510	280	490	230	480
Vc = 45 m/min, *fz* = 0.35 mm/t									
300	90	240	140	190	140	180	140	150	140
Vc = 30 m/min, *fz* = 0.15 mm/t									
990	400	800	640	640	640	610	610	510	610
Vc = 100 m/min, *fz* = 0.2 mm/t									
600	120	480	190	380	190	370	190	300	180
Vc = 60 m/min, *fz* = 0.1 mm/t									

MACHINING APPLICATIONS



MJ, ML

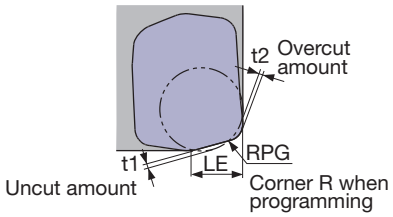
Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Max. cutting width in plunging W	Min. machining dia. øD1	Max. machining dia. øD2	Max. cutting width in enlarging ae
E/HXLN04M020…	20	4	4.5°	0.75	4	28	38	15
E/HXLN04M025…	25	4	2.9°	0.75	4	38	48	20
E/HXLN04M032…	32	4	1.9°	0.75	4	52	62	27
TXLN04M040B16.0R06	40	4	1.2°	0.6	4	68	78	35
TXLN04M042B16.0R06	42	4	1.1°	0.6	4	72	82	37
TXLN04M050B22.0R07	50	4	0.9°	0.6	4	88	98	45
TXLN04M052B22.0R07	52	4	0.8°	0.6	4	92	102	47
TXLN04M063B22.0R07	63	4	0.7°	0.7	4	114	124	58
E/HXLN05M025…	25	5	2.3°	0.5	5	35	48	17
E/HXLN05M032…	32	5	2.1°	0.6	5	48	62	24
TXLN05M040B16.0R05	40	5	2°	1	5	64	78	31
TXLN05M050B22.0R06	50	5	1.3°	1	5	84	98	41
E/HXLN06M032…	32	6	3.7°	1	6	52	62	22
EXLN06M040C32.0R04	40	6	3.4°	1	6	60	78	29
TXLN06M050B22.0R05	50	6	2.8°	1.7	6	79	98	39
TXLN06M052B22.0R05	52	6	2.5°	1.6	6	81	102	41
TXLN06M063B22.0R06	63	6	1.8°	1.6	6	105	124	52

HJ

Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Max. cutting width in plunging W	Min. machining øD1	Max. machining øD2	Max. cutting width in enlarging ae
E/HXLN04M020…	20	1.3	4.9°	0.7	4.1	27	38	15.5
E/HXLN04M025…	25	1.3	3°	0.7	4.1	37	48	20.5
E/HXLN04M032…	32	1.3	2°	0.7	4.1	51	62	27.5
TXLN04M040B16.0R06	40	1.3	1.4°	0.7	4.1	67	78	35.5
TXLN04M042B16.0R06	42	1.3	1.3°	0.7	4.1	71	82	37.5
TXLN04M050B22.0R07	50	1.3	1°	0.7	4.1	87	98	45.5
TXLN04M052B22.0R07	52	1.3	0.9°	0.7	4.1	91	102	47.5
TXLN04M063B22.0R07	63	1.3	0.8°	0.7	4.1	113	124	58.5
E/HXLN06M032…	32	2	5.7°	1.4	6.1	42	62	20
EXLN06M040C32.0R04	40	2	3.8°	1.5	6.1	57	78	28
TXLN06M050B22.0R05	50	2	2.7°	1.6	6.1	77	98	38
TXLN06M052B22.0R05	52	2	2.5°	1.6	6.1	81	102	40
TXLN06M063B22.0R06	63	2	1.8°	1.5	6.1	104	124	51

TOOL GEOMETRY ON PROGRAMMING FOR HIGH FEED

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



	Max. depth of cut APMX (mm)	LE (mm)	Programmed corner R (mm)	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
LNMX04-HJ	1.3	4.1	R1.5	0.8	0
	1.3	4.1	R2.0	0.65	0
	1.3	4.1	R2.5	0.5	0.05
	1.3	4.1	R3.0	0.36	0.2
LNMX06-HJ	2.0	6.1	R2.0	1.4	-
	2.0	6.1	R3.0	1.1	-
	2.0	6.1	R3.5	0.91	-
	2.0	6.1	R4.0	0.74	0.05
	2.0	6.1	R5.0	0.41	0.35

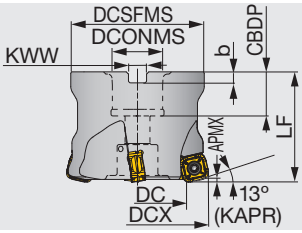
DOFEEDQUAD

TXQ

High feed face mill

GAMP = +7°, GAMF = -8° ~ -4.5°





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

SPARE PARTS

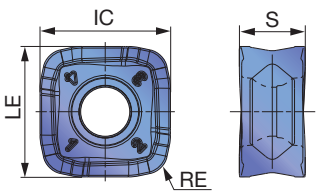
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXQ12R050, 052M22.0...	CSPB-4	H-TBS	M-1000	-	FSHM10-40H	BLDIP15/S7
TXQ12R063M...	CSPB-4	H-TBS	M-1000	-	CM10X30H	BLDIP15/S7
TXQ12R066, 080M27.0...	CSPB-4	H-TBS	M-1000	-	CM12X30H	BLDIP15/S7
TXQ12R080, 100M31.7...	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 (N·m):CSPB-4=3.5

INSERT

SQMU-MJ





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

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H044 - H045

STANDARD CUTTING CONDITIONS

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

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

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

Tool dia: DCX (mm), Number of revolution: *n* (min-1), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 2 mm

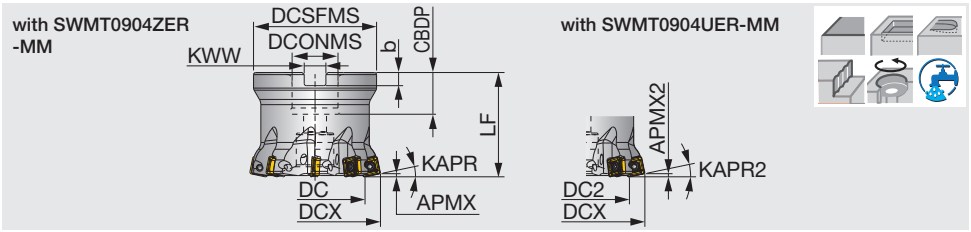
ø50		ø63		ø80		ø100		ø125	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
				Vc = 200 m/min, *fz* = 1.2 mm/t					
950	2,850	750	3,000	590	2,950	470	2,820	380	2,660
				Vc = 150 m/min, *fz* = 1.0 mm/t					
950	2,280	750	2,400	590	2,360	470	2,260	380	2,130
				Vc = 150 m/min, *fz* = 0.8 mm/t					
760	1,140	600	1,200	470	1,180	380	1,140	300	1,050
				Vc = 120 m/min, *fz* = 0.5 mm/t					
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
				Vc = 200 m/min, *fz* = 1.2 mm/t					
950	3,420	750	3,600	590	3,540	470	3,380	380	3,190
				Vc = 150 m/min, *fz* = 1.2 mm/t					
250	370	200	400	150	380	120	360	100	350
				Vc = 40 m/min, *fz* = 0.5 mm/t					
630	380	500	400	390	390	310	370	250	350
				Vc = 100 m/min, *fz* = 0.2 mm/t					
380	60	300	60	235	60	190	60	150	50
				Vc = 60 m/min, *fz* = 0.05 mm/t					

MILLQFEED UAD
TXSW09

High feed mill, for 4-corner single sided inserts

GAMP = +3.8°, GAMF = -3.5°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	DCONMS	CBDP	LF	KWW	b	KAPR	KAPR2	WT(kg)	Air hole	Insert
TXSW09M040B16.0R05	1.5	1	40	5	25	24	38	16	18	40	8	6	12°	7°	0.2	With	SWMT09...
TXSW09M050B22.0R07	1.5	1	50	7	35	34	47	22	20	50	10.4	6.3	12°	7°	0.38	With	SWMT09...

SPARE PARTS

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt	Lubricant
TXSW09...	CSPD-3	BLDIP10/S7	H-TB2W	CM10X30H	M-1000

*Recommended clamping torque (N·m): CSPD-3=2.5

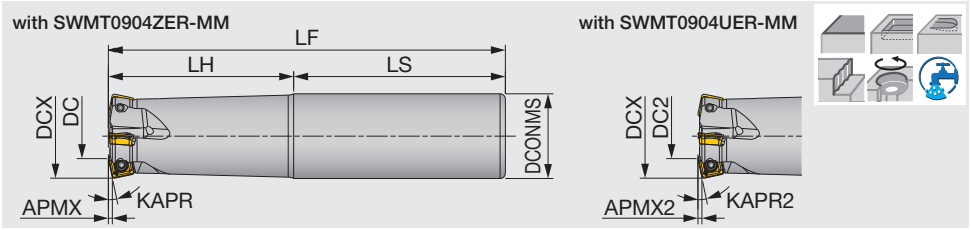
MILLQFEED UAD
EXSW09

Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

High feed mill, for 4-corner single sided inserts

GAMP = +3.9°, GAMF = -3.5°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	KAPR2	WT(kg)	Air hole	Insert
EXSW09M025C25.0R03	1.5	1.0	25	3	10	9	25	140	60	80	12°	7°	0.45	With	SWMT09...
EXSW09M025C25.0R03L	1.5	1.0	25	3	10	10	25	180	100	80	12°	7°	0.57	With	SWMT09...
EXSW09M032C32.0R04	1.5	1.0	32	4	17	16	32	150	70	80	12°	7°	0.81	With	SWMT09...
EXSW09M032C32.0R04L	1.5	1.0	32	4	17	16	32	200	120	80	12°	7°	1.07	With	SWMT09...

SPARE PARTS

Designation	Clamping screw	Wrench	Lubricant
EXSW09...	CSPD-3	IP-10D	M-1000

*Recommended clamping torque (N·m): CSPD-3=2.5

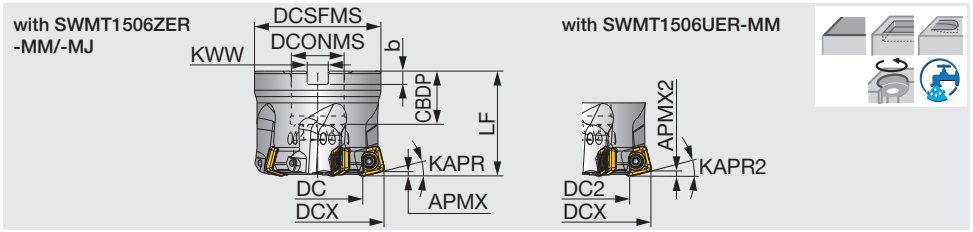
Reference pages: Inserts → H047, Standard cutting conditions → H048 - H049

TXSW15

High feed mill, for 4-corner single sided inserts

GAMP = +5°, GAMF = 0°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	KAPR	KAPR2	WT(kg)	Air hole	Insert
TXSW15M050B22.0R03	2.5	2	50	3	24.1	22.2	47	50	22	20	10.4	6.3	14°	10°	0.4	With	SWMT15...
TXSW15M063B22.0R04	2.5	2	63	4	37.1	35.2	59	50	22	20	10.4	6.3	14°	10°	0.66	With	SWMT15...
TXSW15J080B31.7R05	2.5	2	80	5	54.1	52.2	76	63	31.75	32	12.7	8	14°	10°	1.31	With	SWMT15...
TXSW15M080B27.0R05	2.5	2	80	5	54.1	52.2	76	63	27	22	12.4	7	14°	10°	1.41	With	SWMT15...
TXSW15J100B31.7R06	2.5	2	100	6	74.1	72.2	96	63	31.75	32	12.7	8	14°	10°	2.25	With	SWMT15...
TXSW15M100B32.0R06	2.5	2	100	6	74.1	72.2	96	63	32	25	14.4	8	14°	10°	2.26	With	SWMT15...
TXSW15J125B38.1R07	2.5	2	125	7	99.1	97.2	100	63	38.1	43	15.9	10	14°	10°	2.91	With	SWMT15...
TXSW15M125B40.0R07	2.5	2	125	7	99.1	97.2	100	63	40	37	16.4	9	14°	10°	2.83	With	SWMT15...
TXSW15J160B50.8R08	2.5	2	160	8	134.1	132.2	100	63	50.8	46	19	11	14°	10°	3.93	With	SWMT15...
TXSW15M160B40.0R08	2.5	2	160	8	134.1	132.2	100	63	40	37	16.4	9	14°	10°	4.23	With	SWMT15...

SPARE PARTS

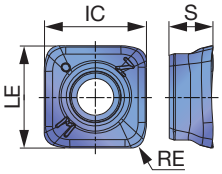
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Torx bit
TXSW15M050B22.0R03	TS50115I	H-TB2W	M-1000	-	-	SRPS118-0273	BT20S
TXSW15M063B22.0R04	TS50115I	H-TB2W	M-1000	-	FSHM10-40H	-	BT20S
TXSW15J080B31.7R05	TS50115I	H-TB2W	M-1000	-	CM16X40H	-	BT20S
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 (N·m): TS50115I=5

INSERT

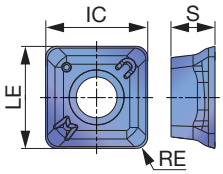
SWMT09/15ZER-MM



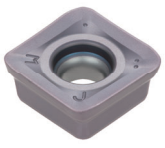


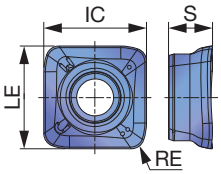
SWMT09/15UER-MM





SWMT15ZER-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH120	Coated AH3135	LE	IC	S
SWMT0904ZER-MM	1	1		●	8.605	8.605	4
SWMT0904UER-MM	1	1		●	9.05	9.05	4
SWMT1506ZER-MM	2	2.5	●	●	16.01	16.01	6.8
SWMT1506UER-MM	2	2		●	16.27	16.27	6.8
SWMT1506ZER-MJ	2	2.5	●	●	15.925	15.925	6.8

●: Line up

Reference pages: Standard cutting conditions → H048 - H049

STANDARD CUTTING CONDITIONS

09 type

ISO	Workpiece material		Hardness	Priority	Insert type	Chip-breaker	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steel S45C, S55C, etc., C45, C55, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 1.5
				for wear resistance	UER	MM	AH3135	100 - 300	0.5 - 1.5
	Alloy steel SCM440, etc., 42CrMo4, 17Cr3, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.5
				for wear resistance	UER	MM	AH3135	100 - 200	0.5 - 1.5
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.2
				for wear resistance	UER	MM	AH3135	100 - 200	0.5 - 1.2
M	Austenitic stainless steel SUS304, X5CrNi18-9, etc.		- 200HB	First choice	UER	MM	AH3135	100 - 150	0.5 - 1.2
				Low cutting load	ZER	MM	AH3135	100 - 150	0.5 - 1.2
	Precipitation hardening stainless steel SUS630, X20CrNiCuNb-16-4, etc.		28HRC - (H1150)	First choice	UER	MM	AH3135	80 - 150	0.3 - 1.2
				Low cutting load	ZER	MM	AH3135	80 - 150	0.3 - 1.2
			40HRC - (H900)	First choice	UER	MM	AH3135	80 - 120	0.3 - 0.8
				Low cutting load	ZER	MM	AH3135	80 - 120	0.3 - 0.8
K	Gray cast iron FC250, FC300, etc. 250, 300, etc., GG25, GG30, etc.		150 - 250HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 2
	Ductile cast iron FCD600, etc., 600-3, etc., GGG40, etc.		150 - 250HB	First choice	ZER	MM	AH3135	80 - 200	0.5 - 2
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	UER	MM	AH3135	30 - 60	0.3 - 0.7
				Low cutting load	ZER	MM	AH3135	30 - 60	0.3 - 0.7
	Heat-resistance alloys Inconel, Hastelloy, etc.		- 40HRC	First choice	UER	MM	AH3135	20 - 50	0.1 - 0.3
				for wear resistance	ZER	MM	AH3135	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	ZER	MM	AH3135	80 - 130	0.1 - 0.3

15 type

ISO	Workpiece material		Hardness	Priority	Insert type	Chip-breaker	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steel S45C, S55C, etc. C45, C55, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 1.5
				for wear resistance	ZER	MM	AH120	100 - 300	0.5 - 1.5
				for impact resistance	ZER	MJ	AH3135	100 - 300	0.5 - 2.0
	Alloy steel SCM440, etc. 42CrMo4, 17Cr3, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.5
				for wear resistance	ZER	MM	AH120	100 - 200	0.5 - 1.5
				for impact resistance	ZER	MJ	AH3135	100 - 200	0.5 - 2.0
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.2
				for wear resistance	ZER	MM	AH120	100 - 200	0.5 - 1.2
				for impact resistance	ZER	MJ	AH3135	100 - 200	0.5 - 1.5
M	Austenitic stainless steel SUS304, X5CrNi18-9, etc.		- 200HB	First choice	UER	MM	AH3135	100 - 150	0.5 - 1.2
				Low cutting load	ZER	MM	AH3135	100 - 150	0.5 - 1.2
	Precipitation hardening stainless steel SUS630, X20CrNiCuNb-16-4, etc.		28HRC - (H1150)	First choice	UER	MM	AH3135	80 - 150	0.3 - 1.2
				Low cutting load	ZER	MM	AH3135	80 - 150	0.3 - 1.2
			40HRC - (H900)	First choice	UER	MM	AH3135	80 - 120	0.3 - 0.8
				Low cutting load	ZER	MM	AH3135	80 - 120	0.3 - 0.8
K	Gray cast iron FC250, FC300, etc. 250, 300, etc. GG25, GG30, etc.		150 - 250HB	First choice	ZER	MJ	AH120	100 - 300	0.5 - 2.0
				for impact resistance	ZER	MJ	AH3135	100 - 300	0.5 - 2.0
				Low cutting load	ZER	MM	AH120	100 - 300	0.5 - 1.5
	Ductile cast iron FCD600, etc. 600-3, etc. GGG40, etc.		150 - 250HB	First choice	ZER	MJ	AH120	80 - 200	0.5 - 2.0
				for impact resistance	ZER	MJ	AH3135	80 - 200	0.5 - 2.0
				Low cutting load	ZER	MM	AH120	80 - 200	0.5 - 1.5
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	UER	MM	AH3135	30 - 60	0.3 - 0.7
				Low cutting load	ZER	MM	AH3135	30 - 60	0.3 - 0.7
				for impact resistance	ZER	MJ	AH3135	30 - 60	0.3 - 0.7
	Heat-resistance alloys Inconel, Hastelloy, etc.		- 40HRC	First choice	UER	MM	AH3135	20 - 50	0.1 - 0.3
				for wear resistance	ZER	MM	AH120	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	ZER	MJ	AH3135	80 - 130	0.1 - 0.3
				for wear resistance	ZER	MJ	AH120	80 - 130	0.1 - 0.3
		SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	ZER	MJ	AH120	50 - 70	0.05 - 0.2

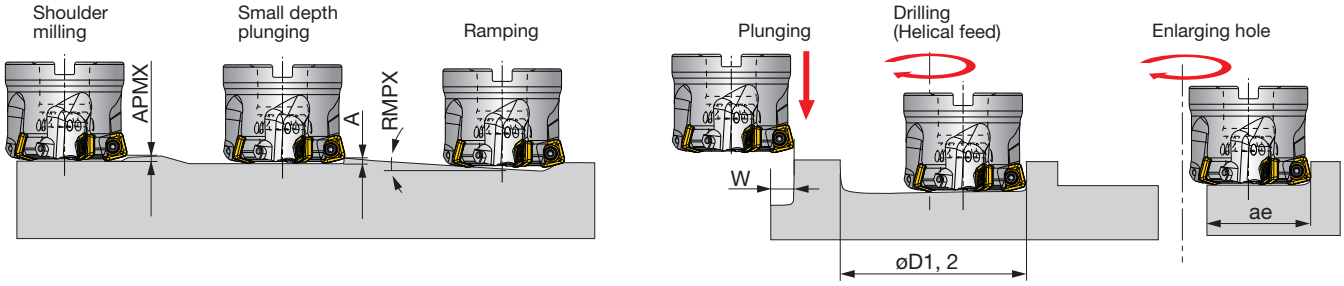
Tool dia.: DC (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Number of inserts: z

ø25, z=3		ø32, z=4		ø40, z=5		ø50, z=7	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
2,550	7,650	1,990	7,960	1,590	7,950	1,270	8,890
			Vc = 200 m/min, *fz* = 1.0 mm/t				
1,910	5,730	1,490	5,960	1,190	5,950	960	6,720
			Vc = 150 m/min, *fz* = 1.0 mm/t				
1,910	4,580	1,490	4,770	1,190	4,760	960	5,380
			Vc = 150 m/min, *fz* = 0.8 mm/t				
1,530	3,670	1,190	3,810	960	3,840	760	4,260
			Vc = 120 m/min, *fz* = 0.8 mm/t				
1,530	3,670	1,190	3,810	960	3,840	760	4,260
			Vc = 120 m/min, *fz* = 0.8 mm/t				
1,270	2,290	1,000	2,400	800	2,400	640	2,690
			Vc = 100 m/min, *fz* = 0.6 mm/t				
2,550	9,180	1,990	9,550	1,590	9,540	1,270	10,670
			Vc = 200 m/min, *fz* = 1.2 mm/t				
1,910	6,880	1,490	7,150	1,190	7,140	1,270	10,670
			Vc = 150 m/min, *fz* = 1.2 mm/t				
510	770	400	800	320	800	250	880
			Vc = 40 m/min, *fz* = 0.5 mm/t				
380	230	300	240	240	240	190	270
			Vc = 30 m/min, *fz* = 0.2 mm/t				
1,270	760	1,000	800	800	800	640	900
			Vc = 100 m/min, *fz* = 0.2 mm/t				

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

ø50, z=3		ø63, z=4		ø80, z=5		ø100, z=6		ø125, z=7		ø160, z=8	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
1,270	3,810	1,010	4,040	800	4,000	640	3,840	510	3,570	400	3,200
					Vc = 200 m/min, *fz* = 1.0 mm/t						
1,270	4,570	1,010	4,850	800	4,800	640	4,610	510	4,280	400	3,840
					Vc = 200 m/min, *fz* = 1.2 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
960	3,460	760	3,650	600	3,600	480	3,460	380	3,190	300	2,880
					Vc = 150 m/min, *fz* = 1.2 mm/t						
960	2,300	760	2,430	600	2,400	480	2,300	380	2,130	300	1,920
					Vc = 150 m/min, *fz* = 0.8 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
760	1,820	610	1,950	480	1,920	380	1,820	310	1,740	240	1,540
					Vc = 120 m/min, *fz* = 0.8 mm/t						
760	1,820	610	1,950	480	1,920	380	1,820	310	1,740	240	1,540
					Vc = 120 m/min, *fz* = 0.8 mm/t						
640	1,150	510	1,220	400	1,200	320	1,150	250	1,050	200	960
					Vc = 100 m/min, *fz* = 0.6 mm/t						
1,270	4,570	1,010	4,850	800	4,800	640	4,610	510	4,280	400	3,840
					Vc = 200 m/min, *fz* = 1.2 mm/t						
1,270	3,810	1,010	4,040	800	4,000	640	3,840	510	3,570	400	3,200
					Vc = 200 m/min, *fz* = 1.0 mm/t						
960	3,460	760	3,650	600	3,600	480	3,460	380	3,190	300	2,880
					Vc = 150 m/min, *fz* = 1.2 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
250	380	200	400	160	400	130	390	100	350	80	320
					Vc = 40 m/min, *fz* = 0.5 mm/t						
200	120	150	120	120	120	100	120	80	110	60	100
					Vc = 30 m/min, *fz* = 0.2 mm/t						
640	380	510	410	400	400	320	380	250	350	200	320
					Vc = 100 m/min, *fz* = 0.2 mm/t						
380	140	300	140	240	140	190	140	150	130	120	120
					Vc = 60 m/min, *fz* = 0.12 mm/t						

APPLICATION RANGE



09 type

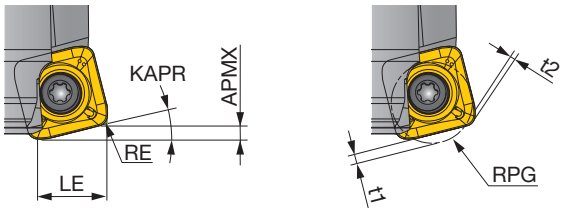
Designation	Tool dia. DCX	Max. depth of cut APMX		Max. plunging depth A	Max. ramping angle RMPX		Max. cutting width in plunging W		Min. machining dia. øD1		Max. machining dia. øD2		Max. cutting width in enlarging ae	
		SWMT 09**ZER	SWMT 09**UER		SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER	SWMT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

15 type

Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

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

TOOL GEOMETRY FOR PROGRAMMING



09 type

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

15 type

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

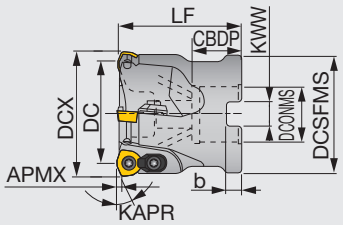
- When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set in SWMT**ZER insert: RPG = 4.5 mm, SWMT**UER insert: RPG = 4 mm. If a larger radius is used, overcutting may occur. The above table shows the uncut (t1) and overcut (t2) amounts for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

MILLFEED
TXP05/06/08/09

High feed mill

GAMP = +5°, GAMF = -4° ~ -6°







Designation	APMX	DCX	CICT	DC	DCSFMS	LF	DCONMS	CBDP	KWW	b	KAPR	WT(kg)	Air hole	Insert
TXP05063RB-E	1.5	63	6	55.4	59	50	22	20	10.4	6.3	15	0.8	with	WPM*05...
TXP05080RB-E	1.5	80	7	72.4	76	63	27	22	12.4	7	15	1.7	with	WPM*05...
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...
TXP06063RB-E	1.5	63	5	54.4	59	50	22	20	10.4	6.3	20	0.7	with	WPM*06...
TXP06080RB-E	1.5	80	6	71.4	76	63	27	22	12.4	7	20	1.6	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...
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...
TXP08066R-E	1.5	66	4	54.6	63	50	27	22	12.4	7	10	0.8	without	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...
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	without	WPM*06...
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...
TXP08160R	1.5	160	8	148.6	100	63	50.8	46	19	11	10	5.1	with	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...
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...
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...
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...
TXP09160R	3	160	7	146.4	100	63	50.8	38	19	11	20	4.7	with	WPMT09...

SPARE PARTS

Designation	Clamp set	Clamping screw	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Wrench 1	Wrench 2
TXP05063RB-E	CSY-15	CSPB-3.5S	M-1000	-	CM10X30H	-	IP-15D	-
TXP05080RB-E	CSY-15	CSPB-3.5S	M-1000	-	-	CAP-CM12X1.75X30	IP-15D	-
TXP06050R	CSY-15	CSPB-4S	M-1000	-	-	CAP-CM10X1.5X30	IP-15D	-
TXP06050R2, RA	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06063RB-E	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06080RB-E	CSY-15	CSPB-4S	M-1000	-	CM12X30H	-	IP-15D	-
TXP08050R	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08050R*	CSX20	CSTB-5	M-1000	-	FSHM10-40H	-	-	T-20T
TXP0805*R-E	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08063R	CSX20	CSTB-5	M-1000	-	-	CAP-CM10X1.5X30	-	T-20T
TXP08063R2	CSX20	CSTB-5	M-1000	-	CM10X30H	-	-	T-20T
TXP08063RA	CSX20	CSTB-5	M-1000	-	CM10X30H	-	-	T-20T
TXP08063, 066R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08080R	CSX20	CSTB-5	M-1000	-	-	CAP-CM16X2.0X40	-	T-20T
TXP08080RA	CSX20	CSTB-5	M-1000	-	CM16X40H	-	-	T-20T
TXP08080R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08100R	CSX20	CSTB-5	M-1000	-	-	CAP-CM16X2.0X40	-	T-20T
TXP08100RA	CSX20	CSTB-5	M-1000	-	CM16X40H	-	-	T-20T
TXP08100R-E	CSX20	CSTB-5	M-1000	-	-	-	-	IP-20T
TXP08125R	CSX20	CSTB-5	M-1000	TMBA-M20H	-	-	-	T-20T
TXP08160R	CSX20	CSTB-5	M-1000	TMBA-M24H	-	-	-	T-20T
TXP09063R*	CSY-20	CSPB-5	M-1000	-	CM10X30H	-	-	IP-20T
TXP09063R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09080R	CSY-20	CSPB-5	M-1000	-	CM16X40H	-	-	IP-20T
TXP09080R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09100R	CSY-20	CSPB-5	M-1000	-	CM16X40H	-	-	IP-20T
TXP09100R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09125R	CSY-20	CSPB-5	M-1000	TMBA-M20H	-	-	-	IP-20T
TXP09125R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09160R	CSY-20	CSPB-5	M-1000	TMBA-M24H	-	-	-	IP-20T

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

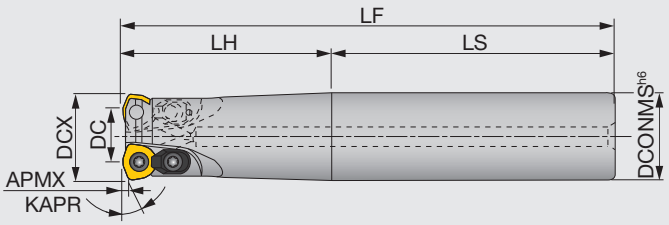
Reference pages: Inserts → H053, Standard cutting conditions → H054 - H055

MILLFEED
EXP05/06/08/09

High feed endmill, shank type

GAMP = +5°, GAMF = -6°





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

SPARE PARTS



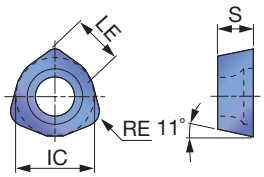
Designation	Clamp set	Clamping screw	Lubricant	Wrench 1	Wrench 2
EXP050...	-	CSPB-3.5S	M-1000	IP-15D	-
EXP060...	CSY-15	CSPB-4S	M-1000	IP-15D	-
EXP080...	CSX20	CSTB-5	M-1000	-	T-20T
EXP090...	CSY-20	CSPB-5	M-1000	-	IP-20T

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

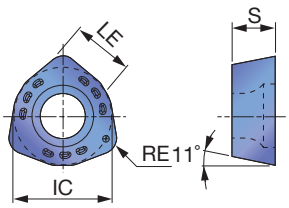
Reference pages: Inserts → H053, Standard cutting conditions → H054 - H055

INSERT

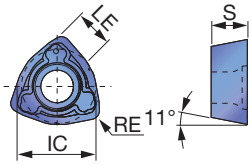
WPMW05/06



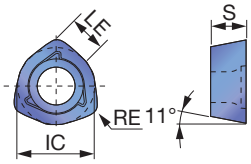
WPMT08/09



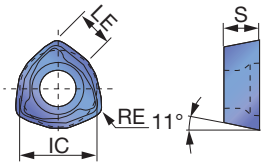
WPMT05/06/08/09-ML



WPMT05/06/08/09-MH



WPMT05/06/08/09-DML



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

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H054 - H055

STANDARD CUTTING CONDITIONS

05·06 type

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

08 type

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

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

STANDARD CUTTING CONDITIONS

09 type

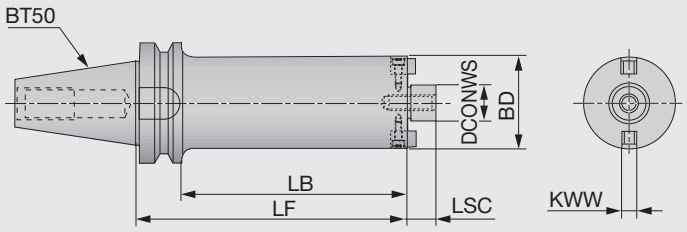
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø50 (CICT = 2)	ø63 (CICT = 3)	ø80 (CICT = 4)	ø100 (CICT = 5)	ø125 (CICT = 6)	ø160 (CICT = 7)
P	Carbon Steels S50C, etc. C50, etc. < 300HB	AH3135	100 ~ 250	0.5 ~ 2	*Vc* = 200 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* =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

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

MILLFEED

BT50-FMC/FMA

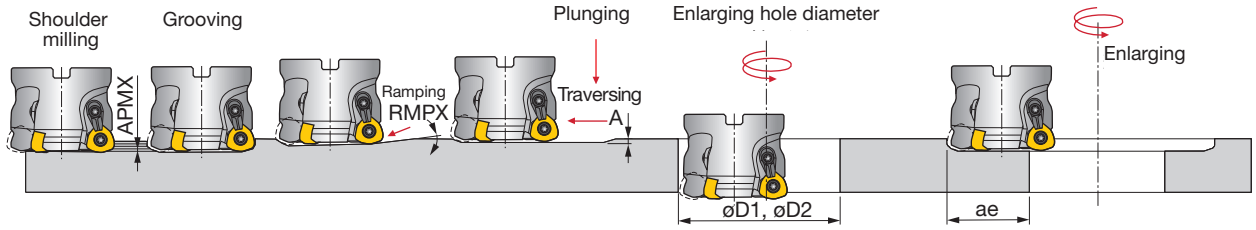
Arbor for TXP mill



*without air hole

Designation	LF	LB	BD	DCONWS	LSC	KWW	WT(kg)	Applicable mill
BT50-FMC22-138-47	138	100	47	22	18	10	5.2	TXP06050R... TXP08050R...
BT50-FMC22-188-47	188	150	47	22	18	10	5.9	
BT50-FMC22-243-47	243	205	47	22	18	10	6.5	
BT50-FMC22-293-47	293	255	47	22	18	10	7.2	
BT50-FMC22-178-59	178	140	59	22	18	10	6.8	TXP08063R... TXP09063R...
BT50-FMC22-238-59	238	200	59	22	18	10	8	
BT50-FMC22-308-59	308	270	59	22	18	10	9.5	
BT50-FMC22-373-59	373	335	59	22	18	10	10.9	
BT50-FMA31.75-215-76	215	177	76	31.75	30	12.7	10	TXP08080R... TXP09080R...
BT50-FMA31.75-295-76	295	257	76	31.75	30	12.7	12.9	
BT50-FMA31.75-375-76	375	337	76	31.75	30	12.7	15.8	
BT50-FMA31.75-275-96	275	237	96	31.75	30	12.7	16.8	TXP08100R... TXP09100R...
BT50-FMA31.75-375-96	375	337	96	31.75	30	12.7	23	

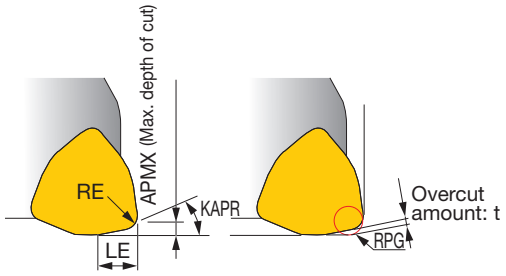
APPLICATION RANGE



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

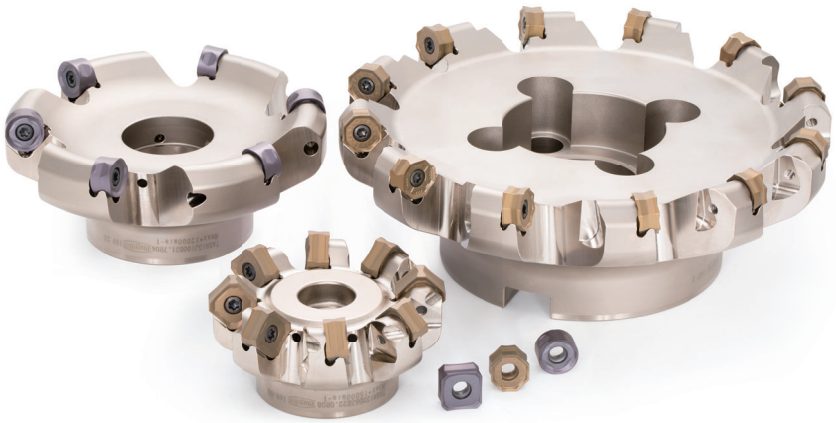
TOOL GEOMETRY FOR PROGRAMMING

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



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

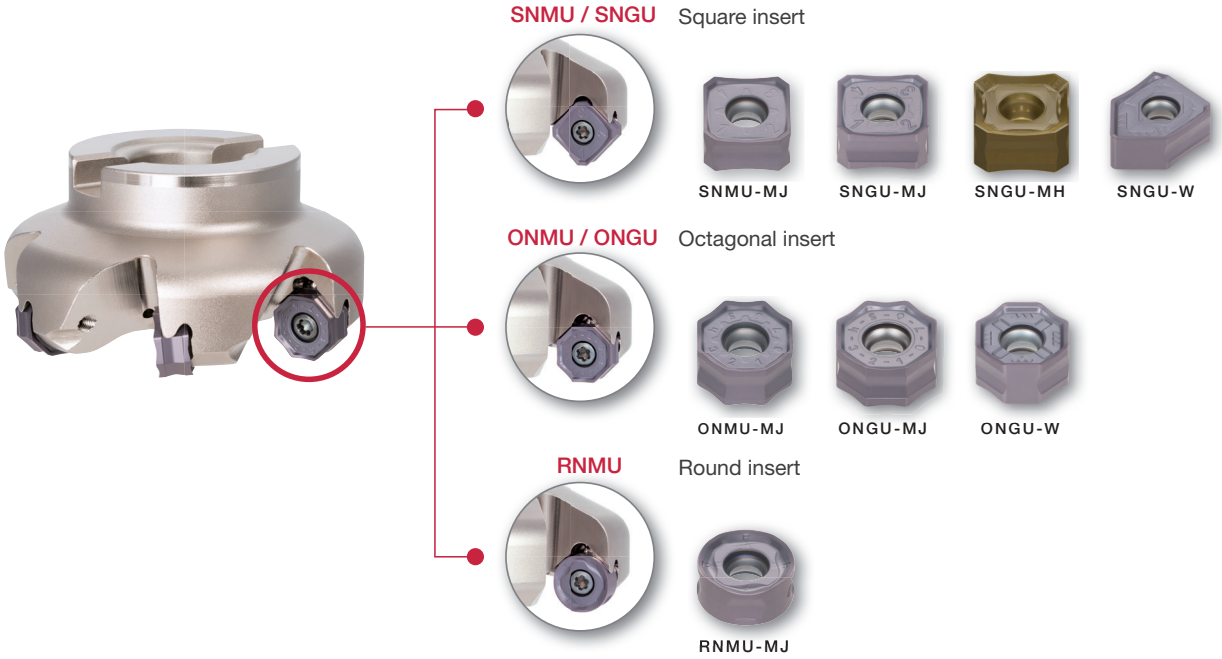
TRIPLE DOTMILL



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: H060 - H062



Super high density PCD cutter for efficient finishing of aluminum

Super high density cutter

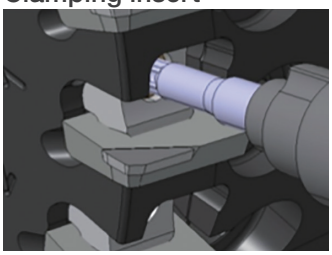


Cutter diameter (mm)	Max num. of teeth	Max. rotation number (min^{-1})	Cutter weight (kg)
50	8	20,000	0.86
63	10	19,000	0.53
80	16	17,000	1.18
100	22	15,000	1.66
125	26	14,000	3.44
160	34	12,000	5.15

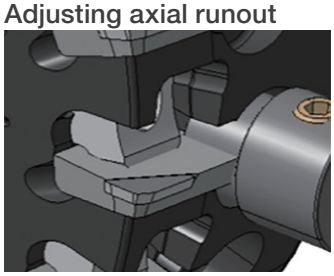
Super high density design
High speed cutting more than Vc = 3,000 m/min is possible.

CamAdjust - super simple adjusting mechanism

Clamping insert

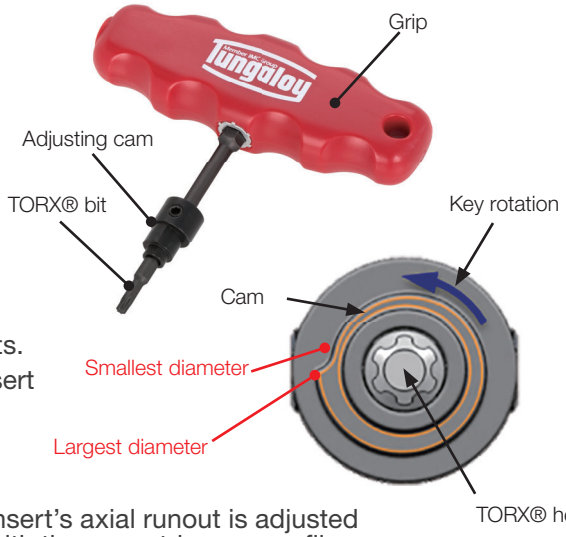


Adjusting axial runout



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: H078 - H081

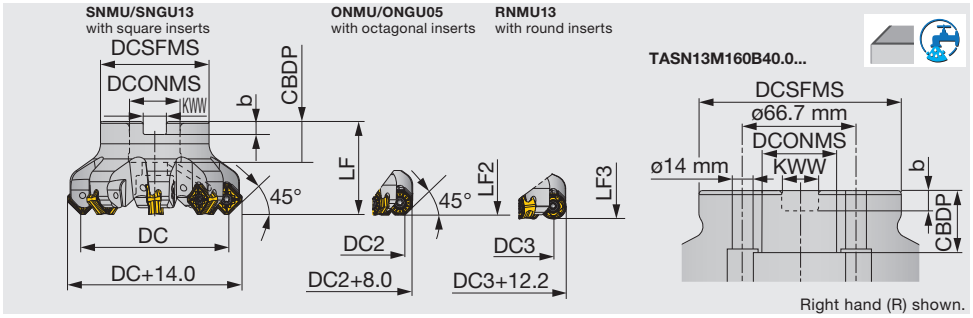
TRIPLE DOTMILL

TASN13

45° face mill, with screw clamp system, for double sided square, octagonal and round inserts

GAMP=+6.0°,GAMF=-6.8°~-6.3°





Right hand (R) shown.

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

Approach angle

10°-20° | 45° | 70° | 85° | 88° | 90° | Others

SPARE PARTS

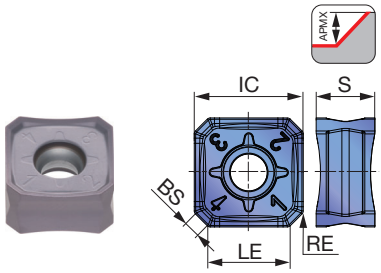
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TASN13M0**B22.0R0*	CSPB-4	H-TB2W	M-1000	-	CM10X30H	BLDIP15/S7
TASN13*080B2*.*R0*	CSPB-4	H-TB2W	M-1000	-	CM12X30H	BLDIP15/S7
TASN13*100B3*.*R0*	CSPB-4	H-TB2W	M-1000	TMBA-M16H	-	BLDIP15/S7
TASN13*125B**.*R**	CSPB-4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

*Recommended clamping torque (N·m): CSPB-4=3.5

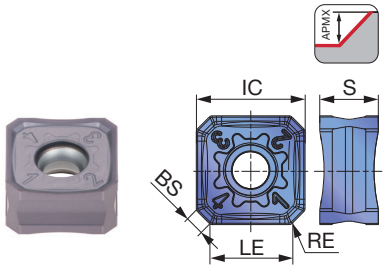
Reference pages: Inserts → H061, Standard cutting conditions → H062

INSERT

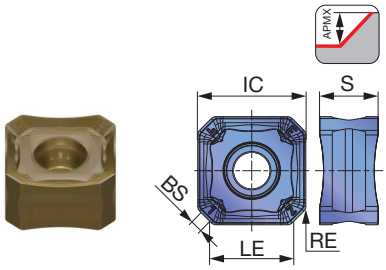
SNMU-MJ



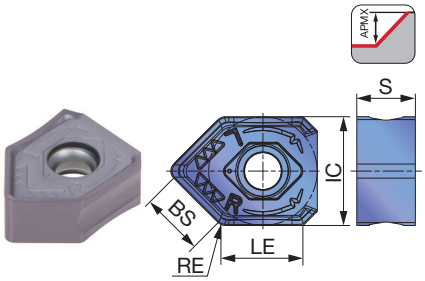
SNGU-MJ



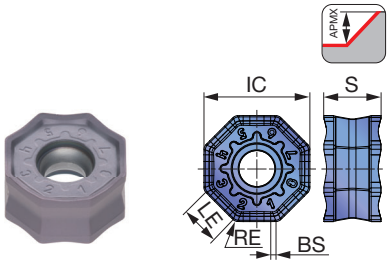
SNGU-MH



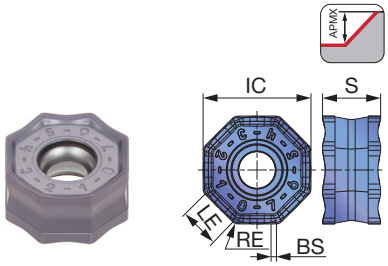
SNGU-W



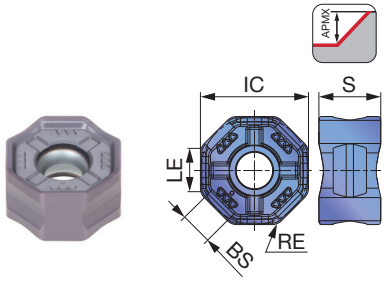
ONMU-MJ



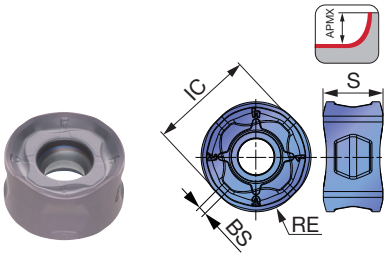
ONGU-MJ



ONGU-W



RNMU-MJ



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated				LE	IC	S	BS
			AH120	AH3135	T3225	T1215				
SNMU1307ANEN-MJ	0.5	6	●	●	●	●	9.4	13	7	2
SNGU1307ANEN-MJ	0.5	6	●	●	●	●	9.4	13	7	2
SNGU1307ANEN-MH	0.8	6			●		9	13	7	2
SNGU1307ANEN-W	1.2	6	●	●			9.6	13	7	7.5
ONMU0507ANEN-MJ	0.8	3.4	●	●	●	●	4.9	13	7	0.7
ONGU0507ANEN-MJ	0.8	3.4	●	●	●	●	4.9	13	7	0.7
ONGU0507ANEN-W	1.6	3.4	●	●			5	13	7.44	3.9
RNMU1307ZNER-MJ	6	6	●	●	●	●	-	13	7.1	1

●: Line up

STANDARD CUTTING CONDITIONS

SNMU / SNGU / ONMU / ONGU

ISO	Workpiece materials		Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, etc. C15, etc.		200 - 300HB	First choice	AH3135	MJ	100 - 250	0.1 - 0.5
				Wear resistance	T3225	MJ	200 - 350	0.1 - 0.4
	High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.		150 - 300HB	First choice	AH3135	MJ	100 - 250	0.1 - 0.4
				Wear resistance	T3225	MJ	180 - 300	0.1 - 0.4
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	MJ	100 - 200	0.1 - 0.4
				Wear resistance	T3225	MJ	150 - 250	0.1 - 0.4
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200HB	First choice	AH3135	MJ	100 - 200	0.1 - 0.35
				Wear resistance	T3225	MJ	100 - 250	0.1 - 0.3
	Stainless cast steel SCH20XNb, etc. GX40NiCrSiNb38-19, etc.		-	First choice	T3225	MH	60 - 120	0.1 - 0.3
				Low cutting force	AH3135	MJ	60 - 120	0.1 - 0.3
K	Gray cast iron FC250, etc. 250, etc.		150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.4
					AH120	MJ	100 - 250	0.1 - 0.5
	Ductile cast iron FCD400, FCD600, etc. 400-15, 600-3, etc.		150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.4
					AH120	MJ	80 - 200	0.1 - 0.5
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	AH3135	MJ	30 - 60	0.1 - 0.3
	Heat-resistant alloys (Inconel718, etc.)		- 40HRC	First choice	AH120	MJ	10 - 40	0.05 - 0.15
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	80 - 130	0.1 - 0.2
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.03 - 0.1

RNMU

ISO	Workpiece materials		Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, etc. C15, etc.		200 - 300 HB	First choice	AH3135	MJ	100 - 250	※ap=6mm: 0.1 - 0.3 ※ap=2mm: 0.4 - 0.8 ※ap=1mm: 0.8 - 1.5
				Wear resistance	T3225	MJ	200 - 350	
	High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.		150 - 300 HB	First choice	AH3135	MJ	100 - 250	
				Wear resistance	T3225	MJ	180 - 300	
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	MJ	100 – 200	
				Wear resistance	T3225	MJ	150 - 250	
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200 HB	First choice	AH3135	MJ	100 - 200	※ap = 6 mm : 0.1 - 0.25 ※ap = 2 mm : 0.3 - 0.7 ※ap = 1 mm : 0.6 - 1.3
				Wear resistance	T3225	MJ	100 - 250	
	Stainless cast steel SCH20XNb, etc. GX40NiCrSiNb38-19, etc.		-	First choice	T3225	MJ	60 - 120	※ap = 2mm: 0.2 - 0.4 ※ap = 1mm: 0.3 - 0.8
				Fracture resistance	AH3135	MJ	60 - 120	
K	Gray cast iron FC250, etc. 250, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	※ap=6mm: 0.1 - 0.3 ※ap=2mm: 0.4 - 0.8 ※ap=1mm: 0.8 - 1.5
					T1215	MJ	100 - 250	
	Ductile cast iron FCD400, FCD600, etc. 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	
					T1215	MJ	80 - 200	
S	Titanium alloys Ti-6Al-4V, etc.		- 40 HRC	First choice	AH3135	MJ	30 - 60	ap=1mm: 0.15 – 0.8
	Heat-resistant alloys (Inconel718, etc.)		- 40 HRC	First choice	AH120	MJ	10 - 40	ap=1mm: 0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	80 - 130	ap=1mm: 0.1 – 0.25
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	ap=0.5mm:0.03–0.1

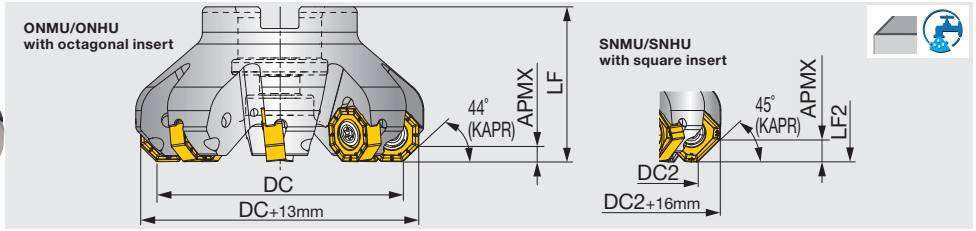
*When using T3225 or T1215, decrease the feed per tooth (*fz*) to 80% of the abovementioned value.

TAN07

45° face mill, with screw clamp system, for double sided square and octagonal inserts, or single sided octagonal inserts

GAMP=-6°,GAMF=+15.5°

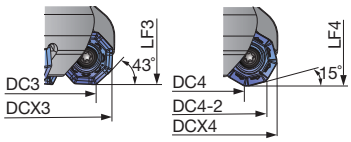




Designation	DC	DC2	CICT	DCSFMS	LF	LF2	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TAN07R063M22.0E05	63	60.3	5	41	40	41.4	22	20	10.4	6.3	0.5	with	SN*U/ON*U/OWMT...	A
TAN07R063M22.0E06	63	60.3	6	41	40	41.4	22	20	10.4	6.3	0.5	with	SN*U/ON*U/OWMT...	A
TAN07R080M25.4-06	80	77.3	6	50	50	51.4	25.4	26	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)

OWMT-ML OWMT-HJ

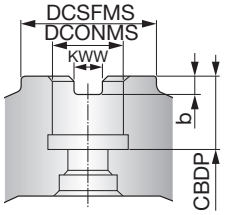


Designation	OWMT-ML			OWMT-HJ			
	DC3	DCX3	LF3	DC4	DC4-2	DCX4	LF4
TAN07R063M...	63.5	76	41	55.7	67.2	76.4	41.4
TAN07R080M...	80.5	93	51	72.7	84.2	93.4	51.4
TAN07R100M...	100.5	113	51	92.7	104.2	113.4	51.4
TAN07R125M...	125.5	138	64	117.7	129.2	138.4	64.4
TAN07R160M...	160.5	173	64	152.7	164.2	173.4	64.4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

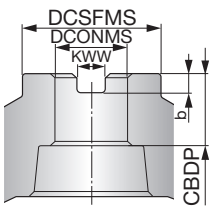
Note: OWMT08 inserts can be only used with screw on type cutters.

Arbor type

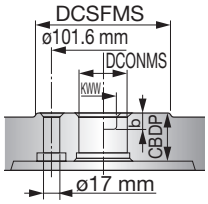
Arbor type A



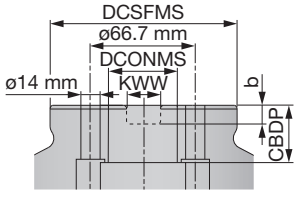
Arbor type B



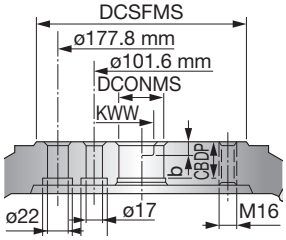
Arbor type C



Arbor type D



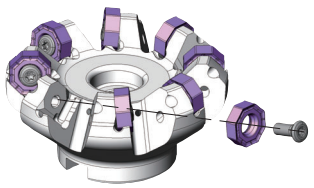
Arbor type E



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 (N·m): SRM5X0.8IP20X+ACROLYTE=7.5



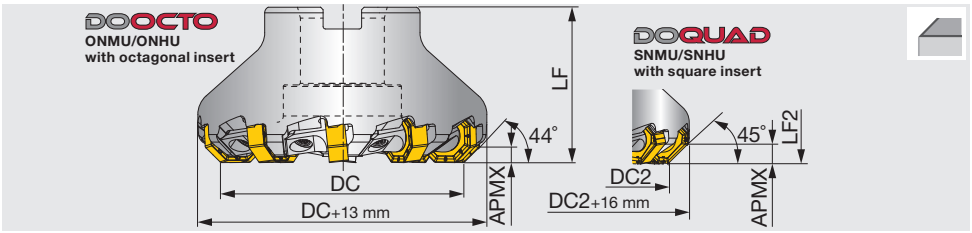
Reference pages: Inserts → H065, Standard cutting conditions → H066

DOOCTO

TAN07-W

High density 45° face mill, with wedge clamp system, for double sided square and octagonal inserts



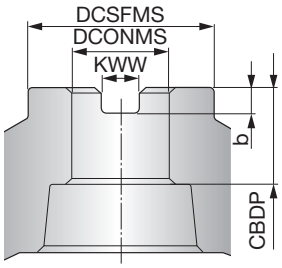


Designation	DC	DC2	CICT	DCSFMS	LF	LF2	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TAN07R063M22.0E08W	63	60.3	8	41	40	41.4	22	20	10.4	6.3	0.6	Without	SN*U/ON*U/OWMT...	B
TAN07R080M25.4-10W	80	77.3	10	50	50	51.4	25.4	26	9.5	6	1	Without	SN*U/ON*U/OWMT...	B
TAN07R080M27.0E10W	80	77.3	10	50	50	51.4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

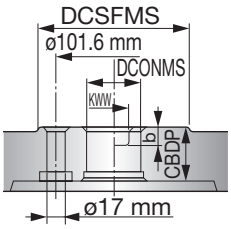
Note: OWMT insert cannot be used with a wedge clamp type cutter.

Arbor type

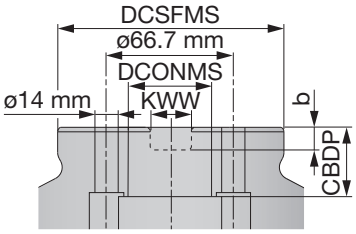
Arbor type B



Arbor type C



Arbor type D



SPARE PARTS

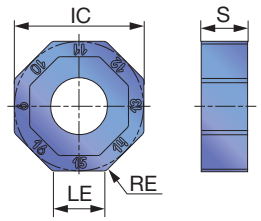
Designation	Grip	Wedge	Wedge fixing screw	Torx bit
TAN07-W	H-TBS	CLARM-10-TUNG1	DS-6P	BLDIP15/S7



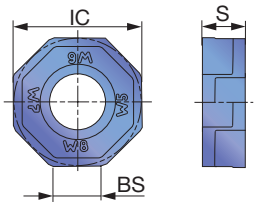
Reference pages: Inserts → H065, Standard cutting conditions → H066

INSERT

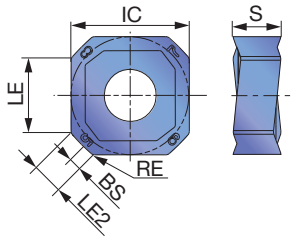
ONMU/ONHU0705-MJ / -ML



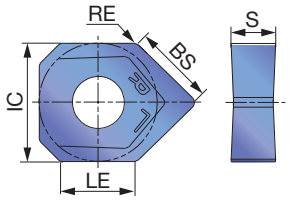
ONHU0705-W



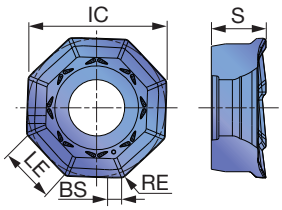
SNMU/SNHU1706 -MJ / -ML



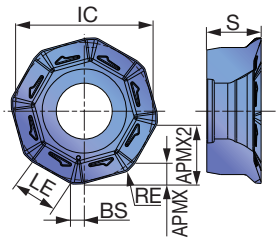
SNHU1706-W



OWMT0807-ML



OWMT0807-HJ



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

★ : First choice
☆ : Second choice

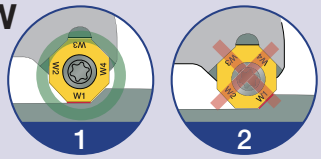
Designation	RE	APMX	Coated								LE	S	LE2	IC	BS	APMX2
			AH120	AH130	AH140	AH725	AH3135	T1115	T1215	T3225						
ONMU0705ANPN-MJ	0.8	4.75			●	●	●	●	●	●	7.2	6.2	-	17.3	-	-
ONHU0705ANPN-MJ	0.8	4.75			●	●					7.2	6.2	-	17.3	-	-
ONMU0705ANPN-ML	0.8	4.75	●				●				7.2	6.2	-	17.3	-	-
ONHU0705ANTN-ML	0.8	4.75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

* Pay attention to the wiper insert installation procedure below.

●: Line up

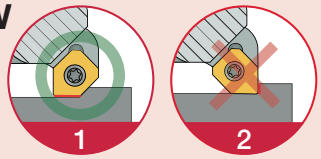
Attention for wiper inserts

ONHU0705ANPR-W



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

SNHU1706ANFN-W



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

STANDARD CUTTING CONDITIONS

Negative type

ISO	Workpiece material	Hardness	Priority	Recommendation		Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
				Grade	Chipbreaker		
P	Low carbon steel S15C, SS400, etc. C15E, etc.	- 200 HB	First choice	AH3135	MJ	100 - 250	0.2 - 0.5
		- 200 HB	Wear resistance	T3225	MJ	200 - 350	0.2 - 0.4
		- 200 HB	Low cutting force	AH3135	ML	100 - 250	0.2 - 0.4
	High carbon steel S45C, S55C, etc. C45E, C55E, etc.	200 - 300 HB	First choice	AH3135	MJ	100 - 230	0.2 - 0.4
		200 - 300 HB	Wear resistance	T3225	MJ	180 - 300	0.2 - 0.4
		200 - 300 HB	Low cutting force	AH3135	ML	100 - 230	0.2 - 0.4
	Alloy steel SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc.	150 - 330 HB	First choice	AH3135	MJ	100 - 200	0.2 - 0.4
		150 - 330 HB	Wear resistance	T3225	MJ	150 - 250	0.2 - 0.4
		150 - 330 HB	Low cutting force	AH3135	ML	100 - 200	0.2 - 0.4
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	- 200 HB	First choice	AH3135	MJ	100 - 200	0.1 - 0.3
		- 200 HB	Wear resistance	T3225	MJ	100 - 250	0.1 - 0.3
K	Grey cast iron FC350, FC450 etc. GG35, GG45, etc.	150 - 250 HB	First choice	T1215	MJ	150 - 300	0.1 - 0.5
		150 - 250 HB	Fracture resistance	AH725	MJ	100 - 250	0.1 - 0.5
		150 - 250 HB	Low cutting force	AH120	ML	100 - 250	0.1 - 0.5
	Ductile cast iron FCD600, etc. GGG60, etc.	150 - 300 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.5
		150 - 300 HB	Fracture resistance	AH725	MJ	80 - 200	0.1 - 0.5
		150 - 300 HB	Low cutting force	AH120	ML	80 - 200	0.1 - 0.5
H	Hardened steel	40 - 50 HRC	First choice	AH725	MJ	80 - 130	0.1 - 0.2
		50 - 60 HRC	First choice	AH725	MJ	50 - 70	0.05 - 0.1

Positive type

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per tooth : *fz* (mm/t)	
						ML	HJ*
P	Low carbon steel S15C, SS400, etc. C15E, etc.	- 200 HB	First choice	AH3135	100 - 300	0.1 - 0.4	0.5 - 1.5
		- 200 HB	Fracture resistance	AH130	100 - 300	0.1 - 0.4	-
	High carbon steel S45C, S55C, etc. C45E, C55E, etc.	200 - 300 HB	First choice	AH3135	100 - 230	0.1 - 0.3	0.5 - 1.5
		200 - 300 HB	Fracture resistance	AH130	100 - 230	0.1 - 0.3	-
	Alloy steel SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc.	150 - 330 HB	First choice	AH3135	100 - 200	0.1 - 0.3	0.5 - 1.5
		150 - 330 HB	Fracture resistance	AH130	100 - 200	0.1 - 0.3	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	- 200 HB	First choice	AH3135	100 - 150	0.1 - 0.3	0.3 - 0.7
		- 200 HB	Fracture resistance	AH130	100 - 150	0.1 - 0.3	-
K	Grey cast iron FC350, FC450 etc. GG35, GG45, etc.	150 - 250 HB	First choice	AH3135	100 - 250	0.1 - 0.4	0.5 - 1.5
		150 - 250 HB	Fracture resistance	AH130	100 - 250	0.1 - 0.4	-
	Ductile cast iron FCD600, etc. GGG60, etc.	150 - 250 HB	First choice	AH3135	80 - 200	0.1 - 0.3	0.5 - 1.5
		150 - 250 HB	Fracture resistance	AH130	80 - 200	0.1 - 0.3	-
S	Titanium alloy Ti-6Al-4V, etc.	- HRC 40	First choice	AH3135	30 - 60	0.1 - 0.3	0.3 - 0.7
		- HRC 40	Fracture resistance	AH130	30 - 60	0.1 - 0.3	-
	Heat resistant alloy Inconel718, etc.	- HRC 40	First choice	AH3135	10 - 40	0.05 - 0.15	0.1 - 0.3
		- HRC 40	Fracture resistance	AH130	10 - 40	0.05 - 0.15	-
H	Hardened steel	40 - 50 HRC	First choice	AH3135	80 - 130	-	0.1 - 0.3
		50 - 60 HRC	First choice	AH3135	50 - 70	-	0.03 - 0.07

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

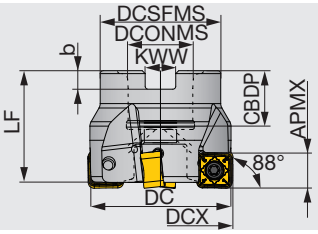
DOQMILL UAD

THSN12

88° face mill, with screw clamp system, for double sided square inserts

GAMP = +3°, GAMF = -11°





Designation	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	8.5	6	1.13	With	SNMU1206...
THSN12J080B25.4R08	9.5	80	80.6	8	58	50	25.4	26	8.5	6	1.15	With	SNMU1206...
THSN12M080B27.0R05	9.5	80	80.6	5	58	50	27	22	12.4	7	1.17	With	SNMU1206...
THSN12M080B27.0R08	9.5	80	80.6	8	58	50	27	22	12.4	7	1.14	With	SNMU1206...
THSN12J100B31.7R06	9.5	100	100.6	6	60	50	31.75	32	12.7	8	1.43	With	SNMU1206...
THSN12J100B31.7R08	9.5	100	100.6	8	60	50	31.75	32	12.7	8	1.39	With	SNMU1206...
THSN12M100B32.0R06	9.5	100	100.6	6	60	50	32	28.5	14.4	8	1.4	With	SNMU1206...
THSN12M100B32.0R08	9.5	100	100.6	8	60	50	32	28.5	14.4	8	1.38	With	SNMU1206...

SPARE PARTS





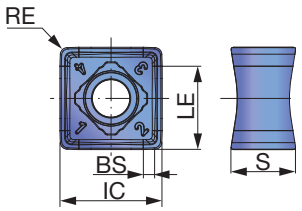

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt
THSN12M050...	CSPB-4	BLDIP15/S7	H-TB2W	CM10x30H
THSN12M063...	CSPB-4	BLDIP15/S7	H-TB2W	CM10x30H
THSN12J080...	CSPB-4	BLDIP15/S7	H-TB2W	CM12X30H
THSN12M080...	CSPB-4	BLDIP15/S7	H-TB2W	CM12X30H
THSN12J100...	CSPB-4	BLDIP15/S7	H-TB2W	TMBA-M16H
THSN12M100...	CSPB-4	BLDIP15/S7	H-TB2W	TMBA-M16H

*Recommended clamping torque (N·m): CSPB-4=3.5

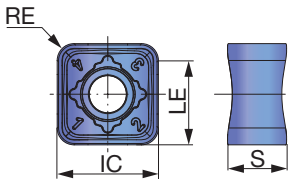
Reference pages: Inserts → H068, Standard cutting conditions → H069

INSERT

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	AH3135	T1215	T3225				
SNMU120608HNEN-MM	0.8	9.5	●	●	●	●	9.8	7.5	12	1.4
SNMU120612EN-MM	1.2	9.5		●	●		10.8	7.25	12	-
SNMU120620EN-MM	2.0	9.5		●	●		10	7	12	-

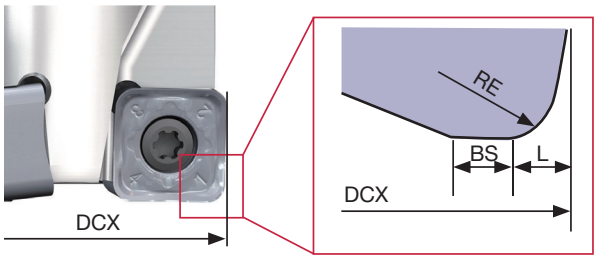
●: Line up

STANDARD CUTTING CONDITIONS

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

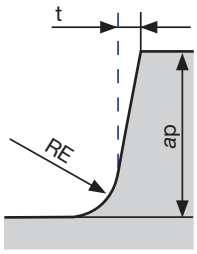
Tool offset

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



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

The following table shows the amount left over cut (t) when the cutter is considered as a shoulder milling cutter.



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

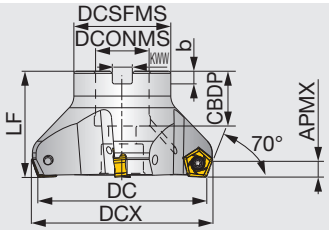
DOPENT

TEN09R/L

70° face mill, with screw clamp system, for double sided pentagonal inserts

GAMP=-6°,GAMF=-10°~-2°





Right hand (R) shown.

Designation	APMX	DC	CICT	DCX	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TEN09R050M22.0-03	6.4	50	3	56	41	40	22	20	10	6	0.3	with	PN*U0905...
TEN09R050M22.0-04	6.4	50	4	56	41	40	22	20	10	6	0.3	with	PN*U0905...
TEN09R050M22.0-06	6.4	50	6	56	41	40	22	20	10	6	0.3	with	PN*U0905...
TEN09R050M22.0E04	6.4	50	4	56	41	40	22	20	10.4	6.3	0.3	with	PN*U0905...
TEN09R050M22.0E06	6.4	50	6	56	41	40	22	20	10.4	6.3	0.3	with	PN*U0905...
TEN09R063M22.0-04	6.4	63	4	69	41	40	22	20	10	6	0.5	with	PN*U0905...
TEN09R063M22.0-06	6.4	63	6	69	41	40	22	20	10	6	0.5	with	PN*U0905...
TEN09R063M22.0-08	6.4	63	8	69	41	40	22	20	10	6	0.5	with	PN*U0905...
TEN09R063M22.0E06	6.4	63	6	69	41	40	22	20	10.4	6.3	0.5	with	PN*U0905...
TEN09R063M22.0E08	6.4	63	8	69	41	40	22	20	10.4	6.3	0.5	with	PN*U0905...
TEN09R080M25.4-04	6.4	80	4	86	46	50	25.4	26	9.5	6	0.9	with	PN*U0905...
TEN09R080M25.4-07	6.4	80	7	86	46	50	25.4	26	9.5	6	0.9	with	PN*U0905...
TEN09R080M25.4-10	6.4	80	10	86	46	50	25.4	26	9.5	6	0.9	with	PN*U0905...
TEN09R080M27.0E07	6.4	80	7	86	50	50	27	22	12.4	7	0.9	with	PN*U0905...
TEN09R080M27.0E10	6.4	80	10	86	50	50	27	22	12.4	7	1	with	PN*U0905...
TEN09R100M31.7-05	6.4	100	5	106	60	50	31.75	32	12.7	8	1.3	with	PN*U0905...
TEN09R/L100M31.7-08*	6.4	100	8	106	60	50	31.75	32	12.7	8	1.3	with	PN*U0905...
TEN09R100M31.7-12	6.4	100	12	106	60	50	31.75	32	12.7	8	1.4	with	PN*U0905...
TEN09R/L100M32.0E08*	6.4	100	8	106	60	50	32	28.5	14.4	8	1.3	with	PN*U0905...
TEN09R100M32.0E12	6.4	100	12	106	60	50	32	28.5	14.4	8	1.4	with	PN*U0905...
TEN09R125M38.1-06	6.4	125	6	131	80	63	38.1	38	15.9	10	2.6	with	PN*U0905...
TEN09R/L125M38.1-10*	6.4	125	10	131	80	63	38.1	38	15.9	10	2.7	with	PN*U0905...
TEN09R125M38.1-16	6.4	125	16	131	80	63	38.1	43	15.9	10	2.9	with	PN*U0905...
TEN09R/L125M40.0E10*	6.4	125	10	131	71	63	40	32	16.4	9	2.3	with	PN*U0905...
TEN09R125M40.0E16	6.4	125	16	131	71	63	40	32	16.4	9	2.5	with	PN*U0905...
TEN09R160M50.8-07	6.4	160	7	166	100	63	50.8	46	19	11	4.4	without	PN*U0905...
TEN09R/L160M40.0E12*	6.4	160	12	166	100	63	40	29	16.4	9	4	without	PN*U0905...
TEN09R160M40.0E20	6.4	160	20	166	100	63	40	29	16.4	9	4.3	without	PN*U0905...
TEN09R/L160M50.8-12*	6.4	160	12	166	100	63	50.8	46	19	11	4.6	without	PN*U0905...
TEN09R160M50.8-20	6.4	160	20	166	100	63	50.8	46	19	11	4.9	without	PN*U0905...

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

Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

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	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15M
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	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R/L160M...12	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R160M...20	CSTR-4L100	H-TBS	M-1000	-	-	BT15S

*Recommended clamping torque (N·m): CSTR-4L100=3.5

Reference pages: Inserts → H071, Standard cutting conditions → H072

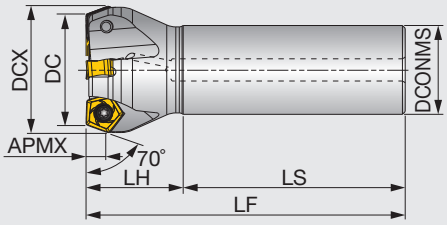
DOPENT

EEN09

70° face endmill, shank type, with screw clamp system, for double sided pentagonal inserts

GAMP=-6°,GAMF=-2°~-10°



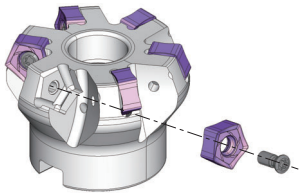


Designation	APMX	DC	DCX	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EEN09R032M32.0-03	6.4	32	38	3	32	80	35	115	0.7	With	PN*U0905...
EEN09R040M32.0-04	6.4	40	46	4	32	80	35	115	0.7	With	PN*U0905...
EEN09R050M32.0-04	6.4	50	56	4	32	80	40	120	0.9	With	PN*U0905...
EEN09R063M32.0-06	6.4	63	69	6	32	80	40	120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

SPARE PARTS

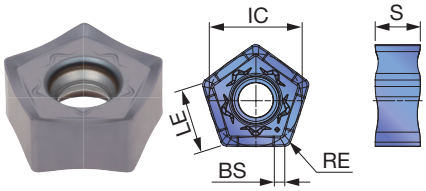
Designation	Clamping screw	Lubricant	Wrench
EEN09	CSTR-4L100	M-1000	T-15D

*Recommended clamping torque (N·m): CSTR-4L100=3.5

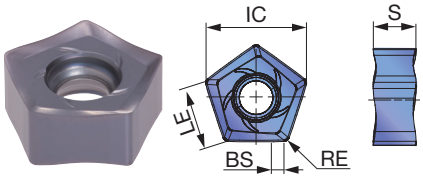


INSERT

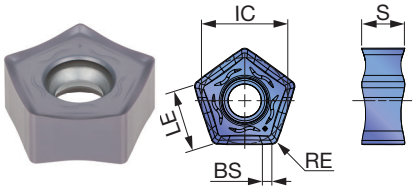
PN*U0905GNEN-MJ (Neutral)



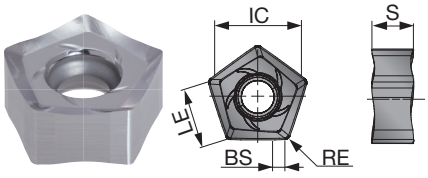
PNCU0905GNER-MJ (Right hand)



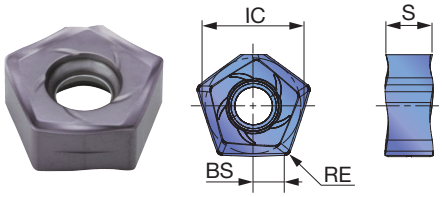
PNCU0905-ML (Neutral)



PNCU0905-AJ (Right hand)



PNCU0905-W (Right hand)



		AH120	AH140	AH725	AH3135	T1115	T1215	T3130	T3225	NS740	TH10
P	Steel	☆		★	★			☆	☆	★	
M	Stainless		☆	☆	★				☆		
K	Cast iron	★		☆		★	★				
N	Non-ferrous										★
S	Superalloys	☆		★	☆						
H	Hard materials										

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H072

STANDARD CUTTING CONDITIONS

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

- Remove excessive chip with an air blast to prevent chip jamming.
- Use water-soluble coolant to avoid built-up edge in case extreme welding occurs on cutting edges. (ex. aluminium machining).
- For the operation with depth of cut which varies (ex. casting skin) and machining of workpiece materials with interrupted surface, the feed (*fz*) should be set to the lower recommened 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)

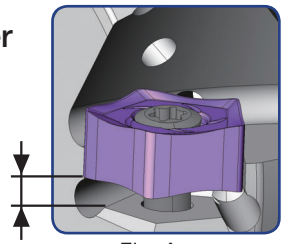
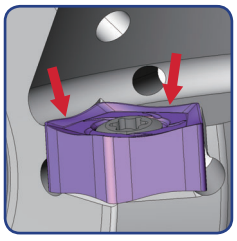


Fig. A


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.

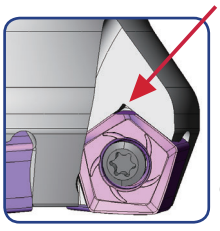


Fig. C

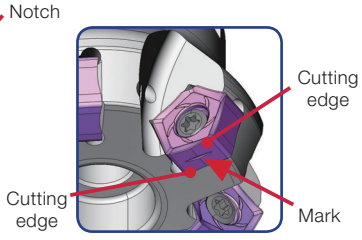


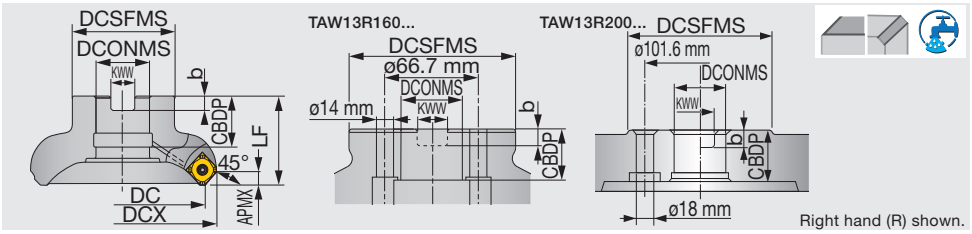
Fig. D

TAW13

30° - 45° face mill, with screw clamp system, for SWMT/SWGT13 inserts

GAMP=+17°~+20°,GAMF=-16°~-11°





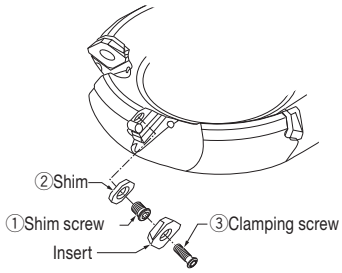
Right hand (R) shown.

Designation	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...

*Recommended clamping torque (N·m): CSPB-3.5=3.5

SPARE PARTS

Designation	③Clamping screw	Lubricant	①Shim screw	Shell locking bolt 1	Shell locking bolt 2	②Shim	Wrench	Wrench 1
TAW13R050 - 063...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM10X30H	FSSA1102	IP-15D	P-3.5
TAW13R080...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM12X30H	FSSA1102	IP-15D	P-3.5
TAW13R100...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M16H	-	FSSA1102	IP-15D	P-3.5
TAW13R125...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M20H	-	FSSA1102	IP-15D	P-3.5
TAW13R160...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSA1102	IP-15D	P-3.5
TAW13R200...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSA1102	IP-15D	P-3.5



Reference pages: Inserts → H075, Standard cutting conditions → H076 - H077

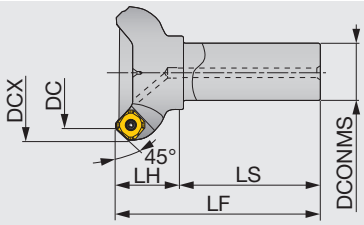
TUNGMILL

EAW13

30° - 45° face endmill, shank type, with screw clamp system, for SWMT/SWGT13 inserts

GAMP=+17°~+20°,GAMF=-16°~-11°





Right hand (R) shown.

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

SPARE PARTS

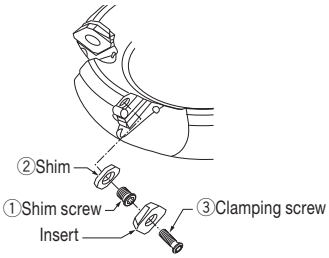







Designation	③Clamping screw	Lubricant	①Shim screw	②Shim	Wrench	Wrench 1
EAW13R025**~040**	CSPB-3.5	M-1000	-	-	IP-15D	-
EAW13R050**~080**	CSPB-3.5	M-1000	DTS5-3.5SS	FSSA1102	IP-15D	P-3.5

*Recommended clamping torque (N·m): CSPB-3.5=3.5

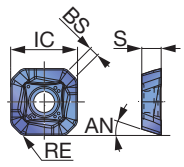


Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

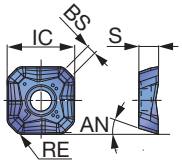
Reference pages: Inserts → H075, Standard cutting conditions → H076 - H077

INSERT

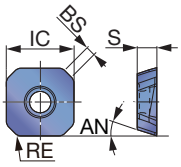
SWMT13T3-MJ



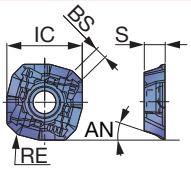
SWMT13T3-ML



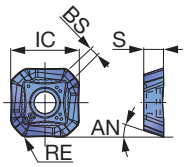
SWMW13T3 (Flat)



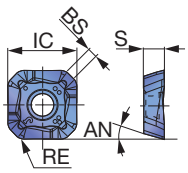
SWMT13T3-HJ



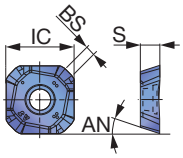
SWMT13T3-MS



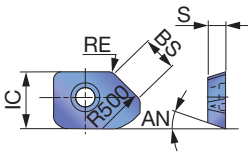
SWGT13T3-MJ



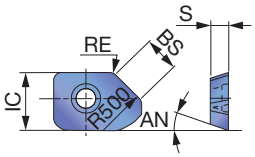
SWGT13T3-AJ



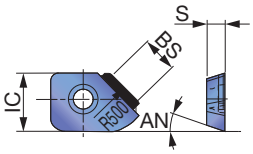
WWCW13T3AFER-WS



WWCW13T3AFFR-WS



WWCW13T3AFFR-WD



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated										Cermet		Uncoated		PCD		IC	S	AN	BS
			AH120	AH130	AH140	AH3135	GH110	T1115	T1215	T3130	T3225	DS1100	NS740		KS05F		DX140					
SWMT13T3AFPR-MJ	1.5	4	●	●	●	●		●	●	●	●		●						13.9	4	18.5°	2
SWMT13T3AFER-ML	1.5	2.5	●			●													13.9	4	18.5°	2
SWMW13T3AFTR	1.5	5	●			●		●	●	●	●		●						13.9	4	18.5°	2
SWMT13T3AFPR-HJ	1.5	2	●	●	●	●		●	●	●	●								14.7	4	18.5°	2.3
SWMT13T3AFPR-MS	1	4		●	●	●													14.1	4	18.5°	2
SWGT13T3AFPR-MJ	1.5	4	●			●							●						13.9	4	18.5°	2
SWGT13T3AFFR-AJ	-	4										●			●				14.1	4	18.5°	2
WWCW13T3AFER-WS	1.5	-					●						●						12.8	4	18.5°	7.8
WWCW13T3AFFR-WS	1.5	-										●			●				12.8	4	18.5°	7.8
WWCW13T3AFFR-WD	-	-															●		12.8	4	18.5°	7.8

●: Line up

DX140 : Packing Quantity = 1 pc.

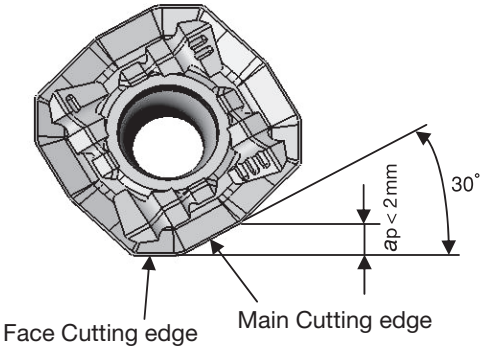
STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Priority	Grade	Cutting speed v_c (m/min)	Roughing (Depth of cut: > 1.0 mm) Feed per tooth: f_z (mm/t) MJ	ML	HJ	MS	Flat	AJ
P	Mild and low carbon steels SS400, etc. E275A, etc. < 180 HB	First choice	AH3135	100 - 270	0.05 - 0.3	0.05 - 0.25	0.2 - 0.6	-	0.05 - 0.3	-
		Wear resistance	T3225	150 - 300	0.05 - 0.3	-	0.2 - 0.6	-	0.05 - 0.3	-
		Surface quality	NS740	100 - 300	0.05 - 0.23	-	-	-	0.05 - 0.23	-
	Carbon and alloy steels S45C, SCM440, etc. C45, 42CrMo4, etc. < 300 HB	First choice	AH3135	100 - 230	0.05 - 0.25	0.05 - 0.2	0.2 - 0.5	-	0.05 - 0.25	-
		Wear resistance	T3225	150 - 280	0.05 - 0.25	-	0.2 - 0.5	-	0.05 - 0.25	-
		Surface quality	NS740	100 - 230	0.05 - 0.2	-	-	-	0.05 - 0.2	-
	Die steels X96CrMoV12, etc. < 30 HRC	First choice	AH3135	100 - 180	0.05 - 0.2	0.05 - 0.2	0.2 - 0.4	-	0.05 - 0.2	-
		Wear resistance	T3225	100 - 180	0.05 - 0.2	-	0.2 - 0.4	-	0.05 - 0.2	-
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. < 250 HB	First choice	AH3135	80 - 200	0.1 - 0.25	0.1 - 0.2	0.2 - 0.5	0.1 - 0.2	-	-
		Wear resistance	T3225	150 - 250	0.1 - 0.25	0.1 - 0.2	0.2 - 0.5	-	0.1 - 0.25	-
K	Grey cast irons FC25, FC300, etc. 250, 300, etc.	First choice	T1215	180 - 300	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Fracture resistance	AH120	150 - 250	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	-	0.05 - 0.25	-
	Ductile cast irons FCD400, FCD600, etc. 400-15S, 600-3, etc.	First choice	T1215	120 - 200	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Fracture resistance	AH120	100 - 180	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	-	0.05 - 0.25	-
S	Titanium alloys Ti-6Al-4V, etc.	First choice	AH130	30 - 60	0.1 - 0.25	-	0.2 - 0.5	0.1 - 0.2	-	-
	Heat-resistance alloys Inconel 718, etc.	First choice	AH120	10 - 40	0.05 - 0.15	-	0.1 - 0.3	-	-	-
N	Aluminium alloys Si < 13 %	-	DS1100 KS05F	300 - 1000	-	-	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	DS1100 KS05F	80 - 300	-	-	-	-	-	0.05 - 0.2
	Copper alloys	-	DS1100 KS05F	200 - 500	-	-	-	-	-	0.05 - 0.2

Notes for use of HJ-type inserts

HJ-type inserts can be used for high feed machining.
When using the insert, care should be taken with the following:

- The maximum depth of cut is *ap* = 2 mm. Select feeds within the above value.
- Do not use the HJ-type inserts with other types (such as MJ- and MS-types) in the same body.
- The outer shape of the HJ-type insert is different from those of other types (such as MJ- and MS-types), but the insert can be held in the same insert pocket.



Notes on use of wiper insert

- When requiring good surface finishes, use of a wiper insert (WWCW13T3AF_ R-W_) is recommended. In general, installing one wiper insert delivers superior surface finishes.
- When using the wiper insert, install the insert as shown in Fig. A. If the insert is installed as shown in Fig. B, breakage of the insert is inevitable and normal surface finish can not be obtained.
- The wiper insert must not be used together with HJ-type inserts
- The wiper insert has one wiping corner.
- The peripheral cutting edge of the wiper insert is retracted from the edge of the normal inserts. Therefore, the feed per tooth (*fz* mm/t) of the normal insert following the wiper insert is double that of other inserts.
- When using the wiper insert, depth of cut (*ap*) less than 1 mm is recommended.

Fig. A

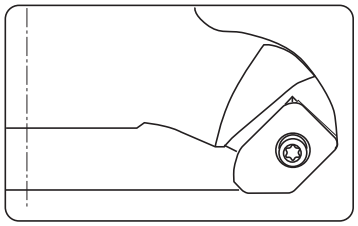
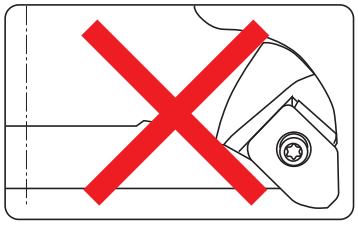


Fig. B



ISO	Workpiece materials	Priority	Grade	Cutting speed *vc* (m/min)	Light cutting to finishing (Depth of cut: ≤ 1.0 mm) Feed per tooth: *fz* (mm/t)					
					MJ	ML	HJ	MS	Flat	AJ
P	Mild and low carbon steels SS400, etc. E275A, etc. < 180 HB	First choice	AH3135	100 - 270	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	-	0.05 - 0.25	-
		Wear resistance	T3225	150 - 300	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Surface quality	NS740	100 - 300	0.05 - 0.2	-	-	-	0.05 - 0.2	-
	Carbon and alloy steels S45C, SCM440, etc. C45, 42CrMo4, etc. < 300 HB	First choice	AH3135	100 - 230	0.05 - 0.2	0.05 - 0.15	0.2 - 0.5	-	0.05 - 0.2	-
		Wear resistance	T3225	150 - 280	0.05 - 0.2	-	0.2 - 0.5	-	0.05 - 0.2	-
		Surface quality	NS740	100 - 230	0.05 - 0.18	-	-	-	0.05 - 0.18	-
	Die steels X96CrMoV12, etc. < 30 HRC	First choice	AH3135	100 - 180	0.05 - 0.18	0.05 - 0.12	0.2 - 0.4	-	0.05 - 0.18	-
		Wear resistance	T3225	100 - 180	0.05 - 0.18	-	0.2 - 0.4	-	0.05 - 0.18	-
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc. < 250 HB	First choice	AH3135	80 - 200	0.1 - 0.2	0.1 - 0.18	0.2 - 0.5	0.1 - 0.18	-	-
		Wear resistance	T3225	150 - 250	0.1 - 0.2	0.1 - 0.18	0.2 - 0.5	-	0.1 - 0.2	-
K	Grey cast irons FC25, FC300, etc. 250, 300, etc.	First choice	T1215	180 - 300	0.1 - 0.2	-	0.2 - 0.6	-	0.1 - 0.2	-
		Fracture resistance	AH120	150 - 250	0.1 - 0.2	0.05 - 0.18	0.2 - 0.6	-	0.1 - 0.2	-
	Ductile cast irons FCD400, FCD600, etc. 400-15S, 600-3, etc.	First choice	T1215	120 - 200	0.1 - 0.2	-	0.2 - 0.6	-	0.1 - 0.2	-
		Fracture resistance	AH120	100 - 180	0.1 - 0.2	0.05 - 0.18	0.2 - 0.6	-	0.1 - 0.2	-
S	Titanium alloys Ti-6Al-4V, etc.	-	AH130	30 - 60	0.1 - 0.2	-	0.2 - 0.5	0.1 - 0.2	-	-
	Heat-resistance alloys Inconel 718, etc.	-	AH120	10 - 40	0.05 - 0.15	-	0.1 - 0.3	-	-	-
N	Aluminium alloys Si < 13 %	-	DS1100 KS05F	300 - 1000	-	-	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	DS1100 KS05F	80 - 300	-	-	-	-	-	0.05 - 0.2
	Copper alloys	-	DS1100 KS05F	200 - 500	-	-	-	-	-	0.05 - 0.2

Notes:

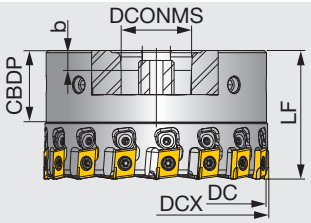
- When cutting at a large depth of cut or a large cutting width, the cutting speed (*vc*) and feed (*fz*) should be set to the lower side of the values shown in the above table.
- Dry cutting (or air-blowing) is generally recommended. However, when chips tend to excessively adhere to the cutting edges when machining stainless steel, use a water soluble cutting fluid. In this case, use the AH130 grade at speeds lower than *vc* = 100 m/min.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.
- TAW13 type TAC mills cannot be used for axial-feed cutting such as ramping, plunging and drilling.

TUNGSMILL

TPYP12

High speed PCD mill for non ferrous metal





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

*D1: Outside diameter
DCX: 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	VC004762I10035F
TPYP12M080B27.0R12	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6080	VC00TEDI12040F
TPYP12J080B25.4R12	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6080	VC00TEDI12040F
TPYP12M100B32.0R16	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6100	VC00TANG16040F
TPYP12J100B31.7R16	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6100	VC00TANG16040F
TPYP12M125B40.0R20	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6125	VC00TEDI20040F
TPYP12J125B38.1R20	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6125	VC00TEDI20040F

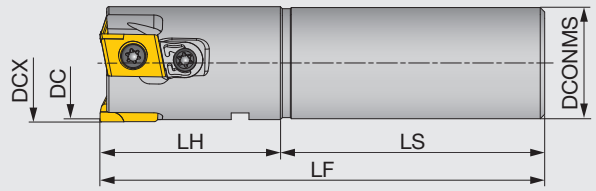
*Recommended clamping torque (N·m): VX040024A=4.5

TUNGSMILL

EPYP12

High speed PCD endmill for non ferrous metal





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

*D1: Outside diameter
DCX: Diameter with 01 type insert

SPARE PARTS

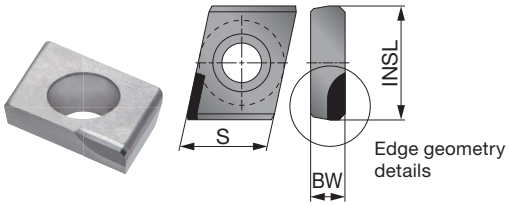
Designation	Clamping screw	Wrench	Wedge fixing screw	Wedge	Wrench
EPYP12M025C25.0R03	VX040024A	T-15F	VX040028A	RSFTC1011	T-8F
EPYP12M032C25.0R05	VX040024A	T-15F	RSRGR5M40	RSFTC1009	T-8F

*Recommended clamping torque (N·m): VX040024A=4.5

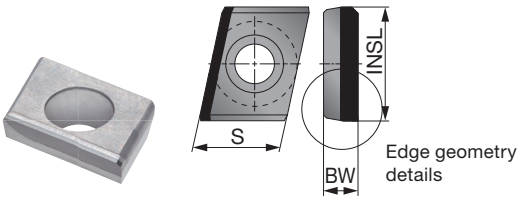
Reference pages: Inserts, Standard cutting conditions → H079

INSERT

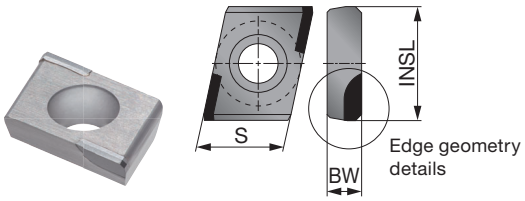
YPEB12X3-1A



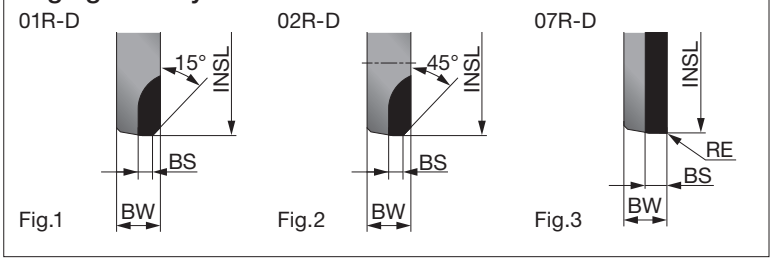
YPEB12X-FP



YPEB12X3-2A/P



Edge geometry details



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

★ : First choice
☆ : Second choice

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

●: Line up

2 pieces per package

STANDARD CUTTING CONDITIONS

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

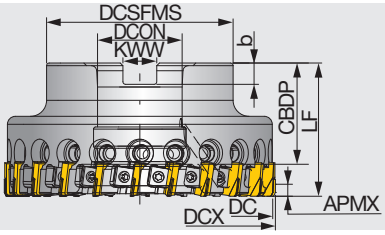
TUNGSMILL FEED

TPYD06

Face mill for aluminium machining, for PCD inserts

GAMP = +9°, GAMF = +4°





Designation	APMX	DC	DCX	CICT	DCSFMS	LF	DCON	CBDP	KWW	b	WT(kg)	Air hole	RPMX	Insert
TPYD06M063B22.0R10	4.5	63	65	10	45	40	22	20	10.4	6.3	0.57	With	19,000	YDEN0603...
TPYD06M080B27.0R16	4.5	80	82	16	60	50	27	22	12.4	7	1.24	With	17,000	YDEN0603...
TPYD06J080B25.4R16	4.5	80	82	16	60	50	25.4	26	9.5	6	1.26	With	15,000	YDEN0603...
TPYD06M100B32.0R22	4.5	100	102	22	70	50	32	25	14.4	8	1.78	With	14,000	YDEN0603...
TPYD06J100B31.7R22	4.5	100	102	22	70	50	31.75	32	12.7	8	1.76	With	12,000	YDEN0603...
TPYD06M125B40.0R26	4.5	125	127	26	90	60	40	32	16.4	9	3.48	With	17,000	YDEN0603...
TPYD06J125B38.1R26	4.5	125	127	26	90	60	38.1	38	15.9	10	3.56	With	15,000	YDEN0603...
TPYD06M160B40.0R34	4.5	160	162	34	90	60	40	32	16.4	9	5.2	With	14,000	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	Clamping screw	Wedge fixing screw	Adjusting cam	Torx bit	Cam tightening screw	Wrench	Grip	Shell locking bolt
TPYD06M063B22.0R10	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	CM10X30H
TPYD06*080B2*.*R16	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	CM12X30H
TPYD06*100B32.0R22	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	CM16X40H
TPYD06*100B31.7R22	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	TMBA-M16H
TPYD06*125B**.*R26	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	TMBA-M20H
TPYD06*160B**.*R34	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W	TMBA-M20H

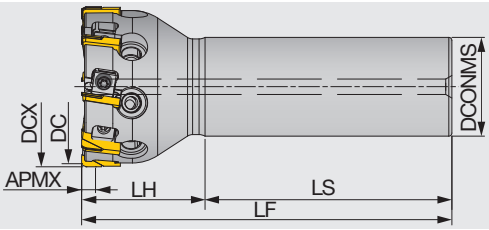
TUNGSMILL FEED

EPYD06

Face endmill for aluminium machining, shank type, for PCD inserts

GAMP = +9°, GAMF = +4°





Designation	APMX	DC	DCX	CICT	DCONMS	LF	LH	LS	WT(kg)	Air hole	RPMX	Insert
EPYD06M050C32.0R08	4.5	50	52	8	32	120	40	80	0.57	With	22,000	YDEN0603...

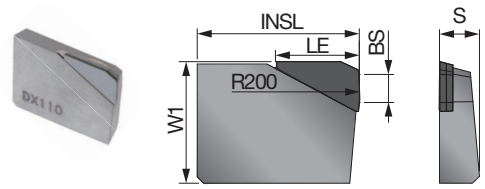
SPARE PARTS

Designation	Clamping screw	Wedge fixing screw	Adjusting cam	Torx bit	Cam tightening screw	Wrench	Grip
EPYD06M050C32.0R08	WF875N	DS-5T	AJC08	BLDT10/S7-A	SSHM4-4	P-2	H-TB2W

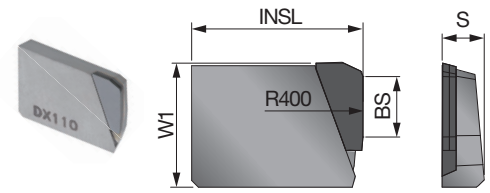
Reference pages: Inserts, Standard cutting conditions → H081

INSERT

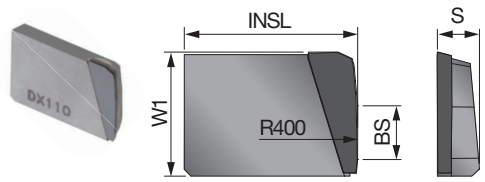
YDEN0603PD(F/S)R-D



YDEN0603PDFR-WD



YDEN0603PDFR-BD



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

★ : First choice
☆ : Second choice

Designation	APMX	Edge prep.	PCD DX110	W1	INSL	S	BS	LE
YDEN0603PDFR-D	4.5	Without	●	9.5	12.7	3.1	2.2	6.5
YDEN0603PDSR-D	4.5	With	●	9.5	12.7	3.1	2.2	6.5
YDEN0603PDFR-WD	-	Without	●	9.2	12.8	3.1	4.5	-
YDEN0603PDFR-BD	-	With	●	9.2	12.9	3.1	4	-

Note: Tungaloy provides refurbishing service for these inserts upon request.

●: Line up

1 piece per package

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Designation	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
N	Cast aluminum alloy / Die-cast Si < 13%	DX110	YDEN0603PDFR-D	500 - 4,000	0.05 - 0.20
	Cast aluminum alloy / Die-cast Si > 13%	DX110	YDEN0603PDFR-D	200 - 800	0.05 - 0.20
	Aluminum alloy	DX110	YDEN0603PDFR-D	500 - 4,000	0.05 - 0.20
	Copper alloy	DX110	YDEN0603PDFR-D	200 - 500	0.05 - 0.20

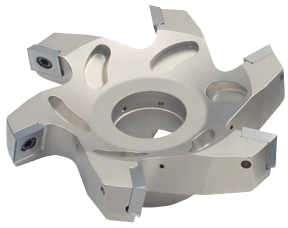
- The values in the above list are of standard recommendations and may require adjustments in consideration with cutting depths and/or workpiece/machine rigidity.
- Use wiper inserts (-WD) for better surface requirements and deburring inserts (-BD) to remove burrs.
- Always use wet cutting (emulsion coolant) for machining aluminum or copper alloys.

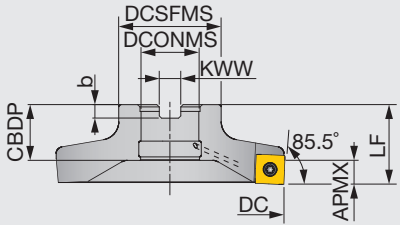
TFE

TFE12R

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

GAMP = +13°, GAMF = +7°





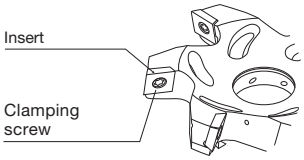
Air through type

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

SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Wrench
TFE12063R	CSPB-4S	M-1000	-	CM10X30H	IP-15D
TFE12080R	CSPB-4S	M-1000	TMBA-M12H	-	IP-15D
TFE12100R	CSPB-4S	M-1000	TMBA-M12H	-	IP-15D
TFE12125R	CSPB-4S	M-1000	TMBA-M12H	-	IP-15D

*Recommended clamping torque (N·m): CSPB-4S=3.5



Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

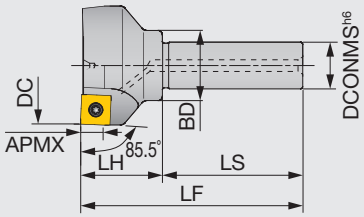
EFE

EFE12R

86° face endmill for aluminium machining, shank type, with screw clamp system, for positive square inserts

GAMP = +13°, GAMF = +7°





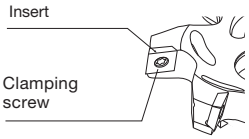
Air through type

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

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EFE12000R	CSPB-4S	M-1000	IP-15D

*Recommended clamping torque (N·m): CSPB-4S=3.5



Reference pages: Inserts → H084, Standard cutting conditions → H085

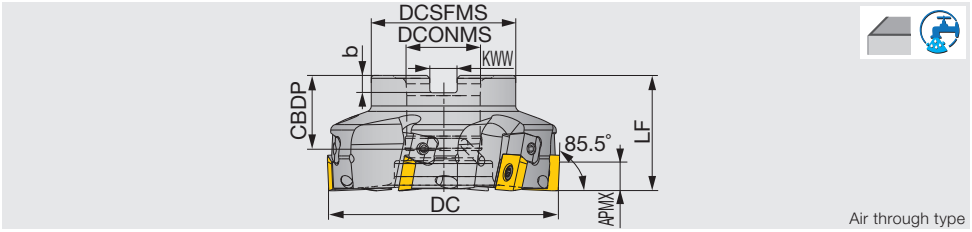
TFE

TFE12R...-...A

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

GAMP = +13°, GAMF = +7°



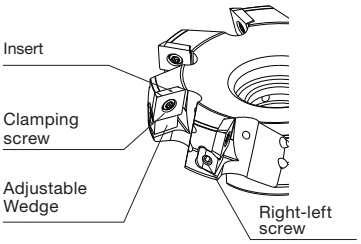


Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TFE12R080M25.4-06A	8	80	6	50	40	25.4	26	9.5	6	0.70	With	SEG*12X4...
TFE12R080M27.0E06A	8	80	6	55	40	27	22	12.4	7	0.69	With	SEG*12X4...
TFE12R100M25.4-08A	8	100	8	50	40	25.4	26	9.5	6	1.15	With	SEG*12X4...
TFE12R100M27.0E08A	8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

SPARE PARTS

Designation	Clamping screw	Adjustable Wedge	Lubricant	Shell locking bolt	Right-left screw	Wrench	Wrench
TFE12R**A	CSTB-4	FW-701R	M-1000	TMBA-M12H	MCS520-2.5	P-2.5T	T-15LB

*Recommended clamping torque (N·m): CSTB-4=3.5



Insert setting procedure – adjustable-type TFE face milling cutter

① Cleaning insert pockets



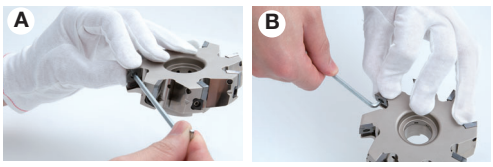
Remove all the inserts. Use air pressure to thoroughly clean the pockets of dust and chips.

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.

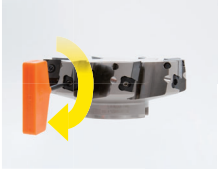
Note:
Since the insert is clamped, loosening the wedge screw will not bring down the insert. To lower insert height, both the insert and wedge screws need to be loosened. Start the adjusting procedure for this insert again from Step 1.

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.

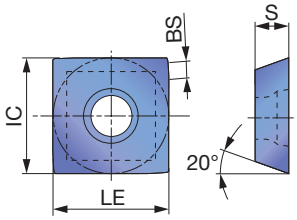
Cautions:

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

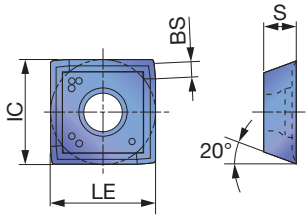
Reference pages: Inserts → H084, Standard cutting conditions → H085

INSERT

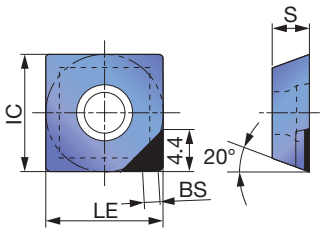
SEGW12X4ZEPR / ZEFR



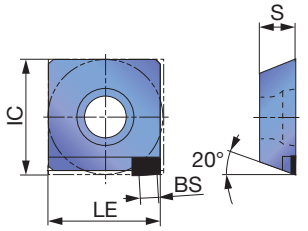
SEGT12X4-AJ



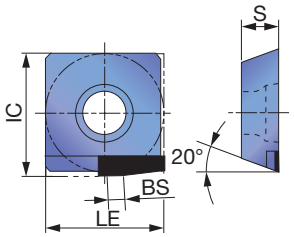
SEGW12X4ZEFR-D



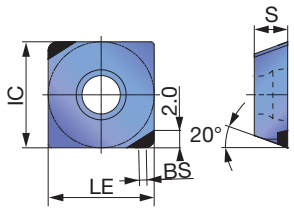
SEGW12X4ZEFR-WD



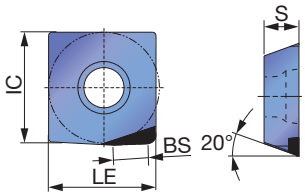
SEGW12X4ZEFR-BD



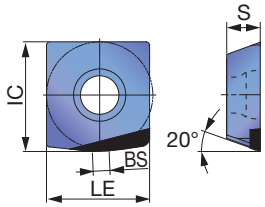
2QP-SECW12X412ZETR



1QP-SECW12X4ZETR-W



1QP-SECW12X4ZETR-B



Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

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

★ : First choice

Designation	Max. ap	Coated			Cermet	Uncoated	PCD	CBN	IC	LE	S	BS
		AH120	AH140	DS1100	NS740	KS05F	DX140	BX480				
SEGW12X4ZEFR	8					●			12.7	12.7	4	1.8
SEGW12X4ZEPR	8	●	●		●				12.7	12.7	4	1.4
SEGT12X4ZEFR-AJ	8			●		●			12.7	12.7	4	1.8
SEGW12X4ZEFR-D	3.5						●		12.7	12.7	4	1.8
SEGW12X4ZEFR-WD	-						●		12.8	12.4	4	2
SEGW12X4ZEFR-BD	-						●		13.1	12.4	4	1.8
2QP-SECW12X412ZETR	1.5							●	12.7	12.7	4	0.9
1QP-SECW12X4ZETR-W	-							●	12.9	12.3	4	4
1QP-SECW12X4ZETR-B	-							●	13.1	12.3	4	2

●: Line up

DX140: 2 pieces per package

BX480: 1 piece per package

How to put each insert together

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

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Designation	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels and alloy steels < 300HB	AH120	SEGW12X4ZEPR	100 - 180	0.03 - 0.15
		NS740	SEGW12X4ZEPR	100 - 180	0.03 - 0.15
M	Stainless steels < 250HB	AH140	SEGW12X4ZEPR	80 - 180	0.03 - 0.15
K	Grey and ductile cast irons	AH120	SEGW12X4ZEPR	100 - 200	0.03 - 0.15
	Grey cast iron	BX480	2QP-SECW12X412ZETR	800 - 1500	0.05 - 0.3
	Ductile cast irons	BX480	2QP-SECW12X412ZETR	500 - 800	0.05 - 0.2
N	Cast aluminium alloy / Die-cast Si < 13%	KS05F	SEGT12X4ZEFR-AJ	200 - 1500	0.05 - 0.2
		DX140	SEGW12X4ZEFR-D	200 - 1500	0.05 - 0.2
	Cast aluminium alloy / Die-cast Si ≥ 13%	KS05F	SEGT12X4ZEFR-AJ	80 - 200	0.05 - 0.2
		DX140	SEGW12X4ZEFR-D	200 - 500	0.05 - 0.2
	Aluminium alloy Tensile strength < 350 N/mm^2	KS05F	SEGT12X4ZEFR-AJ	200 - 1500	0.05 - 0.2
		DX140	SEGW12X4ZEFR-D	200 - 1500	0.05 - 0.2
	Aluminium alloy Tensile strength > 350 N/mm^2	KS05F	SEGW12X4ZEFR	200 - 1500	0.05 - 0.2
		DX140	SEGW12X4ZEFR-D	200 - 1500	0.05 - 0.2
	Copper alloy	KS05F	SEGT12X4ZEFR-AJ	200 - 500	0.05 - 0.2
		DX140	SEGW12X4ZEFR-D	200 - 500	0.05 - 0.2

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

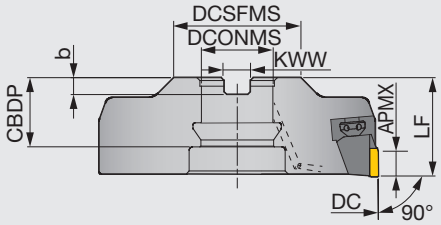
DPD

DPD09

Light weight mill for aluminium machining, for PCD inserts

GAMP = +8.5°, GAMF = +3° ~ +5°



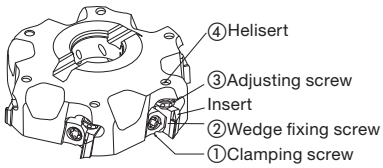


Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
DPD09080R	7	80	4	50	41	25.4	23	9.5	6	0.8	With	YDEN0905...
DPD09080RB	7	80	6	50	41	25.4	28.5	9.5	6	0.82	With	YDEN0905...
DPD09100R	7	100	6	50	35	25.4	24.5	9.5	6	1.13	With	YDEN0905...
DPD09100RB	7	100	8	50	35	25.4	24.5	9.5	6	1.17	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	① Clamping screw	② Wedge fixing screw	③ Adjusting screw	④ Helisert	Shell locking bolt 1	Shell locking bolt 2	Wrench1	Wrench 2
DPD09080R*	FW-304R-T	FDS-8ST-18	AJM5	LM5-0.8X1DNS	-	CM12X30H	T-27T	T-7F
DPD09100R*	FW-304R-T	FDS-8ST-18	AJM5	LM5-0.8X1DNS	TMBA-M12H	-	T-27T	T-7F
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 (N·m): FDS-8ST-18=10

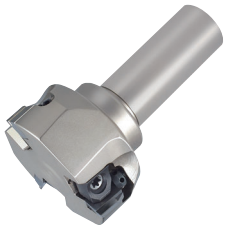


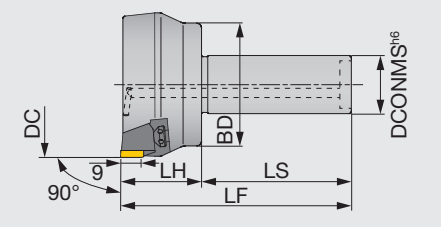
EDPD

EDPD09

Light weight endmill for aluminium machining, shank type, for PCD inserts

GAMP = +8.5°, GAMF = +3°



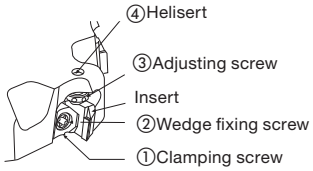


Designation	APMX	DC	CICT	DCONMS	BD	LS	LH	LF	WT(kg)	Air hole	Insert
EDPD09063R	7	63	3	25	37	60	40	100	0.75	With	YDEN0905...

SPARE PARTS

Designation	① Clamping screw	② Wedge fixing screw	③ Adjusting screw	④ Helisert	Wrench1	Wrench 2
EDPD09063R	FW-304R-T	FDS-8SST	AJM5	LM5-0.8X1DNS	T-27T	T-7F

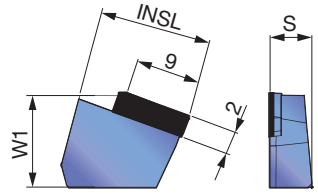
*Recommended clamping torque (N·m): FDS-8SST=10



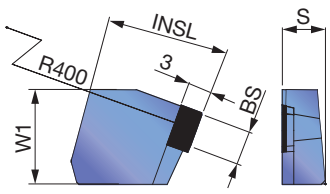
Reference pages: Inserts, Standard cutting conditions → H087

INSERT

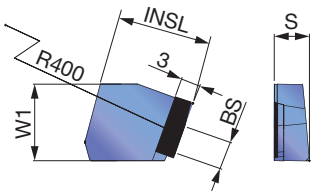
YDEN0905PDFR-D



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

Note: Tungaloy provides refurbishing service for these inserts upon request.

●: Line up

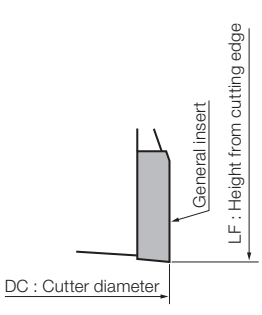
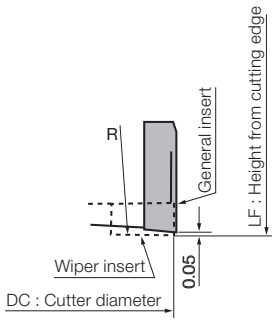
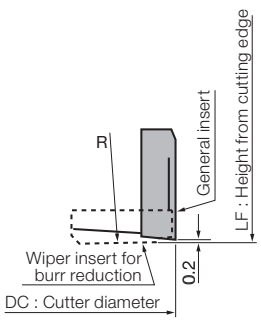
1 piece per package

STANDARD CUTTING CONDITIONS

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

Notes:
(1) When requiring improved surface finish, use the wiper insert together with regular inserts YDEN0905PDFR-WD.
(2) When requiring reduced burr occurrence, use the deburring inserts together with regular inserts YDEN0905PDFR-BD.
(3) When using the cutter at speeds over 1500m/min, use an arbor or tool-holder balanced to within G16.
(4) Wet cutting, using a water soluble cutting fluid, is recommended.
(5) 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.

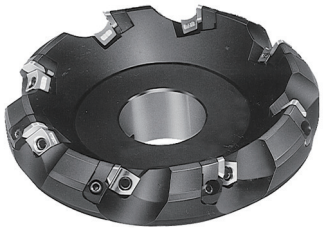
How to put each insert together

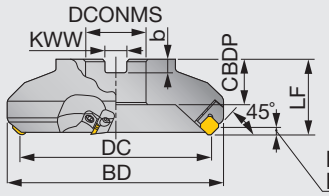
			For general	Accuracy of machining surface priority	Burr reduction priority
Applicable insert	General insert	YDEN0905PDFR-D	◎	◎	◎
	Wiper insert	YDEN0905PDFR-WD	–	◎	–
	Wiper insert for burr reduction	YDEN0905PDFR-BD	–	–	◎
	Number of Inserts by type		All general	1 or 2 wiper inserts in cutter body	General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

TME4400R/LI

45° face mill, with wedge clamp system, for positive square inserts

GAMP = +24°, GAMF = -8° ~ -6°





E class insert: ≤ 4.6 mm
K class insert: ≤ 5.3 mm

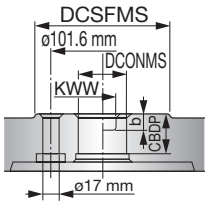
Right hand (R) shown.

Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
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
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
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
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
TME4408R/LI	4	200	10	220.5	63	47.625	38	25.4	14	9.18	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

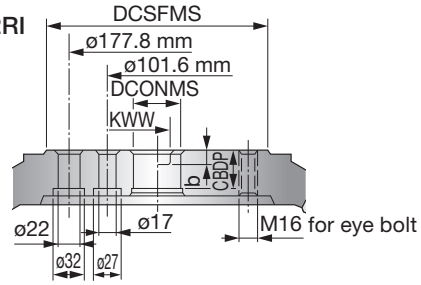
Note: Cutting edge height (LF) is for when SEEN1203AG*N type inserts are used.

Arbor type

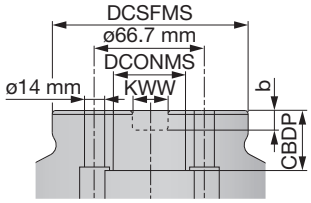
TME4408/10R/LI



TME4412RI



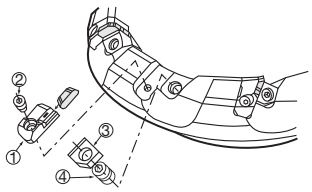
TME4406RI-E



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TME4403RI	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4403LI	LE444L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4403RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4404RI	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4404LI	LE444L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4404RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4405RI	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4405LI	LE444L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4405RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4406RI	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4406LI	LE446L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4406RI-E	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4408RI	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4408LI	LE446L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4410RI	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4410LI	LE446L	FDS-8S	CM4X0.7X14	WF444L	TP-4
TME4412RI	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4

*Recommended clamping torque (N·m): FDS-8S=10

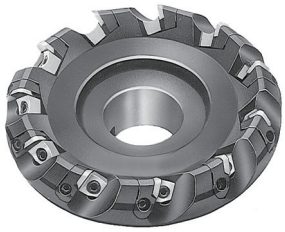


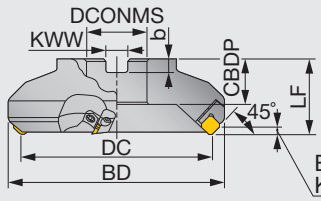
Reference pages: Inserts → H091, Standard cutting conditions → H092

TME4400RB

High density 45° face mill, with wedge clamp system, positive square inserts

GAMP = +24°, GAMF = -8° ~ -6°





E class insert: ≤ 4.6 mm
K class insert: ≤ 5.3 mm

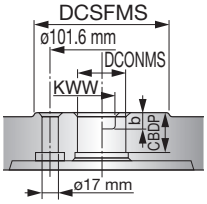
Right hand (R) shown.

Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TME4463RB-E	4	63	5	87.2	40	22	20	10.4	6.3	1.0	SE*N1203
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
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
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
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
TME4408RB	4	200	15	220.5	63	47.625	38	25.4	14	9.24	SE*N1203

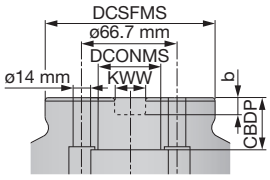
Note: Cutting edge height (LF) is the value when using SEEN1203AG*N inserts.

Arbor type

TME4408RB



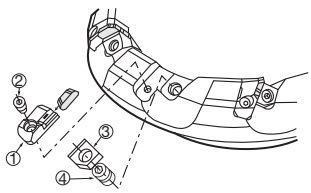
TME4406RB-E



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TME4463RB-E	LE444R	DS-8	CM4X0.7X14	WT402R	TP-4
TME4403RB	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4404RB	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4405RB	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4406RB	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4403 - 06RB-E	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4408RB	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4

*Recommended clamping torque (N·m): DS-8/FDS-8S=8

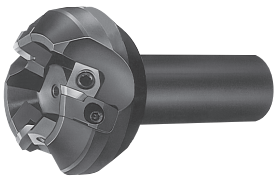


Reference pages: Inserts → H091, Standard cutting conditions → H092

EME4400

45° face endmill, shank type, with wedge clamp system, for positive square inserts

GAMP = +24°, GAMF = -13° ~ -8°



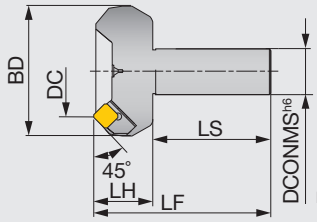


Fig.1

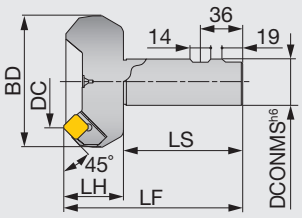


Fig.2

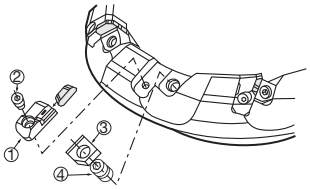
Right hand (R) shown.

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

SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
EME4400	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4

*Recommended clamping torque (N·m): FDS-8S=8

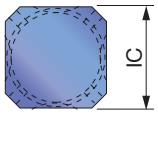


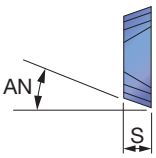
Reference pages: Inserts → H091, Standard cutting conditions → H092

INSERT

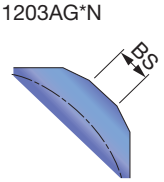
SECN/SEEN/SEKN /SEKR 1203

SE*N1203AG*N (-T)

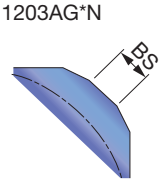




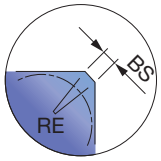
SEE/CN 1203AG*N



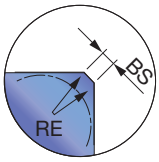
SEE/CN 1203AG*N



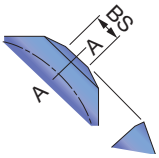
SEEN 1203AGTNCR



SEEN 1203AGTNCR-14

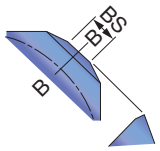


SEKN 1203AG*N-T



A-A cross section

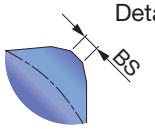
SEEN 1203AG*N-T



B-B cross section

SEKR1203AGSR-MJ
SEKR1203AGPN-MS

Details of edge



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

★ : First choice
☆ : Second choice

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

●: Line up

STANDARD CUTTING CONDITIONS

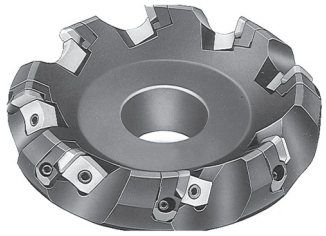
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 4 mm)		Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		AH330	150 ~ 400	0.1 ~ 0.25	150 ~ 400	0.1 ~ 0.28
		AH120	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.28
		T3130	150 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		AH130 · AH140	100 ~ 180	0.1 ~ 0.28	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		AH330	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.23	150 ~ 200	0.1 ~ 0.25
	Die steels < 30 HRC	AH120 · T3130	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		AH120 · GH330	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.1 ~ 0.2	30 ~ 60	0.1 ~ 0.2
	Superalloys Inconel718, etc.	AH120	10 ~ 40	0.05 ~ 0.15	10 ~ 40	0.05 ~ 0.1
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

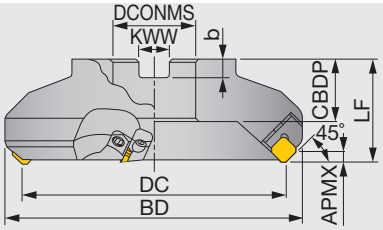
Note: The above are the values for dry cutting of all materials except aluminium alloy.

TME5400RI

45° face mill, with wedge clamp system, for positive square inserts

GAMP = +24°, GAMF = -8° ~ -6°





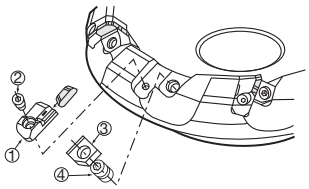
Right hand (R) shown.

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

SPARE PARTS

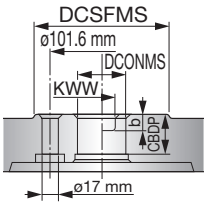
Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TME5400RI	LE540R	FDS-8S	CM4X0.7X14	WF540R	TP-4

*Recommended clamping torque (N·m): FDS-8S=8

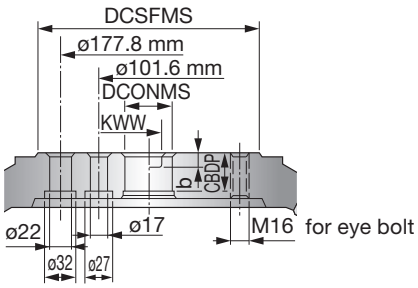


Arbor type

TME5408/10RI



TME5412RI

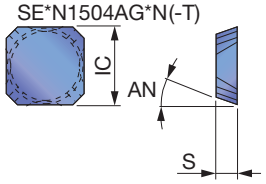


Reference pages: Inserts, Standard cutting conditions → H094

INSERT

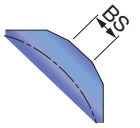
SECN/SEEN/SEKN 1504

SE*N1504AG*N(-T)

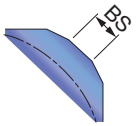


Details of edge

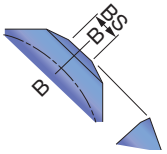
SEKN1504AG*N



SEEN1504AGTN



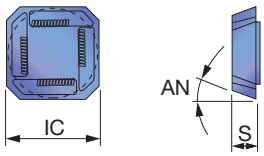
SEKN1504AGTN-T



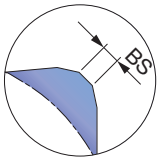
B-B cross section

SEKR1504-MJ

SEKR1504AGSR-MJ
with 3-dimensional chipbreaker



Details of edge



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

★ : First choice
☆ : Second choice

Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

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

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 6 mm) Cutting speed *Vc* (m/min)	Roughing (Depth of cut: APMX 1.5 ~ 6 mm) Feed per tooth *fz* (mm/t)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Cutting speed *Vc* (m/min)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.3
		AH120	150 ~ 250	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.33
		T3130	150 ~ 300	0.1 ~ 0.35	180 ~ 300	0.1 ~ 0.35
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.35	180 ~ 280	0.1 ~ 0.35
		AH120 · GH330	100 ~ 200	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.33
		NS740	100 ~ 180	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
	Die steels < 30 HRC	T3130 · AH120	100 ~ 150	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH140	80 ~ 180	0.15 ~ 0.3	100 ~ 200	0.15 ~ 0.33
		AH120	150 ~ 230	0.15 ~ 0.3	200 ~ 250	0.15 ~ 0.3
K	Cast irons Ductile cast irons	AH120	100 ~ 200	0.1 ~ 0.3	100 ~ 200	0.1 ~ 0.3
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.3	350 ~ 1000	0.1 ~ 0.3
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25
S	Titanium alloys Ti-6Al-4V, etc.	AH140	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Superalloys Inconel718, etc.	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

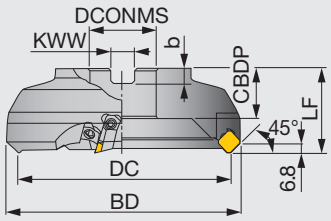
Note: The above are the values for dry cutting of all materials except aluminium alloy.

TMD4400R/LI

45° face mill, with wedge clamp system, for positive square inserts

GAMP = +15°, GAMF = -3°



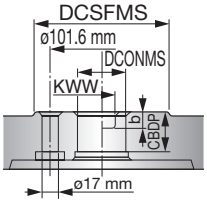


Right hand (R) shown.

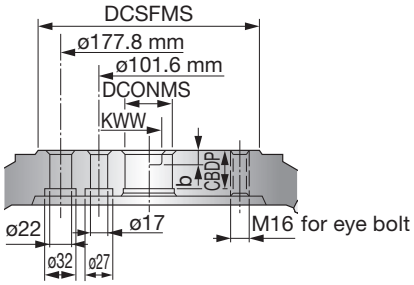
Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TMD4403R/LI	4	80	4	96	50	25.4	26	9.5	6	1.4	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA
TMD4404R/LI	4	100	5	115	63	31.75	32	12.7	8	2.5	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA
TMD4405R/LI	4	125	6	139	63	38.1	38	15.9	10	3.60	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA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

Arbor type

TMD4408/10R/LI



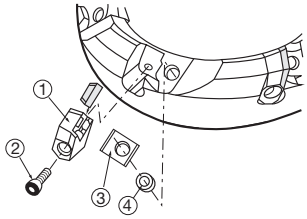
TMD4412RI



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TMD4403RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4403LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4404RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4404LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4405RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4405LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4406RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4406LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4408RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4408LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4410RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4
TMD4410LI	LD440L	FDS-8S	CM4X0.7X14	WP440L	TP-4
TMD4412RI	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4

*Recommended clamping torque (N·m): FDS-8S=8



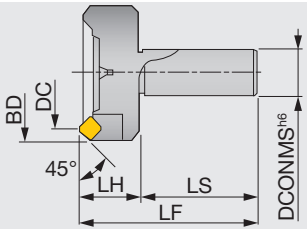
Reference pages: Inserts → H097, Standard cutting conditions → H098

EMD4400RI

45° endmill, shank type, with wedge clamp system, for positive square inserts

GAMP = +15°, GAMF = -3°





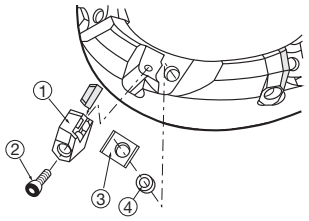
Right hand (R) shown.

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

SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
EMD4403RI-S32	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4

*Recommended clamping torque (N·m): FDS-8S=8



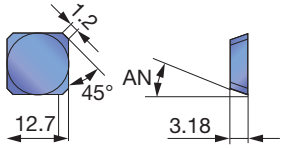
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

Reference pages: Inserts → H097, Standard cutting conditions → H098

INSERT

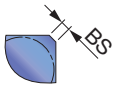
SDCN/SDEN/SDKN 42Z

Regular edge
SD*N42Z*N

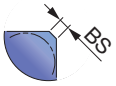


Details of edge

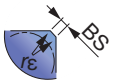
SDKN42ZTN16



SD*N42ZTN20

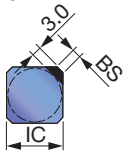


SDKN42ZTNCR
SDEN42ZTNCR



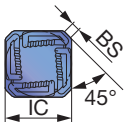
SDCN42ZFN-DIA

SDCN42ZFN-DIA

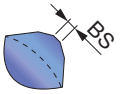


SDKR42Z-MJ

SDKR42ZSR-MJ
with 3-dimensional chipbreaker

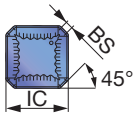


Details of edge



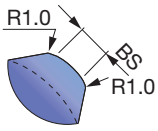
SDMR/SDKR 1203-MJ

SD*R1203AETN-MJ
with 3-dimensional chipbreaker

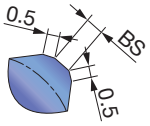


Details of edge

SDMR1203AETN-MJ

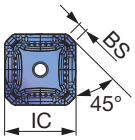


SDKR1203AETN-MJ

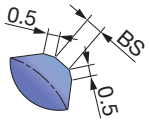


SDKR42Z-MS

SDKR42ZPN-MS

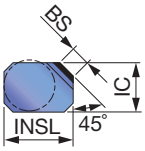


Details of edge



WDCN42ZFR-DIA

Wiper edge
WDCN42ZFR-DIA



		AH3135	AH120	AH130	AH140	AH330	GH330	T1115	T1215	T3130	T3225	NS740	N308	UX30	TH10	DX140
P	Steel	★	★			☆	☆			☆	☆	★	☆		☆	
M	Stainless	★		★	☆						☆					
K	Cast iron		★					☆	★							
N	Non-ferrous														★	★
S	Superalloys		★	☆												
H	Hard materials															

★ : First choice
☆ : Second choice

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

●: Line up

DX140: 1 piece per package

STANDARD CUTTING CONDITIONS

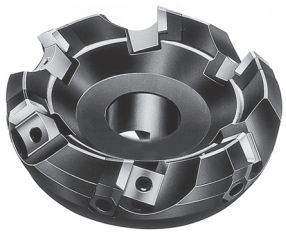
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 4 mm)		Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		T3225	150 ~ 350	0.1 ~ 0.25	150 ~ 350	0.1 ~ 0.28
		AH3135	150 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		T3225	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH3135	100 ~ 200	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
	Die steels < 30 HRC	AH3135	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		T3225	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH3135	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		T3225	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1215	100 ~ 250	0.1 ~ 0.2	100 ~ 250	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.25	100 ~ 200	0.1 ~ 0.3
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.1 ~ 0.2	30 ~ 60	0.1 ~ 0.2
	Superalloys Inconel718, etc.	AH120	10 ~ 40	0.05 ~ 0.15	10 ~ 40	0.05 ~ 0.1
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
		DX140	200 ~ 1000	0.05 ~ 0.18	350 ~ 1000	0.1 ~ 0.2
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

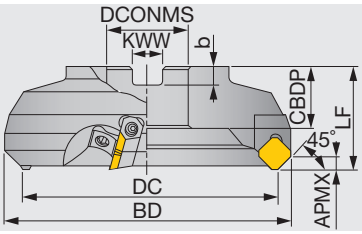
Note: The above are the values for dry cutting of all materials except aluminium alloy.
Maximum depth of cut for DX140 SDCN42ZFN-DIA is 2 mm.

TMD5400RI

45° face mill, with wedge clamp system, for positive square inserts

GAMP = +15°, GAMF = -3°



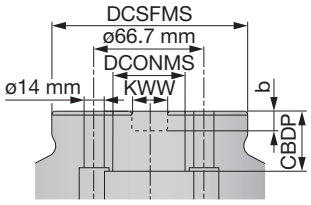


Right hand (R) shown.

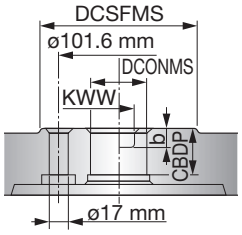
Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TMD5404RI	6	100	4	118	63	31.75	32	12.7	8	2.5	SD*N53Z...
TMD5404RI-E	6	100	4	118	50	32	28.5	14.4	8	2.5	SD*N53Z...
TMD5405RI	6	125	6	142	63	38.1	38	15.9	10	2.5	SD*N53Z...
TMD5405RI-E	6	125	6	142	63	40	32	16.4	9	3.7	SD*N53Z...
TMD5406RI	6	160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

Arbor type

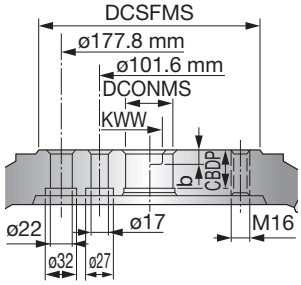
TMD5406RI-E



TMD5408/10...



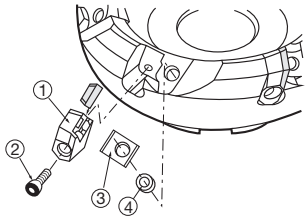
TMD5412RI



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TMD54**RI*	LD540R	FDS-8S	CM4X0.7X20	WF500R	TP-4

*Recommended clamping torque (N·m): FDS-8S=8

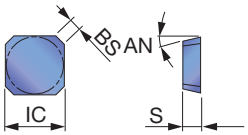


Reference pages: Inserts, Standard cutting conditions → H100

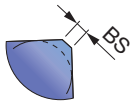
INSERT

SDCN/SDEN 53Z

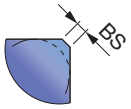
SD*N53Z*N



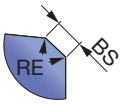
SDEN53ZTN20
Details of edge



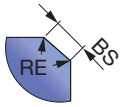
SDKN53ZTN16
Details of edge



SDEN53ZTNCR
Details of edge

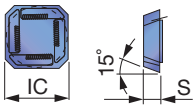


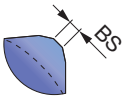
SDKN53ZTNCR
Details of edge



SDKR53-MJ

SDKR53ZSR-MJ
with 3-dimensional chipbreaker





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

★ : First choice
☆ : Second choice

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

●: Line up

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

STANDARD CUTTING CONDITIONS

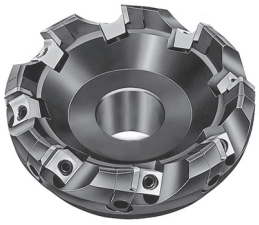
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 6 mm) Cutting speed *Vc* (m/min)	Roughing Feed per tooth *fz* (mm/t)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Cutting speed *Vc* (m/min)	Finishing Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.3
		AH120	150 ~ 250	0.1 ~ 0.35	150 ~ 250	0.1 ~ 0.35
		T3130	150 ~ 300	0.1 ~ 0.35	180 ~ 300	0.1 ~ 0.35
		AH130	100 ~ 180	0.1 ~ 0.35	130 ~ 200	0.1 ~ 0.35
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.35	180 ~ 280	0.1 ~ 0.35
		NS740	100 ~ 180	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
		AH120	100 ~ 200	0.1 ~ 0.3	150 ~ 200	0.1 ~ 0.35
	Die steels < 30 HRC	T3130 · AH120	100 ~ 150	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.3	100 ~ 200	0.15 ~ 0.33
		GH330	150 ~ 230	0.15 ~ 0.3	200 ~ 250	0.15 ~ 0.3
K	Cast irons Ductile cast irons	AH120	100 ~ 200	0.1 ~ 0.3	100 ~ 200	0.1 ~ 0.3
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.3	350 ~ 1000	0.1 ~ 0.3
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

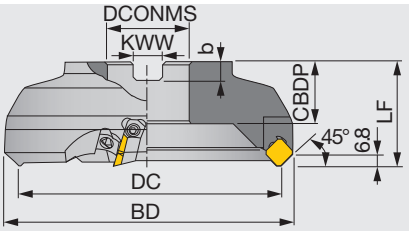
Note: The above are the values for dry cutting of all materials except aluminium alloy.

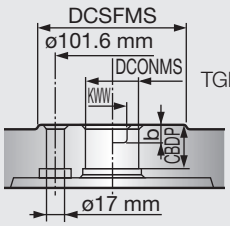
TGD4400-A

45° face mill, with wedge clamp system, for positive square inserts

GAMP = +15°, GAMF = -3°







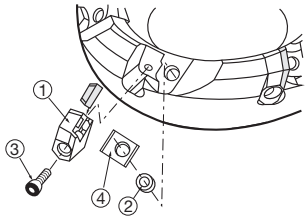


Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TGD4403R-A	4	80	6	96	50	25.4	26	9.5	6	1.4	SD*N42.../SD*R1203.../WDCN42ZFR-DIA
TGD4404R-A	4	100	6	115	63	31.75	32	12.7	8	2.5	SD*N42.../SD*R1203.../WDCN42ZFR-DIA
TGD4405R-A	4	125	8	139	63	38.1	38	15.9	10	3.6	SD*N42.../SD*R1203.../WDCN42ZFR-DIA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

SPARE PARTS

Designation	① Locator	② Wedge fixing screw	③ Locator fixing screw	④ Wedge	Wrench
TGD4400-A	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4

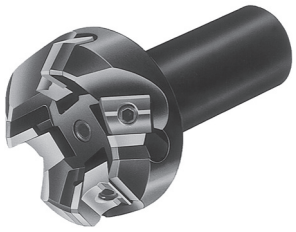
*Recommended clamping torque (N·m):FDS-8S=8

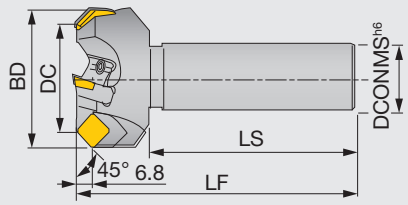


EGD4400

45° face endmill, shank type, with wedge clamp system, for positive square inserts

GAMP = +15°, GAMF = -3°





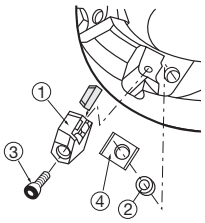


Designation	APMX	DC	CICT	BD	DCONMS	LS	LH	LF	WT(kg)	Insert
EGD4450R	4	50	4	67	32	80	35	115	1.1	SD*N42.../SD*R1203.../WDCN42ZFR-DIA
EGD4463R	4	63	4	79	32	80	35	115	1.4	SD*N42.../SD*R1203.../WDCN42ZFR-DIA

SPARE PARTS

Designation	① Locator	② Wedge fixing screw	③ Locator fixing screw	④ Wedge	Wrench
EGD4400	LD442R	DS-8	BM3X0.5X6	WP193TR	TP-4

*Recommended clamping torque (N·m):DS-8=8

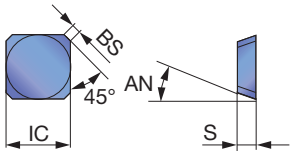


Reference pages: Inserts → H102, Standard cutting conditions → H103

INSERT

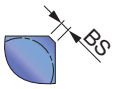
SDCN/SDEN/SDKN 42Z

Regular edge
SD*N42Z*N

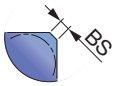


Details of edge

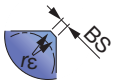
SDKN42ZTN16



SD*N42ZTN20

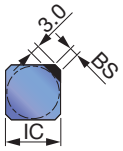


SDKN42ZTNCR
SDEN42ZTNCR



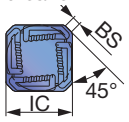
SDCN42ZFN-DIA

SDCN42ZFN-DIA

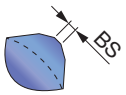


SDKR42Z-MJ

SDKR42ZSR-MJ
with 3-dimensional
chipbreaker

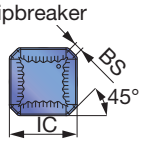


Details of edge



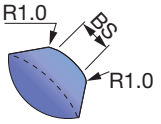
SDMR/SDKR 1203-MJ

SD*R1203AETN-MJ
with 3-dimensional
chipbreaker

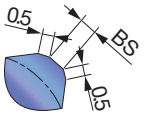


Details of edge

SDMR1203AETN-MJ

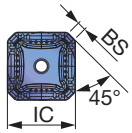


SDKR1203AETN-MJ

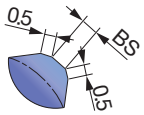


SDKR42Z-MS

SDKR42ZPN-MS

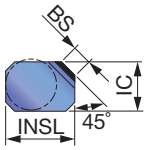


Details of edge



WDCN42ZFR-DIA

Wiper edge
WDCN42ZFR-DIA



Approach angle

10°-20°
45°
70°
85°
88°
90°
Others

		AH3135	AH120	AH130	AH140	AH330	GH330	T1115	T1215	T3130	T3225	NS740	N308	UX30	TH10	DX140
P	Steel	★	★			☆	☆			☆	☆	★	☆		☆	
M	Stainless	★		★	☆						☆					
K	Cast iron		★					☆	★							
N	Non-ferrous														★	★
S	Superalloys		★	☆												
H	Hard materials															

★ : First choice
☆ : Second choice

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

●: Line up

DX140: Packing Quantity = 1 pc.

STANDARD CUTTING CONDITIONS

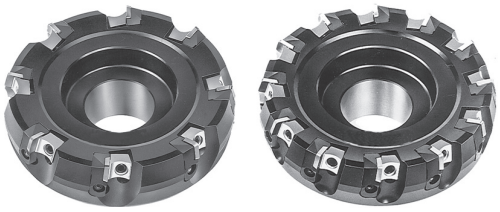
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 4 mm)		Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		T3225	150 ~ 350	0.1 ~ 0.25	150 ~ 350	0.1 ~ 0.28
		AH3135	150 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		T3225	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH3135	100 ~ 200	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
	Die steels < 30 HRC	AH3135	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		T3225	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH3135	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		T3225	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1215	100 ~ 250	0.1 ~ 0.2	100 ~ 250	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.25	100 ~ 200	0.1 ~ 0.25
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.1 ~ 0.2	30 ~ 60	0.1 ~ 0.2
	Superalloys Inconel718, etc.	AH120	10 ~ 40	0.05 ~ 0.15	10 ~ 40	0.05 ~ 0.1
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
		DX140	200 ~ 1000	0.05 ~ 0.18	350 ~ 1000	0.1 ~ 0.2
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

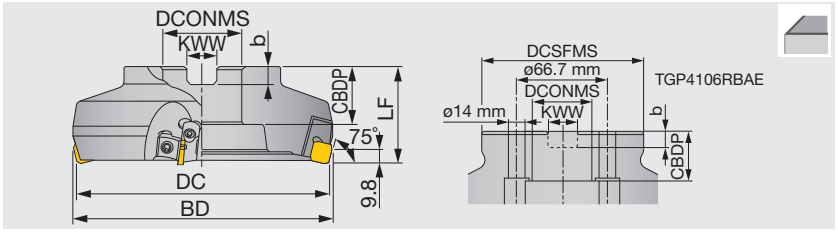
Note: The above are the values for dry cutting of all materials except aluminium alloy.
Maximum depth of cut for DX140 SDCN42ZFN-DIA is 2 mm.

TGP4100RIA/BAA/RBAE

75° face mill, with wedge clamp system, for positive square inserts

GAMP = +7°, GAMF = +1°





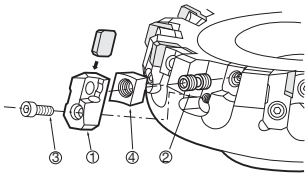
Designation	APMX	DC	CICT	BD	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TGP4103RIA	7	80	5	89	50	25.4	26	9.5	6	1.3	SP*N42.../ WPAN42...
TGP4104RIA	7	100	6	108	63	31.75	32	12.7	8	2.4	SP*N42.../ WPAN42...
TGP4104RBA	7	100	8	108	63	31.75	32	12.7	8	2.4	SP*N42.../ WPAN42...
TGP4104RBAE	7	100	8	108	63	32	25	14.4	8	2.4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

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

SPARE PARTS

Designation	① Locator	② Wedge fixing screw	③ Locator fixing screw	④ 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 (N·m):FDS-8S=8



Reference pages: Inserts, Standard cutting conditions → H105

INSERT

SPCN/SPEN/SPKN 42S

SP*N42S*R/L

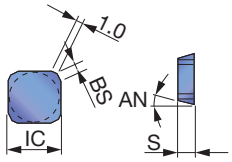


Fig.1

SPEN423*N
Details of edge

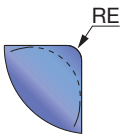


Fig.2

SPKR42SSR-MJ
with 3-dimensional chipbreaker

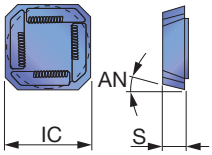
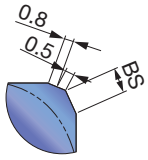


Fig.3

Details of edge



WPAN42SFRS
Wiper edge 1 corner

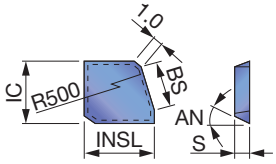


Fig.4

WPAN42SFR
2 corner

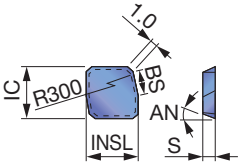


Fig.5

Right hand (R) shown.

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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated					Cermet		Ceramic	Uncoated								
			AH120	AH140	GH330	T1115	T3130	NS740	N308	FX105	UX30	TH10				IC	INSL	S	AN	BS	Fig.
SPCN42STR	0	7						●	●		●					12.7	-	3.18	11°	1.4	1
SPCN42SFR	0	7										●				12.7	-	3.18	11°	1.4	1
SPEN42STR	0	7						●								12.7	-	3.18	11°	1.4	1
SPKN42STR	0	7	●	●	●	●	●	●	●	●*	●					12.7	-	3.18	11°	1.4	1
SPKN42STL	0	7						●			●					12.7	-	3.18	11°	1.4	1
SPKN42SFR	0	7										●				12.7	-	3.18	11°	1.4	1
SPKN42SFL	0	7										●				12.7	-	3.18	11°	1.4	1
SPKR42SSR-MJ	0	7			●	●	●									12.7	-	3.18	11°	0	3
WPAN42SFRS	0	-										●				12.4	14.9	3.18	11°	9.7	4
WPAN42SFR	0	-							●			●				12.4	13.8	3.18	11°	5.2	5
SPGN120312TN	1.2	7								●*						12.7	-	3.18	11°	-	2
SPEN423TN	1.2	7					●	●			●					12.7	-	3.18	11°	-	2
SPEN423FN	1.2	7										●				12.7	-	3.18	11°	-	2

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

●: Line up

STANDARD CUTTING CONDITIONS

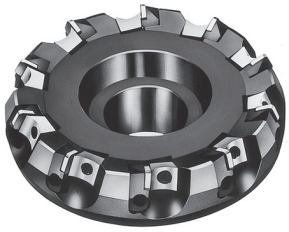
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 4 mm) Cutting speed *Vc* (m/min)	Roughing (Depth of cut: APMX 1.5 ~ 4 mm) Feed per tooth *fz* (mm/t)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Cutting speed *Vc* (m/min)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740 · N308	150 ~ 250	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.23
		AH120 · GH330	150 ~ 250	0.1 ~ 0.23	150 ~ 250	0.1 ~ 0.25
		T3130	150 ~ 300	0.1 ~ 0.25	180 ~ 300	0.1 ~ 0.28
		UX30	100 ~ 180	0.1 ~ 0.25	130 ~ 200	0.1 ~ 0.28
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
		NS740 · N308	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		AH330 · AH120	100 ~ 200	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.23
		UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
	Carbon steels Alloy steels < 300 HB	T3130 · GH330	150 ~ 230	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
		NS740 · N308	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
	Die steels < 30 HRC	T3130	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH120 · AH140	150 ~ 230	0.15 ~ 0.2	200 ~ 250	0.15 ~ 0.23
		UX30	150 ~ 180	0.15 ~ 0.2	180 ~ 200	0.15 ~ 0.23
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.23
		TH10 · UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.23
		FX105	200 ~ 500	0.1 ~ 0.2	200 ~ 600	0.1 ~ 0.3

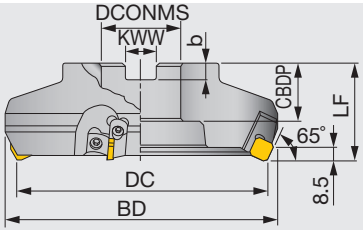
Note: Dry cutting is recommended for the above materials.

TGP4200R-A

65° face mill, with wedge clamp system, for positive square inserts

GAMP = +5°,GAMF = +1°





Right hand (R) shown.

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

SPARE PARTS

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

*Recommended clamping torque (N·m):FDS-8S=8

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

INSERT

SPAN/SPCN/SPEN/SPKN 42Z

Regular edge
SP*N42Z*R/L

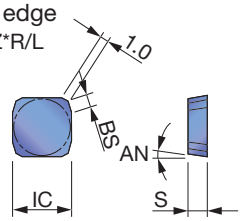


Fig.1

SPEN423*N

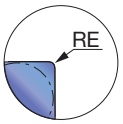


Fig.2

Wiper edge 2 corners
WPAN42Z*R/L

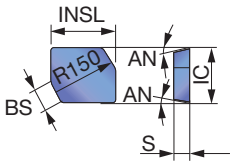


Fig.3

Right hand (R) shown.

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	INSL	S	AN	BS	RE	Fig.
		T1115	T3130	NS740	X407	N308	UX30	TH10							
SPAN42ZFR	6							●	12.7	-	3.18	11°	2	-	1
SPCN42ZFL	6							●	12.7	-	3.18	11°	2	-	1
SPCN42ZFR	6							●	12.7	-	3.18	11°	2	-	1
SPCN42ZTR	6			●	●	●			12.7	-	3.18	11°	2	-	1
SPEN423TN	6		●	●			●		12.7	-	3.18	11°	-	1.2	2
SPEN423FN	6							●	12.7	-	3.18	11°	-	1.2	2
SPEN42ZTR	6			●					12.7	-	3.18	11°	2	-	1
SPKN42ZFL	6							●	12.7	-	3.18	11°	2	-	1
SPKN42ZFR	6							●	12.7	-	3.18	11°	2	-	1
SPKN42ZTR	6	●	●	●	●	●	●		12.7	-	3.18	11°	2	-	1
WPAN42ZFR	6							●	12.2	14.28	3.18	11°	4.5	-	3

●: Line up

Reference pages: Standard cutting conditions → H107

STANDARD CUTTING CONDITIONS

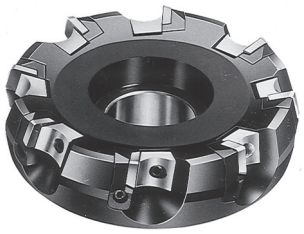
ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 4 mm)		Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	T3130	150 ~ 250	0.1 ~ 0.25	180 ~ 250	0.1 ~ 0.28
		NS740	100 ~ 250	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.23
	Carbon steels Alloy steels < 300 HB	T3130	130 ~ 250	0.1 ~ 0.23	150 ~ 250	0.1 ~ 0.25
		NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.23
M	Stainless steels < 250 HB	T3130	150 ~ 250	0.15 ~ 0.2	200 ~ 250	0.15 ~ 0.23
		UX30	150 ~ 180	0.15 ~ 0.2	180 ~ 200	0.15 ~ 0.23

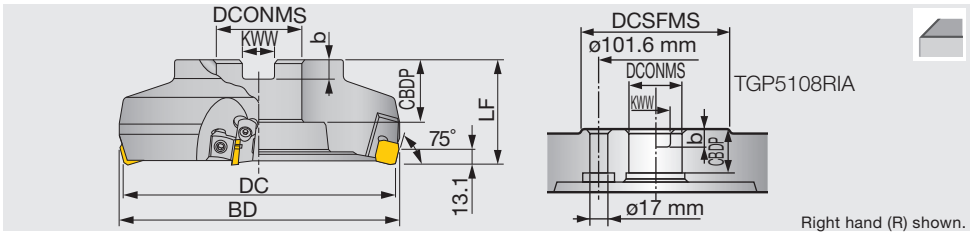
Note: Dry cutting is recommended for the above materials.

TGP5100RIA

75° face mill, with wedge clamp system, for positive square inserts

GAMP = +7°,GAMF = +1°





Right hand (R) shown.

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

SPARE PARTS

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

*Recommended clamping torque (N·m):FDS-8S=8

INSERT

SPCN/SPKN 53S

Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

SP*N53S*R/L

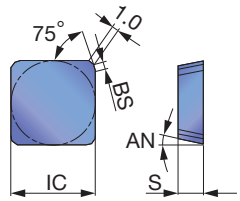


Fig.1

SPKN53STR20

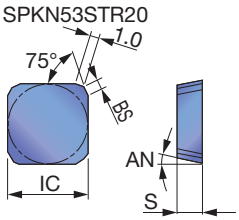


Fig.2

SPKR53SSR-MJ
with 3-dimensional chipbreaker

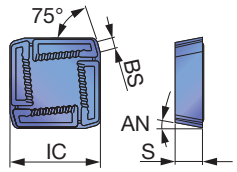


Fig.3

Right hand (R) shown.

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

★ : First choice
☆ : Second choice

Designation	APMX	GH330	T1115	T3130	NS740	N308	UX30	TH10	IC	S	AN	BS	Fig.
SPCN53SFR	10							●	15.875	4.76	11°	1.2	1
SPCN53STR	10					●	●		15.875	4.76	11°	1.2	1
SPKN53SFR	10							●	15.875	4.76	11°	1.2	1
SPKN53STL	10						●		15.875	4.76	11°	1.2	1
SPKN53STR	10	●	●		●		●		15.875	4.76	11°	1.2	1
SPKN53STR20	10			●					15.875	4.76	11°	2	2
SPKR53SSR-MJ	10	●		●					15.875	4.76	11°	2	3

●: Line up

Reference pages: Standard cutting conditions → H109

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Roughing (Depth of cut: APMX 1.5 ~ 8 mm) Cutting speed *Vc* (m/min)	Roughing (Depth of cut: APMX 1.5 ~ 8 mm) Feed per tooth *fz* (mm/t)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Cutting speed *Vc* (m/min)	Finishing (Depth of cut: APMX 0.3 ~ 0.7 mm) Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	T3130	150 ~ 300	0.1 ~ 0.35	180 ~ 300	0.1 ~ 0.35
		NS740 · N308	100 ~ 250	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.3
		GH330	150 ~ 250	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.33
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.3	180 ~ 280	0.1 ~ 0.35
		NS740 · N308	100 ~ 180	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
		GH330	100 ~ 200	0.1 ~ 0.28	150 ~ 200	0.1 ~ 0.33
K	Cast irons Ductile cast irons	TH10	80 ~ 130	0.1 ~ 0.3	80 ~ 130	0.1 ~ 0.3
		T1115	100 ~ 200	0.1 ~ 0.3	100 ~ 200	0.1 ~ 0.3
M	Stainless steels < 250 HB	T3130	150 ~ 250	0.15 ~ 0.25	200 ~ 250	0.15 ~ 0.28
		GH330	150 ~ 230	0.15 ~ 0.3	200 ~ 250	0.15 ~ 0.3

Note: Dry cutting is recommended for the above materials.

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.



● 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.

Performance

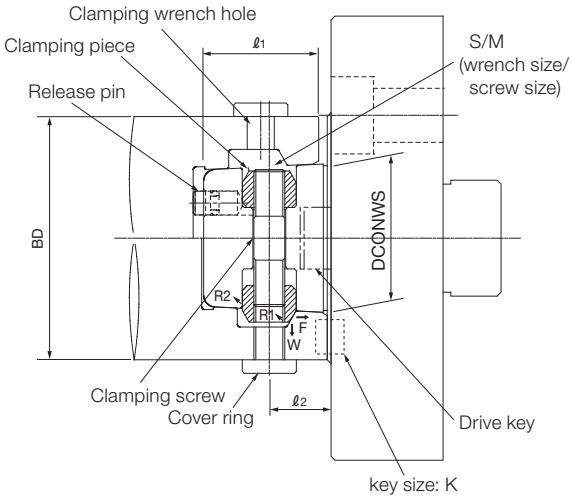
Original clamp system provides high rigidity, accuracy and operating speed.

● 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	ℓ1	ℓ2				
TAQ32	19	32	18	8.5	3/M6	8	3	4×10^3
TAQ40	24	40	21	10	3/M6	10	5	5.5×10^3
TAQ50	30	50	25	12	4/M8	12	8	9×10^3
TAQ63	38	63	32	15	4/M8	16	10	12×10^3
TAQ80	48	80	40	18	5/M10	18	20	18×10^3
TAQ100	60	100	50	22	6/M12	20	30	23×10^3

Part assembly



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

DATA

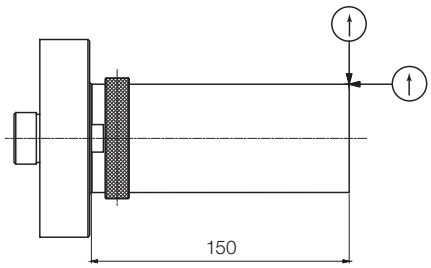
Comparison of clamping force

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

●Repeatability for accuracy

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

Note: Measured at 150 mm far from end face.

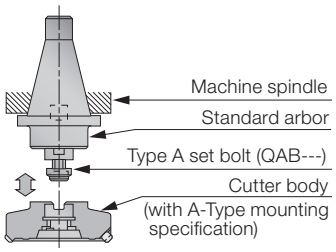


QC system for TAC Mills

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. ø80 ~ 160

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.

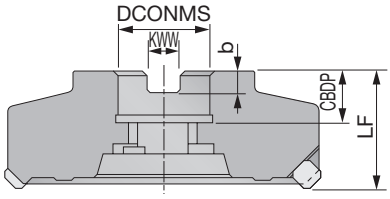
Replacement method

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.

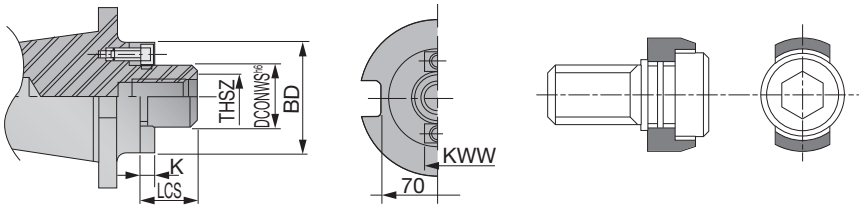
A-type QC Mounting System for Small Diameter TAC Mills

● Dimensional details of mount
(For ø80 to ø160 dia. TAC mills)



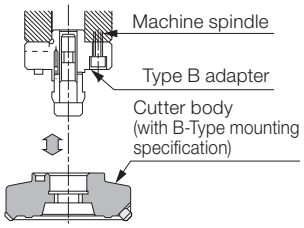
Cutter dia. (mm)	Dimensions (mm) DCONMS	b	KWW	CBDP	LF
ø80	25.4	6	9.5	20	50
ø100	31.75	8	12.7	22	50
ø125	38.1	10	15.9	27	63
ø160	50.8	11	19	27	63

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



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

Type B QC system



Features

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

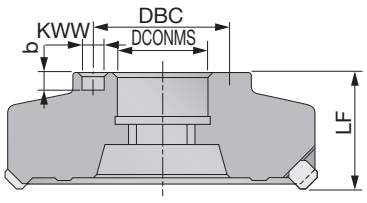
Replacement method

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

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

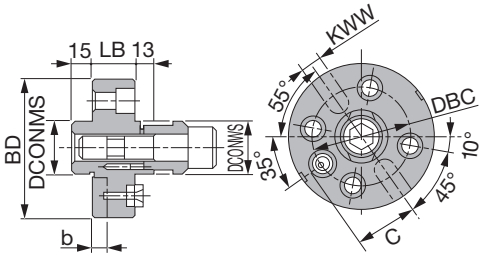
B-type QC Mounting System for Small Diameter TAC Mills

● Dimensional details of mount
(For ø80 to ø160 dia. TAC mills)



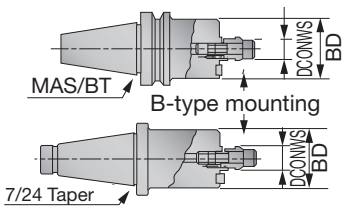
Cutter dia. (mm)	Dimensions (mm) DCONMS	b	KWW	LF	DBC
ø80	25.4	7	10	50	45
ø100	31.75	7	12	63	55
ø125	38.1	7	15	63	70
ø160	50.8	7	18	63	85

● Dimensional details of B-type adapters



Cutter dia. (mm)	Dimensions (mm) DCONWS	c	BD	DCONMS	KWW	b	DBC	S	LB
ø80	25.4	22.5	80	25.4	9.5	7	45	M10	25
ø100	31.75	27.5	100	31.75	12.7	8	55	M10	25
ø125	38.1	35	100	38.1	15.9	10	70	M12	30
ø160	50.8	42.5	125	50.8	19	11	85	M16	30

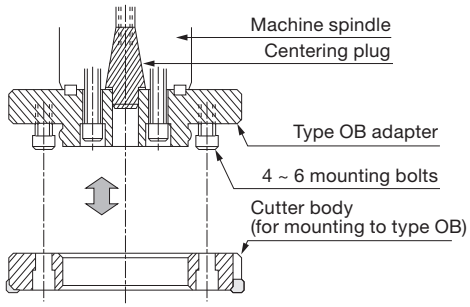
Instead of the above B-type adapters, BT- and T-type arbors can be also used for B-type QC mount cutters. These arbors are made to order on request.



QC system for TAC Mills

Large dia. TAC mills QC system Dia. ø200 ~

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.

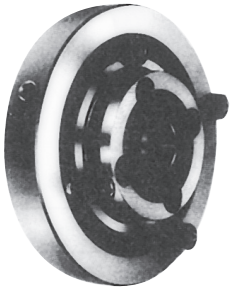
Removal - Loosen the bolt slightly, and by one turn, turn the cutter to remove it from the adapter.

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

Cutter body (ø200 ~ ø400 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.

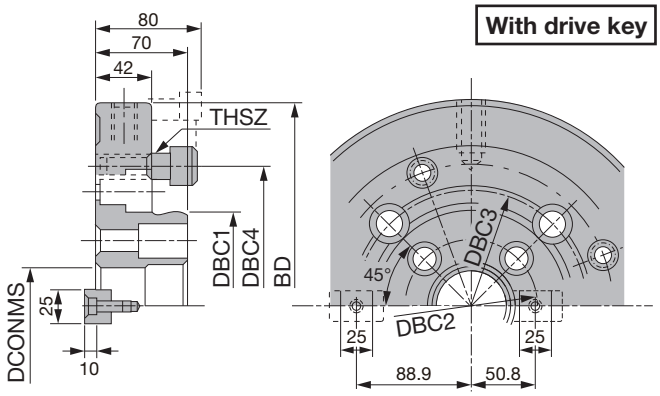
OB type adapter



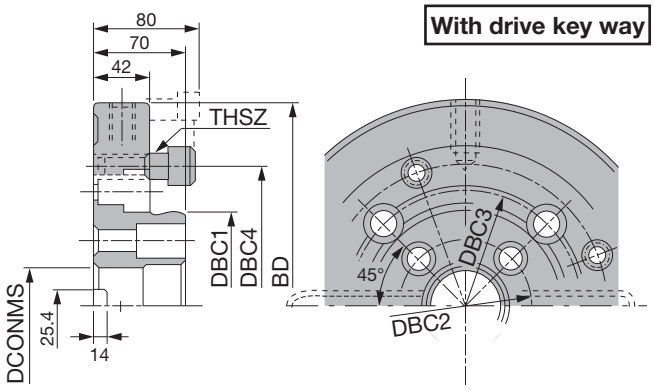
OB type cutter body



● Dimensional details of mount of OB-type adapters



QA12K to QA16K type shown.



QA12M to QA16M type shown.

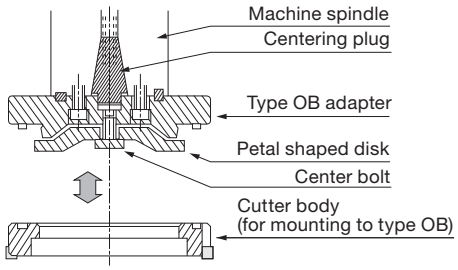
Adapter Designation	Dimensions (mm)							
	BD	DCONMS	DBC1	DBC2	DBC3	DBC4	THSZ	Bolts
QA08K/M	198	47.625	63.5	101.6	-	114.3	M16×40	4
QA10K/M	248	60	133.35	101.6	-	177.8	M16×50	4
QA12K/M	313	60	146.05	101.6	177.8	215.9	M20×50	4
QA14K/M	353	60	215.9	101.6	177.8	260.4	M20×50	6
QA16K/M	398	60	254	101.6	177.8	304.8	M20×50	6

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

Notes: • Dimension ød can be made to customer’s specifications.
• Special centering plugs for ø60 mm hole are made to order.

Large dia. TAC mills QC system Dia. ø200 ~

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 clamper 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 (ø200 ~ ø400 mm)

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

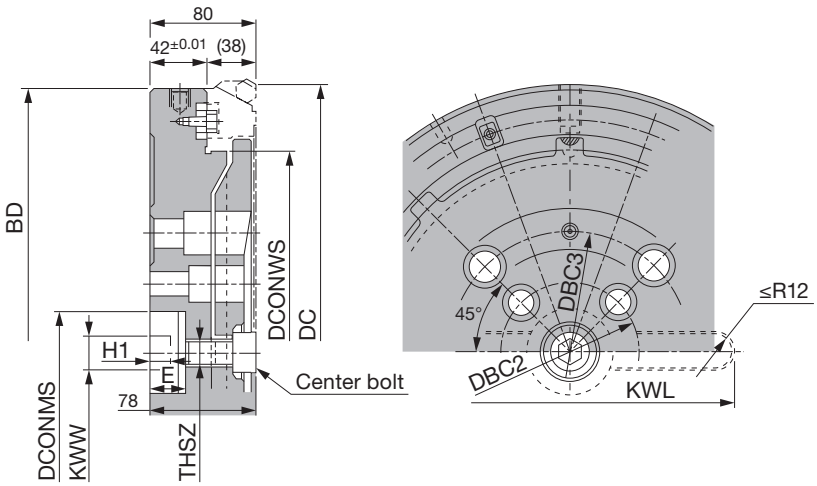
CB type adapter



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

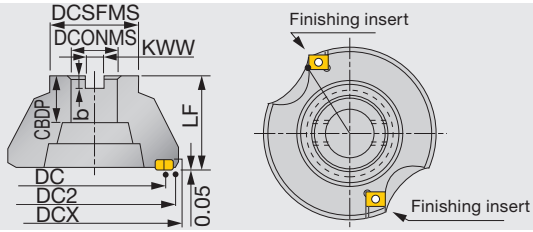
Note: • Dimension ød can be made to customer’s specifications.
• Because of the dimensional restriction of “E”, standard CO- type centering plugs can not be used for the adapters shown in the above table. Special centering plugs applicable for the above adapters can be made to order on request.

NMS09

High precision finishing face mill, for negative rectangular inserts

GAMP = 10°, GAMF = -30°





Designation	APMX	DC	CICT	DC2	DCX	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
NMS09080R	0.2	80	2	92	100.7	50	25.4	26	9.5	6	1.49	LNCQ0906...
NMS09100R	0.2	100	2	112	120.7	50	31.75	32	12.7	8	2.1	LNCQ0906...
NMS09125R	0.2	125	2	137	145.7	63	38.1	38	15.9	10	4.07	LNCQ0906...
NMS09160R	0.2	160	2	172	180.7	63	50.8	38	19	11	6.15	LNCQ0906...
NMS09200R	0.2	200	2	212	220.7	63	47.625	38	25.4	14	9.67	LNCQ0906...

SPARE PARTS




Designation	Clamping screw	Wedge
NMS09...	CSTB-4	T-15D

*Recommended clamping torque (N·m): CSTB-4=3.5

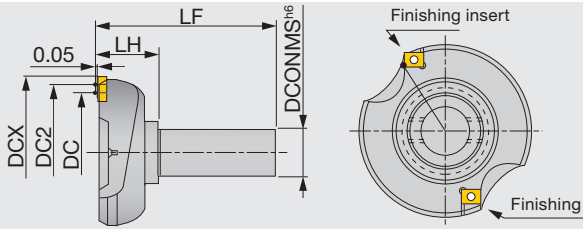
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

EMS09

High precision finishing endmill, shank type, for negative rectangular inserts

GAMP = +10°, GAMF = -30°





Designation	APMX	DC	CICT	DC2	DCX	DCONMS	LH	LF	Insert
EMS09080R	0.2	80	2	92	100.7	32	40	120	LNCQ0906...

SPARE PARTS




Designation	Clamping screw	Wedge
EMS09080R	CSTB-4	T-15D

*Recommended clamping torque (N·m): CSTB-4=3.5

Reference pages: Inserts, Standard cutting conditions → H115

INSERT

LNCQ0906N-100(50)L

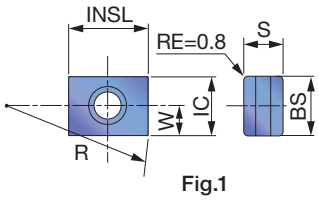


Fig.1

LNCQ0906-50S

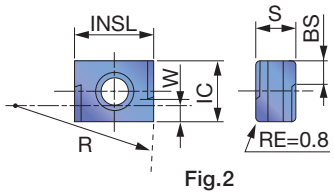


Fig.2

		Coated		Cermet
		AH120	GH110	NS740
P	Steel	☆		★
M	Stainless	★		★
K	Cast iron	★	★	
N	Non-ferrous			
S	Superalloys			
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	APMX	Coated AH120	Coated GH110	Cermet NS740	IC	INSL	S	R	W	BS	Fig.
LNCQ0906N-100L	0.2	●	●	●	9.525	12.7	6.35	100	4.763	7.9	1
LNCQ0906N-50L	0.2	●	●	●	9.525	12.7	6.35	50	4.763	7.9	1
LNCQ0906R-50S	0.2	●	●	●	-	12.7	6.35	50	2.3	4	2

●: Line up

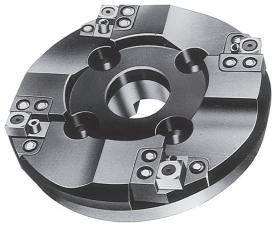
STANDARD CUTTING CONDITIONS

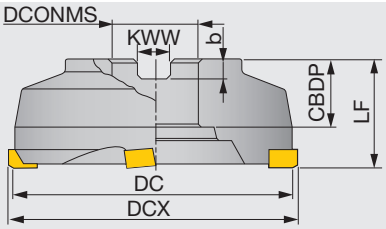
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	LNCQ0906N-100(50)L Depth of cut APMX (mm)	LNCQ0906N-100(50)L Feed per tooth *f* (mm/rev)	LNCQ0906R-50S Depth of cut APMX (mm)	LNCQ0906R-50S Feed per tooth *f* (mm/rev)
P	Mild steels SS400, etc. E275A, etc. < 180 HB	NS740	200 ~ 300	< 0.2	2 ~ 6	≤ 0.2	1 ~ 2.5
	Carbon steels S55C, etc. C55, etc. < 300 HB	NS740	150 ~ 250				
	Alloy steels SCM440, etc. 42CrMo4, etc. < 300 HB	NS740	120 ~ 200				
	Die steels SKD61, etc. X40CrMoV5-1, etc. < 300 HB	NS740	100 ~ 150				
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	AH120 NS740	150 ~ 220	< 0.2	2 ~ 6	≤ 0.2	1 ~ 2.5
K	Cast irons FC250, etc. 250, etc.	GH110 AH120	120 ~ 200	< 0.2	2 ~ 6	≤ 0.2	1 ~ 2.5

MS

High precision finishing face mill, with adjustable structure

GAMP = -5°,GAMF = -30°





Right hand (R) shown.

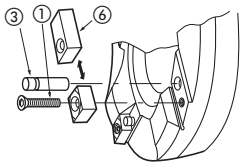
Designation	APMX	DC	CICT	DCX	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
MS04R/L	0.1	100	2	105	55	31.75	32	12.7	8	3	SN**56...
MS05R/L	0.1	125	2	130	60	38.1	38	15.9	10	4	SN**56...
MS06R/L	0.1	150	4	155	60	50.8	38	19	11	5	SN**56...
MS08R/L	0.1	200	4	205	60	47.625	38	25.4	14	8.5	SN**56...
MS10R/L	0.1	250	4	255	60	47.625	38	25.4	14	14	SN**56...
MS12R/L	0.1	300	4	305	60	47.625	38	25.4	14	23	SN**56...

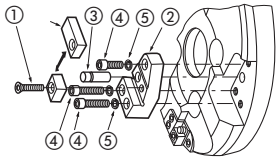
SPARE PARTS

Designation	① Clamping screw	② Locator	③ Pin	④ Locator fixing screw	⑤ Washer	⑥ 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 (N·m):CST-5=3.5

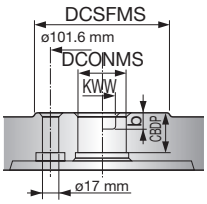
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others



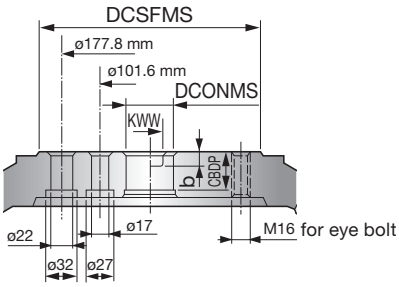


Arbor type

MS08, 10R/L



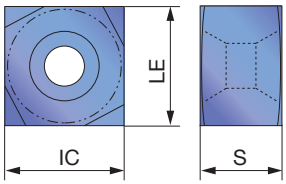
MS12R/L



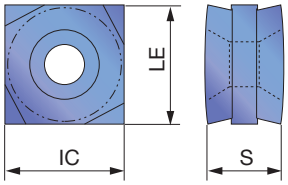
Reference pages: Inserts, Standard cutting conditions → H117

INSERT

SNAA/SNCC56FTR



SNAG/SNCJ56FTR



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

★ : First choice
☆ : Second choice

Designation	APMX	Cermet	LE	IC	S
		X407			
SNAA56FTR	0.1	●	7.85	15.875	9.52
SNAG56FTR	0.1		7.85	15.875	9.52
SNCC56FTR	0.1		7.85	15.875	9.52
SNCJ56FTR	0.1		7.85	15.875	9.52

●: Line up

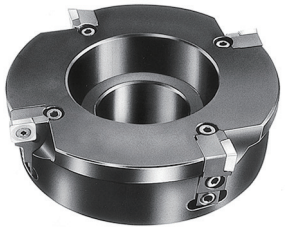
STANDARD CUTTING CONDITIONS

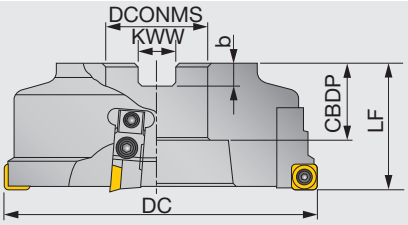
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Depth of cut APMX (mm)
P	Mild steels	X407	260 ~ 300	≤ 6	≤ 0.1
P	Carbon steels	X407	120 ~ 180	≤ 6	≤ 0.1
P	Alloy steels	X407	120 ~ 180	≤ 6	≤ 0.1
P	Die steels	X407	120 ~ 180	≤ 6	≤ 0.1
H	Carbon steel (> 40HRC)	X407	150 ~ 200	≤ 3	≤ 0.05

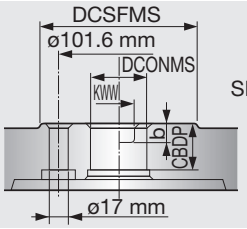
SFP4000R

High precision finishing face mill, with adjustable structure

GAMP = +5°,GAMF = -20°







SFP4008R

Designation	APMX	DC	CICT	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
SFP4004R	0.1	100	2	63	31.75	32	12.7	8	2.3	SPHA435FNW
SFP4005R	0.1	125	2	63	38.1	38	15.9	10	3.5	SPHA435FNW
SFP4006R	0.1	160	4	63	50.8	38	19	11	5.8	SPHA435FNW
SFP4008R	0.1	200	4	63	47.625	38	25.4	14	9	SPHA435FNW
SFP4004R-E	0.1	100	2	63	32	32	14.4	8	2.3	SPHA435FNW
SFP4005R-E	0.1	125	2	63	40	32	16.4	9	3.5	SPHA435FNW
SFP4006R-E	0.1	160	4	63	40	29	16.4	9	5.8	SPHA435FNW

SPARE PARTS

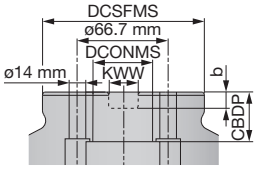
Designation	Clamping screw	Locator	Adjusting screw	Locator fixing screw1	Locator fixing screw2	Wedge	Wrench	Washer1	Washer2	Wrench
SFP40...	CSTA-5S	LW400R	FDS-8S	CM5X0.8X16	CM5X0.8X8	FW-305	T-15D	5S	L5	P-4

*Recommended clamping torque (N·m):CSTA-5S=3.5

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

Arbor type

SFP4006R-E

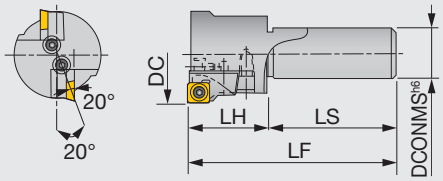


EFP4000R

High precision finishing endmill, shank type, with adjustable structure

GAMP = +5°, GAMF = -20°





Designation	APMX	DC	CICT	DCONMS	LS	LF	LH	Insert
EFP4050R	0.1	50	1	32	80	120	40	SPHA435FNW
EFP4063R	0.1	63	2	32	80	130	50	SPHA435FNW

Note: EFP4050R does not have the adjustable structure.

SPARE PARTS

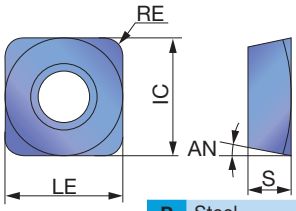
Designation	Clamping screw	Locator	Adjusting screw	Locator fixing screw1	Locator fixing screw2	Wedge	Wrench	Washer1	Washer2	Wrench
EFP4050R	CSTA-5S	LW402R	-	CM5X0.8X16	-	-	T-15D	-	-	-
EFP4063R	CSTA-5S	LW400R	FDS-8S	CM5X0.8X16	CM5X0.8X18	FW-305	T-15D	5S	L5	P-4

*Recommended clamping torque (N·m):CSTA-5S=3.5

Reference pages: Inserts, Standard cutting conditions → H119

INSERT

SPHA435



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Cermet N308	Uncoated TH10	IC	LE	S	AN
SPHA435FNW	2	0.1	●	●	12.7	12.7	4.76	11°

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per revolution: *f* (mm/rev) SFP	Feed per revolution: *f* (mm/rev) EFP	Depth of cut APMX (mm)
P	Mild steels	N308	180 ~ 250	≤ 6	≤ 4	≤ 0.1
P	Carbon steels	N308	150 ~ 200	≤ 6	≤ 4	≤ 0.1
P	Alloy steels	N308	150 ~ 200	≤ 6	≤ 4	≤ 0.1
M	Stainless steels	N308	160 ~ 200	≤ 4	≤ 3	≤ 0.1
K	Cast irons	TH10	100 ~ 150	≤ 5	≤ 3	≤ 0.2
N	Non-ferrous metals	TH10	200 ~ 500	≤ 6	≤ 4	≤ 0.1

Note: Under the above conditions, attainable surface roughness is 3 to 4 µm RzJIS for steel and 6 to 12 µm RzJIS for cast iron.

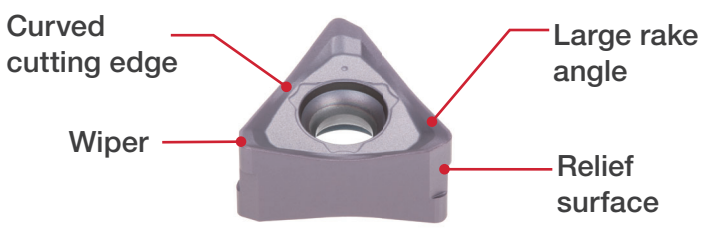
DOFORCE TRI



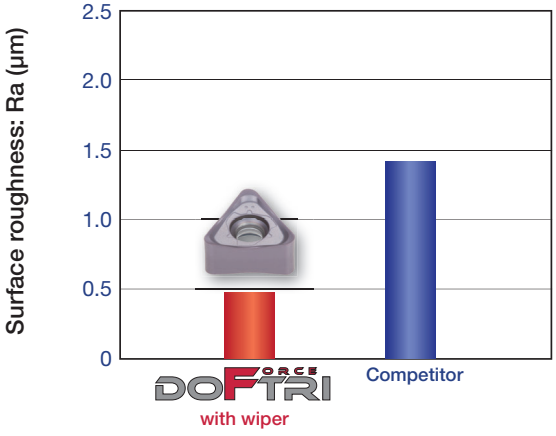
High precision shoulder mill series with economical double-sided triangular inserts

Innovative insert

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



Comparison of surface roughness



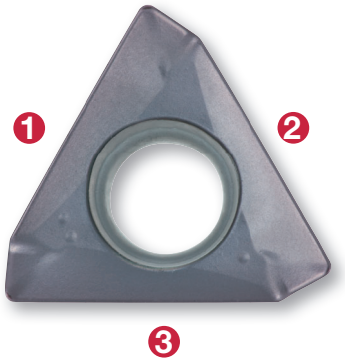
Reference pages: H122 - H124

TUNG-TRI

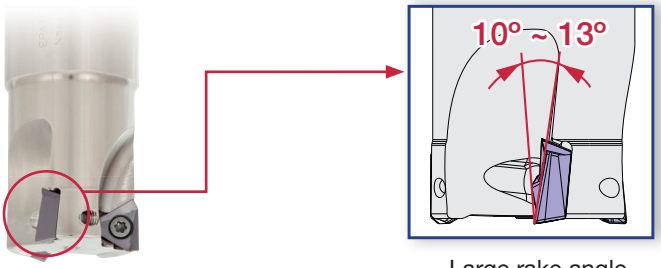


Excellent cutting performance with improved profitability

Economical 3 cutting-edge inserts



Drastically reduced cutting force



Large rake angle

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



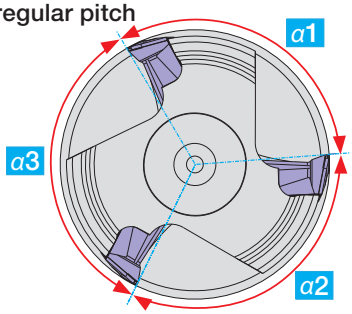
Good surface finish due to positive inclination on wiper edge

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

Applicable for a wide range of cutting conditions

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

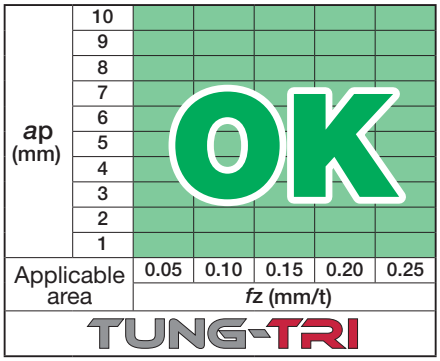
Irregular pitch

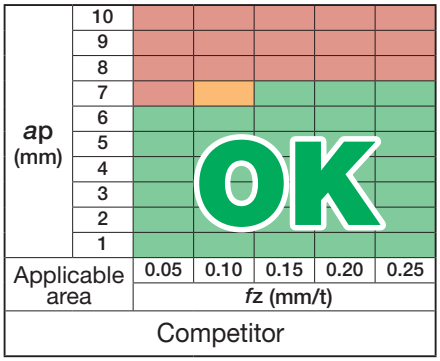


α1 ≒ α2 ≒ α3

■Cutting performance

○ OK △ Chatter × Strong chattter





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

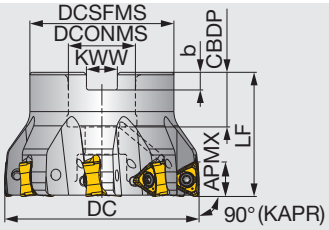
Reference pages: H125 - H134

DOFTRI FORCE TPTN12

Square shoulder mill, with screw clamp system, for double sided triangular inserts

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







Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Shell locking bolt	Insert
TPTN12M050B22.0R04	11	50	4	47	40	22	20	10.4	6.3	0.4	With	CM10X30H	TN*U12...
TPTN12M050B22.0R05	11	50	5	47	40	22	20	10.4	6.3	0.4	With	CM10X30H	TN*U12...
TPTN12M063B22.0R05	11	63	5	47	40	22	20	10.4	6.3	0.6	With	CM10X30H	TN*U12...
TPTN12M063B22.0R06	11	63	6	47	40	22	20	10.4	6.3	0.6	With	CM10X30H	TN*U12...
TPTN12J080B25.4R06	11	80	6	58	50	25.4	26	9.5	6	1.1	With	CM12X30H	TN*U12...
TPTN12J080B25.4R08	11	80	8	58	50	25.4	26	9.5	6	1.1	With	CM12X30H	TN*U12...
TPTN12M080B27.0R06	11	80	6	58	50	27	22	12.4	7	1.1	With	CM12X30H	TN*U12...
TPTN12M080B27.0R08	11	80	8	58	50	27	22	12.4	7	1.1	With	CM12X30H	TN*U12...
TPTN12J100B31.7R07	11	100	7	67	50	31.75	32	12.7	8	1.4	With	TMBA-M16H	TN*U12...
TPTN12J100B31.7R10	11	100	10	67	50	31.75	32	12.7	8	1.4	With	TMBA-M16H	TN*U12...
TPTN12M100B32.0R07	11	100	7	67	50	32	28.5	14.4	8	1.4	With	TMBA-M16H	TN*U12...
TPTN12M100B32.0R10	11	100	10	67	50	32	28.5	14.4	8	1.4	With	TMBA-M16H	TN*U12...
TPTN12J125B38.1R08	11	125	8	71	63	38.1	38	15.9	10	2.4	With	TMBA-M20H	TN*U12...
TPTN12J125B38.1R12	11	125	12	71	63	38.1	38	15.9	10	2.5	With	TMBA-M20H	TN*U12...
TPTN12M125B40.0R08	11	125	8	71	63	40	32	16.4	9	2.3	With	TMBA-M20H	TN*U12...
TPTN12M125B40.0R12	11	125	12	71	63	40	32	16.4	9	2.4	With	TMBA-M20H	TN*U12...

SPARE PARTS

Designation	Clamping screw	Grip	Torx bit	Lubricant	Shell locking bolt 1	Shell locking bolt 2
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	-

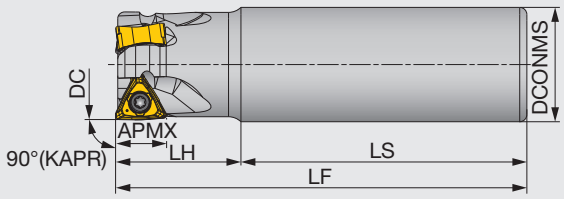
*Recommended clamping torque (N·m): CSPB-3.5=3.5

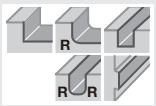
DOFTRI FORCE EPTN12

Square shoulder endmill, shank type, with screw clamp system, for double sided triangular inserts

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







Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPTN12M032C32.0R02N	11	32	2	32	80	35	115	0.7	Withouut	TN*U12...
EPTN12M032C32.0R03N	11	32	3	32	80	35	115	0.7	Withouut	TN*U12...
EPTN12M040C32.0R03N	11	40	3	32	80	35	115	0.8	Withouut	TN*U12...
EPTN12M040C32.0R04N	11	40	4	32	80	35	115	0.8	Withouut	TN*U12...

SPARE PARTS

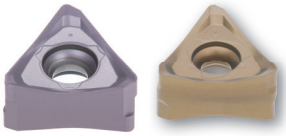
Designation	Clamping screw	Grip	Torx bit	Lubricant
EPTN12...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000

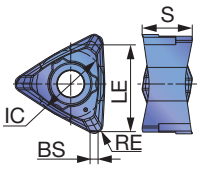
*Recommended clamping torque (N · m) : CSPB-3.5=3.5

Reference pages: Inserts → H123, Standard cutting conditions → H124

INSERT

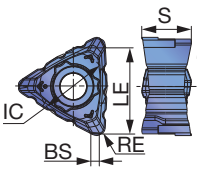
TNGU-MJ/TNMU-MJ





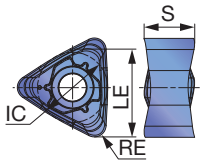
TNMU-NMJ





TNMU-R-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated				LE	IC	S	BS
			AH120	AH3135	T1215	T3225				
TNGU120708PER-MJ	0.8	11	●	●	●		12	9.525	7.04	1.16
TNMU120708PER-MJ	0.8	11	●	●	●	●	12	9.525	7.1	1.16
TNMU120708PER-NMJ	0.8	11	●	●			12	9.525	7.1	1.16
TNMU1207R16PER-MJ	1.6	11	●	●			12	9.525	6.88	-

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15E4, E275A, etc.	- 300 HB	First choice	AH3135	MJ	100 - 250	0.08 - 0.3
		- 300 HB	Wear resistance	T3225	MJ	100 - 300	0.08 - 0.3
		- 300 HB	Low cutting force	AH3135	NMJ	100 - 250	0.08 - 0.14
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	- 300 HB	First choice	AH3135	MJ	100 - 230	0.08 - 0.3
		- 300 HB	Wear resistance	T3225	MJ	100 - 280	0.08 - 0.3
		- 300 HB	Low cutting force	AH3135	NMJ	100 - 230	0.08 - 0.14
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3135	MJ	100 - 180	0.08 - 0.25
		30 - 40 HRC	Wear resistance	T3225	MJ	100 - 200	0.08 - 0.25
		30 - 40 HRC	Low cutting force	AH3135	NMJ	100 - 180	0.08 - 0.14
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	First choice	AH3135	MJ	90 - 200	0.08 - 0.25
		-	Wear resistance	T3225	MJ	90 - 250	0.08 - 0.25
		-	Low cutting force	AH3135	NMJ	90 - 200	0.08 - 0.14
K	Grey cast iron FC250, 250, etc. FC300, 300, etc.	150 - 250 HB	First choice	AH120	MJ	140 - 250	0.08 - 0.3
		150 - 250 HB	Wear resistance	T1215	MJ	140 - 300	0.08 - 0.3
		150 - 250 HB	Low cutting force	AH120	NMJ	140 - 250	0.08 - 0.14
	Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc.	150 - 250 HB	First choice	AH120	MJ	110 - 200	0.08 - 0.25
		150 - 250 HB	Wear resistance	T1215	MJ	110 - 250	0.08 - 0.25
		150 - 250 HB	Low cutting force	AH120	NMJ	110 - 200	0.08 - 0.14
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH120	MJ	20 - 60	0.08 - 0.2
		-	Low cutting force	AH120	NMJ	20 - 60	0.08 - 0.14
	Heat-resistant alloys Inconel718, etc.	-	First choice	AH120	MJ	20 - 40	0.07 - 0.18
		-	Low cutting force	AH120	NMJ	20 - 40	0.07 - 0.14

When using NMJ chipbreaker, please set up the feed not to exceed the value below.

Designation	Chip thickness (mm)
TNMU120708PER-NMJ	< 0.2

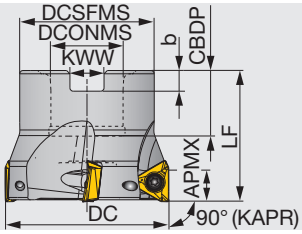
TUNG-TRI

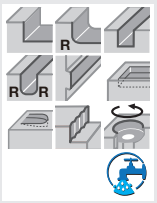
TPA06

High precision square shoulder mill, with screw clamp system, for triangular inserts

GAMP = +8.5°~ +11.5°, GAMF = -5.5°~ -12.5°







Designation	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
TPA06R032M16.0E05	6	32	5	30	16	18	40	5.6	8.4	0.14	With	TOMT06...
TPA06R040M16.0E06	6	40	6	35	16	18	40	5.6	8.4	0.22	With	TOMT06...
TPA06R050M22.0E08	6	50	8	41	22	20	40	6.3	10.4	0.31	With	TOMT06...

SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
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

*Recommended clamping torque (N·m): CSTB-2.5=1.3

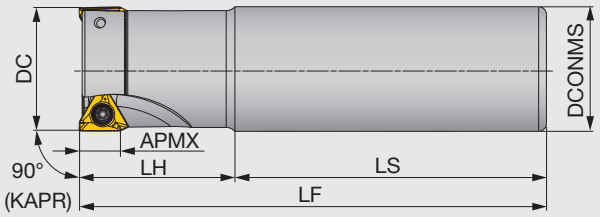
TUNG-TRI

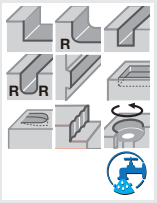
EPA06

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

GAMP = +8.5°~ +11.5°, GAMF = -5.5°~ -12.5°







Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPA06R012M16.0-01N	6	12	1	16	50	18	68	0.09	Without	TOMT06...
EPA06R016M16.0-02N	6	16	2	16	60	24	84	0.12	Without	TOMT06...
EPA06R016M16.0-02L	6	16	2	16	105	40	145	0.2	With	TOMT06...
EPA06R018M16.0-02N	6	18	2	16	60	24	84	0.13	Without	TOMT06...
EPA06R018M16.0-02L	6	18	2	16	115	30	145	0.21	With	TOMT06...
EPA06R020M16.0-02N	6	20	2	16	60	30	90	0.14	Without	TOMT06...
EPA06R020M20.0-02N	6	20	2	20	70	30	100	0.23	Without	TOMT06...
EPA06R020M20.0-03N	6	20	3	20	70	30	100	0.22	Without	TOMT06...
EPA06R020M20.0-02L	6	20	2	20	135	50	185	0.41	With	TOMT06...
EPA06R022M20.0-02N	6	22	2	20	70	30	100	0.23	Without	TOMT06...
EPA06R022M20.0-03N	6	22	3	20	70	30	100	0.23	Without	TOMT06...
EPA06R022M20.0-02L	6	22	2	20	145	40	185	0.42	With	TOMT06...
EPA06R025M25.0-03N	6	25	3	25	80	35	115	0.41	Without	TOMT06...
EPA06R025M25.0-04N	6	25	4	25	80	35	115	0.41	Without	TOMT06...
EPA06R025M25.0-02L	6	25	2	25	150	70	220	0.78	With	TOMT06...
EPA06R028M25.0-03N	6	28	3	25	80	35	115	0.42	Without	TOMT06...
EPA06R028M25.0-04N	6	28	4	25	80	35	115	0.42	Without	TOMT06...
EPA06R028M25.0-02L	6	28	2	25	180	40	220	0.8	With	TOMT06...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EPA06R012 - 018M...	CSTB-2.5S	M-1000	T-8D
EPA06R020 - 028M...	CSTB-2.5	M-1000	T-8D

*Recommended clamping torque (N·m): CSTB-2.5S/CSTB-2.5=1.3

Reference pages: Inserts → H131 - H132, Standard cutting conditions → H133

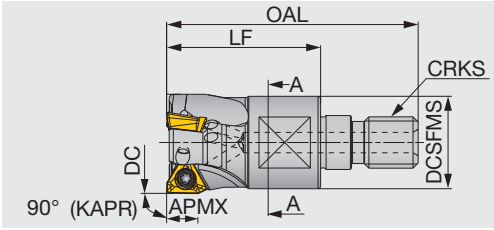
TUNG-TRI

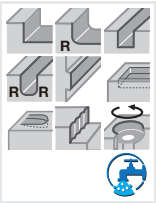
HPA06-M

High precision square shoulder endmill, modular type, for triangular inserts (TungFlex)

GAMP = +8.5°~ +11.5°, GAMF = -12.5°~ -5.5°







Designation	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HPA06R016MM08-02	6	16	2	42	25	10	13	M8	0.03	With	TOMT06...
HPA06R020MM10-03	6	20	3	49	30	15	18	M10	0.06	With	TOMT06...
HPA06R025MM12-04	6	25	4	57	35	17	21	M12	0.1	With	TOMT06...
HPA06R032MM16-05	6	32	5	63	40	22	29	M16	0.20	With	TOMT06...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
HPA06R016MM08-02	CSTB-2.5S	M-1000	T-8D
HPA06R020 - 032MM...	CSTB-2.5	M-1000	T-8D

*Recommended clamping torque (N·m): CSTB-2.5S/CSTB-2.5=1.3

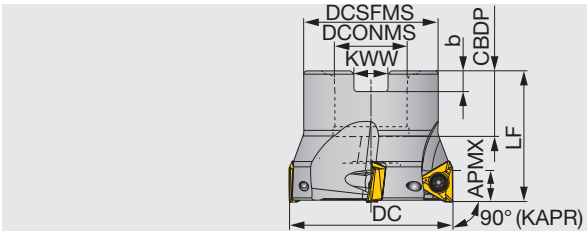
TUNG-TRI

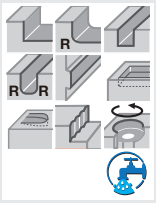
TPA10

High precision square shoulder mill, with screw clamp system, for triangular inserts

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







Designation	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
TPA10R040M16.0E04	10	40	4	35	16	18	40	5.6	8.4	0.2	With	TO*T10...
TPA10R050M22.0E04	10	50	4	41	22	20	40	6.3	10.4	0.31	With	TO*T10...
TPA10R063M22.0E06	10	63	6	41	22	20	40	6.3	10.4	0.51	With	TO*T10...
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...
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...

SPARE PARTS







Designation	Clamping screw	Grip	Lubricant	Shell locking bolt	Torx bit
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

*Recommended clamping torque (N·m): SR14-562/S=3.5

Reference pages: Inserts → **H131 - H132**, Standard cutting conditions → **H133**, TungFlex → **H210**

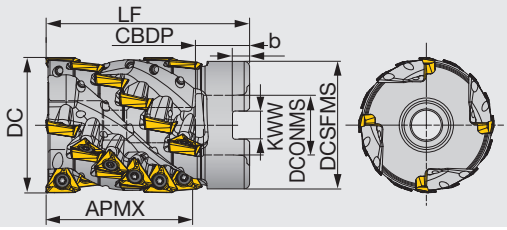
TUNG-TRI

TLA10

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

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





Designation	APMX	DC	ZEFP	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	Shell locking bolt1	Shell locking bolt2	Wrench
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 (N·m): SR14-562=3.5

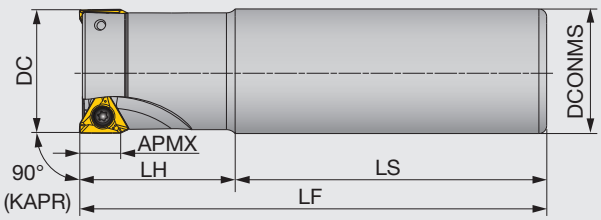
TUNG-TRI

EPA10

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

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





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

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
EPA10...	SR14-562/S	SW6-SD	M-1000	BLDT10/S7

*Recommended clamping torque (N·m): SR14-562/S=3.5

Reference pages: Inserts → H131 - H132, Standard cutting conditions → H133

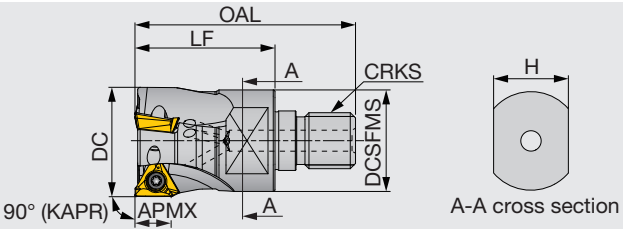
TUNG-TRI

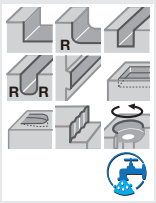
HPA10-M

High precision square shoulder endmill, modular type, for triangular inserts (TungFlex)

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







Designation	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
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...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
HPA10...	SR14-562/S	SW6-SD	M-1000	BLDT10/S7

*Recommended clamping torque (N·m): SR14-562/S=3.5

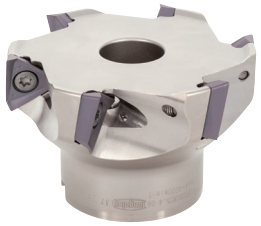
TUNG-TRI

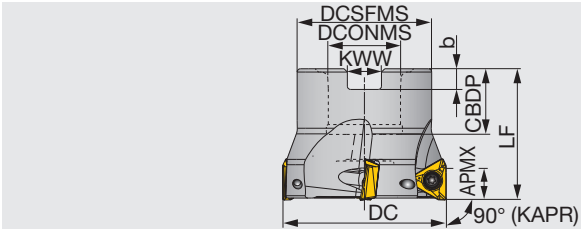
TPA15

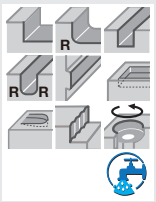
Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

High precision square shoulder mill, with screw clamp system, for triangular inserts

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







Designation	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
TPA15R050M22.0E04	15	50	4	41	22	20	40	6.3	10.4	0.27	With	TOMT15...
TPA15R063M22.0E05	15	63	5	41	22	20	40	6.3	10.4	0.41	With	TOMT15...
TPA15R080M25.4-06	15	80	6	46	25.4	26	50	6	9.5	0.83	With	TOMT15...
TPA15R080M27.0E06	15	80	6	50	27	22	50	7	12.4	0.86	With	TOMT15...
TPA15R100M31.7-07	15	100	7	60	31.75	32	50	8	12.7	1.3	With	TOMT15...
TPA15R100M32.0E07	15	100	7	60	32	28.5	50	8	14.4	1.27	With	TOMT15...
TPA15R125M38.1-08	15	125	8	80	38.1	38	63	10	15.9	2.7	With	TOMT15...
TPA15R125M40.0E08	15	125	8	71	40	32	63	9	16.4	2.47	With	TOMT15...
TPA15R160M40.0E10N	15	160	10	100	40	32	63	9	16.4	4.77	Without	TOMT15...
TPA15R160M50.8-10N	15	160	10	100	50.8	46	63	11	19	4.4	Without	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
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	-	CM12X30H	BT20S
TPA15R100M...	TS45120I	H-TB2W	M-1000	TMBA-M16H	-	BT20S
TPA15R125M...	TS45120I	H-TB2W	M-1000	TMBA-M20H	-	BT20M
TPA15R160M...	TS45120I	H-TB2W	M-1000	-	-	BT20M

*Recommended clamping torque (N·m): TS45120I=5

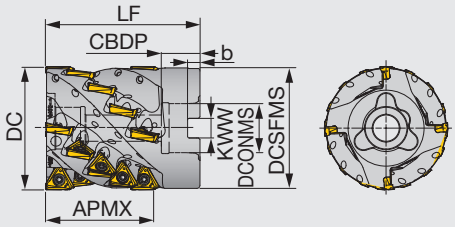
Reference pages: Inserts → **H131 - H132**, Standard cutting conditions → **H133**, TungFlex → **H210**

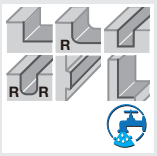
TUNG-TRI
TLA15-M

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

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







Designation	APMX	DC	ZEFP	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	TOMT15...
TLA15R080L070M32.0E04M	70	80	4	20	78	32	25	100	8	14.4	2.38	With	TOMT15...
TLA15R100L083M38.1-05M	83	100	5	30	98	38.1	38	110	10	15.9	4.24	With	TOMT15...
TLA15R100L083M40.0E05M	83	100	5	30	98	40	32	110	9	16.4	4.26	With	TOMT15...

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	Torx bit	Lubricant	Shell locking bolt
TLA15R080...	TS45120I	H-TB2W	BT20S	M-1000	CM16X75
TLA15R100...	TS45120I	H-TB2W	BT20S	M-1000	CM20X80

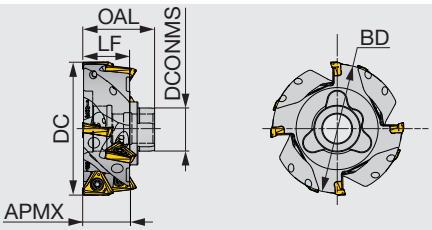
*Recommended clamping torque (N·m): TS45120I=5

TUNG-TRI
TLA15-S

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

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







Designation	APMX	DC	ZEFP	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	TOMT15...
TLA15R100L028-05S	28	100	5	10	97.2	33	46	28	1.05	With	TOMT15...

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
TLA15...	TS45120I	H-TB2W	M-1000	BT20S

*Recommended clamping torque (N·m): TS45120I=5

CENTER BOLT
(Optional parts)




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

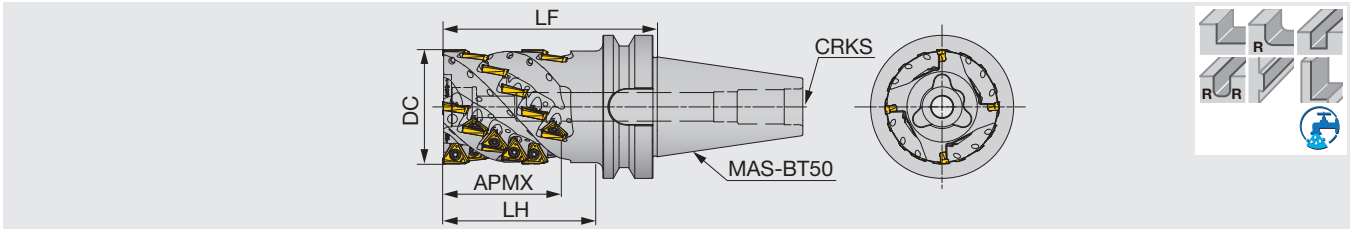
Reference pages: Inserts → H131 - H132, Standard cutting conditions → H133

TUNG-TRI

TLA15-BT

Square shoulder mill for roughing, with BT tapered shank, for triangular inserts

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



Designation	APMX	DC	ZEFP	CICT	LF	LH	WT(kg)	Air hole	CRKS	Insert
TLA15R080L083BT50-04M	83	80	4	24	150	107	6.29	With	M24	TOMT15...
TLA15R100L097BT50-05M	97	100	5	35	165	126.5	8.92	With	M24	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit	Shell locking bolt
TLA15R080L083BT50-04M	TS45120I	H-TB2W	M-1000	BT20S	CAP-CM16×2.0×55
TLA15R100L097BT50-05M	TS45120I	H-TB2W	M-1000	BT20S	CAP-CM20×2.5×50

*Recommended clamping torque (N·m): TS45120I=5

CENTER BOLT
(Optional parts)

No. of subunits	1 pc	2 pcs
TLA15R080L083BT50-04M	CAP-CM16×2.0×55	CM16x120
TLA15R100L097BT50-05M	CAP-CM20×2.5×50	CM20x80

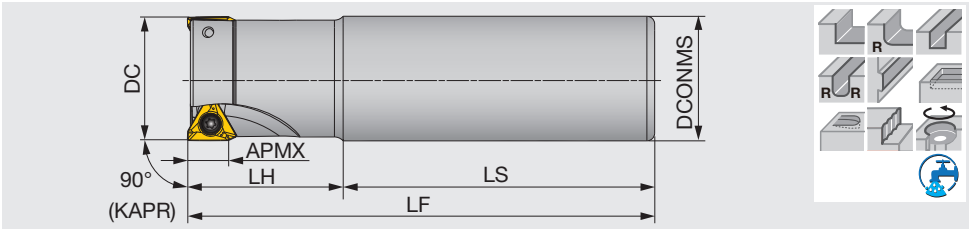
TUNG-TRI

EPA15

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

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





Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPA15R040M32.0-03N	15	40	3	32	80	40	120	0.73	Without	TOMT15...
EPA15R040M32.0-02L	15	40	2	32	205	50	255	1.56	With	TOMT15...
EPA15R050M32.0-04N	15	50	4	32	80	40	120	0.83	Without	TOMT15...
EPA15R050M42.0-02L	15	50	2	42	310	50	360	3.84	With	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
EPA15...	TS45120I	H-TB2W	M-1000	BT20S

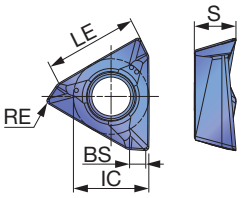
*Recommended clamping torque (N·m): TS45120I=5

Reference pages: Inserts → H131 - H132, Standard cutting conditions → H133

INSERT

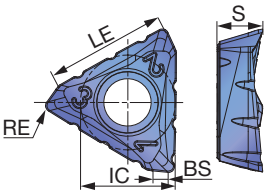
TOMT-MJ



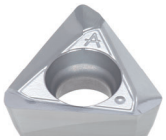


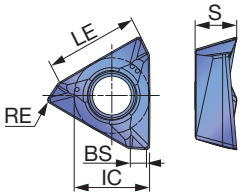
TOMT-NMJ





TOGT-AJ





		Coated				Uncoated							
	Designation	RE	APMX	AH120	AH3135	T1215	T3225	KS05F		LE	IC	S	BS
P	Steel			☆	★		☆						
M	Stainless				★		☆						
K	Cast iron			★		★							
N	Non-ferrous							★					
S	Superalloys			★	☆								
H	Hard materials												
	TOMT060302PDER-MJ	0.2	6	●	●					6.2	5.6	3.2	1.4
	TOMT060304PDER-MJ	0.4	6	●	●		●			6.2	5.6	3.2	1.2
	TOMT060308PDER-MJ	0.8	6	●	●	●	●			6.2	5.6	3.2	0.8
	TOMT100404PDER-MJ	0.4	10	●	●		●			10.5	8.6	4.7	1.5
	TOMT100408PDER-MJ	0.8	10	●	●	●	●			10.5	8.6	4.7	1.1
	TOMT100416PDER-MJ	1.6	10	●	●					10.5	8.6	4.7	0.2
	TOMT150604PDER-MJ	0.4	15	●	●		●			15.7	12.7	6	2.2
	TOMT150608PDER-MJ	0.8	15	●	●	●	●			15.7	12.7	6	1.9
	TOMT150616PDER-MJ	1.6	15	●	●					15.7	12.7	6	1.1
	TOMT150620PDER-MJ	2	15	●	●					15.7	12.7	6	0.7
	TOMT150608PDER-NMJ	0.8	15	●	●		●			15.7	12.7	6	1.9
	TOGT100404PDFR-AJ	0.4	10					●		10.5	8.6	5.2	1.5
	TOGT100408PDFR-AJ	0.8	10					●		10.5	8.6	5.1	1.1

★ : First choice
☆ : Second choice

●: Line up

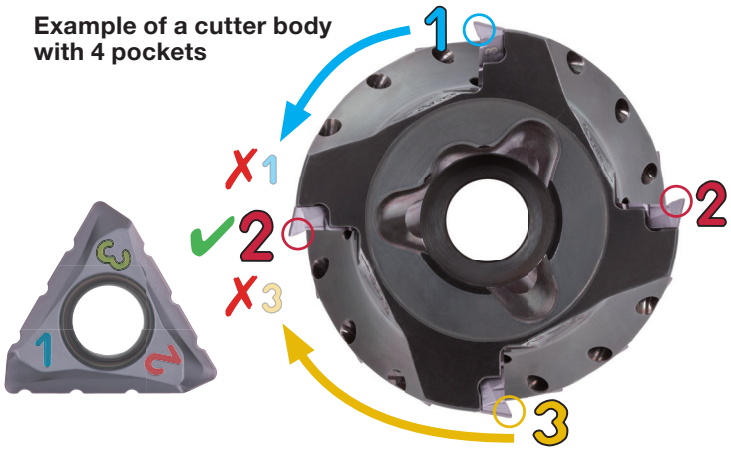
Caution for using NMJ chipbreaker

⚠ 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.

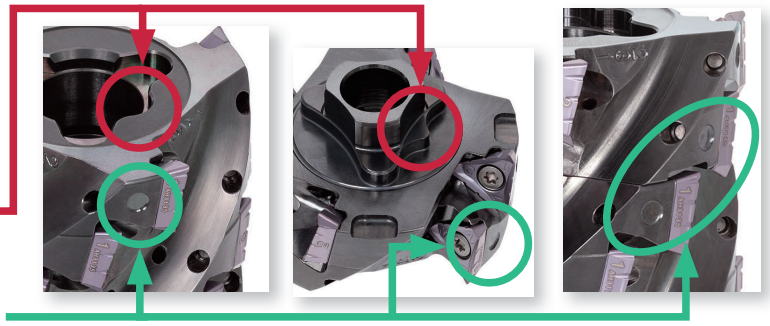
Item: TOMT150608PDER-NMJ

Example of a cutter body with 4 pockets



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 (Poka-yoke) to avoid setting error.



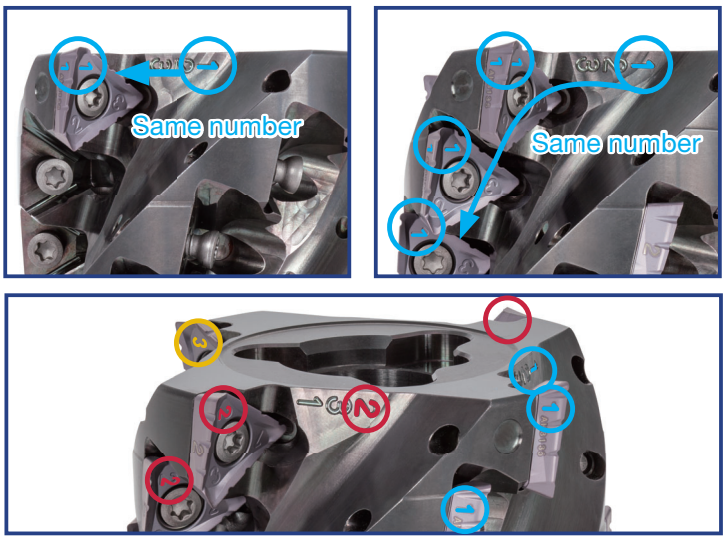
Directions for setting NMJ inserts on roughing type bodies

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.



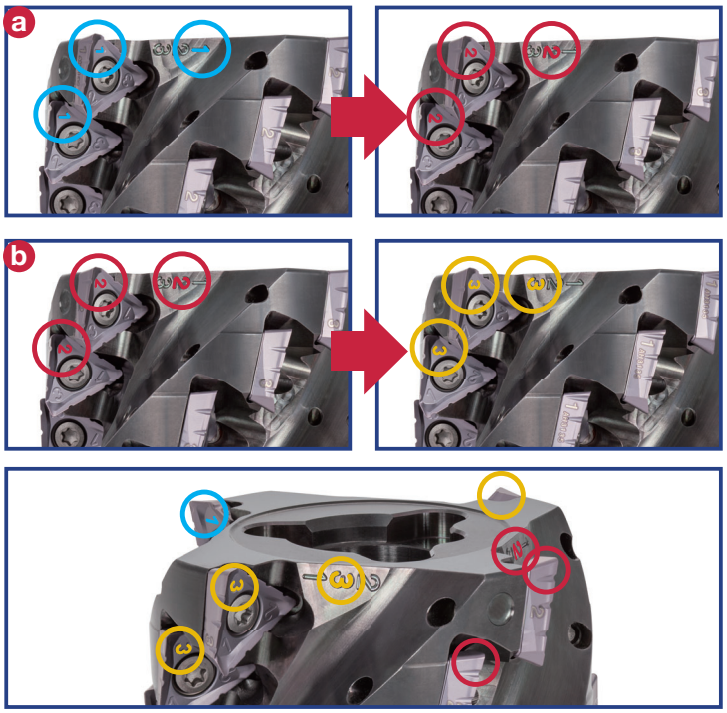
Directions for changing corners for inserts on roughing type bodies

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.



STANDARD CUTTING CONDITIONS

TPA/EPA/HPA

	Workpiece materials	Hard-ness HB	Grades	Cutting speed *Vc* (m/min)			Feed per tooth: *fz* (mm/t)				
							MJ			NMJ	AJ
				T/E/HPA06	T/E/HPA10	T/EPA15	T/E/HPA06	T/E/HPA10	T/EPA15	T/EPA15	T/E/HPA10
P	Low carbon steel (SS400, S15C , etc. E275A, C15E4, etc.	- 200	AH3135	100 - 220	100 - 250	100 - 250	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25	0.08 - 0.15	-
P	High carbon steel S45C, etc. C45, etc.	200 - 300	AH3135	100 - 170	100 - 200	100 - 230	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2	0.08 - 0.15	-
P	Alloy steel SCM440, etc. 42CrMo4, etc.	150 - 300	AH3135	100 - 170	100 - 200	100 - 230	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2	0.08 - 0.15	-
P	Tool steel SKD61, etc. X40CrMoV5-1, etc	30 - 40 HRC	AH3135	100 - 120	100 -150	100 - 180	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2	0.08 - 0.15	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH3135	80 - 150	80 - 200	90 - 200	0.05 - 0.15	0.08 - 0.2	0.08 - 0.2	0.08 - 0.15	-
K	Grey cast iron FC250, etc. 250, etc.	150 - 250	AH120	100 - 200	100 - 250	140 - 250	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25	0.08 - 0.15	-
K			T1215	150 - 250	150 - 300	200 - 300	0.05 - 0.12	0.08 - 0.15	0.08 - 0.18	-	-
K	Ductile cast iron FCD450, etc. 450-10S, etc.	150 - 250	AH120	80 - 150	80 - 200	110 - 200	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25	0.08 - 0.15	-
K			T1215	100 - 200	130 - 250	150 - 250	0.05 - 0.12	0.08 - 0.15	0.08 - 0.18	-	-
N	Aluminium Si < 13%	-	KS05F	-	300 - 1000	-	-	-	-	-	0.08 - 0.22
N	Aluminium Si ≥ 13%	-	KS05F	-	100 - 200	-	-	-	-	-	0.08 - 0.22
S	Titanium alloys Ti-6Al-4V, etc.	-	AH120	20 - 50	20 - 60	20 - 60	0.05 - 0.1	0.08 - 0.15	0.08 - 0.18	0.08 - 0.15	-
S	Heat-resistant alloys Inconel 718, etc.	-	AH120	20 - 35	20 - 40	20 - 40	0.03 - 0.08	0.05 - 0.13	0.07 - 0.15	0.07 - 0.15	-

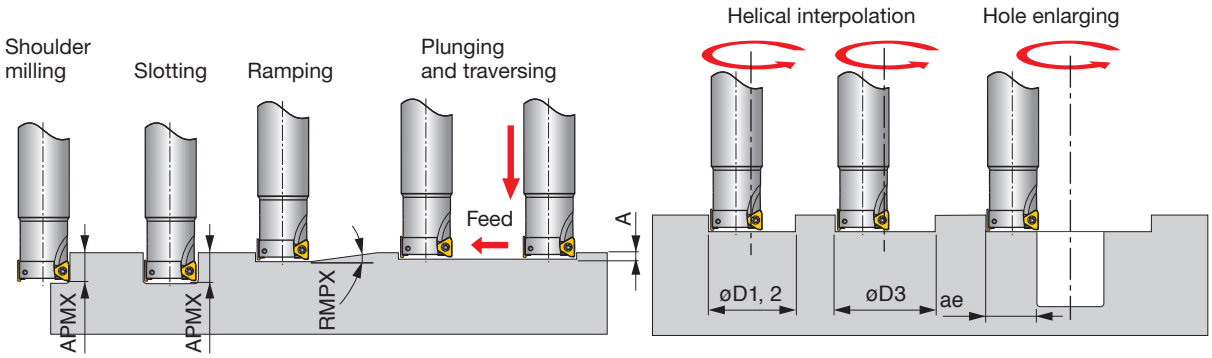
· When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.
· Remove excessive chip accumulation with an air blast.
· For the operation with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (*fz*) should 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 HB	Grades	Cutting speed *Vc* (m/min)		Feed per tooth: *fz* (mm/t)				
						MJ		NMJ	AJ	
				TLA10	TLA15	TLA10	TLA15	TLA15	TLA10	
P	Low carbon steel SS400, S15C, etc. E275A, C15E4, etc.	- 200	AH3135	100 - 250	100 - 250	0.08 - 0.18	0.08 - 0.22	0.08 - 0.15	-	
P	High carbon steel S45C, etc. C45, etc.	200 - 300	AH3135	100 - 200	100 - 270	0.08 - 0.14	0.08 - 0.18	0.08 - 0.15	-	
P	Alloy steel SCM440, etc. 42CrMo4, etc.	30 - 40 HRC	AH3135	100 - 150	100 - 180	0.08 - 0.14	0.08 - 0.18	0.08 - 0.15	-	
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH3135	80 - 200	90 - 200	0.08 - 0.15	0.08 - 0.18	0.08 - 0.15	-	
K	Grey cast iron FC250, etc. 250, etc.	150 - 250	AH120	100 - 250	140 - 250	0.08 - 0.18	0.08 - 0.25	0.08 - 0.15	-	
K			T1215	150 - 250	150 - 250	0.08 - 0.15	0.08 - 0.18	-	-	
K	Ductile cast iron FCD450, etc. 450-10S, etc.	150 - 250	AH120	80 - 200	110 - 200	0.08 - 0.18	0.08 - 0.25	0.08 - 0.15	-	
K			T1215	150 - 250	150 - 250	0.08 - 0.15	0.08 - 0.18	-	-	
N	Aluminium Si < 13%	-	KS05F	300 - 1000	-	-	-	-	0.08 - 0.22	
N	Aluminium Si ≥ 13%	-	KS05F	100 - 200	-	-	-	-	0.08 - 0.22	
S	Titanium alloys Ti-6Al-4V, etc.	-	AH120	20 - 60	20 - 60	0.08 - 0.15	0.08 - 0.18	0.08 - 0.15	-	
S	Heat-resistant alloys Inconel 718, etc.	-	AH120	20 - 40	20 - 40	0.05 - 0.13	0.07 - 0.15	0.07 - 0.15	-	

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

APPLICATION RANGE



Designation	DC	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Min. machining depth øD1	Max. machining diameter øD2	Max. machining diameter øD3 *	Max. cutting width in enlarging ae
EPA06R012…	12	6	5°	0.6	18	23.6	21	11.5
E/HPA06R016…	16	6	4.3°	0.6	25	31.6	29	15.5
EPA06R018…	18	6	3.5°	0.6	29.5	35.6	33	17.5
E/HPA06R020…	20	6	2.8°	0.6	33.5	39.6	37	19.5
EPA06R022…	22	6	2.5°	0.6	37.5	43.6	41	21.5
E/HPA06R025…	25	6	2°	0.6	43.5	49.6	47	24.5
E/HPA10R025…	25	10	2°	0.6	42.1	49.6	47	24.5
EPA06R028…	28	6	1.8°	0.6	49.5	55.6	53	27.5
EPA10R028…	28	10	2°	0.6	48.1	55.6	53	27.5
H/TPA06R032…	32	6	1.5°	0.6	57.5	63.6	61	31.5
E/HPA10R032…	32	10	2°	0.6	56.1	63.6	61	31.5
EPA10R035…	35	10	1.7°	0.6	62.1	69.6	67	34.5
TPA06R040…	40	6	1°	0.6	73.5	79.6	77	39.5
E/TPA10R040…	40	10	1.4°	0.6	72.1	79.6	77	39.5
EPA15R040…	40	15	2.3°	0.8	68.5	79.2	75.5	39
TPA06R050…	50	6	0.7°	0.6	94	99.6	97	49.5
TPA10R050…	50	10	0.9°	0.6	92.1	99.6	97	49.5
E/TPA15R050…	50	15	1.7°	0.8	88.5	99.2	95.5	49
TPA10R063…	63	10	0.8°	0.6	118.1	125.6	123	62.5
TPA15R063…	63	15	1.4°	0.8	114.5	125.2	121.5	62
TPA10R080…	80	10	0.6°	0.6	152.1	159.6	157	79.5
TPA15R080…	80	15	1°	0.8	148.5	159.2	155.5	79
TPA10R100…	100	10	0.5°	0.6	192.1	199.6	197	99.5
TPA15R100…	100	15	0.8°	0.8	188.5	199.2	195.5	99
TPA15R125…	125	15	0.6°	0.8	238.5	249.2	245.5	124
TPA15R160…	160	15	0.5°	0.8	308.5	319.2	315.5	159

* Flat bottom hole

Note: Corner RE for dimensions of øD1, øD2 and øD3: RE = 0.4 for E/TPA06, E/TPA10 and RE = 0.8 for E/TPA15.

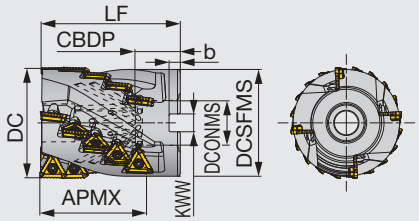
TUNGTSHRED

LPTC16

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

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





Designation	APMX	DC	ZEFP	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
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 (N·m): TS 40B100I=3.5

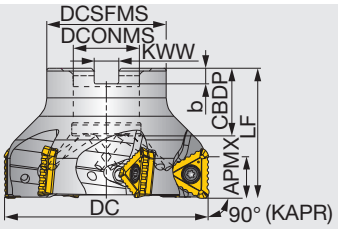
TUNGTSHRED

TPTC16

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

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





Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	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...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt1	Shell locking bolt2	Torx bit
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 (N·m): TS 40B100I=3.5

Reference pages: Inserts → H136, Standard cutting conditions → H137

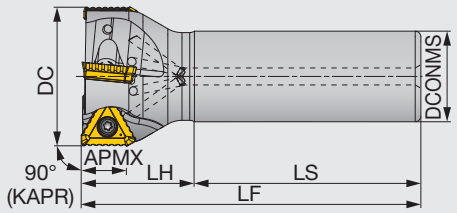
TUNGTSHRED

EPTC16

Square shoulder endmill, shank type, with screw clamp system, for shred inserts

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





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

SPARE PARTS

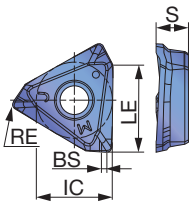
Designation	Clamping screw	Grip	Lubricant	Torx bit
EPTC16...	TS 40B100I	H-TB2W	M-1000	BT15S

*Recommended clamping torque (N·m): TS 40B100I=3.5

INSERT

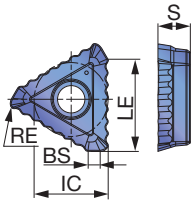
TCGT-MJ





TCMT-NMJ





Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

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

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H137

STANDARD CUTTING CONDITIONS

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

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

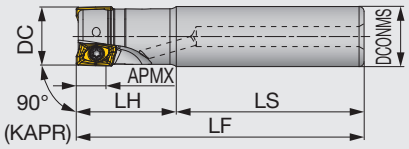
TUNGFORCE TUNGFREC

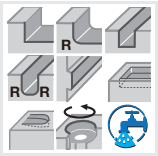
EPAV06

Mini square shoulder endmill, shank type, with screw clamp system

GAMP = +6.0°~ +7.6°, GAMF = -37.1°~ -32.4°







Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPAV06M008C10.0R01	6	8	1	10	60	20	80	0.04	With	AVGT06...
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...
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...
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...
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...
EPAV06M018C16.0R04	6	18	4	16	70	20	90	0.13	With	AVGT06...
EPAV06M018C16.0R03	6	18	3	16	70	20	90	0.13	With	AVGT06...
EPAV06M018C16.0R03L	6	18	3	16	160	20	180	0.26	With	AVGT06...
EPAV06M020C20.0R05	6	20	5	20	70	30	100	0.21	With	AVGT06...
EPAV06M020C20.0R04	6	20	4	20	70	30	100	0.23	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...
EPAV06M025C25.0R06	6	25	6	25	80	35	115	0.4	With	AVGT06...
EPAV06M025C25.0R05	6	25	5	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...
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...

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
EPAV06M...	CSPB-2H	M-1000	IP-6DB

*Recommended clamping torque (N·m): CSPB-2H=0.7

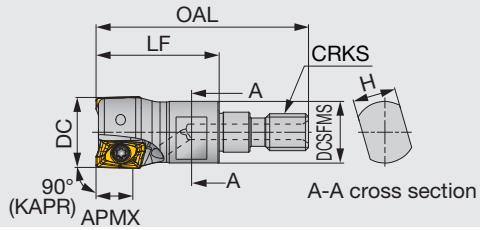
Reference pages: Inserts, Standard cutting conditions → H141

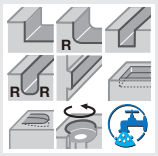
HPAV06-M

Mini square shoulder endmill, modular type (TungFlex)

GAMP = +6.0°~ +7.6°, GAMF = -37.1°~ -32.4°







Designation	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HPAV06M010M06R02	6	10	2	34.5	20	7	9.5	M6	0.01	With	AVGT06...
HPAV06M012M06R02	6	12	2	34.5	20	7	10	M6	0.01	With	AVGT06...
HPAV06M012M06R03	6	12	3	34.5	20	7	10	M6	0.01	With	AVGT06...
HPAV06M016M08R03	6	16	3	42	25	10	13	M8	0.03	With	AVGT06...
HPAV06M016M08R04	6	16	4	42	25	10	13	M8	0.03	With	AVGT06...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS





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

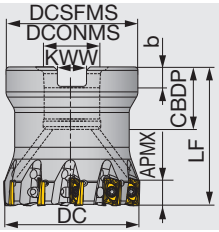
*Recommended clamping torque (N·m): CSPB-2H=0.7

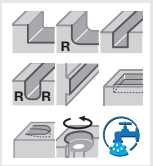
TPAV06

High feed endmill, modular type, with coolant directly to the tool tips (TungFlex)

GAMP = +6.0°~ +7.6°, GAMF = -37.1°~ -32.4°







Designation	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...

SPARE PARTS






Designation	Clamping screw	Lubricant	Wrench	Shell locking bolt
TPAV06M040B16.0R10	CSPB-2H	M-1000	IP-6DB	CM8X30H

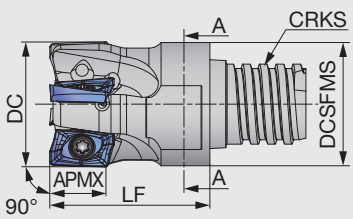
*Recommended clamping torque (N·m): CSPB-2H=0.7

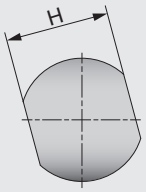
Reference pages: Inserts, Standard cutting conditions → **H141**, TungFlex → **H210**

TUNGFORCE TUNGFREC

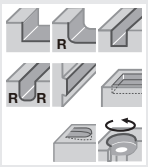
HPAV06-S

Mini square shoulder endmill, modular type (TungMeister)





A-A cross section



Designation	APMX	DC	CICT	LF	H	DCSFMS	CRKS	WT (kg)	Air hole	Insert
HPAV06M010S05R02	6	10	2	10	8	8	S05	0.01	Without	AVGT06...
HPAV06M010S06R02	6	10	2	16	8	9.8	S06	0.01	Without	AVGT06...
HPAV06M012S08R02	6	12	2	18	10	11.7	S08	0.02	Without	AVGT06...
HPAV06M012S08R03	6	12	3	18	10	11.7	S08	0.02	Without	AVGT06...
HPAV06M016S10R03	6	16	3	20	13	15.4	S10	0.03	Without	AVGT06...
HPAV06M016S10R04	6	16	4	20	13	15.4	S10	0.03	Without	AVGT06...

- Applicable shank: VSSD, VTSD, VSC, VSTD, VER
Please see the page **I086 - I089** for the types and the selection of TungMeister shank.
Please use VAD-M adapter to connect TungMeister with a metric thread shank.

Spanner*	Designation	Connection screw size
	KEYV-S05	S05
	KEYV-S06	S06
	KEYV-S08	S08
	KEYV-S10	S10

*sold separately

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

SPARE PARTS





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

*Recommended clamping torque (N·m): CSPB-2H=0.7

Reference pages: Inserts, Standard cutting conditions → H141, TungMeister shank → I086 - I089

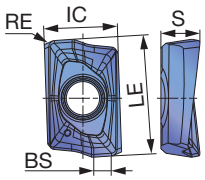
INSERT

AVGT-MJ



AVGT-AJ





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

★ : First choice
☆ : Second choice

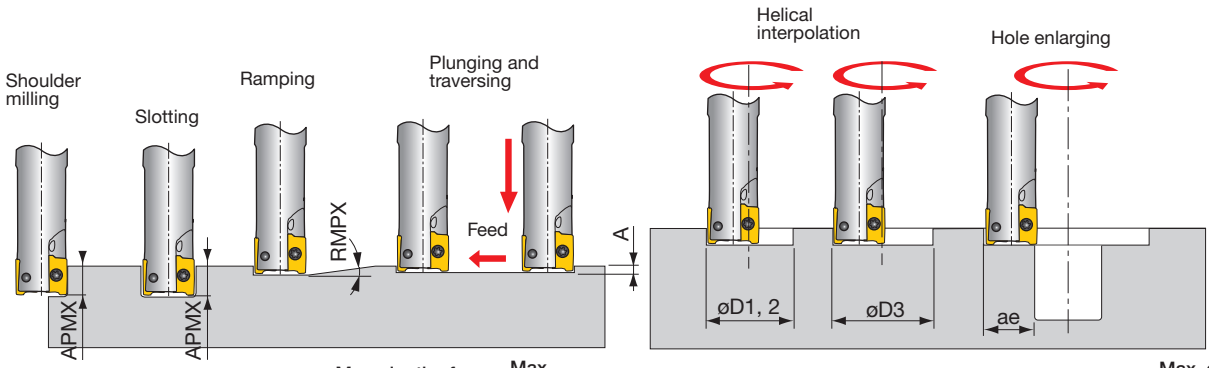
Designation	RE	APMX	Coated			Uncoated	LE	IC	S	BS
			AH120	AH130	AH3135	KS05F				
AVGT060300PBER-MJ	0.0	6			●		8	5	2.7	1.6
AVGT060302PBER-MJ	0.2	6	●	●	●		8	5	2.7	1.5
AVGT060304PBER-MJ	0.4	6	●	●	●		8	5	2.7	1.3
AVGT060308PBER-MJ	0.8	6	●	●	●		8	5	2.6	0.9
AVGT060300PBFR-AJ	0.0	6				●	8	5	2.7	1.6
AVGT060302PBFR-AJ	0.2	6				●	8	5	2.7	1.5
AVGT060304PBFR-AJ	0.4	6				●	8	5	2.7	1.3
AVGT060308PBFR-AJ	0.8	6				●	8	5	2.6	0.9

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15E, E275A, etc.		- 200 HB	First choice	AH3135	230 - 430	0.07 - 0.12
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.		- 300 HB	First choice	AH3135	150 - 350	0.07 - 0.12
	Prehardend steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	100 - 230	0.07 - 0.12
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		-	First choice	AH3135	150 - 220	0.06 - 0.1
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250 HB	First choice	AH120	200 - 330	0.07 - 0.12
	Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc.		150 - 250 HB	First choice	AH120	150 - 240	0.07 - 0.12
N	Aluminium alloys Si < 13%		-	First choice	KS05F	650 - 1000	0.07 - 0.12
	Aluminium alloys Si ≥ 13%		-	First choice	KS05F	100 - 230	0.04 - 0.12
S	Titanium alloys Ti-6Al-4V, etc.		-	First choice	AH130	40 - 90	0.04 - 0.1
	Superalloys Inconel718, etc.		-	First choice	AH130	45 - 65	0.04 - 0.09
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH120	45 - 70	0.04 - 0.08
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	40 - 65	0.04 - 0.06

MACHINING APPLICATIONS

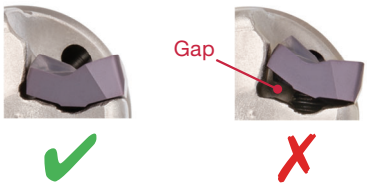


Designation	DC	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Min. machining øD1	Max. machining øD2	Max. machining øD3*	Max. cutting width in enlarging ae
EPAV06_008…	8	6	-	-	-	-	-	-
EPAV/HPAV06_010…	10	6	3°	0.3	15	19	18	9.5
EPAV/HPAV06_012…	12	6	3°	0.3	18	23	22	11.5
EPAV/HPAV06_014…	14	6	2.3°	0.3	22	27	26	13.5
EPAV/HPAV06_016…	16	6	2°	0.3	28	31	30	15.5
EPAV/HPAV06_018…	18	6	1.6°	0.3	30	35	34	17.5
EPAV/HPAV06_020…	20	6	1.4°	0.3	34	39	38	19.5
EPAV/HPAV06_025…	25	6	1.1°	0.3	44	49	48	24.5
EPAV/HPAV06_032…	32	6	0.8°	0.3	58	63	62	31.5
TPAV06_040…	40	6	0.6°	0.3	74	79	78	39.5

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

*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.

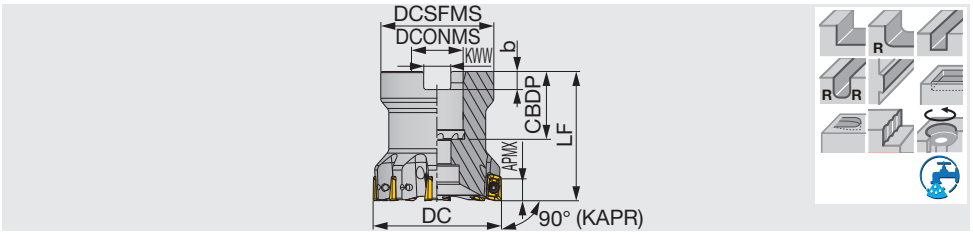


TUNGREC
TPO07

High precision square shoulder mill, with screw clamp system, for AOMT/AOGT07 inserts

GAMP = +7°, GAMF = +13°~ +18°





Designation	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TPO07R032M16.0E08	32	8	30	40	16	21	8.4	5.6	0.1	With	AO*T0702...
TPO07R040M16.0E10	40	10	35	40	16	21	8.4	5.6	0.2	With	AO*T0702...
TPO07R050M22.0E12	50	12	41	40	22	22	10.4	6.3	0.3	With	AO*T0702...

SPARE PARTS

Designation	Clamping screw	Shell locking bolt	Wrench
TPO07R032, 040...	CSTB-2.5L046	CM8X30H	T-7DB
TPO07R050M22.0E12	CSTB-2.5L046	CM10X30H	T-7DB

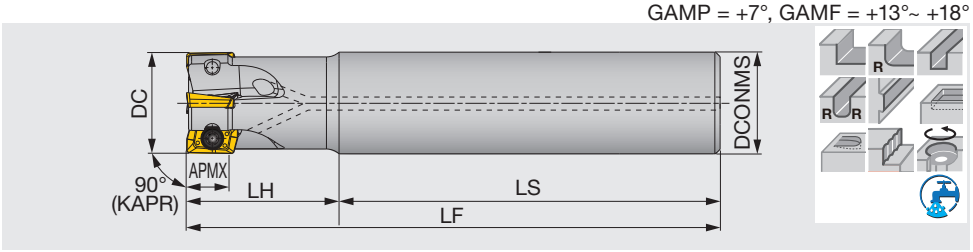
*Recommended clamping torque (N·m): CSTB-2.5L046=0.9

TUNGREC
EPO07

High precision square shoulder endmill, shank type, with screw clamp system, for AOMT/AOGT07 inserts

GAMP = +7°, GAMF = +13°~ +18°





Designation	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPO07R012M12.0-02	12	2	12	50	18	68	0.1	With	AO*T0702...
EPO07R012M12.0-02L	12	2	12	95	30	125	0.1	With	AO*T0702...
EPO07R016M12.0-02	16	2	12	50	20	70	0.1	With	AO*T0702...
EPO07R016M16.0-02L	16	2	16	105	40	145	0.2	With	AO*T0702...
EPO07R016M16.0-04	16	4	16	60	24	84	0.1	With	AO*T0702...
EPO07R018M16.0-02L	18	2	16	105	40	145	0.2	With	AO*T0702...
EPO07R018M16.0-04	18	4	16	60	24	84	0.1	With	AO*T0702...
EPO07R020M16.0-03	20	3	16	60	30	90	0.1	With	AO*T0702...
EPO07R020M20.0-03L	20	3	20	135	50	185	0.4	With	AO*T0702...
EPO07R020M20.0-05	20	5	20	70	30	100	0.2	With	AO*T0702...
EPO07R022M20.0-03L	22	3	20	135	50	185	0.4	With	AO*T0702...
EPO07R022M20.0-05	22	5	20	70	30	100	0.2	With	AO*T0702...
EPO07R025M20.0-03	25	3	20	60	35	95	0.3	With	AO*T0702...
EPO07R025M25.0-03L	25	3	25	150	70	220	0.7	With	AO*T0702...
EPO07R025M25.0-07	25	7	25	80	35	115	0.4	With	AO*T0702...
EPO07R028M25.0-03L	28	3	25	150	70	220	0.7	With	AO*T0702...
EPO07R028M25.0-07	28	7	25	80	35	115	0.4	With	AO*T0702...

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

SPARE PARTS

Designation	Clamping screw	Wrench
EPO07R012...	SR-10503833-S	T-7DB
EPO07R016 - 028...	CSTB-2.5L046	T-7DB

*Recommended clamping torque (N·m): SR-10503833-S=0.9 , CSTB-2.5L046=0.9

Reference pages: Inserts → H144, Standard cutting conditions → H145

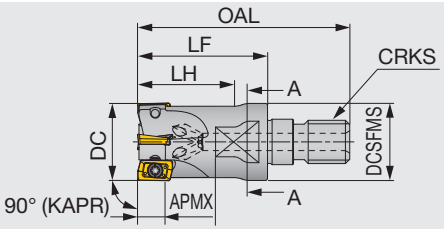
TUNGREC

HPO07-M

High precision square shoulder endmill, modular type, for AOMT/AOGT07 inserts (TungFlex)

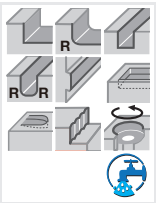
GAMP = +7°, GAMF = +13°~ +18°







A-A cross section



Designation	DC	CICT	OAL	LF	LH	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HPO07R012MM06-02	12	2	39.5	25	-	7	9.8	M6	0.01	With	AO*T0702...
HPO07R012MM08-02	12	2	42	25	20	10	12.8	M8	0.02	With	AO*T0702...
HPO07R016MM08-04	16	4	42	25	-	10	12.8	M8	0.03	With	AO*T0702...
HPO07R016MM10-04	16	4	49	30	20	15	17.8	M10	0.05	With	AO*T0702...
HPO07R020MM10-05	20	5	49	30	-	15	17.8	M10	0.06	With	AO*T0702...
HPO07R025MM12-07	25	7	57	35	-	17	20.8	M12	0.1	With	AO*T0702...

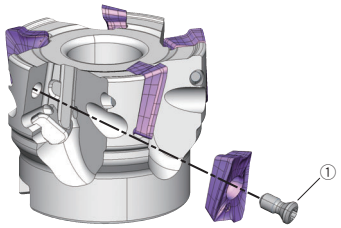
SPARE PARTS





Designation	①Clamping screw	Lubricant	Wrench
HPO07R012MM0*-02	SR-10503833-S	M-1000	T-7DB
HPO07R016 - 025...	CSTB-2.5L046	M-1000	T-7DB

*Recommended clamping torque (N·m): SR-10503833-S=0.9 , CSTB-2.5L046=0.9



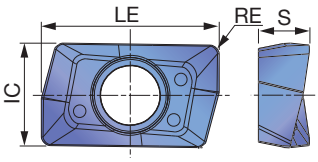
Approach angle

10°-20° 45° 70° 85° 88° 90° Others

INSERT

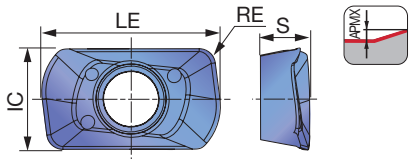
AOMT07-MJ



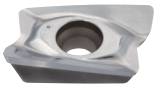


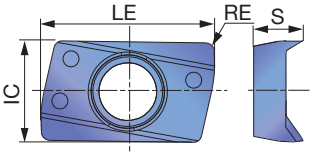
AOMT07-HJ





AOGT07-AJ





		Coated		Uncoated
		AH140	AH725	KS15F
P	Steel		★	
M	Stainless	★	☆	
K	Cast iron		★	
N	Non-ferrous			★
S	Superalloys		★	
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	RE	APMX	AH140	AH725	KS15F	LE	IC	S
AOMT070202PDPR-MJ	0.2	7	●	●		8	4.7	2.3
AOMT070204PDPR-MJ	0.4	7	●	●		8	4.7	2.3
AOMT070208PDPR-MJ	0.8	7	●	●		8	4.7	2.3
AOMT070216PDPR-MJ	1.6	7	●	●		8	4.7	2.3
AOMT070208PDPR-HJ	0.8	0.8	●	●		8.8	4.9	2.4
AOGT070204PDFR-AJ	0.4	6.4			●	8.1	4.7	2.3

●: Line up

Reference pages: Standard cutting conditions → H145, TungFlex → H210

STANDARD CUTTING CONDITIONS

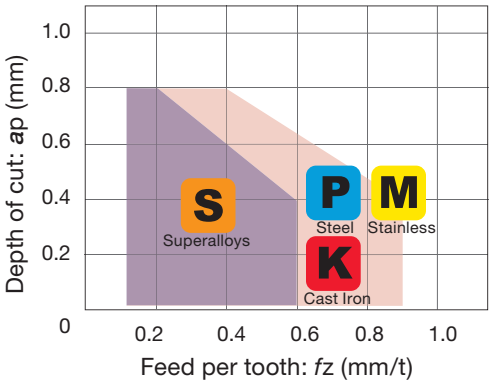
ISO	Workpiece materials	Hardness HB	Grades	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t)		
					MJ	HJ	AJ
P	Low carbon steel S15C, etc. C15E4, etc.	< 200	AH725	90 - 200	0.05 - 0.1	0.4 - 0.9	-
P	High carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	200 - 300	AH725	90 - 150	0.05 - 0.1	0.4 - 0.9	-
P	Tool steel SKD11, etc. X153CrMoV12, etc.	150 - 300	AH725	80 - 120	0.05 - 0.1	0.4 - 0.9	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH140	90 - 150	0.05 - 0.1	0.4 - 0.9	-
K	Grey cast irons FC250, etc. 250, etc.	150 - 250	AH725	100 - 180	0.05 - 0.1	0.4 - 0.9	-
K	Ductile cast irons FCD450, etc. 450-10S, etc.	150 - 250	AH725	80 - 150	0.05 - 0.1	0.4 - 0.9	-
N	Aluminium alloys Si < 13%	-	KS15F	300 - 1000	-	-	0.08 - 0.2
N	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 200	-	-	0.08 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	20 - 50	0.05 - 0.1	0.4 - 0.9	-
S	Superalloys Inconel 718, etc.	-	AH725	20 - 35	0.05 - 0.08	0.2 - 0.6	-

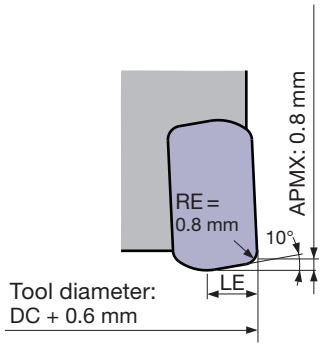
· To remove excessive chip accumulation use an air blast.
· To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
· When cutting an interrupted surface or a casted skin, the feed per tooth (*fz*) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by 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.

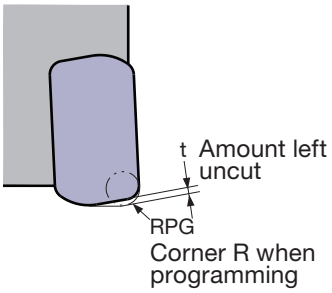
CAUTIONARY POINTS WHEN USING HJ INSERTS

HJ type inserts are designed for high feed machining.
Please note the following when using HJ inserts:
1. The shape of HJ insert differs from that of other inserts (MJ, AJ). However the same insert pocket can be used.
2. When using HJ inserts, all the inserts on the cutter body must be HJ type. Do not use other types of inserts (MJ and AJ types) with HJ inserts on the same cutter body.
3. When using CAD/CAM, please program it as a radius cutter. The table below shows the corner R when programming and the uncut area (t).
4. With HJ inserts, the tool diameter increases by 0.6 mm over the diameter DC shown in the table.

TungRec 07 type HJ inserts Standard conditions







Max. depth of cut APMX (mm)	Main cutting edge length LE (mm)	Corner R when programming	Amount left uncut t (mm)
0.8	3	R 0.5	0.4
		R 1	0.3

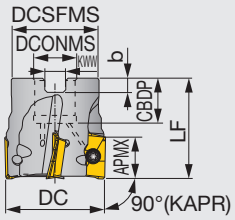
TUNGREC

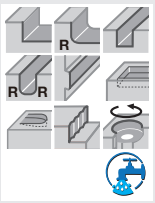
TPO11

Square shoulder mill, with screw clamp system, for double sided triangular inserts

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







Designation	APMX	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
TPO11R040M16.0E06	10.6	40	6	35	16	18	40	5.6	8.4	0.21	With	AS*T11T3...
TPO11R050M22.0E07	10.6	50	7	45	22	20	40	6.3	10.4	0.35	With	AS*T11T3...
TPO11R063M22.0E08	10.6	63	8	47	22	20	45	6.3	10.4	0.59	With	AS*T11T3...
TPO11R080M25.4-10	10.6	80	10	58	25.4	26	50	6	9.5	1.07	With	AS*T11T3...
TPO11R100M31.75-11	10.6	100	11	70	31.75	32	63	8	12.7	1.95	With	AS*T11T3...
TPO11R080M27.0E10	10.6	80	10	58	27	22	50	7	12.4	1.05	With	AS*T11T3...
TPO11R100M32.0E11	10.6	100	11	70	32	25	63	8	14.4	2.01	With	AS*T11T3...

SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
TPO11R040M16.0E06	CSPB-2.5	M-1000	CM8X30H	IP-8D
TPO11R050, 063...	CSPB-2.5	M-1000	CM10X30H	IP-8D
TPO11R080M25.4-10	CSPB-2.5	M-1000	CM12X30H	IP-8D
TPO11R100M31.75-11	CSPB-2.5	M-1000	CM16X40H	IP-8D
TPO11R080M27.0E10	CSPB-2.5	M-1000	CM12X30H	IP-8D
TPO11R100M32.0E11	CSPB-2.5	M-1000	CM16X40H	IP-8D

*Recommended clamping torque (N・m) : CSPB-2.5=1.3

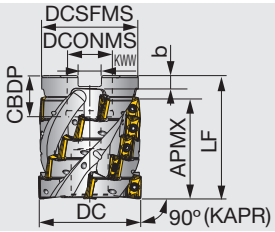
TUNGREC

TLS11

High efficiency square shoulder mill for roughing, for ASMT/ASGT11 inserts

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







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

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

SPARE PARTS

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

*Recommended clamping torque (N・m) : CSPB-2.5=1.3

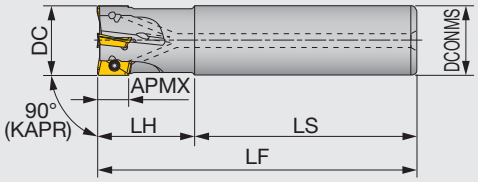
Reference pages: Inserts → H149, Standard cutting conditions → H150 - H151

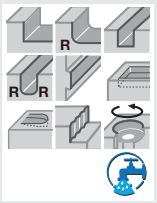
EPO11

High precision square shoulder endmill, shank type, with screw clamp system, for ASMT/ASGT11 inserts

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







Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
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...
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...
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...
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...
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...
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...
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...
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...
EPO11R032M32.0-02L	10.6	32	2	32	175	80	255	1.48	With	AS*T11T3...
EPO11R032M32.0-03	10.6	32	3	32	80	40	120	0.68	With	AS*T11T3...
EPO11R032M32.0-05	10.6	32	5	32	80	40	120	0.67	With	AS*T11T3...
EPO11R035M32.0-02L	10.6	35	2	32	215	40	255	1.49	With	AS*T11T3...
EPO11R035M32.0-03	10.6	35	3	32	80	40	120	0.69	With	AS*T11T3...
EPO11R035M32.0-05	10.6	35	5	32	80	40	120	0.67	With	AS*T11T3...
EPO11R040M32.0-02L	10.6	40	2	32	205	50	255	1.53	With	AS*T11T3...
EPO11R040M32.0-04	10.6	40	4	32	80	40	120	0.72	With	AS*T11T3...
EPO11R040M32.0-06	10.6	40	6	32	80	40	120	0.71	With	AS*T11T3...
EPO11R050M32.0-05	10.6	50	5	32	80	40	120	0.83	With	AS*T11T3...
EPO11R050M32.0-07	10.6	50	7	32	80	40	120	0.82	With	AS*T11T3...
EPO11R050M42.0-03L	10.6	50	3	42	310	50	360	3.78	With	AS*T11T3...

SPARE PARTS





Designation	Clamping screw	Lubricant	Wrench
EPO11R012 - 022...	CSPB-2.5S	M-1000	IP-8D
EPO11R025 - 050...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N・m) : CSPB-2.5/CSPB-2.5S=1.3

Reference pages: Inserts → H149, Standard cutting conditions → H150 - H151

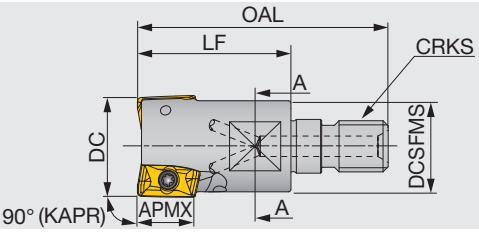
TUNGREC

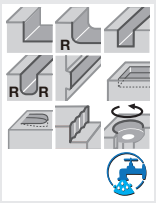
HPO11-M

High precision square shoulder endmill, modular type, for ASMT/ASGT11 inserts (TungFlex)

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







Designation1	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HPO11R020MM10-02	10.6	20	2	49	30	15	17.8	M10	0.06	With	AS*T11T3...
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
HPO11R020MM10-02	CSPB-2.5S	M-1000	IP-8D
HPO11R025, 032...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m)：CSPB-2.5/CSPB-2.5S=1.3

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

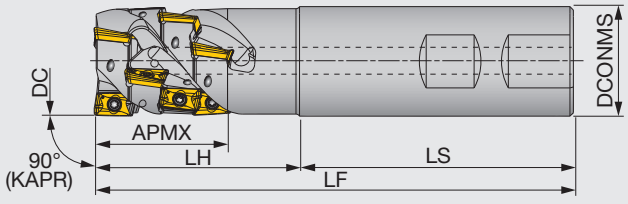
TUNGREC

ELS11

High efficiency roughing endmill, shank type, for ASMT/ASGT11 inserts

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







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

SPARE PARTS

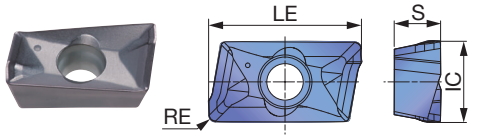
Designation	Clamping screw	Lubricant	Wrench
ELS11...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m)：CSPB-2.5=1.3

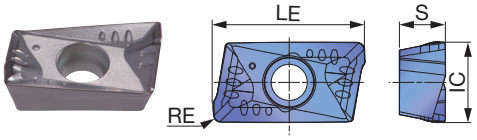
Reference pages: Inserts → H149, Standard cutting conditions → H150 - H151, Tung Flex → H210

INSERT

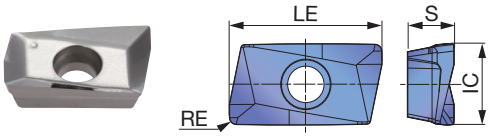
ASMT11-MJ



ASMT11-MS



ASGT11-AJ



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated								Cermet	Uncoated	LE	IC	S
			AH120	AH130	AH140	AH725	T1115	T1215	T3130	DS1100	NS740	KS05F			
ASMT11T304PDPR-MJ	0.4	10.6	●	●		●	●		●		●		12.3	6.7	3.7
ASMT11T308PDPR-MJ	0.8	10.6	●	●		●	●	●	●		●		12.3	6.7	3.7
ASMT11T312PDPR-MJ	1.2	10.6	●			●			●				12.3	6.7	3.7
ASMT11T316PDPR-MJ	1.6	10.6	●			●			●		●		12.3	6.7	3.7
ASMT11T320PDPR-MJ	2	10.6	●										12.3	6.7	3.7
ASMT11T330PDPR-MJ	3	10.6	●	●									12.3	6.7	3.7
ASMT11T304PDPR-MS	0.4	10.6		●	●								12.3	6.7	3.7
ASGT11T304PDFR-AJ	0.4	10.6								●		●	12.3	6.7	3.7
ASGT11T308PDFR-AJ	0.8	10.6								●		●	12.3	6.7	3.7

●: Line up

STANDARD CUTTING CONDITIONS

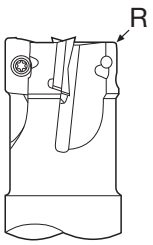
TPO11/EPO11/HPO11 type

ISO	Workpiece material	Brinell hardness HB	Priority	Grade	Cutting speed: *Vc* (m/min)	Feed per tooth: *fz* (mm/t) MJ	MS	AJ
P	Low carbon steel S15C, etc. C15E4, etc.	~ 200	First choice	AH725	100 - 250	0.1 - 0.2	-	-
		~ 200	Wear resistance	T3130	100 - 250	0.1 - 0.2	-	-
		~ 200	Surface quality	NS740	100 - 250	0.05 - 0.15	-	-
	High carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	200 ~ 300	First choice	AH725	100 - 200	0.1 - 0.15	-	-
		200 ~ 300	Wear resistance	T3130	100 - 200	0.1 - 0.15	-	-
		200 ~ 300	Surface quality	NS740	100 - 200	0.05 - 0.12	-	-
	Tool steel SKD11, etc. X153CrMoV12, etc.	150 ~ 300	First choice	AH725	100 - 150	0.1 - 0.15	-	-
		150 ~ 300	Wear resistance	T3130	100 - 150	0.1 - 0.15	-	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	-	AH130	80 - 200	-	0.08 - 0.2	-
K	Grey cast irons FC250, etc. 250, etc.	150 ~ 250	First choice	AH120	100 - 250	0.12 - 0.2	-	-
		150 ~ 250	Wear resistance	T1215 T1115	100 - 250	0.12 - 0.2	-	-
	Ductile cast irons FCD450, etc. 450-10S, etc.	150 ~ 250	First choice	AH120	80 - 200	0.12 - 0.2	-	-
		150 ~ 250	Wear resistance	T1215 T1115	80 - 200	0.12 - 0.2	-	-
N	Aluminium alloys Si < 13%	-	-	DS1100	300 - 1000	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	-	DS1100	100 - 200	-	-	0.05 - 0.2
	Copper alloys	-	-	KS05F	200 - 500	-	-	0.05 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	-	AH130	20 - 60	-	0.08 - 0.15	-
	Superalloys Inconel 718, etc.	-	-	AH725	20 - 40	0.08 - 0.13	-	-

CAUTIONARY POINT IN MODIFYING CUTTER BODIES

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

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



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

STANDARD CUTTING CONDITIONS

Roughing type TLS11 / ELS11

ISO	Workpiece material	Brinell hardness HB	Priority	Grade	Cutting speed: *Vc* (m/min)	Feed per tooth: *fz* (mm/t) MJ	MS	AJ
P	Low carbon steel S15C, etc. C15E4, etc.	~ 200	First choice	AH725	100 - 250	0.10 - 0.18	-	-
		~ 200	Wear resistance	T3130	100 - 250	0.10 - 0.18	-	-
	High carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	200 ~ 300	First choice	AH725	100 - 200	0.08 - 0.14	-	-
		200 ~ 300	Wear resistance	T3130	100 - 200	0.08 - 0.14	-	-
	Tool steel SKD11, etc. X153CrMoV12, etc.	150 ~ 300	First choice	AH725	100 - 200	0.08 - 0.14	-	-
		150 ~ 300	Wear resistance	T3130	100 - 200	0.08 - 0.14	-	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	-	AH130	100 - 150	-	0.08 - 0.15	-
K	Grey cast irons FC250, etc. 250, etc.	150 ~ 250	First choice	AH120	100 - 250	0.10 - 0.18	-	-
		150 ~ 250	Wear resistance	T1215 T1115	100 - 250	0.10 - 0.18	-	-
	Ductile cast irons FCD450, etc. 450-10S, etc.	150 ~ 250	First choice	AH120	80 - 200	0.10 - 0.18	-	-
		150 ~ 250	Wear resistance	T1215 T1115	80 - 200	0.10 - 0.18	-	-
N	Aluminium alloys Si < 13%	-	-	DS1100	200 - 500	-	-	0.05 - 0.18
	Aluminium alloys Si ≥ 13%	-	-	DS1100	100 - 200	-	-	0.05 - 0.18
S	Titanium alloys Ti-6Al-4V, etc.	-	-	AH130	20 - 60	-	0.08 - 0.14	-
	Superalloys Inconel718, etc.	-	-	AH725	20 - 40	0.06 - 0.12	-	-

· To remove excessive chip accumulation use an air blast.
· To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
· When cutting an interrupted surface or a casted skin, the feed per tooth (*fz*) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by 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.

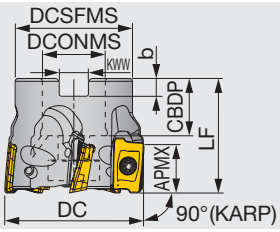
TUNGREC

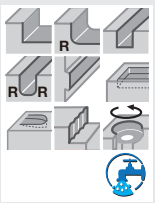
TPO18

High precision square shoulder mill, with screw clamp system, for AOMT/AOGT18 inserts

GAMP = +14° ~ +17°, GAMF = +22° ~ +31°







Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
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...
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...
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...
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...
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...

Approach angle

10°-20° 45° 70° 85° 88° 90°

Others

SPARE PARTS







Designation	Clamping screw	Grip	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TPO18R040M...	CSTB-4L093	H-TBS	-	FSHM8-30H	BT15M
TPO18R050M...	CSTB-4L093	H-TBS	-	CM10X30H	BT15M
TPO18R063M...	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 (N·m)：CSTB-4L093=3.5, CSTB-4L120=3.5

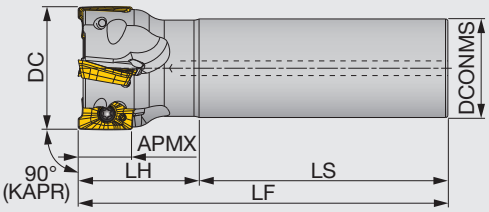
Reference pages: Inserts, Standard cutting conditions → H154

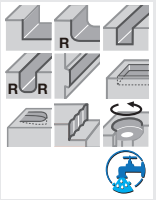
EPO18

High precision square shoulder endmill, shank type, with screw clamp system, for AOMT/AOGT18 inserts

GAMP = +14° ~ +17°, GAMF = +22° ~ +31°







Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
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...
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...
EPO18R030M32.0-02	16.7	30	2	32	80	40	120	0.6	With	AO*T1805...
EPO18R030M32.0-02L	16.7	30	2	32	175	80	255	1.4	With	AO*T1805...
EPO18R030M32.0-03	16.7	30	3	32	80	40	120	0.6	With	AO*T1805...
EPO18R032M32.0-02	16.7	32	2	32	80	40	120	0.7	With	AO*T1805...
EPO18R032M32.0-02L	16.7	32	2	32	175	80	255	1.5	With	AO*T1805...
EPO18R032M32.0-03	16.7	32	3	32	80	40	120	0.6	With	AO*T1805...
EPO18R035M32.0-02	16.7	35	2	32	80	40	120	0.7	With	AO*T1805...
EPO18R035M32.0-02L	16.7	35	2	32	175	80	255	1.5	With	AO*T1805...
EPO18R035M32.0-03	16.7	35	3	32	80	40	120	0.7	With	AO*T1805...
EPO18R040M32.0-02L	16.7	40	2	32	205	50	255	1.6	With	AO*T1805...
EPO18R040M32.0-03	16.7	40	3	32	80	40	120	0.7	With	AO*T1805...
EPO18R040M32.0-04	16.7	40	4	32	80	40	120	0.7	With	AO*T1805...
EPO18R040M42.0-02L	16.7	40	2	42	210	100	310	3	With	AO*T1805...
EPO18R050M32.0-03	16.7	50	3	32	80	40	120	0.8	With	AO*T1805...
EPO18R050M32.0-05	16.7	50	5	32	80	40	120	0.8	With	AO*T1805...
EPO18R050M42.0-03L	16.7	50	3	42	310	50	360	3.8	With	AO*T1805...
EPO18R063M32.0-04	16.7	63	4	32	80	45	125	1	With	AO*T1805...
EPO18R063M32.0-06	16.7	63	6	32	80	45	125	1.1	With	AO*T1805...
EPO18R063M42.0-03L	16.7	63	3	42	310	50	360	4	With	AO*T1805...

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

SPARE PARTS





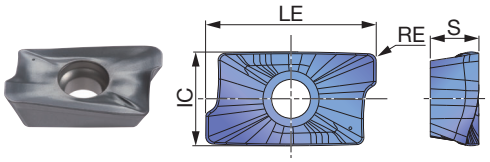
Designation	Clamping screw	Wrench
EPO18R025 - 030...	CSTB-4L085	T-15DB
EPO18R032 - 050...	CSTB-4L093	T-15DB
EPO18R063M...	CSTB-4L120	T-15DB

*Recommended clamping torque N·m)：CSTB-4L085=3.5, CSTB-4L093=3.5, CSTB-4L120=3.5

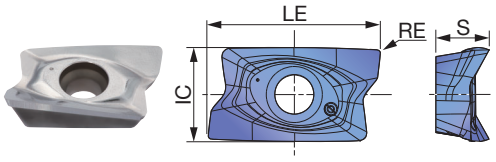
Reference pages: Inserts, Standard cutting conditions → H154

INSERT

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			Uncoated		LE	IC	S
			AH140	AH725		KS15F				
AOMT180508PDPR-MJ	0.8	16.7	●	●				19.5	10.7	5.6
AOMT180516PDPR-MJ	1.6	16.7	●	●				19.5	10.7	5.6
AOMT180524PDPR-MJ	2.4	16.7	●	●				19.5	10.7	5.6
AOMT180532PDPR-MJ	3.2	16.7	●	●				19.5	10.7	5.6
AOGT180504PDFR-AJ	0.4	16.7				●		19.8	10.8	6.1
AOGT180508PDFR-AJ	0.8	16.7				●		19.8	10.8	6.1

●: Line up

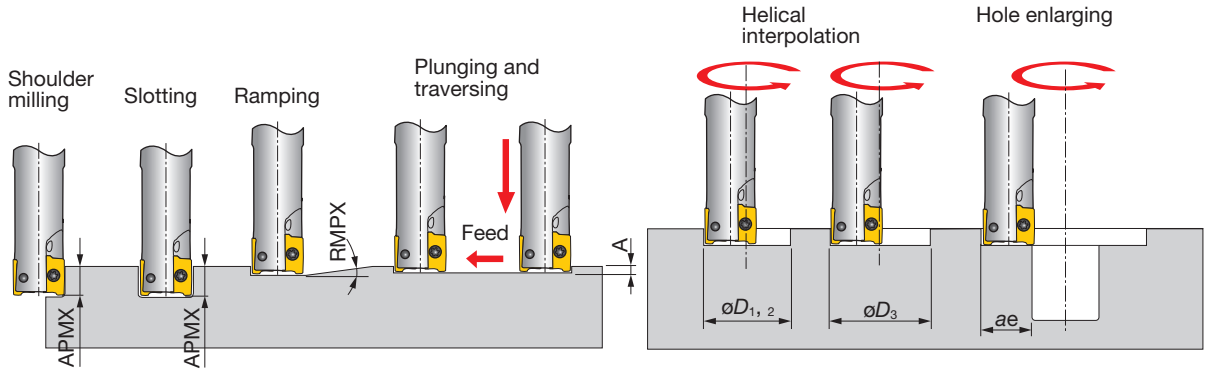
STANDARD CUTTING CONDITIONS

TPO18/EPO18 type

ISO	Workpiece material	Brinell hardness HB	Priority	Cutting speed: *Vc* (m/min)	Feed per tooth: *fz* (mm/t)	
					MJ	AJ
P	Low carbon steel S15C, etc. C15E4, etc.	~ 200	AH725	100 - 250	0.08 - 0.25	-
	High carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	200 ~ 300	AH725	100 - 230	0.08 - 0.2	-
	Tool steel SKD11, etc. X153CrMoV12, etc.	150 ~ 300	AH725	100 - 180	0.08 - 0.2	-
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH140	90 - 200	0.08 - 0.2	-
K	Grey cast irons FC250, etc. 250, etc.	150 ~ 250	AH725	140 - 250	0.08 - 0.25	-
	Ductile cast irons FCD450, etc. 450-10S, etc.	150 ~ 250	AH725	110 - 200	0.08 - 0.25	-
N	Aluminium alloys Si < 13%	-	KS15F	300 - 1000	-	0.05 - 0.25
	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 200	-	0.05 - 0.25
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	20 - 60	0.08 - 0.18	-
	Superalloys Inconel718, etc.	-	AH725	20 - 40	0.08 - 0.15	-

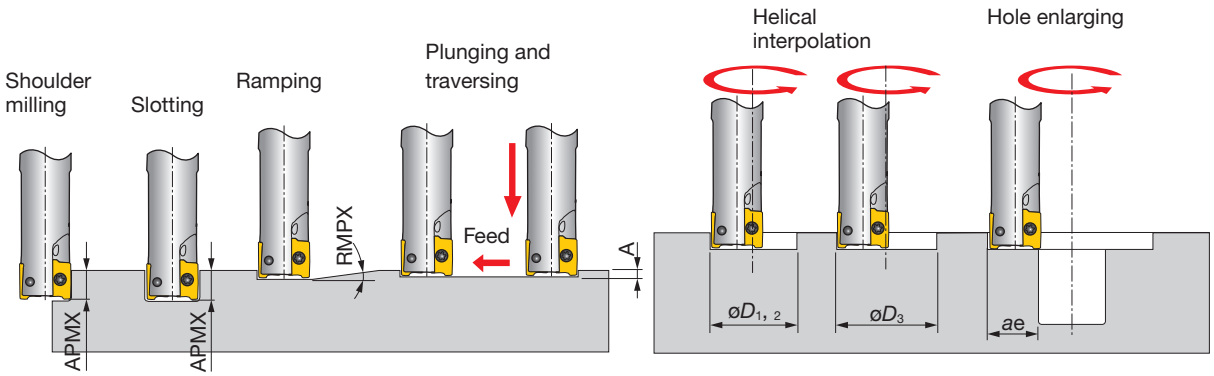
· To remove excessive chip accumulation use an air blast.
· To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
· When cutting an interrupted surface or a casted skin, the feed per tooth (fz) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by 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.

APPLICATION RANGE



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

APPLICATION RANGE



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

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

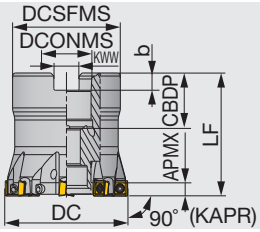
*Flat bottom hole
Note: Corner RE for dimensions of ø*D*1, ø*D*2, and ø*D*3: RE = 0.4 for EPO07 / EPO11 and RE = 0.8 for EPO18.

TUNGQUAD
TPD05

High density square shoulder mill, with screw clamp system, for SDMT/SDHT05 inserts

GAMP = +5°, GAMF = -7° ~ +12°





Right hand (R) shown.

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

SPARE PARTS

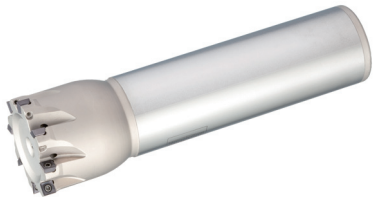
Designation	Clamping screw	Shell locking bolt	Wrench
TPD05R032M16.0E06	CSPB-2L043	CM8X30H	IP-6DB
TPD05R040M22.0E08	CSPB-2L043	CM10X30H	IP-6DB

*Recommended clamping torque (N·m) : CSPB-2L043=0.7

TUNGQUAD
EPD05

High density square shoulder endmill, shank type, with screw clamp system, for SDMT/SDHT05 inserts

GAMP = +5°, GAMF = -7° ~ +12°



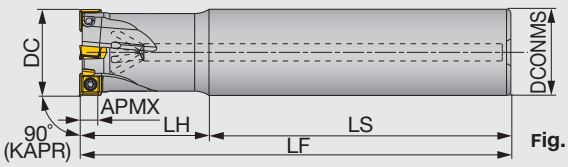


Fig. 1

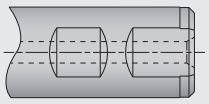


Fig. 2

Right hand (R) shown.

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

SPARE PARTS

Designation	Clamping screw	Wrench
EPD05...	CSPB-2L043	IP-6DB

*Recommended clamping torque (N·m) : CSPB-2L043=0.7

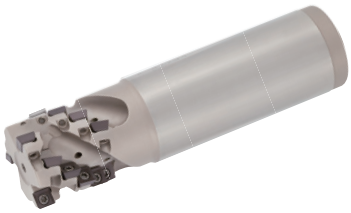
Reference pages: Inserts → H159, Standard cutting conditions → H160 - H161

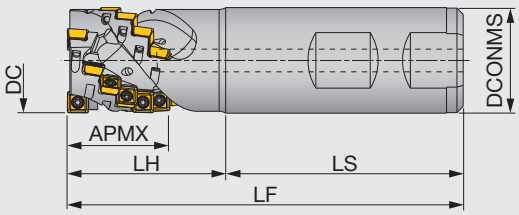
TUNGQUAD

ELD05

High density square shoulder endmill for roughing, shank type, with screw clamp system, for SDMT/SDHT05 inserts

GAMP = +5°, GAMF = -3°





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

SPARE PARTS

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

*Recommended clamping torque (N·m)：CSPB-2L043=0.7

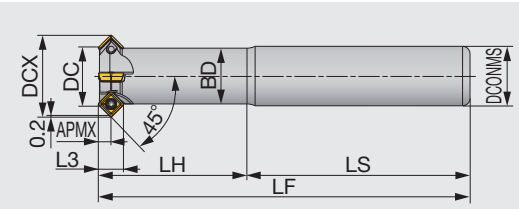
TUNGQUAD

EASD05

Chamfering endmill, for SDMT/SDHT05 inserts

GAMP = +5°, GAMF = -7° ~ +12°





Designation	DCX	CICT	DC*	BD	APMX	DCONMS	LH	L3	LS	LF	Air hole	Insert
EASD05M006C12.0R01	12	1	5.7	7.5	3	12	40	6.8	60	100	Without	SD*T0502...
EASD05M008C12.0R02	14	2	7.8	9.1	3	12	40	6.8	60	100	Without	SD*T0502...
EASD05M016C16.0R04	22	4	15.7	15	3	16	40	6.8	60	100	Without	SD*T0502...

The minimum chamfering diameter (DC) measures up to the point where the insert's nose radius ends.
This will offset the total tool length by shortening 0.3 mm.

SPARE PARTS

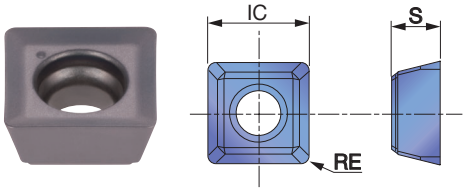
Designation	Clamping screw	Wrench
EASD05...	CSPB-2L043	IP-6DB

*Recommended clamping torque (N·m)：CSPB-2L043=0.7

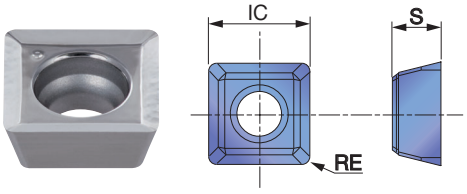
Reference pages: Inserts → H159, Standard cutting conditions → H160 - H161

INSERT

SDMT05-MJ



SDHT05-AJ



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

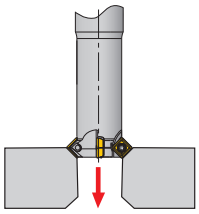
★ : First choice
☆ : Second choice

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

●: Line up

CUTTING PERFORMANCE

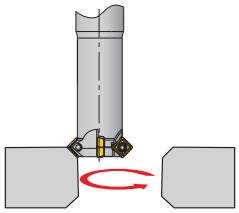
Chamfering & countersinking



■ **C2.5 (45° x 2.5 mm)**
Workpiece material: S55C / C55

Designation	Cutting speed *Vc* (m/min)	Feed rate *fz* (mm/z)
EASD05M006C12.0R01	80 - 120	0.03 - 0.08
EASD05M008C12.0R02	80 - 120	0.03 - 0.08
EASD05M016C16.0R04 (*z=2)	80 - 120	0.03 - 0.08

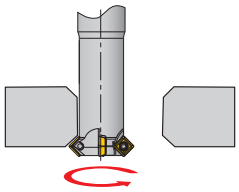
Interpolated chamfering



■ **C2.5 (45° x 2.5 mm)**
Workpiece material: S55C / C55

Designation	Cutting speed *Vc* (m/min)	Feed rate *fz* (mm/z)
EASD05M006C12.0R01	80 - 120	0.08 - 0.12
EASD05M008C12.0R02	80 - 120	0.08 - 0.12
EASD05M016C16.0R04	80 - 120	0.08 - 0.12

Back chamfering



■ **C1.0 (45° x 1.0 mm)**
Workpiece material: S55C / C55

Designation	Cutting speed *Vc* (m/min)	Feed rate *fz* (mm/z)
EASD05M006C12.0R01	80 - 120	0.08 - 0.12
EASD05M008C12.0R02	80 - 120	0.08 - 0.12
EASD05M016C16.0R04	80 - 120	0.08 - 0.12

STANDARD CUTTING CONDITIONS

Bore, shank type TPD05/EPD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels S15C, etc. C15E4, etc.	~ 200	AH725	230 - 320	0.04 - 0.1
P	High carbon steels S45C, etc. C45, etc.	200 ~ 300	AH725	150 - 230	0.04 - 0.1
P	Alloyed steels SCM440, etc. 42CrMo4, etc.	150 ~ 300	AH725	150 - 230	0.04 - 0.1
P	Tool steels SKD11, etc. X153CrMoV12, etc.	~ 300	AH725	110 - 130	0.03 - 0.09
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	-	AH140	100 - 200	0.03 - 0.09
K	Grey cast irons FC250, etc. 250, etc.	150 ~ 250	AH725	200 - 300	0.05 - 0.12
K	Ductile cast irons FCD450, etc. 450-10S, etc.	150 ~ 250	AH725	160 - 240	0.05 - 0.12
N	Aluminium alloys Si < 13%	-	TH10	350 - 500	0.05 - 0.15
N	Aluminium alloys Si ≥ 13%	-	TH10	100 - 200	0.05 - 0.15

* For deep and wide cutting, set the *Vc* and *fz* to the lower recommended limits and check the vibration and spindle load of the machine.

Roughing type ELD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels S15C, etc. C15E4, etc.	~ 200	AH725	100 - 250	0.04 - 0.1
P	High carbon steels S45C, etc. C45, etc.	200 ~ 300	AH725	100 - 200	0.04 - 0.1
P	Alloyed steels SCM440, etc. 42CrMo4, etc.	150 ~ 300	AH725	100 - 200	0.04 - 0.1
P	Tool steels SKD11, etc. X153CrMoV12, etc.	~ 300	AH725	100 - 130	0.03 - 0.09
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	-	AH140	100 - 150	0.03 - 0.09
K	Grey cast irons FC250, etc. 250, etc.	150 ~ 250	AH725	100 - 250	0.05 - 0.12
K	Ductile cast irons FCD450, etc. 450-10S, etc.	150 ~ 250	AH725	80 - 200	0.05 - 0.12
N	Aluminium alloys Si < 13%	-	TH10	200 - 500	0.05 - 0.15
N	Aluminium alloys Si ≥ 13%	-	TH10	100 - 200	0.05 - 0.15

Interpolated or back chamfering type

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels S15C, etc. C15E4, etc.	AH725	230 ~ 320	0.04 ~ 0.1
P	High carbon steels S45C, etc. C45, etc.	AH725	150 ~ 230	0.04 ~ 0.1
P	Alloyed steels SCM440, etc. 42CrMo4, etc.	AH725	150 ~ 230	0.04 ~ 0.1
P	Tool steels SKD11, etc. X153CrMoV12, etc.	AH725	110 ~ 130	0.03 ~ 0.09
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	AH140	100 ~ 200	0.03 ~ 0.09
K	Grey cast irons FC250, etc. 250, etc.	AH725	150 ~ 250	0.05 ~ 0.12
K	Ductile cast irons FCD450, etc. 450-10S, etc.	AH725	100 ~ 180	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	TH10	350 ~ 500	0.05 ~ 0.15
N	Copper alloys	TH10	100 ~ 200	0.05 ~ 0.15

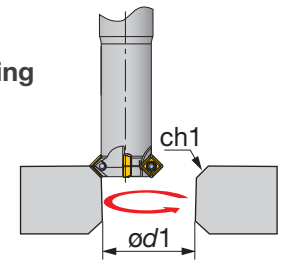
Front chamfering type

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels S15C, etc. C15E4, etc.	AH725	160 ~ 220	0.04 ~ 0.1
P	High carbon steels S45C, etc. C45, etc.	AH725	110 ~ 160	0.04 ~ 0.1
P	Alloyed steels SCM440, etc. 42CrMo4, etc.	AH725	110 ~ 160	0.04 ~ 0.1
P	Tool steels SKD11, etc. X153CrMoV12, etc.	AH725	80 ~ 90	0.03 ~ 0.09
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	AH140	70 ~ 140	0.03 ~ 0.09
K	Grey cast irons FC250, etc. 250, etc.	AH725	110 ~ 180	0.05 ~ 0.12
K	Ductile cast irons FCD450, etc. 450-10S, etc.	AH725	70 ~ 130	0.05 ~ 0.12
N	Aluminium alloys Si < 13%	TH10	250 ~ 350	0.05 ~ 0.15
N	Copper alloys	TH10	70 ~ 140	0.05 ~ 0.15

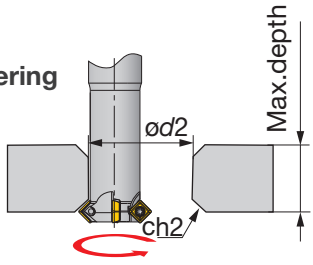
* When chamfering over C1.0 (45° x 1.0 mm), decrease the cutting parameters to 70% of the above parameters.

APPLICATION RANGE

Front chamfering



Back chamfering



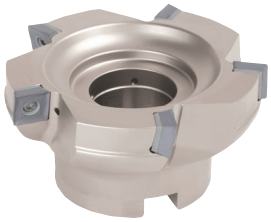
Designation	Minimum hole diameter to be chamfered (mm)		Maximum chamfer dimension (at 45°) (mm)		Maximum reachable hole distance when back chamfering (mm)
	Front-chamfer ø*d*1	Back-chamfer ø*d*2	Front ch1	Back ch2	Max. depth
EASD05M006C12.0R01	5.7	12.5	2.9 x 2.9	2 x 2	18.2
EASD05M008C12.0R02	7.8	14.5	2.9 x 2.9	1.5 x 1.5	33.2
EASD05M016C16.0R04	15.8	22.5	2.9 x 2.9	2.8 x 2.8	43.2

TUNGMILL

TPW13

Square shoulder mill, with screw clamp system, for SWMT/SWGT13 inserts

GAMP = +11.5°, GAMF = -13° ~ -10.5°



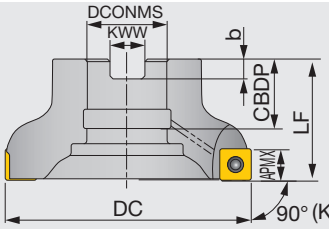


Fig. 1

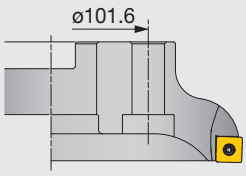


Fig. 2

Right hand (R) shown.

Designation	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

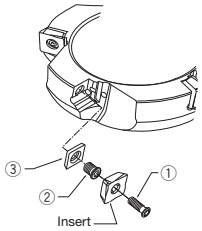
Approach angle

10°-20°
45°
70°
85°
88°
90°
Others

SPARE PARTS

Designation	①Clamping screw	Lubricant	②Shim screw	Shell locking bolt 1	Shell locking bolt 2	③Shim	Wrench for ①	Wrench for ②
TPW13R050, 063...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM10X30H	FSSP1102	IP-15D	P-3.5
TPW13R080M...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM12X30H	FSSP1102	IP-15D	P-3.5
TPW13R100M...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M16H	-	FSSP1102	IP-15D	P-3.5
TPW13R125M...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M20H	-	FSSP1102	IP-15D	P-3.5
TPW13R160, 200...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSP1102	IP-15D	P-3.5

*Recommended clamping torque (N·m) : CSPB-3.5=3.5



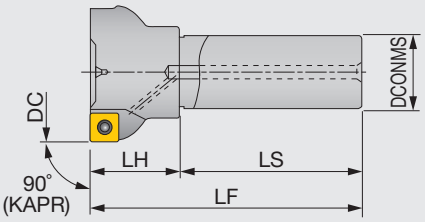
Reference pages: Inserts → H164, Standard cutting conditions → H165

EPW13

Square shoulder endmill, shank type, with screw clamp system, for SWMT/SWGT13 inserts

GAMP = +11.5°, GAMF = -13° ~ -10.5°





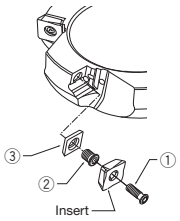
Right hand (R) shown.

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

SPARE PARTS

Designation	①Clamping screw	Lubricant	②Shim screw	③Shim	Wrench for ①	Wrench for ②
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 (N·m)：CSPB-3.5=3.5

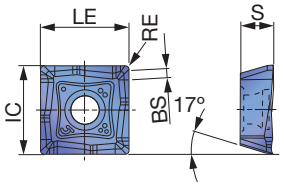


Reference pages: Inserts → H164, Standard cutting conditions → H165

INSERT

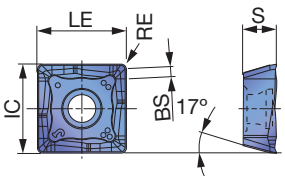
SWGT1304-MJ





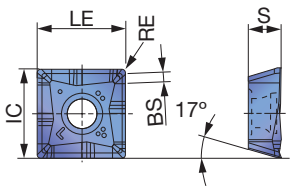
SWMT1304-MJ





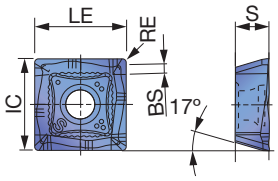
SWMT1304-ML



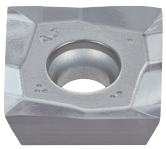


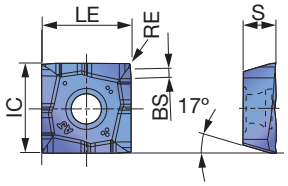
SWMT1304-MS





SWGT1304-AJ





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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated								Cermet		Uncoated				LE	IC	S	BS
			AH120	AH130	AH140	AH3135	T1115	T1215	T3130	T3225	DS1100	NS740		KS05F							
SWGT1304PDPR-MJ	0.8	10	●									●						13.6	13.6	5	1.4
SWMT1304PDPR-MJ	0.8	10	●	●	●	●	●	●	●	●		●						13.6	13.6	5	1.4
SWMT1304PDER-ML	0.8	10	●			●												13.6	13.6	5	1.4
SWMT1304PDPR-MS	0.8	10		●	●													13.6	13.6	5	1.4
SWGT1304PDFR-AJ	0	10									●			●				13.6	13.6	5	1.6

●: Line up

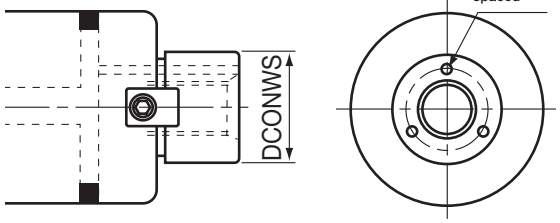
STANDARD CUTTING CONDITIONS TPW / EPW13 type

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Roughing (Depth of cut: APMX ≥ 1.0 mm)				Light cutting to finishing (Depth of cut: APMX ≥ 1.0 mm)			
				Feed per tooth: *fz* (mm/t)				Feed per tooth: *fz* (mm/t)			
				MJ	ML	MS	AJ	MJ	ML	MS	AJ
P	Mild steels Low carbon steels < 180HB	AH3135 (First choice)	100 - 270	0.05 - 0.25	0.05 - 0.2	-	-	0.05 - 0.2	0.05 - 0.18	-	-
		T3225 (Wear resistance)	150 - 300	0.05 - 0.25	-	-	-	0.05 - 0.2	-	-	-
		AH130 (Fracture resistance)	80 - 180	0.05 - 0.25	-	0.05 - 0.2	-	0.05 - 0.2	-	0.05 - 0.18	-
		NS740 (Surface finish)	100 - 300	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
	Carbon steels Alloy steels < 300HB	AH3135 (First choice)	100 - 230	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
		T3225 (Wear resistance)	150 - 280	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		AH130 (Fracture resistance)	80 - 150	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		NS740 (Surface finish)	100 - 230	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
	Die steels < 30HRC	AH3135 (First choice)	100 - 180	0.05 - 0.15	0.05 - 0.12	-	-	0.05 - 0.12	0.05 - 0.1	-	-
		T3225 (Wear resistance)	100 - 180	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
M	Stainless steels < 50HB	AH130 / AH3135 (First choice)	80 - 200	0.05 - 0.2	-	0.05 - 0.18	-	0.05 - 0.18	-	0.05 - 0.15	-
		AH120 (Wear resistance)	150 - 250	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
K	Grey cast irons Ductile cast irons	T1215 (First choice)	100 - 250	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		AH120 (Fracture resistance)	100 - 250	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
N	Aluminium alloys Si < 13 %	DS1100 / KS05F (First choice)	300 - 1000	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13 %	DS1100 / KS05F (First choice)	80 - 300	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2
	Copper alloys	DS1100 / KS05F (First choice)	200 - 500	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2

Notes:

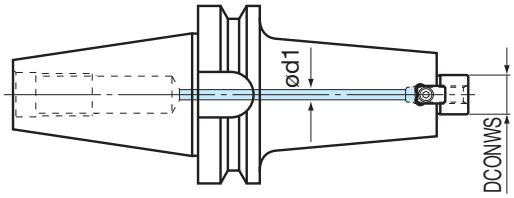
- When machining at large depth of cut or large cutting width, *Vc* and *fz* should be reduced.
- As a rule, dry machining (including air blow) is recommended. But, for excessive chip welding, such as when machining stainless steels, use a water soluble cutting fluid. In this case, use AH140 and set the cutting speed to *Vc* ≤ 100 m/min.
- When machining mild steel, carbon steel or alloy steel in wet conditions the T3130 is recommended. In this case, *Vc* and *fz* should be reduced.
- TPW13 type can not be used for ramping, plunging and drilling.

Face mill arbors with center through-coolant hole



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

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



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

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

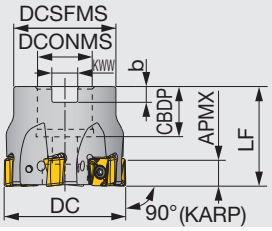
Cautionary notes in use

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

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

GAMP = +4° ~ +5°, GAMF = +13° ~ +15°







Right hand (R) shown.

Designation	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TPQ11R040M16.0E04	9	40	4	35	40	16	20	8.4	5.6	0.2	With	LQMU1107...
TPQ11R050M22.0E06	9	50	6	41	40	22	20	10.4	6.3	0.4	With	LQMU1107...
TPQ11R063M22.0E07	9	63	7	47	40	22	20	10.4	6.3	0.5	With	LQMU1107...
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...
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...
TPQ18R050M22.0E03	16	50	3	47	40	22	20	10.4	6.3	0.4	With	LQMU1808...
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...
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...
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...

SPARE PARTS







Designation	Clamping screw	Grip 1	Grip 2	Torx bit	Shell locking bolt
TPQ11R040M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM8×30H
TPQ11R050M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10×30H
TPQ11R063M...	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
TPQ18R063M...	SR14-591	-	H-TB	BT20M	CM12×30H
TPQ18R080M...	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 (N·m) : CSTB-3.5L115=2.5, SR14-591=5

Reference pages: Inserts → H168, Standard cutting conditions → H169

DOREC
EPQ11,18

Square shoulder endmill, shank type, with screw clamp system, for LQMU inserts

GAMP = +4° ~ +5°, GAMF = +13° ~ +15°



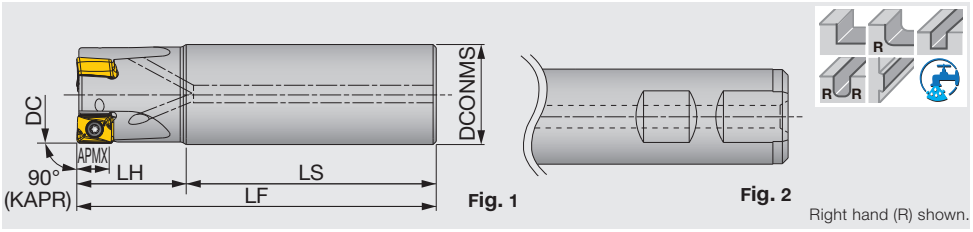


Fig. 1 Fig. 2

Right hand (R) shown.

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

SPARE PARTS



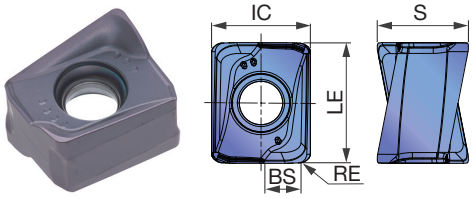
Designation	Clamping screw	Grip 1	Grip 2	Torx bit	Wrench
EPQ11...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	T-10D
EPQ18...	SR14-591	-	H-TB	BT20M	T-20D

*Recommended clamping torque (N·m) : CSTB-3.5L115=2.5, SR14-591=5

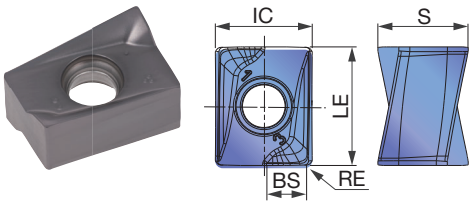
Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

INSERT

LQMU11-PXER-MJ



LQMU11/18-PNER-MJ



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

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H169

STANDARD CUTTING CONDITIONS

LQMU11-PXER-MJ

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

LQMU11/18-PNER-MJ

ISO	Workpiece material	Hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, etc. C15E, etc.	- 200	AH725	100 - 250	0.1 - 0.25*
P	High carbon steel S45C, S55C, etc. C45, C55, etc.	200 - 300	AH725	100 - 230	0.1 - 0.2*
P	Alloy steel SCM440, SCr415, etc. 42CrMo4, etc.	150 - 300	AH725	100 - 230	0.1 - 0.2*
P	Tool steel D2, etc. X153CrMoV12, etc.	- 300	AH725	100 - 180	0.1 - 0.2*
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH140	90 - 180	0.1 - 0.25*
K	Grey cast iron FC250, etc. 250, etc.	150 - 250	AH120	140 - 250	0.1 - 0.25*
K	Ductile cast iron FCD400, etc. 450-10S, etc.	150 - 250	AH120	110 - 200	0.1 - 0.25*
S	Superalloys Inconel 718, Ti-6Al-4V, etc.	-	AH725	20 - 50	0.08 - 0.2*

* When using LQMU11 inserts, see page **H170** for proper feed per tooth setting.

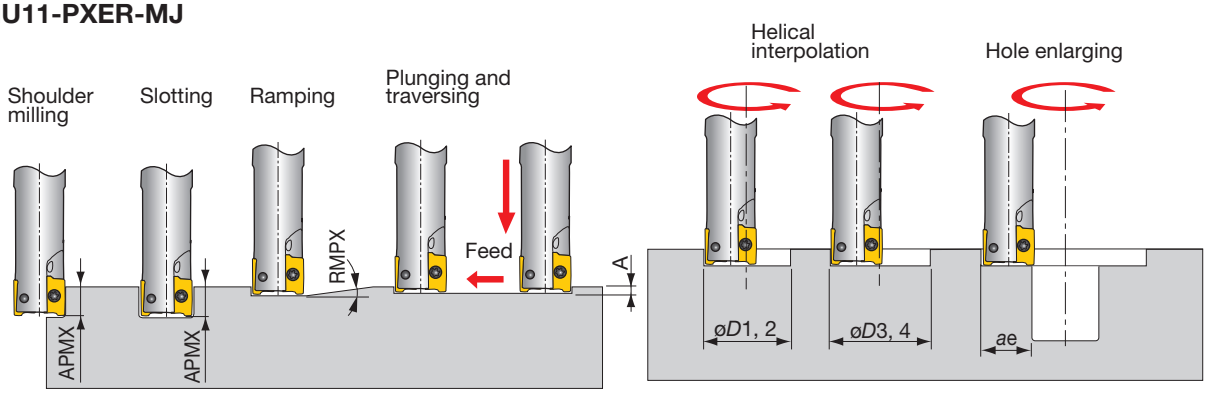
· For applications with poor chip evacuation, use air gun to remove chips from the machining area to avoid chip re-cutting and part damage.

· To machine cast surface with unstable cutting depths or interruptions, it is recommended to lower the feed rate (*fz*) to the lowest parameter in the recommended range.

· Rigidity of the machine and/or workpiece and the spindle power capability greatly influence the cutting conditions. For applications with large cutting width/depth and/or long tool overhang, start with a *Vc* and *fz* in the lower range of the recommended cutting parameters and monitor the machine stability.

APPLICATION RANGE

LQMU11-PXER-MJ



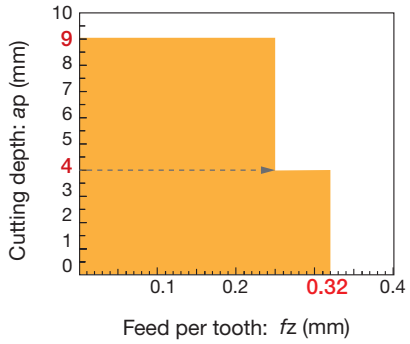
Designation	DC	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Min. machining øD1	Max. machining øD2*	Max. machining øD3	Max. machining øD4*	Max. machining RE	Max. cutting width in enlarging ae
EPQ11R025…	25	9	1.8°	0.6	35	46.8	49	48.5	0.8	24.1
EPQ11R032…	32	9	1.3°	0.6	48	60.8	63	62.5	0.8	31.1
TPQ11R040…	40	9	0.9°	0.6	64	76.8	79	78.5	0.8	39.1
TPQ11R050…	50	9	0.7°	0.6	84	96.8	99	98.5	0.8	49.1
TPQ11R063…	63	9	0.5°	0.6	110	122.8	125	124.5	0.8	62.1
TPQ11R080…	80	9	0.4°	0.6	144	156.8	159	158.5	0.8	79.1
TPQ11R100…	100	9	0.3°	0.6	184	196.8	199	198.5	0.8	99.1

*For a flat bottom

NOTE WHEN USING LQMU11 INSERTS

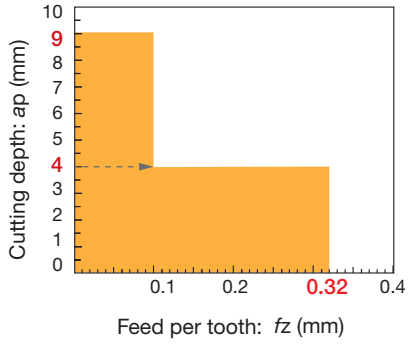
Maximum feed rate per tooth varies depending on the cutting depth and width.
Use proper feed rate as described below.
Use caution. Tool may damage if the parameters are not properly set.

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



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

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



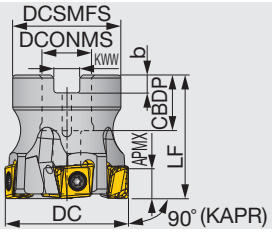
Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
Insert : LQMU110708PXER-MJ
Grade : AH3125
Workpiece material : S55C (200HB)
Cutting Speed : *Vc* = 200 m/min
Cutting width : *ae* = 42.5 mm
Coolant : Dry
Machine : Vertical M/C, 22 kW

TECMILL
TPM11,16

Square shoulder mill, with screw clamp system, for LMMU tangential clamp inserts

GAMP = +5° ~ +6°, GAMF = +9° ~ +13°

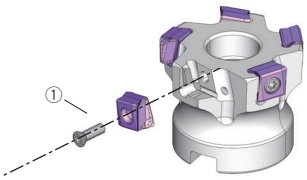






Right hand (R) shown.

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



SPARE PARTS







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

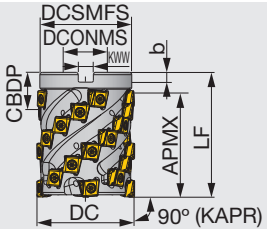
*Recommended clamping torque (N·m) : CSTB-3.5L110=3.5, CSTB-5L159=5, SM35-114-H0=3.5

TECMILL
TLM11

Square shoulder mill for roughing, with screw clamp system, for LMMU tangential clamp inserts

GAMP = +5° ~ +6°, GAMF = +9° ~ +13°







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

SPARE PARTS





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

*Recommended clamping torque N·m) : SM35-114-H0=3.5

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

Reference pages: Inserts → H172, Standard cutting conditions → H173

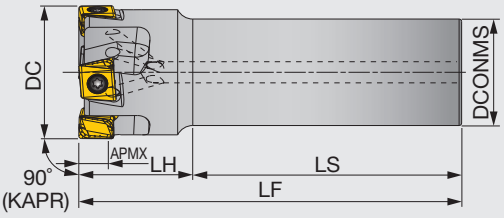
TECMILL

EPM11

Square shoulder endmill, shank type, with screw clamp system, for LMMU tangential clamp inserts

GAMP = +5° ~ +6°, GAMF = +9° ~ +13°







Right hand (R) shown.

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

SPARE PARTS





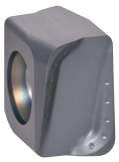
Designation	Clamping screw	Wrench
EPM11...	SM35-114-H0	T-15DF

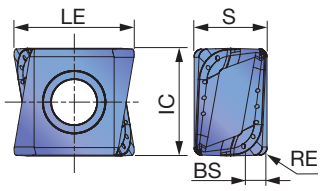
*Recommended clamping torque (N·m) : SM35-114-H0=3.5

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

INSERT

LMMU11/16-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated						LE	IC	S	BS
			AH3135	AH725	AH120	AH140	T1215	T3225				
LMMU110708PNER-MJ	0.8	9.7	●	●	●	●	●	●	11.7	10.5	7.1	2
LMMU110716PNER-MJ	1.6	9.7	●	●	●	●	●	●	11.7	10.5	7.1	1.2
LMMU110724PNER-MJ	2.4	9.7		●	●	●			11.7	10.5	7.1	0.4
LMMU110732PNER-MJ	3.2	9.7		●	●	●			11.7	10.5	7.1	-
LMMU160908PNER-MJ	0.8	15.1	●	●	●	●	●	●	17.3	16	9.5	2.4
LMMU160916PNER-MJ	1.6	15.1	●	●	●	●			17.3	16	9.5	1.6
LMMU160924PNER-MJ	2.4	15.1		●	●	●			17.3	16	9.5	0.8
LMMU160932PNER-MJ	3.2	15.1		●	●	●			17.3	16	9.5	-

●: Line up

Reference pages: Standard cutting conditions → H173

STANDARD CUTTING CONDITIONS

Bore, shank type

ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15E4, E275A, etc.		- 200 HB	First choice	AH3135	100 - 250	0.12-0.3
			- 200 HB	Wear resistance	T3225	150 - 350	0.08 - 0.2
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.		- 300 HB	First choice	AH3135	100 - 230	0.1 - 0.25
			- 300 HB	Wear resistance	T3225	150 - 350	0.08 - 0.2
	Prehardend steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	100 - 230	0.1 - 0.25
			30 - 40 HRC	Wear resistance	T3225	120 - 350	0.08 - 0.2
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.		-	First choice	AH3135	90 - 180	0.1 - 0.25
K	Grey cast iron FC250, etc. 250, etc.		150 - 250 HB	First choice	AH120	140 - 250	0.12 - 0.3
			150 - 250 HB	Wear resistance	T1215	120 - 350	0.08 - 0.2
	Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc.		150 - 250 HB	First choice	AH120	110 - 200	0.12- 0.3
			150 - 250 HB	Wear resistance	T1215	120 - 350	0.08 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.		-	First choice	AH725	30 - 60	0.08 - 0.2
	Superalloys Inconel718, etc.		-	First choice	AH725	20 - 50	0.06 - 0.1
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH725	45 - 70	0.08 - 0.15
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH725	40 - 65	0.06 - 0.1

Roughing type

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

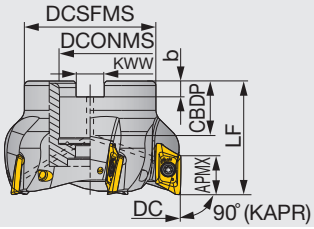
TUNG-ALUMILL

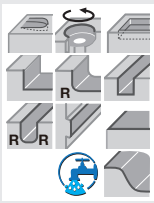
TPV16

90° shoulder mill for aluminium machining, with screw clamp system, for XVCT16 inserts

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







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

SPARE PARTS

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

*Recommended clamping torque (N·m) : TS40093I/HG=4.5

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

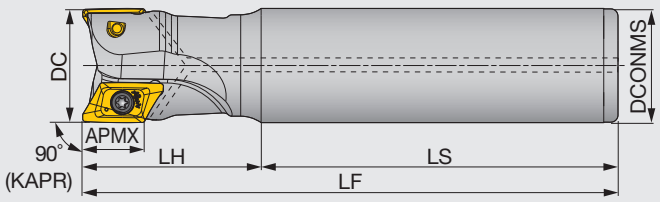
TUNG-ALUMILL

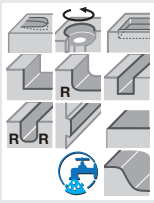
EPV16

90° shoulder endmill for aluminium machining, shank type, with screw clamp system, for XVCT16 inserts

GAMP = +6° ~ +10°, GAMF = -12° ~ -9°







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

SPARE PARTS

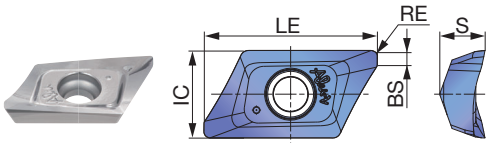
Designation	Clamping screw	Grip	Torx bit
EPV16R025M...	TS40085I/HG	H-TBS	BT15S
EPV16R032M...	TS40093I/HG	H-TBS	BT15S
EPV16R040M...	TS40093I/HG	H-TBS	BT15S

*Recommended clamping torque (N·m) : TS40085I/HG=4.5, TS40093I/HG=4.5

Reference pages: Inserts, Standard cutting conditions → H175

INSERT

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 TH10	LE	IC	S	BS
XVCT160504R-AJ	0.4	16	●	22.2	11.2	5.9	1.3
XVCT160508R-AJ	0.8	16	●	22.2	11.2	5.9	1
XVCT160512R-AJ	1.2	15.5	●	21.7	11.2	5.8	1
XVCT160516R-AJ	1.6	15	●	21.2	11.2	5.75	1
XVCT160520R-AJ	2	14.5	●	20.8	11.2	5.75	1
XVCT160530R-AJ	3	14	●	19.5	11.2	5.6	1
XVCT160532R-AJ	3.2	14	●	19.2	11.2	5.6	1
XVCT160540R-AJ	4	13	●	18.4	11.2	5.5	1.2
XVCT160550R-AJ	5	13	●	18.4	11.2	5.4	0.4

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

●: Line up

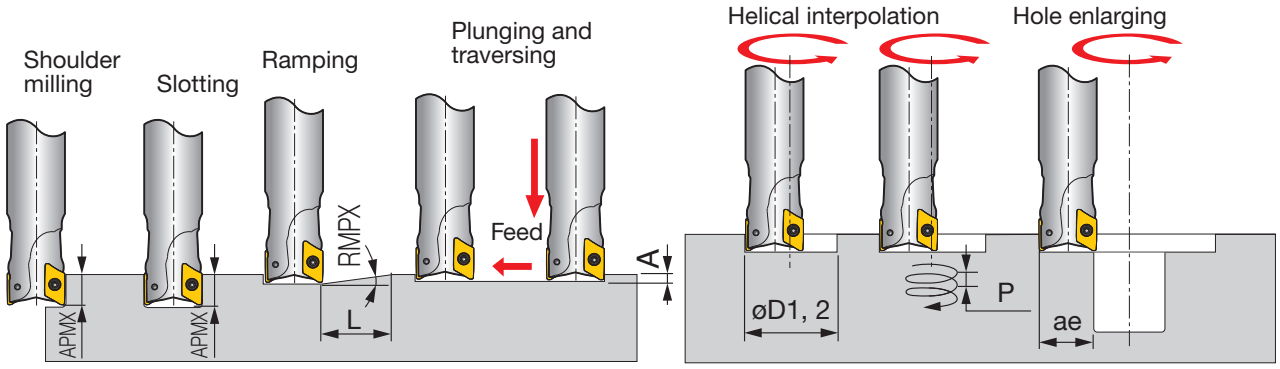
STANDARD CUTTING CONDITIONS

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

Safety guidelines

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

APPLICATION RANGE

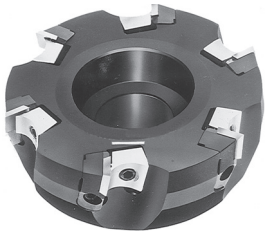


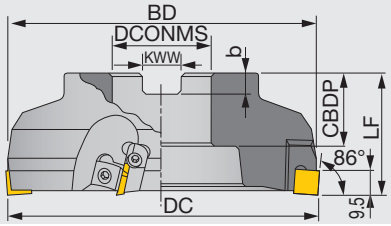
	Tool	Corner radius	Max. depth of cut	Straight ramp down Max. ramping angle	Min. length	Step down Max. plunging depth	Helical ramp down Min. machining	Min. pitch/rev	Max. machining	Max. pitch/rev	Hole enlarging Max. width
Designation	DC	RE	APMX	RMPX	L	A	øD1	P	øD2	P	ae
EPV16R025…	25	0.4, 0.8	16	22	40	4.2	29.1	4.4	49	13.6	22.5
EPV16R025…	25	1.2	15.5	22	40	4.2	29.1	4.4	49	13.6	22.5
EPV16R025…	25	1.6	15	22	38	3.7	29.1	4.4	49	13.2	22.5
EPV16R025…	25	2	14.5	22	38	3.7	29.1	4.4	49	13.2	22.5
EPV16R025…	25	3, 3.2	14	21	38	2.5	29.1	4.2	49	12.3	22.5
EPV16R025…	25	4, 5	13	18.5	40	2.3	29.1	3.7	49	12.3	22.5
EPV16R032…	32	0.4, 0.8	16	16.5	54	4	43.1	8.8	63	13.6	28.8
EPV16R032…	32	1.2	15.5	16.5	54	4	43.1	8.8	63	13.6	28.8
EPV16R032…	32	1.6	15	16	54	3.5	43.1	8.5	63	13.2	28.8
EPV16R032…	32	2	14.5	16	54	3.5	43.1	8.5	63	13.2	28.8
EPV16R032…	32	3, 3.2	14	15	54	3	43.1	7.9	63	12.3	28.8
EPV16R032…	32	4, 5	13	13.5	56	2.5	43.1	7.1	63	12.3	28.8
T/EPV16R040…	40	0.4, 0.8	16	11.5	79	4	59.1	10.4	79	13.6	36
T/EPV16R040…	40	1.2	15.5	11.5	79	4	59.1	10.4	79	13.6	36
T/EPV16R040…	40	1.6	15	11	80	3.5	59.1	9.9	79	13.2	36
T/EPV16R040…	40	2	14.5	11	80	3.5	59.1	9.9	79	13.2	36
T/EPV16R040…	40	3, 3.2	14	10	82	3	59.1	9	79	12.3	36
T/EPV16R040…	40	4, 5	13	8.5	90	2.5	59.1	7.6	79	12.3	36
TPV16R050…	50	0.4, 0.8	16	9.5	96	4	79.1	13	99	13.6	45
TPV16R050…	50	1.2	15.5	9.5	96	4	79.1	13	99	13.6	45
TPV16R050…	50	1.6	15	9	98	3.5	79.1	12.3	99	13.2	45
TPV16R050…	50	2	14.5	9	98	3.5	79.1	12.3	99	13.2	45
TPV16R050…	50	3.0, 3.2	14	8	103	3	79.1	10.9	99	12.3	45
TPV16R050…	50	4, 5	13	7	110	2.5	79.1	9.5	99	12.3	45
TPV16R063…	63	0.4, 0.8	16	7	130	4	105.1	13.6	125	13.6	56.7
TPV16R063…	63	1.2	15.5	7	130	4	105.1	13.6	125	13.6	56.7
TPV16R063…	63	1.6	15	6.5	136	3.5	105.1	12.8	125	13.2	56.7
TPV16R063…	63	2	14.5	6.5	136	3.5	105.1	12.8	125	13.2	56.7
TPV16R063…	63	3.0, 3.2	14	6	136	3	105.1	11.8	125	12.3	56.7
TPV16R063…	63	4, 5	13	5.5	140	2.5	105.1	10.8	125	12.3	56.7
TPV16R080…	80	0.4, 0.8	16	5	183	4	139.1	13.6	159	13.6	72
TPV16R080…	80	1.2	15.5	5	183	4	139.1	13.6	159	13.6	72
TPV16R080…	80	1.6	15	4.5	197	3.5	139.1	12.4	159	13.2	72
TPV16R080…	80	2	14.5	4.5	197	3.5	139.1	12.4	159	13.2	72
TPV16R080…	80	3, 3.2	14	4	207	3	139.1	11	159	12.3	72
TPV16R080…	80	4, 5	13	3.5	221	2.5	139.1	9.6	159	12.3	72
TPV16R100…	100	0.4, 0.8	16	3.5	262	4	179.1	12.9	199	13.6	90
TPV16R100…	100	1.2	15.5	3.5	262	4	179.1	12.9	199	13.6	90
TPV16R100…	100	1.6	15	3	296	3.5	179.1	11.1	199	13.2	90
TPV16R100…	100	2	14.5	3	296	3.5	179.1	11.1	199	13.2	90
TPV16R100…	100	3, 3.2	14	2.5	332	3	179.1	9.2	199	12.3	90
TPV16R100…	100	4, 5	13	2.5	309	2.5	179.1	9.2	199	11.6	90
TPV16R125…	125	0.4, 0.8	16	2.5	367	4	229.1	12.1	249	13.6	112.5
TPV16R125…	125	1.2	15.5	2.5	367	4	229.1	12.1	249	13.6	112.5
TPV16R125…	125	1.6	15	2	444	3.5	229.1	9.7	249	13.2	112.5
TPV16R125…	125	2	14.5	2	444	3.5	229.1	9.7	249	13.2	112.5
TPV16R125…	125	3, 3.2	14	1.5	554	3	229.1	7.3	249	8.7	112.5
TPV16R125…	125	4, 5	13	1.5	516	2.5	229.1	7.3	249	8.7	112.5

THE4000RIA

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

GAMP = 13°, GAMF = +7° ~ +9°



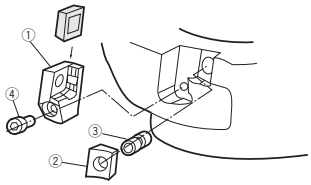


Right hand (R) shown.

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

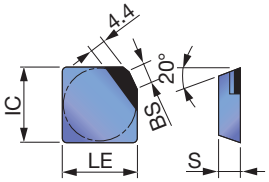
SPARE PARTS

Designation	①Locator	②Wedge	③Wedge fixing screw	④Locator fixing screw	Wrench
THE4003RIA	LE413R	WP440R	FDS-8SS	CM4X0.7X14	TP-4
THE400*RIA	LE413R	WP440R	FDS-8S	CM4X0.7X14	TP-4

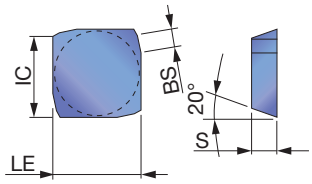


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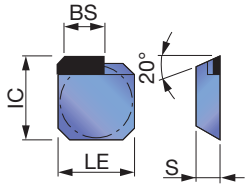
SECN42ZFR-DIA



SEEN/SECN 42Z



WECN42ZFR-DIA



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

★ : First choice
☆ : Second choice

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

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

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2
		DX140	200 ~ 1000	0.05 ~ 0.2
	Aluminium alloys Si ≥ 13%	TH10	80 ~ 200	0.1 ~ 0.2
		DX140	200 ~ 400	0.1 ~ 0.2
	Duralumin	TH10	200 ~ 1000	0.05 ~ 0.2
		DX140	200 ~ 1000	0.05 ~ 0.2
	Copper alloys	TH10	200 ~ 500	0.05 ~ 0.2

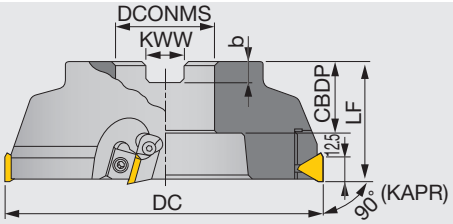
Note : Use of water-soluble cutting fluid is recommended.
Maximum depth of cut for SECN42ZFR-DIA is 3.5 mm.

TSE3000R

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

GAMP = +17°, GAMF = +5°





Right hand (R) shown.

Designation	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...
TSE3004RIA-E	8	100	6	63	32	32	14.4	8	2	TE*N32/TEKR1603...
TSE3005RIA	8	125	6	63	38.1	38	15.9	10	3.1	TE*N32/TEKR1603...
TSE3006RIA	8	160	8	63	50.8	38	19	11	5.2	TE*N32/TEKR1603...

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

SPARE PARTS

Designation	①Clamp set	②Locator	③Locator fixing screw	④Wedge	⑤Wedge fixing screw	Wrench 1	Wrench 2
TSE3050R..., 63R...	CSL-4	-	-	-	-	-	P-3
TSE300*RIA	-	LE303R	CM4X0.7X12	WF330R	FDS-8S	TP-4	-

*Recommended clamping torque (N·m) : FDS-8S=8

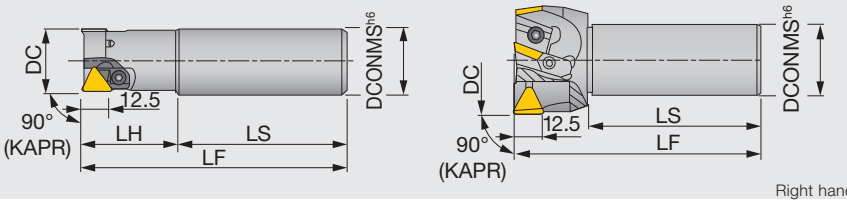
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

ESE3000R

Square shoulder endmill, shank type, with wedge clamp system, for positive triangular inserts

GAMP = +17°, GAMF = +5°





Right hand (R) shown.

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

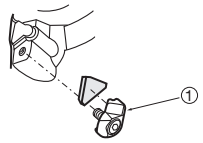
Note: The items do not have variable pitch.

SPARE PARTS

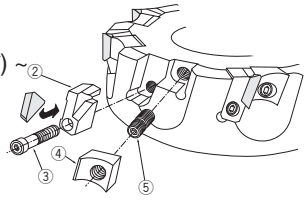
Designation	Clamp set	Locator	Wedge fixing screw	Shell locking bolt	Wedge	Wrench 1	Wrench 2
ESE3020R - ESE3050R	CSL-4	-	-	-	-	-	P-3
ESE3063R	-	LE302R	DS-8S	SHCM4-10	WP302R	TP-4	-

*Recommended clamping torque (N·m) : DS-8S=8

TSE3050R ~ 3063R
ESE3020R ~ 3040R



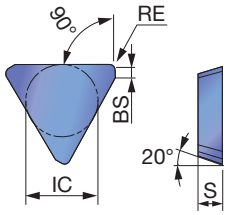
TSE3003R/LIA~
3006R/LIA
ESE3050R (RS**) ~
3063R (RS**)



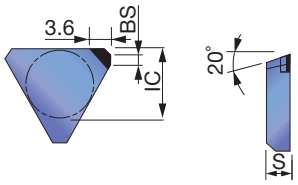
Reference pages: Inserts → H179, Standard cutting conditions → H180

INSERT

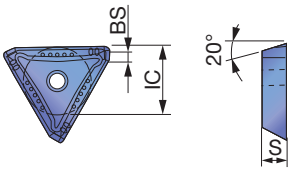
TECN/TEEN 32Z



TECN32ZFR-DIA



TEKR16-MS



		AH120	AH130	AH140	AH330	GH330	T1115	T3130	AH3135	T1215	T3225	NS740	N308	UX30	TH10	DX140	
P	Steel	★			☆	☆		☆	★		☆	★	☆	☆			
M	Stainless		★	☆					★		☆						
K	Cast iron	★					☆			★							
N	Non-ferrous														★	★	
S	Superalloys	★	☆														
H	Hard materials																

★ : First choice
☆ : Second choice

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

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

●: Line up

DX140: 1 piece per package

STANDARD CUTTING CONDITIONS

Applied to cutter dia. ≤ ø40 mm

ISO	Workpiece material	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH3135	60 ~ 180	0.05 ~ 0.2
		NS740	60 ~ 150	0.05 ~ 0.15
	Carbon steels Alloy steels < 300 HB	AH3135	60 ~ 150	0.05 ~ 0.18
		NS740	60 ~ 130	0.05 ~ 0.15
	Die steels < 30 HRC	AH3135	80 ~ 130	0.05 ~ 0.2
		NS740	60 ~ 130	0.05 ~ 0.15
M	Stainless steels < 250 HB	AH3135	100 ~ 180	0.08 ~ 0.2
K	Cast irons	AH120	100 ~ 150	0.05 ~ 0.2
N	Aluminium alloys	TH10	200 ~ 400	0.05 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1

Applied to cutter dia. ≥ ø50 mm

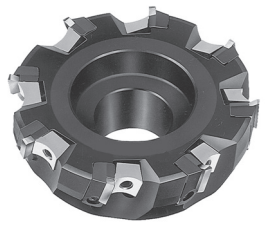
ISO	Workpiece material	Grades	Roughing (Depth of cut: > 1.5 mm)		Finishing (Depth of cut: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH3135	130 ~ 230	0.1 ~ 0.2	130 ~ 250	0.1 ~ 0.23
		T3225	130 ~ 300	0.1 ~ 0.23	150 ~ 300	0.1 ~ 0.25
		NS740	130 ~ 200	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.2
	Carbon steels Alloy steels < 300 HB	AH3135	100 ~ 200	0.1 ~ 0.18	130 ~ 230	0.1 ~ 0.2
		T3225	130 ~ 280	0.1 ~ 0.2	180 ~ 280	0.1 ~ 0.23
		NS740	100 ~ 150	0.1 ~ 0.15	150 ~ 200	0.1 ~ 0.18
	Die steels < 30 HRC	AH3135	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		T3225	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH3135	80 ~ 180	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		T3225	150 ~ 200	0.1 ~ 0.18	200 ~ 250	0.1 ~ 0.25
K	Cast irons Ductile cast iron	T1215	100 ~ 250	0.1 ~ 0.2	100 ~ 250	0.1 ~ 0.2
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.25	350 ~ 1000	0.1 ~ 0.25
		DX140	200 ~ 1000	0.05 ~ 0.15	350 ~ 1000	0.1 ~ 0.2
	Copper alloys	TH10	200 ~ 500	0.1 ~ 0.15	200 ~ 500	0.1 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

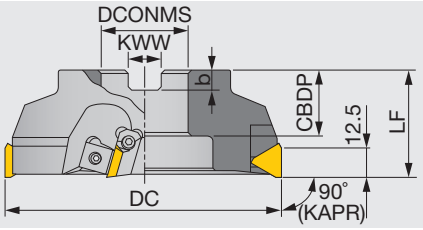
Note:
- Dry cutting is recommended except for aluminium alloys
- Maximum depth of cut for TECN32ZFR-DIA is 2.5 mm.

TSE4000RIA

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

GAMP = +17°, GAMF = +5°



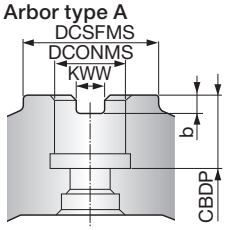


Right hand (R) shown.

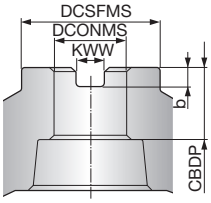
Designation	APMX	DC	CICT	LF	DCONMS	CBDP	KWW	b	WT(kg)	Arbor type
TSE4003RIA	10	80	4	50	25.4	26	9.5	60	1	A
TSE4004RIA	10	100	6	63	31.75	32	12.7	80	1.9	A
TSE4005RIA	10	125	6	63	38.1	38	15.9	100	2.9	B
TSE4006RIA	10	160	8	63	50.8	38	19	110	4.9	B
TSE4008RIA	10	200	10	63	47.625	38	25.4	140	7.4	C
TSE4010RIA	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

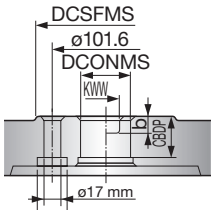
Arbor type A



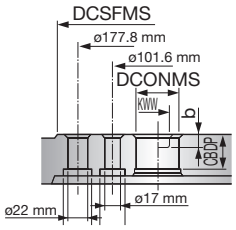
Arbor type B



Arbor type C



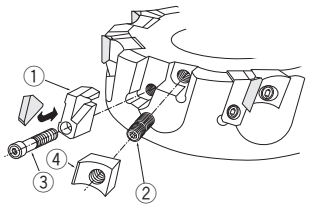
Arbor type D



SPARE PARTS

Designation	①Locator	②Wedge fixing screw	③Locator fixing screw	Shell locking bolt	④Wedge	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	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4
TSE4004RIAE	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4
TSE4005RIAE	LE405R	FDS-8S	CM4X0.7X14	-	WF500R	TP-4
TSE4006RIAE	LE405R	FDS-8S	CM4X0.7X14	-	WF500R	TP-4

*Recommended clamping torque (N·m) : FDS-8SS/FDS-8S=8



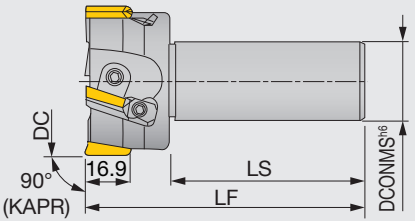
Reference pages: Inserts → H182, Standard cutting conditions → H183

ESE4000R

Square shoulder endmill, shank type, with wedge clamp system, for positive triangular inserts

GAMP = +17°, GAMF = +1° ~ +4°





Right hand (R) shown.

Designation	APMX	DC	CICT	DCONMS	LS	LF	Insert
ESE4050RA	10	50	3	32	80	115	TE*N43/TEKR2204...
ESE4063RA	10	63	4	32	80	115	TE*N43/TEKR2204...
ESE4003RIA-S32	10	80	4	32	80	120	TE*N43/TEKR2204...

(注) ESE4050RA and ESE4063RAdo not have variable pitch.

SPARE PARTS

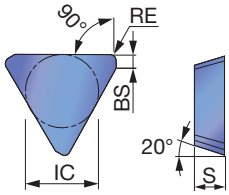
Designation	Locator	Wedge fixing screw	Locator fixing screw	Shell locking bolt	Wedge	Wrench
ESE4050RA	LE402AR	DS-8S	-	SHCM4-10	WT402R	TP-4
ESE4063RA	LE402AR	DS-8	-	SHCM4-10	WT402R	TP-4
ESE4003RIA-S32	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4

*Recommended clamping torque (N·m)：DS-8S/DS-8/FDS-8S=8

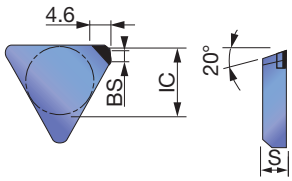
Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

INSERT

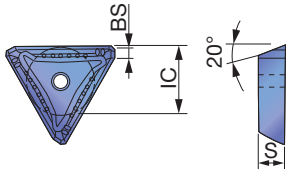
TECN/TEEN 43Z



TECN43ZFR-DIA



TEKR22-MS



		AH120	AH130	AH140	AH330	GH330	T1115	T3130	AH3135	T1215	T3225	NS740	N308	UX30	TH10	DX140
P	Steel	☆		☆	☆	☆		☆	★		☆	★	☆		☆		
M	Stainless	☆	★	☆					★		☆						
K	Cast iron	★					☆			★					☆		
N	Non-ferrous														★	★	
S	Superalloys	☆	☆														
H	Hard materials																

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated										Cermet			Uncoated		PCD		IC	S	BS
			AH120	AH130	AH140	AH330	GH330	T1115	T3130	AH3135	T1215	T3225	NS740	N308		UX30	TH10	DX140				
TECN43ZFR	C0.5	10															●			12.7	4.76	2
TECN43ZTR	1	10											●	●		●				12.7	4.76	1.31
TEEN43ZFR	C0.5	10															●			12.7	4.76	2
TEEN43ZTR	1	10	●	●	●	●	●	●	●	●	●	●	●	●		●				12.7	4.76	1.31
TECN43ZFR-DIA	-	3.5																●		12.7	4.76	2
TEKR2204PEPR-MS	-	10			●															12.7	4.76	1.8

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

●: Line up

DX140: 1 piece per package

Reference pages: Standard cutting conditions → H183

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grades	Roughing (Depth of cut: > 1.5 mm)		Finishing (Depth of cut: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH3135	130 ~ 230	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.23
		T3225	130 ~ 300	0.1 ~ 0.23	180 ~ 300	0.1 ~ 0.25
		NS740	130 ~ 200	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.2
	Carbon steels Alloy steels < 300 HB	AH3135	100 ~ 200	0.1 ~ 0.18	130 ~ 230	0.1 ~ 0.2
		T3225	130 ~ 280	0.1 ~ 0.2	180 ~ 280	0.1 ~ 0.23
		NS740	100 ~ 150	0.1 ~ 0.15	150 ~ 200	0.1 ~ 0.18
	Die steels < 30 HRC	T3225	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
		AH3135	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH3135	80 ~ 180	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		T3225	150 ~ 200	0.1 ~ 0.18	200 ~ 250	0.1 ~ 0.25
K	Cast irons Ductile cast iron	T1215	100 ~ 250	0.1 ~ 0.2	100 ~ 250	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.25	350 ~ 1000	0.1 ~ 0.25
		DX140	200 ~ 1000	0.05 ~ 0.15	350 ~ 1000	0.1 ~ 0.2
	Copper alloys	TH10	200 ~ 500	0.1 ~ 0.15	200 ~ 500	0.1 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

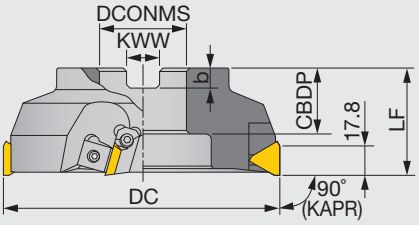
Note:
- Dry cutting is recommended except for aluminium alloys
- Maximum depth of cut for DX140 TECN43ZFR-DIA is 3.5 mm.

TSP4000IA

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

GAMP = +5°, GAMF = 0°





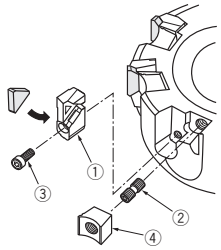
Right hand (R) shown.

Designation	APMX	DC	CICT	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TSP4003RIA	10	80	4	50	25.4	26	9.5	6	1.1	TP*N43 / TP*R...
TSP4004RIA	10	100	6	63	31.75	32	12.7	8	2	TP*N43 / TP*R...
TSP4005RIA	10	125	6	63	38.1	38	15.9	10	3.1	TP*N43 / TP*R...
TSP4006RIA	10	160	8	63	50.8	38	19	11	5.1	TP*N43 / TP*R...
TSP4008RIA	10	200	10	63	47.625	38	25.4	14	7.7	TP*N43 / TP*R...
TSP4010RIA	10	250	12	63	47.625	38	25.4	14	14.1	TP*N43 / TP*R...
TSP4012RIA	10	315	14	63	47.625	38	25.4	14	22.6	TP*N43 / TP*R...

SPARE PARTS

Designation	Locator	Wedge fixing screw	Locator fixing screw	Shell locking bolt	Wedge	Wrench
TSP4003RIA	LP403R	FDS-8S	CM4X0.7X14	CAP-CM12X1.75X30	WF330N	TP-4
TSP4004RIA	LP403R	FDS-8S	CM4X0.7X14	CAP-CM16X2.0X40	WF330N	TP-4
TSP40**RIA	LP405R	FDS-8S	CM4X0.7X14	-	WF500R	TP-4

*Recommended clamping torque (N·m)：FDS-8S=8



Approach angle

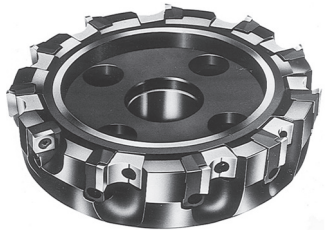
10°-20°
45°
70°
85°
88°
90°
Others

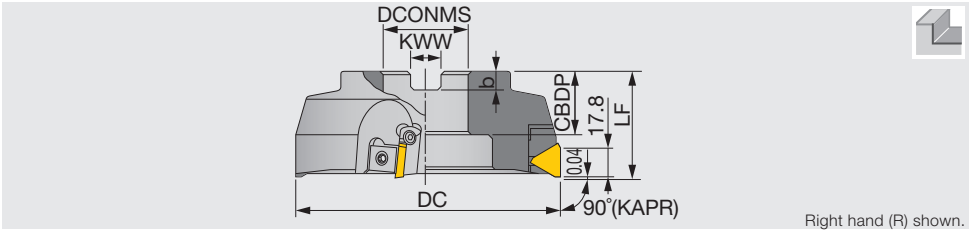
Reference pages: Inserts, Standard cutting conditions → H186 - H187

TFP4000IA

Square shoulder mill with finisher

GAMP = +5°, GAMF = 0°





Right hand (R) shown.

Designation	APMX	DC	CICT	LF	DCONMS	CBDP	KWW	b	WT(kg)	Insert
TFP4004RIA	10	100	5	63	31.75	32	12.7	8	2	TP*N43 / TP*R...
TFP4005RIA	10	125	6	63	38.1	38	15.9	10	3.1	TP*N43 / TP*R...
TFP4006RIA	10	160	8	63	50.8	38	19	11	5.2	TP*N43 / TP*R...
TFP4008RIA	10	200	10	63	47.625	38	25.4	14	7.9	TP*N43 / TP*R...

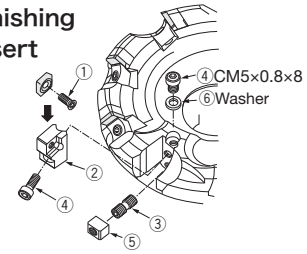
A SPARE PARTS FOR FINISHING INSERT



Designation	①Clamping screw	②Locator	③Wedge fixing screw	④Locator fixing screw	④Locator fixing screw	⑤Wedge	Wrench 1	Wrench 2
TFP40...	CSTA-5S	LW400R	FDS-8S	CM4X0.7X14	CM5X0.8X16	FW-305	T-15D	TP-4

*Recommended clamping torque (N·m) : FDS-8S=8

A Finishing insert



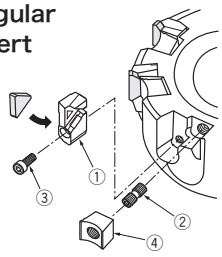
B SPARE PARTS FOR REGULAR INSERT



Designation	①Clamping screw	②Wedge fixing screw	③Locator fixing screw	④Wedge	Wrench
TFP4004RIA	LP403R	FDS-8S	CM4X0.7X14	WF330N	TP-4
TFP4005 - 08...	LP405R	FDS-8S	CM4X0.7X14	WF500R	TP-4

*Recommended clamping torque N·m) : FDS-8S=8

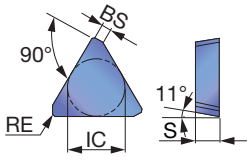
B Regular insert



Reference pages: Inserts, Standard cutting conditions → H186 - H187

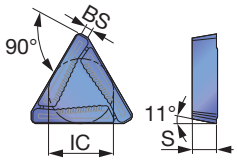
INSERT

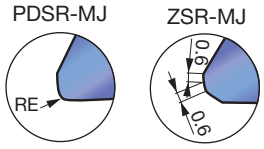
TPCN/TPEN/TPKN 43Z



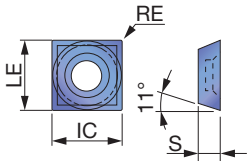
図は右勝手(R)を示す

TPKR/TPMR-MJ





SPHA-FNW



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated						Cermet		Uncoated				IC	LE	S	BS
			AH120	AH130	AH140	GH330	T1115	T3130	NS740	N308	UX30	TH10						
TPCN43ZFR	C0.5	10										●			12.7	-	4.76	2
TPCN43ZTR	C0.5	10							●	●	●				12.7	-	4.76	2
TPEN43ZTR	C0.5	10							●						12.7	-	4.76	2
TPEN43ZTRCR	1	10						●							12.7	-	4.76	2
TPKN43ZFR	C0.5	10										●			12.7	-	4.76	2
TPKN43ZTR	C0.5	10	●	●	●	●	●	●	●	●	●				12.7	-	4.76	2
TPKR43ZSR-MJ	-	10				●		●							12.7	-	4.76	1.5
TPMR2204PDSR-MJ	0.8	10				●		●							12.7	-	4.76	1.2
TPKN43ZFL	C0.5	10										●			12.7	-	4.76	2
SPHA431FNW	0.4	-								●		●			12.7	12.7	4.76	-

●: Line up

STANDARD CUTTING CONDITIONS

TSP4000IA · TFP4000IA (When finishing insert is not in use)

ISO	Workpiece material	Grades	Roughing (Depth of cut: > 1.5 mm)		Finishing (Depth of cut: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH120 · GH330	100 ~ 230	0.1 ~ 0.25	130 ~ 250	0.1 ~ 0.3
		T3130	130 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		UX30	100 ~ 180	0.1 ~ 0.25	130 ~ 200	0.1 ~ 0.3
		NS740 · N308	130 ~ 200	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
	Carbon steels Alloy steels < 300 HB	AH120 · GH330	100 ~ 180	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.28
		T3130	130 ~ 180	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		UX30	80 ~ 130	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.28
		NS740 · N308	100 ~ 150	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
	Die steels < 30 HRC	T3130 · AH120 · GH330	100 ~ 150	0.1 ~ 0.18	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.18	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	150 ~ 200	0.15 ~ 0.23	200 ~ 230	0.15 ~ 0.25
		AH120	150 ~ 230	0.15 ~ 0.2	200 ~ 250	0.15 ~ 0.23
K	Cast irons Ductile cast iron	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		TH10 · UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25
S	Titanium alloys	AH130	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

STANDARD CUTTING CONDITIONS FOR MJ INSERT TPM/KR

ISO	Workpiece material	Roughing (Depth of cut: > 1.5 mm) Feed per tooth *fz* (mm/t)	
		TPKR43ZSR-MJ	TPMR2204PDSR-MJ
P	Mild steels·Unhardened steels < 180 HB	0.1 ~ 0.23	0.1 ~ 0.4
	Carbon steels · Alloy steels < 300 HB	0.1 ~ 0.2	0.1 ~ 0.35
	Die steels < 30 HRC	0.1 ~ 0.18	0.1 ~ 0.25

Please refer to the above table for cutting speeds and finishing conditions.

STANDARD CUTTING CONDITIONS (WHEN FINISHING INSERT IS IN USE)

TFP4000IA (For finishing)

ISO	Workpiece material	Grades		Cutting speed *Vc* (m/min)
		Regular insert	Finishing insert	
P	Mild steels·Unhardened steels < 180 HB	NS740	N308	180 ~ 300
		N308	N308	180 ~ 250
	Carbon steels · Alloy steels < 300 HB	NS740	N308	150 ~ 250
		N308	N308	150 ~ 230
K	Cast irons. Ductile cast irons	T1115	TH10	100 ~ 150

Notes:
- Above conditions are applied when the finishing insert is used.
- Generally, high-speed, high-feed and small depth of cut are recommended for TFP4000IA type cutters.
- When cutting width is larger than 60 mm, the maximum depth of cut should be around 1 mm.

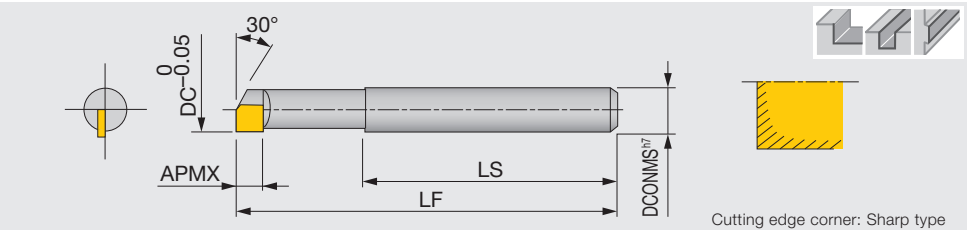
Starting guideline		
Depth of cut a_p (mm)	Feed per rev. *f* (mm/rev)	Feed per tooth f_z (mm/t)
> 1.0	1 ~ 1.6	0.15 ~ 0.2
0.2 ~ 0.7	1.6 ~ 2.5	0.18 ~ 0.3
< 0.1	2 ~ 3.5	0.2 ~ 0.4

Notes: When cutting width is larger than 60 mm, the maximum depth of cut should be around 1 mm.

DEB1000

T-DIA endmill for high speed aluminium machining





Designation	DX140	NOF	DC	DCONMS	APMX	LS	LF
DEB1040	●	1	4	6	3.5	32	45
DEB1050	●	1	5	6	3.5	35	50
DEB1060	●	1	6	6	3.5	35	50
DEB1070		1	7	8	5	37	55
DEB1080	●	1	8	8	5	37	55
DEB1090		1	9	10	5	40	60
DEB1100	●	1	10	10	5	40	60
DEB1110		1	11	12	5	45	65
DEB1120	●	1	12	12	5	45	65

Note: ●: Line up

- The cutting edge is very sharp. Please handle it carefully. Do not directly measure the cutting edge with micrometer, etc. as it may cause chipping.
- Please keep the tool overhang from the milling chuck as short as possible.
- Please choose a machine that is as rigid as possible.

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

STANDARD CUTTING CONDITIONS

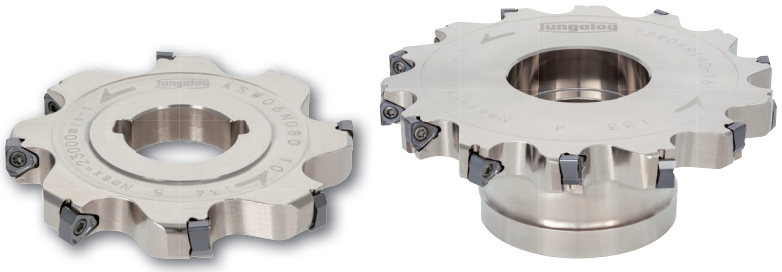
DEB1000

For side milling $a_p \leq 3D$, $a_e = 0.1$ mm

ISO	Workpiece material	Mill dia. (mm)	Cutting Speed *Vc* (m/min)	No. of revolutions *n* (min^{-1})	Table feed *Vf* (mm/min)
N	Aluminium alloys, Copper alloys	ø4	120 - 180	12,000	120
		ø5	120 - 180	9,600	120
		ø6	120 - 180	8,000	120
		ø8	120 - 180	6,000	120
		ø10	120 - 180	4,800	120
		ø12	120 - 180	4,000	100

- Keep the tool overhang as short as possible. When the overhang is long, please reduce the number of revolutions and feed to prevent chattering.
- Please adjust the number of revolutions and feed speed according to the cutting condition, such as depth of cut and machine rigidity.

TUNGUSLOT UNIVERSAL

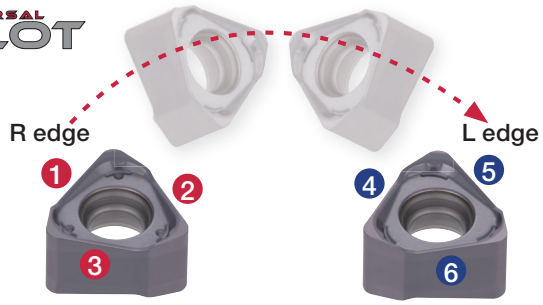


High economy by 6-corner insert with wiper
Machining stability with the cutter design for optimum chip evacuation

High economy by 6-corner insert

6-corner insert provides economical advantage. Self-wiper edge delivers good surface quality.

TUNGUSLOT UNIVERSAL
6 corners
with wiper



ASW / TSW
CW = 10, 12, 14, 16 mm

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

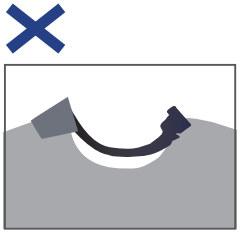
TUNGUSLOT UNIVERSAL

OK



Optimum chipbreaker and big gullets create compact chip formation and smooth evacuation!

Competitor



Unformed chip and narrow gullet cause chip packing.

TUNGUSLOT UNIVERSAL ASW / TSW type

P **Steel** S55C / C55 (200HB)
Edge width: CW = 10 mm, Dry
Corner radius: RE = 0.8 mm

Cutter	Depth of slot: *ae* (mm)		
	10	20	30
TUNGUSLOT UNIVERSAL	O	O	O
Competitor A	O	O	×

Chips at *ae* = 30 mm depth

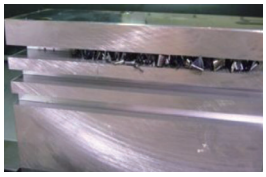
TUNGUSLOT UNIVERSAL



Competitor A



Packed chips



Chips are packed because of bad chip control and flow.

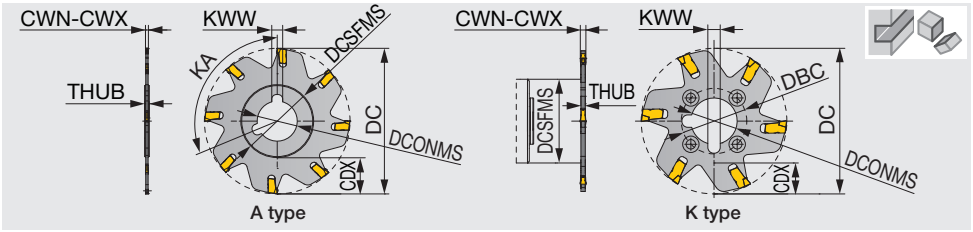
Reference pages: H196 - H198

TUNGMSLIT

S/ASG

Side cutter for thin slitting and cutting off





Designation	CW	CWN	CWX	DC	CICT	Seat size	CDX	DCONMS	THUB	DCSFMS	DBC	KA	KWW	SS	SS	Drive flange	Key	Insert
SSG01R063-E1.6	1.6	1.5	1.79	63	6	1	14	10	2.4	32	22	-	3	SW25-32	SW1.00-32	-	K	SSM1*N/ SSS1*N
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
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
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
ASG01N125-1.6(4)	1.6	1.5	1.79	125	12	1	30	31.75	2.4	64	-	75	7.92	-	-	-	A	SSM1*N/ SSS1*N
ASG01N125-E1.6(4)	1.6	1.5	1.79	125	12	1	30	27	2.4	64	-	75	7	-	-	-	A	SSM1*N/ SSS1*N
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
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
ASG02N080-E2	2.2	1.8	2.69	80	8	2	20	22	2.4	39	-	112.5	6	-	-	-	A	SSM2*N/ SSS2*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
ASG02N125-2(4)	2.2	1.8	2.69	125	12	2	32	31.75	2.4	60	-	75	7.92	-	-	-	A	SSM2*N/ SSS2*N
ASG02N125-E2(4)	2.2	1.8	2.69	125	12	2	32	27	2.4	60	-	75	7	-	-	-	A	SSM2*N/ SSS2*N
SSG03R063-E3	3.1	1.8	2.69	63	5	3	15	10	2.4	32	22	-	3	SW25-32	SW1.00-32	-	K	SSM3*N/ SSS3*N
SSG03R080-3	3.1	2.7	3.53	80	6	3	16	25.4	2.4	46	36	-	6.35	SW32-25.4-46-J	SW1.25-46	R1.00-46	K	SSM3*N/ SSS3*N
SSG03R080-E3	3.1	2.7	3.53	80	6	3	19(2)	22	2.4	40(1)	32	-	6	SW32-40	-	R22-46	K	SSM3*N/ SSS3*N
SSG03R100-3	3.1	2.7	3.53	100	6	3	26	25.4	2.4	46	36	-	6.35	SW32-25.4-46-J	SW1.25-46	R1.00-46	K	SSM3*N/ SSS3*N
SSG03R100-E3	3.1	2.7	3.53	100	6	3	29(3)	22	2.4	40(1)	32	-	6	SW32-40	-	R22-46	K	SSM3*N/ SSS3*N
SSG03R125-3(4)	3.1	2.7	3.53	125	8	3	34	31.75	2.4	55	45	-	7.92	-	-	R1.25-55	K	SSM3*N/ SSS3*N
SSG03R125-E3(4)	3.1	2.7	3.53	125	8	3	34	32	2.4	55	45	-	8	S32-55	-	R32-55	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
SSG04R080-4	4.1	3.54	4.52	80	6	4	16	25.4	3.2	46	36	-	6.35	SW32-25.4-46-J	SW1.25-46	R1.00-46	K	SSM4*N/ SSS4*N
SSG04R080-E4	4.1	3.54	4.52	80	6	4	19(2)	22	3.2	40(1)	32	-	6	SW32-40	-	R22-46	K	SSM4*N/ SSS4*N
SSG04R100-4	4.1	3.54	4.52	100	6	4	26	25.4	3.2	46	36	-	6.35	SW32-25.4-46-J	SW1.25-46	R1.00-46	K	SSM4*N/ SSS4*N
SSG04R100-E4	4.1	3.54	4.52	100	6	4	29(3)	22	3.2	40(1)	32	-	6	SW32-40	-	R22-46	K	SSM4*N/ SSS4*N
SSG04R125-4(4)	4.1	3.54	4.52	125	8	4	34	31.75	3.2	55	45	-	7.92	-	-	R1.25-55	K	SSM4*N/ SSS4*N
SSG04R125-E4(4)	4.1	3.54	4.52	125	8	4	34	32	3.2	55	45	-	8	S32-55	-	R32-55	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, only one keyway.
CW = When standard inserts are mounted. CWN, CWX = When special inserts are mounted.
Since a single insert cuts the full groove width, use the insert whose width is equal to the groove width in the application.

Tolerance of slot width*

±0.1

*Just for reference

SPARE PARTS

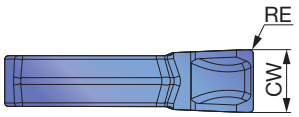
Designation	Grip	Extractor
SSG01/02...	ESG0.5	-
ASG01/02...	ESG0.5	-
SSG03/04...	-	ESG1

Reference pages: Inserts, Standard cutting conditions → H191

INSERT

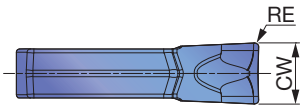
SSM





SSS





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

★ : First choice
☆ : Second choice

Designation	RE	Coated	CW±0.04
		GH130	
SSM22N	0.2	●	2.2
SSM31N	0.2	●	3.1
SSM41N	0.25	●	4.1
SSS16N	0.16	●	1.6
SSS22N	0.2	●	2.2
SSS31N	0.2	●	3.1
SSS41N	0.25	●	4.1

●: Line up

STANDARD CUTTING CONDITIONS

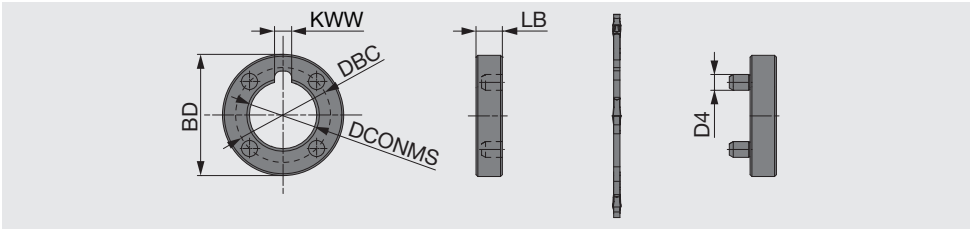
ISO	Workpiece material	Hardness (HB)	Insert	Cutting speed *Vc* (m/min)	Chip thickness t (mm)
P	Low carbon steel SS400, S15C, etc. E275A, C15E4, etc.	- 200	SSM...	150 - 230	0.05 - 0.15
	High carbon steel S45C, S55C, etc. E355D, C55, etc.	200 - 300	SSM...	100 - 170	0.04 - 0.13
	Alloy steels SCM440, SCr415, etc. 42CrMo4, 20Cr4, etc.	150 - 300	SSM...	90 - 160	0.04 - 0.13
	Tool steel SKD11, SKD61, etc. X153CrMoV12, X40CrMoV5-1, etc.	- 300	SSM...	70 - 120	0.04 - 0.13
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	SSS...	90 - 200	0.04 - 0.13
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.	150 - 250	SSM...	100 - 200	0.05 - 0.15
	Ductile cast iron FCD400, etc, 400-15S, etc.	150 - 250	SSM...	80 - 130	0.05 - 0.15

TUNGMINISLIT

R (drive flange set)

Drive flange set for side cutters





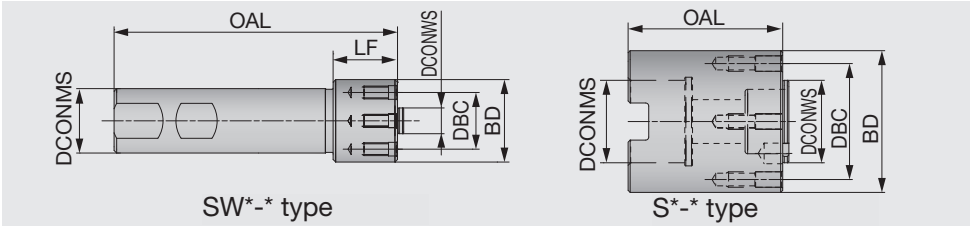
Designation	DCONMS	BD	D4	DBC	LB	KWW
R1.00-46	25.4	46	5	36	10	6.35
R22-46	22	46	6	32	10	6
R1.25-55	31.75	55	6	45	10	7.92
R32-55	32	55	6	45	10	8

TUNGMINISLIT

SW

Drive shank for side cutters





Approach angle

10°-20° 45° 70° 85° 88° 90°

Designation	DCONMS	DCONMS	DCONWS	BD	DBC	LF	OAL
SW25-32	25	-	10	32	22	25	110
SW32-40	32	-	22	40	32	30	120
SW32-25.4-46-J	32	-	25.4	46	36	30	120
SW1.00-32	25.4	-	10	32	22	25.4	110
SW1.25-46	31.75	-	25.4	46	36	30	120
S32-55	-	32	32	55	45	-	60

SPARE PARTS

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

*Recommended clamping torque (N·m):SR76-961=3.5

COMBINATION OF ARBORS / ATTACHMENTS

Cutter bodies : “A” type

A-type disk cutters are without clamping holes on the hub and can be mounted only by using axial drive arbors.





Axial drive arbor

Cutter bodies : “K” type

K-type disk cutters are with clamping holes on the hub and can be mounted by using intermediate shanks or shell adaptors, making it possible to use endmills / shell mill arbors.





Drive flange



Axial drive arbor



Shank adaptor



Shell adaptor



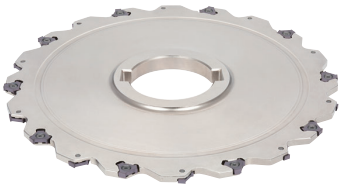
Shell mill / Endmill arbor

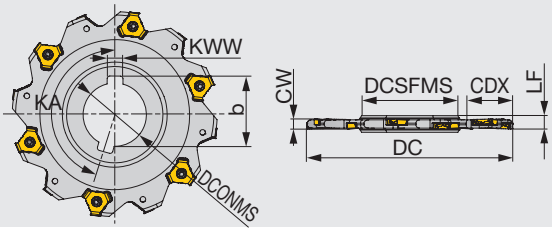
Tool dia.	ø63	ø80	ø100	ø125
Drive flange	-	✔	✔	✔
Shank / Shell adaptor	✔	✔	✔	✔

TUNGTHIN SLIT

ASV 02/03/04/05

Axial drive slot mill, for tangentially mounted inserts





Designation	CW	DC	ZEFP/CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	KA	Insert
ASV02N080-4	4	80	5/10	41	25.4	6	28	6.35	15	162	TVKX0202...
ASV02N080-E4	4	80	5/10	41	27	6	29.8	7	15	162	TVKX0202...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...
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...

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

SPARE PARTS







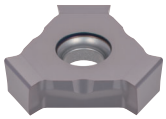
Designation	Clamping screw	Grip	Lubricant	Torx bit	Mono block type Torx bit
ASV02/03N...	SR114-018-L3.40	-	M-1000	-	T-6D
ASV04N...	SR14-500/L5.1	H-TB2W	M-1000	BT15S	-
ASV05N...	SR14-500-L7.0	H-TB2W	M-1000	BT15S	-

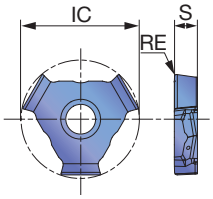
*Recommended clamping torque (N·m): SR114-018-L3.40=0.7, SR14-500/L5.1=3.5, SR14-500-L7.0=3.5

Reference pages: Inserts, Standard cutting conditions → H195

INSERT

TVKX-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	Coated			S	IC
		AH120	AH130	AH725		
TVKX020202TN-MJ	0.2	●		●	2.4	9.4
TVKX020204TN-MJ	0.4	●		●	2.4	9.4
TVKX03X302TN-MJ	0.2	●		●	3.2	9.4
TVKX03X304TN-MJ	0.4	●		●	3.2	9.4
TVKX04H304TN-MJ	0.4	●	●	●	3.5	16.9
TVKX04H308TN-MJ	0.8	●	●	●	3.5	16.9
TVKX050404TN-MJ	0.4	●	●	●	4.5	16.9
TVKX050408TN-MJ	0.8	●	●	●	4.5	16.9

●: Line up

STANDARD CUTTING CONDITIONS

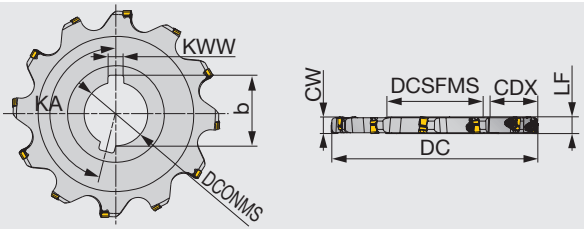
ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per edge line: *fz* (mm/t) ASV *ae* / DC (mm) 10%	ASV *ae* / DC (mm) 20%	30%	≤ 50%
P	Low carbon steels SS400, etc. E275A, etc.	- 200	First choice	AH725	90 - 180	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
		- 200	Fracture resistance	AH130	90 - 180	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
	High carbon steels S45C, etc. C45, etc.	200 - 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		200 - 300	Fracture resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
	Alloy steels SCM440, etc. 42CrMo4, etc.	150 - 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		150 - 300	Fracture resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
	Tool steels SKD61, etc. X40CrMoV5-1, etc.	- 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		- 300	Fracture resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-		AH130	90 - 200	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
K	Grey cast irons FC250, etc. 250, etc.	150 - 250		AH120	120 - 230	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 - 250		AH120	90 - 150	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
		-	Fracture resistance	AH130	30 - 40	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
		-	Fracture resistance	AH130	20 - 35	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07

TUNGUSLOT UNIVERSAL

ASW 06/07/09

Axial drive slot mill, for 6-corner double sided inserts





Designation	CW	DC	ZEFP/CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	KA	Insert
ASW06N080-10	10	80	4/8	41	25.4	10	28	6.35	18.5	157.5	WNGU0603...
ASW06N080-E10	10	80	4/8	41	27	10	29.8	7	18.5	157.5	WNGU0603...
ASW06N100-10	10	100	5/10	48	31.75	10	35.2	7.92	25	162	WNGU0603...
ASW06N100-E10	10	100	5/10	47	32	10	34.8	8	25.5	162	WNGU0603...
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...
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...
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...
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...
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...
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...

Approach angle: 10°-20° | 45° | 70° | 85° | 88° | 90° | Others

SPARE PARTS



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

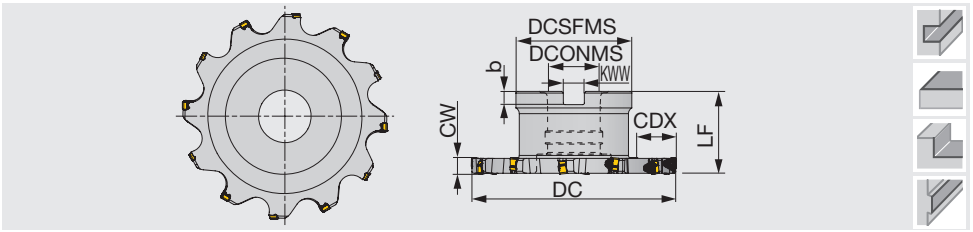
*Recommended clamping torque N·m)：CSPB-2.5=1.3, CSPB-3.5＝3.5, CSPD-3=2.5

Reference pages: Inserts, Standard cutting conditions → H198

TSW 06/07/09

Radial drive slot mill, for 6-corner double sided inserts





Designation	CW	DC	ZEFP/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...
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...
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...
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...
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...
TSW07R160-12	12	160	7/14	100	38.1	63	10	15.9	29	WNGU07T3...
TSW07R160-E12	12	160	7/14	82	40	63	9	16.4	38	WNGU07T3...
TSW09R160-16	16	160	7/14	100	38.1	63	10	15.9	29	WNGU0904...
TSW09R160-E16	16	160	7/14	82	40	63	9	16.4	38	WNGU0904...

SPARE PARTS



Designation	Clamping screw1	Clamping screw2	Grip	Lubricant	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

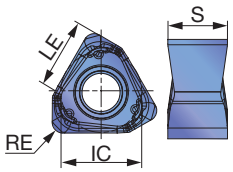
*Recommended clamping torque (N·m):CSPB-2.5=1.3, CSPB-3.5=3.5, CSPD-3=2.5

Reference pages: Inserts, Standard cutting conditions → H198

INSERT

WNGU-MJ





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
		AH120	AH130	AH725	AH3135			
WNGU060304TN-MJ	0.4	●			●	5.6	6.1	4.4
WNGU060308TN-MJ	0.8	●	●	●	●	5.6	6.1	4.4
WNGU060310TN-MJ	1	●			●	5.6	6.1	4.4
WNGU060316TN-MJ	1.6	●	●	●		5.6	6.1	4.4
WNGU060320TN-MJ	2	●			●	5.6	6.1	4.4
WNGU07T304TN-MJ	0.4	●			●	6.8	7.4	5.5
WNGU07T308TN-MJ	0.8	●	●	●		6.8	7.4	5.5
WNGU07T310TN-MJ	1	●			●	6.8	7.4	5.5
WNGU07T316TN-MJ	1.6	●	●	●		6.8	7.4	5.5
WNGU07T320TN-MJ	2	●			●	6.8	7.4	5.5
WNGU090404TN-MJ	0.4	●			●	8.5	8.6	6.5
WNGU090408TN-MJ	0.8	●	●	●		8.5	8.6	6.5
WNGU090410TN-MJ	1	●			●	8.5	8.6	6.5
WNGU090416TN-MJ	1.6	●	●	●		8.5	8.6	6.5
WNGU090420TN-MJ	2	●			●	8.5	8.6	6.5

●: Line up

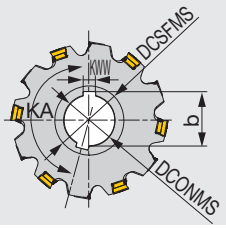
STANDARD CUTTING CONDITIONS

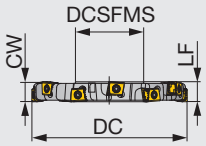
ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per edge line: *fz* (mm/t) TSW / ASW ae / DC (mm) 10%	20%	30%	≤ 50%
P	Low carbon steels SS400, etc. E275A, etc.	- 200	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		- 200	Fracture resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	High carbon steels S45C, etc. C45, etc.	200 - 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		200 - 300	Fracture resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	Alloy steels SCM440, etc. 42CrMo4, etc.	150 - 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		150 - 300	Fracture resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	Tool steels SKD61, etc. X40CrMoV5-1, etc.	- 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		- 300	Fracture resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	-	AH130	90 - 200	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
K	Grey cast irons FC250, etc. 250, etc.	150 - 250	-	AH120	120 - 230	0.12 - 0.42	0.09 - 0.31	0.07 - 0.27	0.07 - 0.25
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 - 250	-	AH120	90 - 150	0.12 - 0.42	0.09 - 0.31	0.07 - 0.27	0.07 - 0.25
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
		-	Fracture resistance	AH130	30 - 40	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
		-	Fracture resistance	AH130	20 - 35	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1

ASN 10/12/15

Axial drive slot mill, for tangentially mounted inserts







Designation	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
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
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
ASN10R200M50.0E16-08	16	200	8	16	69	50	16	53.6	12	64.5	168.75	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
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
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
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
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
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
ASN15R200M50.0E25-07	25	200	7	14	69	50	25	53.6	12	64.5	168.75	LMEU1509**ZNEN-MJ
ASN15R250M50.0E25-08	25	250	8	16	84	50	25	53.6	12	82	170	LMEU1509**ZNEN-MJ

SPARE PARTS





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

*Recommended clamping torque (N·m): SM40-143-H0=1.3, CSTB-5L159=5

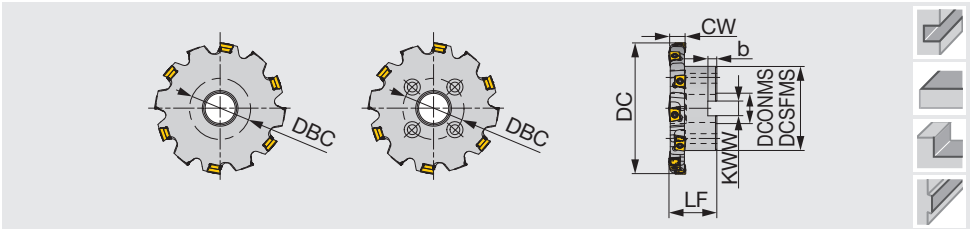
Reference pages: Inserts, Standard cutting conditions → H201

TECTSLOT TANGENTIAL

TSN

Radial drive slot mill, for tangentially mounted inserts





Designation	CW	DC	ZEFP	CICT	DCSFMS	DCONMS	LF	b	KWW	CDX	DBC	Insert
TSN10R100M25.4-16-05	16	100	5	10	50	25.4	50	6	9.5	24	-	LMEU1008**ZNEN-MJ
TSN10R100M27.0E16-05	16	100	5	10	58	27	50	7	12.4	20	-	LMEU1008**ZNEN-MJ
TSN10R125M31.7-16-06	16	125	6	12	70	31.75	50	8	12.7	26.5	-	LMEU1008**ZNEN-MJ
TSN10R125M32.0E16-06	16	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1008**ZNEN-MJ
TSN10R160M38.1-16-07	16	160	7	14	100	38.1	63	10	15.9	29	-	LMEU1008**ZNEN-MJ
TSN10R160M40.0E16-07	16	160	7	14	82	40	63	9	16.4	38	-	LMEU1008**ZNEN-MJ
TSN10R200M40.0E16-08	16	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1008**ZNEN-MJ
TSN10R200M47.6-16-08	16	200	8	16	135	47.625	63	14	25.4	31.5	101.6	LMEU1008**ZNEN-MJ
TSN12R100M25.4-19-05	19	100	5	10	50	25.4	50	6	9.5	24	-	LMEU1208**ZNEN-MJ
TSN12R100M27.0E19-05	19	100	5	10	58	27	50	7	12.4	20	-	LMEU1208**ZNEN-MJ
TSN12R125M31.7-19-06	19	125	6	12	70	31.75	50	8	12.7	26.5	-	LMEU1208**ZNEN-MJ
TSN12R125M32.0E19-06	19	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1208**ZNEN-MJ
TSN12R160M38.1-19-07	19	160	7	14	100	38.1	63	10	15.9	29	-	LMEU1208**ZNEN-MJ
TSN12R160M40.0E19-07	19	160	7	14	82	40	63	9	16.4	38	-	LMEU1208**ZNEN-MJ
TSN12R200M40.0E19-08	19	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1208**ZNEN-MJ
TSN12R200M47.6-19-08	19	200	8	16	135	47.625	63	14	25.4	31.5	101.6	LMEU1208**ZNEN-MJ
TSN12R250M47.6-19-09	19	250	9	18	140	47.625	63	14	25.4	54	101.6	LMEU1208**ZNEN-MJ
TSN12R250M60.0E19-09	19	250	9	18	135	60	63	14	25.7	60	101.6	LMEU1208**ZNEN-MJ
TSN15R125M31.7-25-05	25	125	5	10	70	31.75	50	8	12.7	26.5	-	LMEU1509**ZNEN-MJ
TSN15R125M32.0E25-05	25	125	5	10	66	32	50	8	14.4	28.5	-	LMEU1509**ZNEN-MJ
TSN15R160M38.1-25-06	25	160	6	12	100	38.1	63	10	15.9	29	-	LMEU1509**ZNEN-MJ
TSN15R160M40.0E25-06	25	160	6	12	82	40	63	9	16.4	38	-	LMEU1509**ZNEN-MJ
TSN15R200M40.0E25-07	25	200	7	14	95	40	63	9	16.4	55	66.7	LMEU1509**ZNEN-MJ
TSN15R200M47.6-25-07	25	200	7	14	135	47.625	63	14	25.4	31.5	101.6	LMEU1509**ZNEN-MJ
TSN15R250M47.6-25-08	25	250	8	16	140	47.625	63	14	25.4	54	101.6	LMEU1509**ZNEN-MJ
TSN15R250M60.0E25-08	25	250	8	16	135	60	63	14	25.7	60	101.6	LMEU1509**ZNEN-MJ

Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

SPARE PARTS

Designation	Clamping screw	Grip	Torx bit
TSN10/12R...	SM40-143-H0	H-TB	BT15S
TSN15R...	CSTB-5L159	H-TB	BT20S

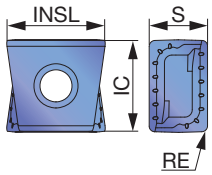
*Recommended clamping torque (N·m): SM40-143-H0=1.3, CSTB-5L159=5

Reference pages: Inserts, Standard cutting conditions → H201

INSERT

LMEU-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	Coated				INSL	IC	S
		AH120	AH140	AH725	AH3135			
LMEU100808ZNEN-MJ	0.8	●	●	●	●	12.7	10.5	8
LMEU100810ZNEN-MJ	1	●			●	12.7	10.5	8
LMEU100816ZNEN-MJ	1.6	●	●	●	●	12.5	10.5	8
LMEU100820ZNEN-MJ	2	●			●	12.4	10.5	8
LMEU100824ZNEN-MJ	2.4	●	●	●	●	12.4	10.5	8
LMEU100830ZNEN-MJ	3	●			●	12.2	10.5	8
LMEU100832ZNEN-MJ	3.2	●	●	●	●	12.2	10.5	8
LMEU120808ZNEN-MJ	0.8	●	●	●	●	13.6	12.7	8
LMEU120816ZNEN-MJ	1.6	●	●	●	●	13.4	12.7	8
LMEU120820ZNEN-MJ	2	●			●	13.3	12.7	8
LMEU120824ZNEN-MJ	2.4	●	●	●	●	13.2	12.7	8
LMEU120830ZNEN-MJ	3	●			●	13.1	12.7	8
LMEU120832ZNEN-MJ	3.2	●	●	●	●	13.1	12.7	8
LMEU150908ZNEN-MJ	0.8	●	●	●	●	15.6	15	9.5
LMEU150916ZNEN-MJ	1.6	●	●	●	●	15.4	15	9.5
LMEU150920ZNEN-MJ	2	●			●	15.4	15	9.5
LMEU150924ZNEN-MJ	2.4	●	●	●	●	15.3	15	9.5
LMEU150930ZNEN-MJ	3	●			●	15.2	15	9.5
LMEU150932ZNEN-MJ	3.2	●	●	●	●	15.1	15	9.5
LMEU150940ZNEN-MJ*	4	●			●	14.9	15	9.5
LMEU150950ZNEN-MJ*	5	●			●	14.7	15	9.5

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

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per edge line: *fz* (mm/t) TSN / ASN ae / DC (mm) 10%	20%	30%	≤ 50%
P	Low carbon steels SS400, etc. E275A, etc.	- 200	First choice	AH3135	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		- 200	Fracture resistance	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	High carbon steels S45C, etc. C45, etc.	200 - 300	First choice	AH3135	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		200 - 300	Fracture resistance	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	Alloy steels SCM440, etc. 42CrMo4, etc.	150 - 300	First choice	AH3135	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		150 - 300	Fracture resistance	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	Tool steels SKD61, etc. X40CrMoV5-1, etc.	- 300	First choice	AH3135	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		- 300	Fracture resistance	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	-	AH3135	90 - 200	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
K	Grey cast irons FC250, etc. 250, etc.	150 - 250	-	AH120	120 - 230	0.22 - 0.5	0.16 - 0.38	0.14 - 0.32	0.13 - 0.3
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 - 250	-	AH120	90 - 150	0.22 - 0.33	0.16 - 0.25	0.14 - 0.21	0.13 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.12 - 0.22	0.09 - 0.16	0.07 - 0.14	0.07 - 0.13
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.12 - 0.22	0.09 - 0.16	0.07 - 0.14	0.07 - 0.13

PROFILEMILL SERIES



Lineups and Application Ranges

- All inserts are precision ground, making them suitable for various applications ranging from roughing to finishing
- Increased reliability thanks to the innovative insert clamping design

Finishing

Semi-Finishing

Roughing

Ball type



BALL FINISH NOSE

Tool diameter ø8 - 32
(R4 – R16)



BALL ROUGH NOSE

Tool diameter ø16 - 25
(R8 - R12.5)

Radius type



BALL FINISH NOSE

Tool diameter ø12 - 20
(R0.5 – R1.5)



DO MINI MILL

Tool diameter ø16 - 25
(R0.5, R1.0)

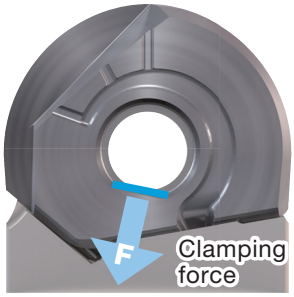
Reference pages: BallFinishNose → H206 - H209, BallRoughNose → H204 - H205, DoMini-Mill → H211

BALL FINISH NOSE



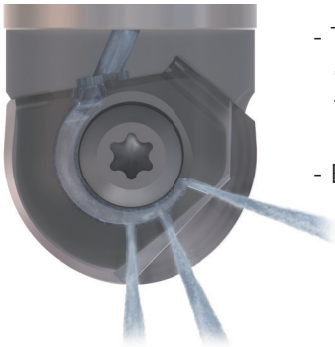
Indexable endmill for high precision finishing!

Secure clamping mechanism



- Clamping force gathers on the flat part of the insert hole as the screw is tightened.
- The force pushes the insert towards the cutter body, providing high repeatability and rigidity as well as minimum run-out.

Unique coolant delivery system



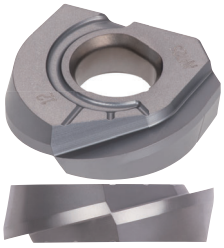
- The coolant channel on insert surface, delivers coolant to the cutting edge from three directions.

- Excellent chip evacuation and cooling effect provides good surface finish and long tool life in machining of hardened steel.

Two insert varieties

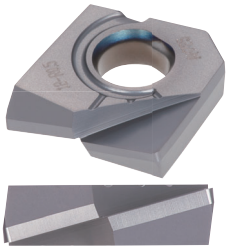
MJ chipbreaker

Ball nose type: ZFBM



- Suitable for finishing and three-dimensional milling of die & mold
- Applicable for a wide range of operations

Radius type: ZFRM



- Suitable for finishing of die & mold
- Designed for milling with high productivity

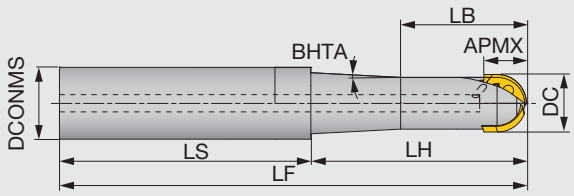
Reference pages: H206 - H209

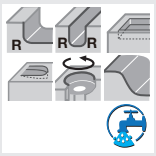
ROUGH BALLRNOSE

EBRM...

Ball nose endmill for semi-roughing, shank type, with screw clamp system







Designation	APMX	DC	CICT	DCONMS	LS	LF	LH	LB	BHTA	WT(kg)	Air hole	Insert
EBRM16T20S130	11.8	16	2	20	70	130	60	35	3	0.235	With	ZRBM160...
EBRM16T20S200	11.8	16	2	20	140	200	60	35	3	0.395	With	ZRBM160...
EBRM20T25S160	13.6	20	2	25	85	160	75	45	3	0.455	With	ZRBM200...
EBRM20T25S220	13.6	20	2	25	135	220	85	60	5	0.655	With	ZRBM200...
EBRM25T32S200	17.7	25	2	32	115	200	85	55	6	0.965	With	ZRBM250...
EBRM25T32S300	17.7	25	2	32	180	300	120	70	4	1.505	With	ZRBM250...

SPARE PARTS

Designation	Clamping screw	Wrench
EBRM16...	TS25064I	T-8D
EBRM20...	TS30085I/HG	T-9D
EBRM25...	TS35085I/HG	T-15D

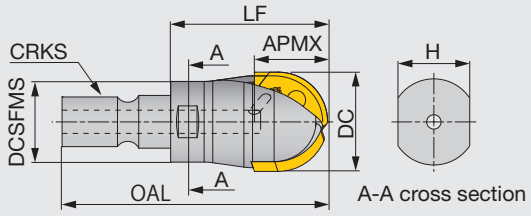
*Recommended clamping torque (N·m) :TS25064I=1.3, TS30085I/HG=2.3, TS35085I/HG=3.5

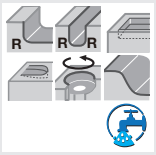
ROUGH BALLRNOSE

HBRM...

Ball nose endmill for semi-roughing, modular type, with screw clamp system (TungFlex)







Designation	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HBRM16M08	11.8	16	2	42.5	25	10	13	M8	0.025	With	ZRBM160...
HBRM20M10	13.6	20	2	50	30	15	18	M10	0.05	With	ZRBM200...
HBRM25M12	17.7	25	2	57	35	17	21	M12	0.08	With	ZRBM250...

SPARE PARTS

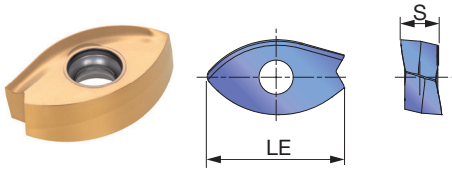
Designation	Clamping screw	Wrench
HBRM16...	TS25064I	T-8D
HBRM20...	TS30085I/HG	T-9D
HBRM25...	TS35085I/HG	T-15D

*Recommended clamping torque (N·m) :TS25064I=1.3, TS30085I/HG=2.3, TS35085I/HG=3.5

Reference pages: Inserts, Standard cutting conditions → H205

INSERT

ZRBM...



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

★ : First choice
☆ : Second choice

Designation	RE	Coated APH730	LE	S
ZRBM160-MM	8	●	12.4	3.7
ZRBM200-MM	10	●	14.9	4.8
ZRBM250-MM	12.5	●	18.9	5.9

●: Line up
5 piece per package

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Selection criteria	Recommended grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, etc. C15, etc.	- 300HB	First choice	APH730	MM	150 - 350	0.08 - 0.6
	High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	- 300HB	First choice	APH730	MM	120 - 320	0.05 - 0.5
	Prehardened steels NAK80, PX5 etc.	30 - 40HRC	First choice	APH730	MM	100 - 200	0.05 - 0.5
M	Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	- 200HB	First choice	APH730	MM	100 - 280	0.05 - 0.6
	Martensitic stainless steel SUS420J1, etc. X20Cr13, etc.	- 200HB	First choice	APH730	MM	100 - 300	0.05 - 0.6
K	Gray cast irons FC250, etc. 250, etc.	150 - 250HB	First choice	APH730	MM	120 - 380	0.08 - 0.6
	Ductile cast iron FCD600, etc. 600-3, etc.	150 - 250HB	First choice	APH730	MM	100 - 280	0.08 - 0.6
S	Titanium alloy Ti-6Al-4V, etc.	-	First choice	APH730	MM	20 - 80	0.05 - 0.6
	Heat-resistance alloys Inconel718, etc.	-	First choice	APH730	MM	20 - 60	0.05 - 0.4
H	Hardened steel SKD61, etc. X40CrMoV51, etc.	40 - 50HRC	First choice	APH730	MM	40 - 80	0.05 - 0.2
	Hardened steel SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	APH730	MM	30 - 60	0.04 - 0.14

The above cutting parameters are for reference. Adjustments may be required depending on applications, machine powers and rigidity, and/or workpiece fixture/clamping methods.

BALL FINISH NOSE

EBFM

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



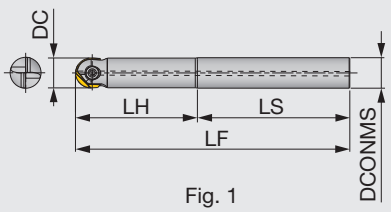


Fig. 1

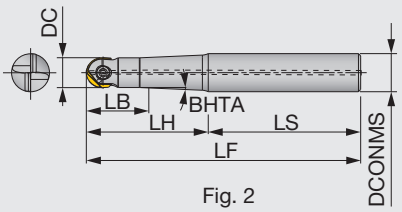
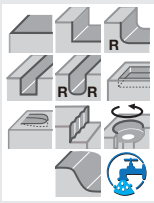


Fig. 2



Designation	DC	DCONMS	LS	LH	LF	LB	BHTA	Air hole	Fig.	Shank material	Insert
EBFM08T12S100	8	12	80	20	100	10	9.5°	With	2	Steel	ZFBM080...
EBFM08S08C100	8	8	70	30	100	-	-	Without	1	Carbide	ZFBM080...
EBFM08S08C140	8	8	75	65	140	-	-	Without	1	Carbide	ZFBM080...
EBFM10T12S100	10	12	75	25	100	15	5°	With	2	Steel	ZFBM100...
EBFM10S10C140	10	10	65	75	140	-	-	Without	1	Carbide	ZFBM100...
EBFM10S10C220	10	10	80	140	220	-	-	Without	1	Carbide	ZFBM100...
EBFM12S12S110	12	12	80	30	110	-	-	With	1	Steel	ZF*M120...
EBFM12S12C160	12	12	70	90	160	-	-	Without	1	Carbide	ZF*M120...
EBFM12S12C220	12	12	70	150	220	-	-	Without	1	Carbide	ZF*M120...
EBFM16T20S130	16	20	80	50	130	15.5	1.5°	With	2	Steel	ZF*M160...
EBFM16S16C160	16	16	80	80	160	-	-	Without	1	Carbide	ZF*M160...
EBFM16S16C220	16	16	70	150	220	-	-	Without	1	Carbide	ZF*M160...
EBFM20T25S180	20	25	100	80	180	24	2.5°	With	2	Steel	ZF*M200...
EBFM20S20C220	20	20	100	120	220	-	-	Without	1	Carbide	ZF*M200...
EBFM20S20C300	20	20	80	220	300	-	-	Without	1	Carbide	ZF*M200...
EBFM25T32S200	25	32	100	100	200	32	1.5°	With	2	Steel	ZFBM250...
EBFM25S25C220	25	25	100	120	220	-	-	Without	1	Carbide	ZFBM250...
EBFM25S25C300	25	25	80	220	300	-	-	Without	1	Carbide	ZFBM250...
EBFM30T32S220	30	32	120	100	220	35	0.5°	With	2	Steel	ZFBM300...
EBFM30S32C250	30	32	100	150	250	-	-	Without	1	Carbide	ZFBM300...
EBFM30S32C350	30	32	100	250	350	-	-	Without	1	Carbide	ZFBM300...
EBFM32S32S250	32	32	150	100	250	-	-	With	1	Steel	ZFBM320...
EBFM32S32C300	32	32	80	220	300	-	-	Without	1	Carbide	ZFBM320...

SPARE PARTS






Designation	Clamping screw	Torx bit	Grip	Wrench
EBFM08...	TS 25F080A	-	-	T-8D
EBFM10...	TS 30F100A	-	-	T-10D
EBFM12...	TS 40F120A	-	-	T-15D
EBFM16...	TS 50F160A	BT20S	H-TB2W	-
EBFM20...	TS 60F200A	BLDT25/M7	H-TB2W	-
EBFM25...	TS 70F250A	BLDT25/M7	H-TB2W	-
EBFM30...	TS 80F300A	-	-	T-T30
EBFM32...	TS 80F300A	-	-	T-T30

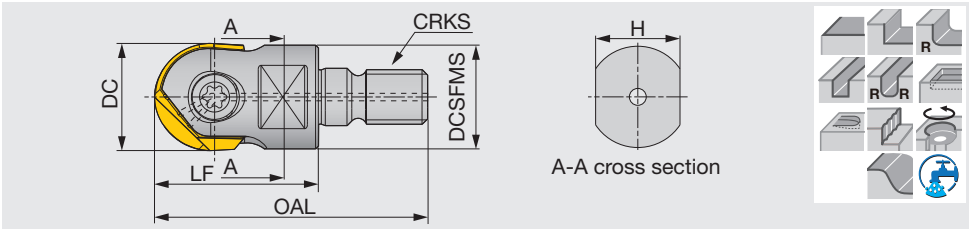
*Recommended clamping torque (N·m) : TS 25F080A=1.3, TS 30F100A=2.5, TS 40F120A=3.5, TS 50F160A=5, TS 60F200A=7, TS 70F250A=7, TS 80F300A=10

Reference pages: Inserts → H208, Standard cutting conditions → H209

BALL FINISH NOSE
HBFM

High precision finishing endmill, modular type, with screw clamp system (TungFlex)





Designation	DC	OAL	LF	H	DCSFMS	CRKS	Air hole	Insert
HBFM10M06	10	34.5	20	7	9.7	M6	With	ZFBM100...
HBFM12M06	12	37.5	23	7	11.5	M6	With	ZF*M120...
HBFM12M08	12	40	23	10	13	M8	With	ZF*M120...
HBFM16M08	16	47	30	10	13	M8	With	ZF*M160...
HBFM20M10	20	49	30	15	19	M10	With	ZF*M200...
HBFM25M12	25	57	35	17	24	M12	With	ZFBM250...
HBFM30M16	30	66	43	22	29	M16	With	ZFBM300...
HBFM32M16	32	66	43	22	29.5	M16	With	ZFBM320...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS



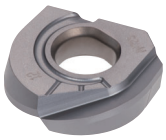
Designation	Clamping screw	Torx bit	Grip	Wrench
HBFM10...	TS 30F100A	-	-	T-10D
HBFM12...	TS 40F120A	-	-	T-15D
HBFM16...	TS 50F160A	BT20S	H-TB2W	-
HBFM20...	TS 60F200A	BLDT25/M7	H-TB2W	-
HBFM25...	TS 70F250A	BLDT25/M7	H-TB2W	-
HBFM30...	TS 80F300A	-	-	T-T30
HBFM32...	TS 80F300A	-	-	T-T30

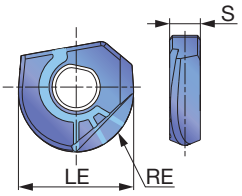
*Recommended clamping torque (N·m) : TS 25F080A=1.3, TS 30F100A=2.5, TS 40F120A=3.5, TS 50F160A=5, TS 60F200A=7, TS 70F250A=7, TS 80F300A=10

Reference pages: Inserts → H208, Standard cutting conditions → H209, TungFlex → H210

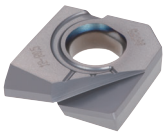
INSERT

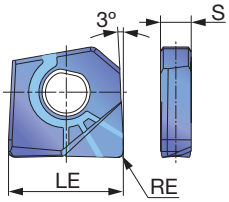
ZFBM-MJ





ZFRM-MJ





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

★ : First choice
☆ : Second choice

Designation	RE	Coated		LE	S
		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

●: Line up
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

Reference pages: Standard cutting conditions → H209, TungFlex → H210

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Max. depth of cut (mm)	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t)							
							D8	D10	D12	D16	D20	D25	D30	D32
P	Low carbon steel, alloy steel	85 - 180 HB	First choice	AH725	≤ 0.04D	180 - 260	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
		85 - 180 HB	Wear resistance	AH710	≤ 0.04D	180 - 260	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
	High carbon steel, alloy steel	180 - 280 HB	First choice	AH725	≤ 0.03D	150 - 230	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
		180 - 280 HB	Wear resistance	AH710	≤ 0.03D	180 - 230	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
	Prehardened steel Die & mold tool steel	40 - 48 HRC	First choice	AH710	≤ 0.03D	180 - 300	0.15	0.15	0.2	0.2	0.25	0.25	0.3	0.3
		40 - 48 HRC	Fracture resistance	AH725	≤ 0.03D	180 - 300	0.15	0.15	0.2	0.2	0.25	0.25	0.3	0.3
M	Stainless steel	135 - 200 HB	First choice	AH725	≤ 0.03D	100 - 250	0.1	0.15	0.2	0.2	0.25	0.25	0.3	0.3
K	Cast iron	150 - 240 HB	First choice	AH710	≤ 0.04D	90 - 350	0.2	0.2	0.25	0.3	0.3	0.35	0.4	0.4
		150 - 240 HB	Fracture resistance	AH725	≤ 0.04D	90 - 350	0.2	0.2	0.25	0.3	0.3	0.35	0.4	0.4
N	Aluminium	-	First choice	AH725	≤ 0.03D	200 - 400	0.25	0.25	0.35	0.35	0.35	0.4	0.4	0.45
S	Titanium alloy	-	First choice	AH725	≤ 0.03D	30 - 80	0.08	0.08	0.1	0.12	0.15	0.18	0.2	0.2
	Heat-resistance alloys	-	First choice	AH725	≤ 0.03D	20 - 60	0.08	0.08	0.1	0.12	0.15	0.18	0.2	0.2
H	High hardened steel	48 - 65 HRC	First choice	AH710	≤ 0.02D	50 - 180	0.08	0.08	0.1	0.13	0.15	0.2	0.2	0.25

· Remove excessive chip accumulation with an air blast.
· For the operation with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (*fz*) should be set to the lower recommended value shown in the above table.
· Cutting conditions maybe limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

How to clamp the insert

1. Clear chips and dust from the pocket.
2. Place the insert in the pocket. The insert can be placed only in one direction.
3. Tighten the screw while pressing the insert into the pocket.

How to check the run-out

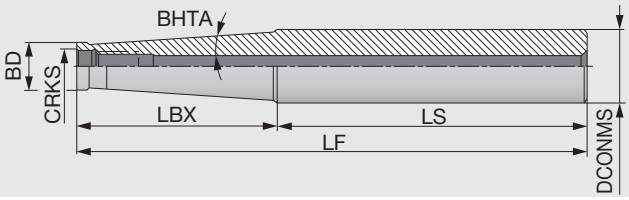
1. Clamp the insert on the shank.
2. Clamp the shank on a high-precision arbor.
3. Measure the run-out on tool presetter or by dial gauge.

Notes:
1. Due to the helical cutting edge, it is important that the run-out is inspected with the insert clamped on the shank.
2. Do not use micrometer or caliper to inspect the insert diameter as inaccurate dimensions may be provided.

TungFlex

TungFlex modular shank





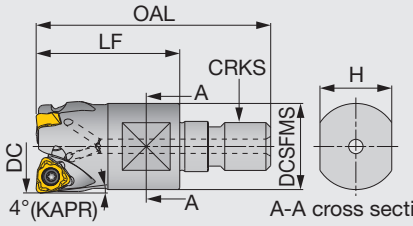
Designation	DCONMS	LF	LS	LBX	BD	CRKS	BHTA	Shank type
SM06-L60C10	10	60	40	20	9.7	M6	0°	Cylindrical
SM06-L105-C12	12	105	45	60	9.7	M6	1.2°	Cylindrical
SM06-L125-C16	16	125	65	60	9.7	M6	3.3°	Cylindrical
SM08-L73C16	16	73	48	25	13	M8	0°	Cylindrical
SM08-L128-C16	16	128	48	80	13	M8	0.9°	Cylindrical
SM08-L170-C20	20	170	103.2	66.8	13	M8	3.3°	Cylindrical
SM10-L80-C20	20	80	50	30	18	M10	0°	Cylindrical
SM10-L130-C20	20	130	50	80	18	M10	0.6°	Cylindrical
SM10-L200-C25	25	200	142.8	57.2	19	M10	3.3°	Cylindrical
SM12-L86-C25	25	86	56	30	21	M12	5.1°	Cylindrical
SM12-L200-C32	32	200	122	78	21	M12	4.4°	Cylindrical
SM16-L95-C32	32	95	60	35	29	M16	1.7°	Cylindrical
SM16-L230-C32	32	230	180	50	29	M16	1.8°	Cylindrical

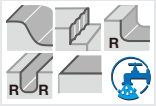
HFWX04-M

Small-radius finishing endmill, modular type (TungFlex)

GAMP = 0°, GAMF = -14°







Designation	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HFWX04M016M08R02	16	2	42	25	10	13	M8	0.03	With	WXHU04...
HFWX04M020M10R03	20	3	49	30	15	18	M10	0.05	With	WXHU04...
HFWX04M025M12R04	25	4	52	30	17	21	M12	0.09	With	WXHU04...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS



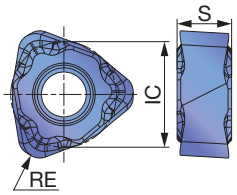


Designation	Clamping screw	Lubricant	Wrench
HFWX04M...	SR34-514	M-1000	T-7F

*Recommended clamping torque (N·m) : SR34-514=0.9

INSERT

WXHU-MJ

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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH110	IC	S
WXHU040305R-MJ	0.5	0.5	●	6.35	3.18
WXHU040310R-MJ	1	1	●	6.35	3.18

* For plunging, the maximum cutting width is 2 mm.

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material		Hardness	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	High carbon steel S45C, S55C, etc. C45, C55, etc.		200 - 300 HB	AH110	100 - 300	0.1 - 0.3
P	Alloy steel SCM440, etc. 42CrMo4, SCr145, etc.		150 - 300 HB	AH110	100 - 300	0.1 - 0.3
P	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	AH110	100 - 300	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	AH110	80 - 130	0.1 - 0.3
H	Hardened steel	SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	AH110	50 - 100	0.05 - 0.15

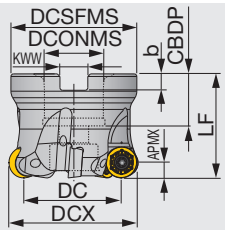
Reference pages: TungFlex → H210

FIXRMILL
TRP10/12/16

Radius mill with anti-rotation system

GAMP = +4°, GAMF = -4°







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

SPARE PARTS







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

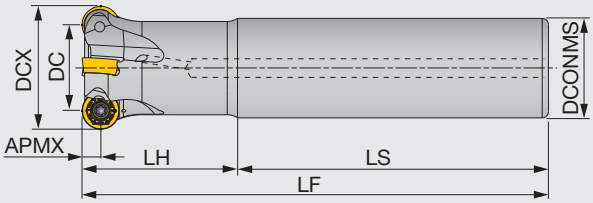
*Recommended clamping torque (N·m) :CSPB-3.5S/CSTR-4L100=3.5, CSPB-5=5

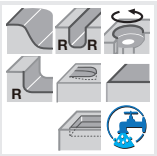
FIXRMILL
ERP

Radius endmill with anti-rotation system, shank type

GAMP = +10°~ +4°, GAMF = -2°~ -8.5°







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

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

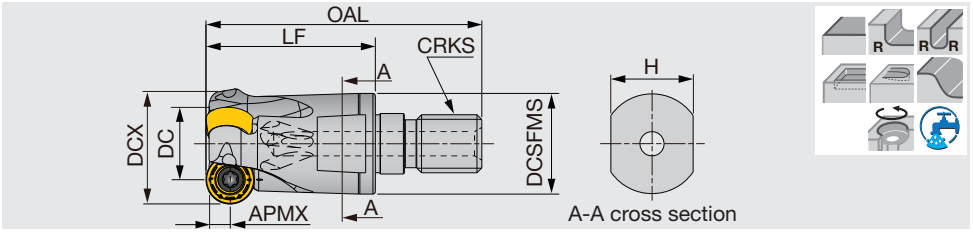
*Recommended clamping torque (N·m) :CSPB-3.5S/CSTR-4L100=3.5, CSPB-5=5

Reference pages: Inserts → H213, Standard cutting conditions → H214 - H215

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

GAMP = 1°~ 4°, GAMF = -8.5°~ 2°





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

Please see the page **H210** for TungFlex modular shank.

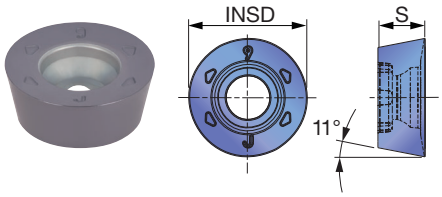
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	
			Bit	Grip
HRP10R**	CSPB-3.5S	M-1000	BLD IP15/S7	H-TBS
HRP12R**	CSTR-4L100	M-1000	BT15S	H-TBS

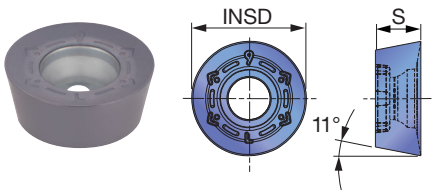
*Recommended clamping torque (N·m) :CSPB-3.5S/CSTR-4L100=3.5

INSERT

RPMT-MJ



RPMT-ML



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

★ : First choice
☆ : Second choice

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

●: Line up

Reference pages: Standard cutting conditions → H214 - H215, TungFlex → H210

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels S45C, S55C, etc. C45, C55, etc.	< 300 HB	First choice	AH725	MJ	120 - 250	0.3 - 0.7
		< 300 HB	Fracture resistance	AH130	MJ	120 - 250	0.3 - 0.7
	Alloy steels SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc.	150 - 300 HB	First choice	AH725	MJ	100 - 250	0.2 - 0.6
		150 - 300 HB	Fracture resistance	AH130	MJ	100 - 250	0.2 - 0.6
	Tool steels SKD11, etc. X153CrMoV12, etc.	< 300 HB	-	AH725	ML	80 - 180	0.2 - 0.4
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	< 200 HB	First choice	AH130	ML	100 - 250	0.2 - 0.6
		< 200 HB	Fracture resistance	AH130	MJ	100 - 250	0.2 - 0.6
	Stainless steels SUS430, etc. X6Cr17, etc.	< 200 HB	First choice	AH4035	ML	100 - 300	0.2 - 0.6
		< 200 HB	Fracture resistance	AH4035	MJ	100 - 300	0.2 - 0.6
K	Grey cast irons FCD250, etc. 250, etc.	150 - 250 HB	-	AH725	ML	120 - 250	0.3 - 0.7
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 - 250 HB	-	AH725	ML	100 - 200	0.3 - 0.7
H	Hardened steels SKD61, etc X40CrMoV5-1, etc.	40 - 50 HRC	-	AH725	MJ	60 - 140	0.1 - 0.3
	Hardened steels SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	-	AH725	MJ	20 - 60	0.05 - 0.2

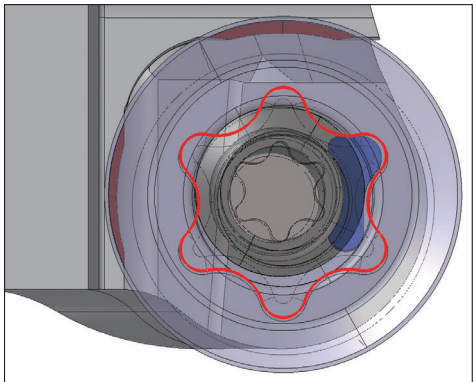
· Use air blast to remove chips from the work area in slot milling or pocketing operation.
· When machining at high cutting speeds of more than *Vc* = 1000 m/min, the dynamic balance of the tools must be adjusted.
· Cutting conditions are limited by machine power, workpiece rigidity and spindle output. When the cutting width or depth is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

Tool dia.: DCX (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Depth of cut: *ap* = 2.0 mm

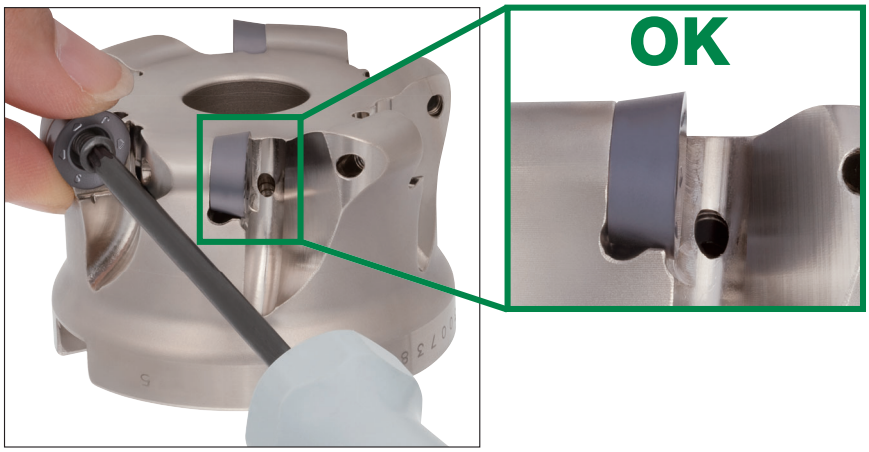
ø20		ø25		ø32			ø35		ø40				ø50		ø63	
n	*Vf* E/HRP10	*n*	*Vf* E/HRP10, E/HRP12	*n*	*Vf* E/HRP10	E/HRP12	*n*	*Vf* ERP10	*n*	*Vf* TRP10	ERP12	ERP16	*n*	*Vf* ERP12	*n*	*Vf* TRP12	TRP16
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2070	1240	1660	1000	1290	1550	1160	1180	1420	1030	1550	1240	620	830	1250	660	1190	990
Vc = 130 m/min, *fz* = 0.3 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, *fz* = 0.4 mm/t																	
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, *fz* = 0.4 mm/t																	
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2390	2390	1910	1910	1490	2980	2240	1360	2720	1190	2980	2380	1190	950	2380	760	2280	1900
Vc = 150 m/min, *fz* = 0.5 mm/t																	
1590	630	1270	510	990	790	590	910	730	800	800	640	320	640	640	510	610	510
Vc = 100 m/min, *fz* = 0.2 mm/t																	
640	150	510	120	400	190	140	360	170	320	190	150	75	250	150	200	140	120
Vc = 40 m/min, *fz* = 0.12 mm/t																	

■ Caution for insert clamping

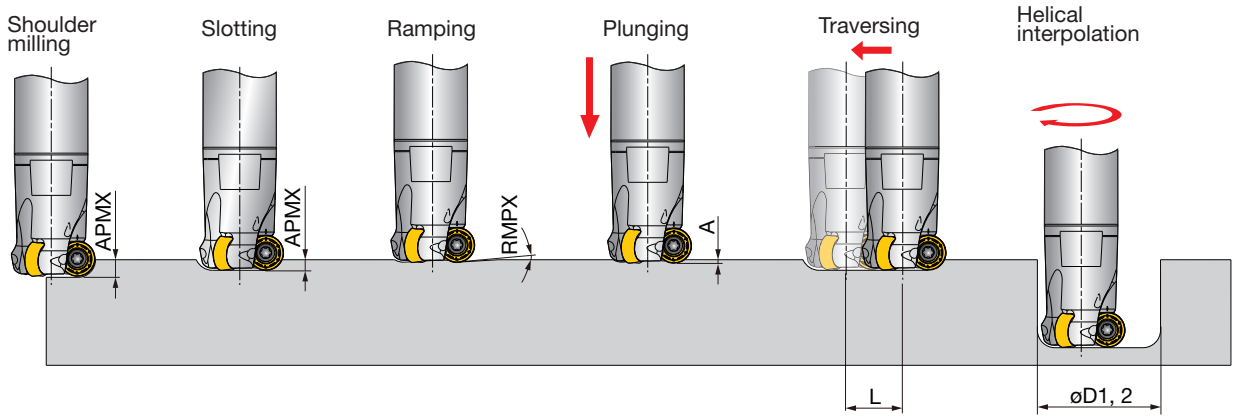
When clamping an insert, please carefully locate it in the seat, fasten the screw, and make sure there is no gap between it and the body.



Set the insert cavity to fit the protrusion on the body.



APPLICATION RANGE



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

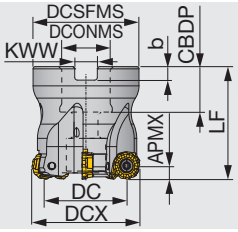
*For flat bottom hole

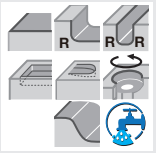
ROUNDSPLIT
TRC12/16

Face mill, for round inserts with 6mm or 8mm radius

GAMP = +0°, GAMF = -1°~ -5°





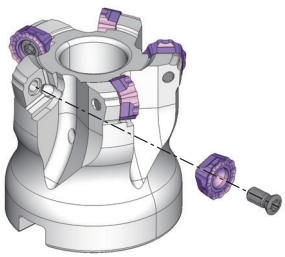


Designation	APMX	DCX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TRC12R040M16.0-04	6	28	4	40	35	40	16	18	8.2	5.6	0.2	With	RCMT1204...
TRC12R040M16.0E04	6	28	4	40	35	40	16	19	8.4	5.6	0.2	With	RCMT1204...
TRC12R050M22.0-05	6	38	5	50	47	50	22	20	10	6	0.4	With	RCMT1204...
TRC12R050M22.0E05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

SPARE PARTS

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

*Recommended clamping torque (N·m) : CSTB-4L090=3.5, CSTB-5L120=5



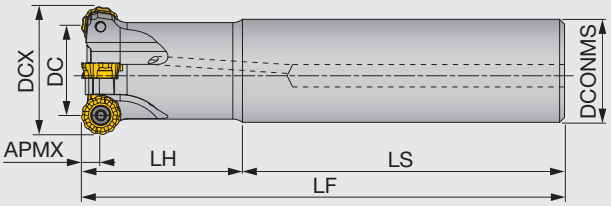
Reference pages: Inserts, Standard cutting conditions → H219

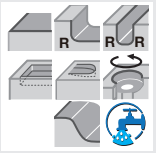
ROUNDSPLIT
ERC12/16

Endmill, shank type, for round inserts with 6mm or 8mm radius

GAMP = +0°, GAMF = -1°~ -5°







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

SPARE PARTS





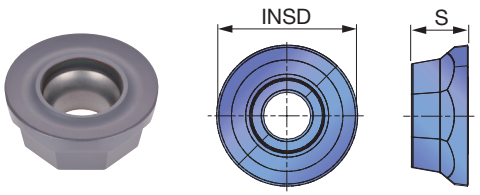
Designation	Clamping screw	Wewnch
ERC12R...	CSTB-4L090	T-15DB
ERC16R040...	CSTB-5L105	T-20DB
ERC16R050...	CSTB-5L120	T-20DB

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

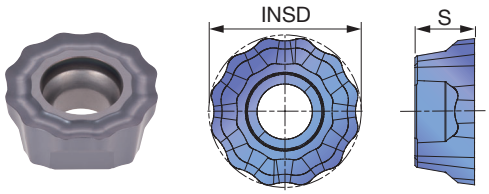
Reference pages: Inserts, Standard cutting conditions → H219

INSERT

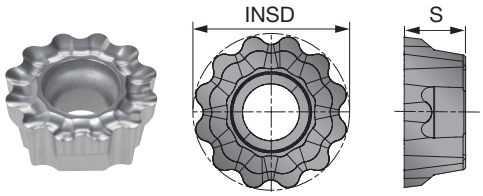
RCMT-MJ



RCMT-NMJ



RCMT-NAJ



		AH120	AH140	AH725	KS15F
P	Steel	☆		★	
M	Stainless		★	☆	
K	Cast iron	★		☆	
N	Non-ferrous				★
S	Superalloys	★		★	
H	Hard materials				

★ : First choice
☆ : Second choice

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

●: Line up

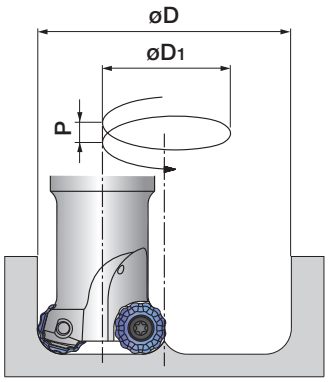
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) each chipbreaker MJ	NMJ	NAJ
P	Low carbon steels S15C, SS400, etc. C15E4, E275A, etc.	~ 200	AH725	100 - 220	0.2 - 0.7	0.17 - 0.3	-
	High carbon steels S45C, S55C, etc. C45, C55, etc.	200 ~ 300	AH725	100 - 200	0.2 - 0.7	0.17 - 0.25	-
	Alloyed steels SCM440, SCr415, etc. 42CrMo4, 20Cr4, etc.	150 ~ 300	AH725	100 - 200	0.2 - 0.7	0.17 - 0.25	-
	Tool steels SK, SKH, etc. X40CrMoV5-1, etc.	~ 300	AH725	100 - 180	0.2 - 0.7	0.17 - 0.25	-
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	AH140	90 - 180	0.2 - 0.6	0.15 - 0.25	-
K	Grey cast irons FC250, FC300, etc. 250, 300, etc.	150 ~ 250	AH120	140 - 250	0.2 - 0.7	0.17 - 0.3	-
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 ~ 250	AH120	140 - 250	0.2 - 0.7	0.17 - 0.3	-
N	Aluminium alloys Si < 13%	-	KS15F	500 - 1200	-	-	0.1 - 0.3
	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 300	-	-	0.1 - 0.3
S	Heat-resisting alloy Inconel 718, Ti-6Al-4V, etc.	-	AH725	20 - 50	0.2 - 0.6	0.15 - 0.25	-

· To remove excessive chip accumulation use an air blast.
· When chips stick to the cutting edges (aluminium machining), use a water soluble cutting fluid.

· Cutting conditions are limited by machine power and material rigidity. When the cutting width or depth is large, set Vc and fz below the recommended values and check the machine vibration and spindle load.

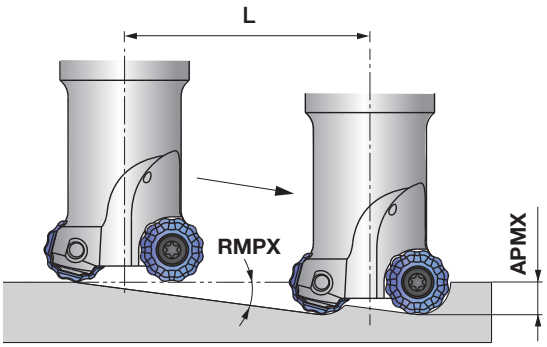
Holemaking with helical feed



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

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

Ramping



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

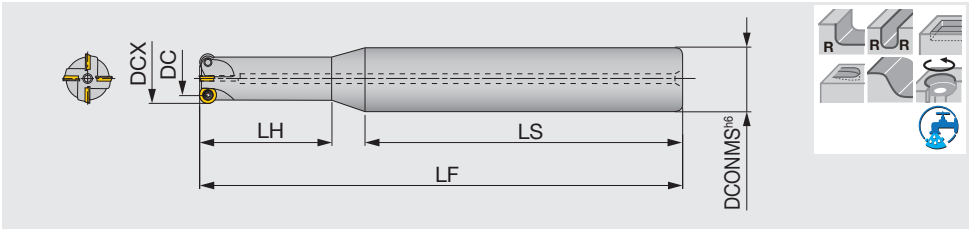
Tool pass length: L = *a*p / tan RMPX, Ramping angle needs to be set at smaller than 2 degrees in order to prevent chips from getting tangled.

EWD05/07/10

Endmill, shank type, for round inserts with 2.5 mm, 3.5 mm, or 5 mm radius

GAMP = 0°, GAMF = -3°~ +0.5°





Designation	APMX	DC	CICT	DCX	DCONMS	LS	LH	LF	Air hole	Insert
EWD05010R	2.5	5	2	10	20	80	20	130	With	RDMW05...
EWD05012R	2.5	7	3	12	20	80	20	130	With	RDMW05...
EWD07015R	3.5	8	3	15	20	100	40	150	With	RDMW07...
EWD05015R	2.5	10	4	15	20	100	40	150	With	RDMW05...
EWD10020R	5.0	10	2	20	25	120	40	170	With	RDMW10...
EWD07020R	3.5	13	4	20	25	120	40	170	With	RDMW07...
EWD05020R	2.5	15	5	20	25	120	40	170	With	RDMW05...
EWD10025R	5.0	15	3	25	32	125	45	195	With	RDMW10...
EWD07025R	3.5	18	5	25	32	125	45	195	With	RDMW07...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch
EWD050**R	CSTD-1.8	M-1000	T-6D
EWD070**R	CSTB-2.5S	M-1000	T-8D
EWD100**R	CSTB-3.5H	M-1000	T-15D

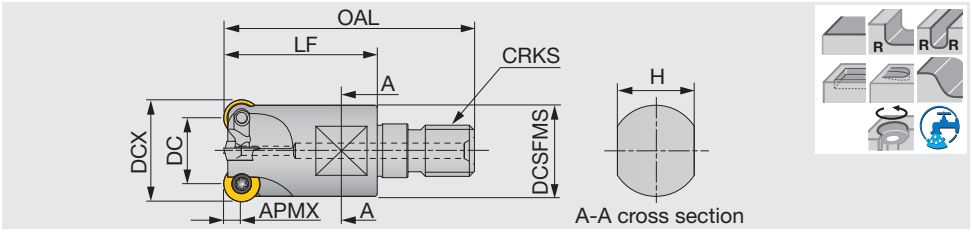
*Recommended clamping torque (N·m) :CSTD-1.8=0.7, CSTB-2.5S=1, CSTB-3.5H=3.5

HWD07-M

Endmill, modular type, for round inserts with 3.5 mm radius (TungFlex)

GAMP = 0°, GAMF = -3°~ +0.5°





Designation	APMX	DC	CICT	DCX	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole
HWD07R015MM08-03	3.5	8	3	15	42	25	10	12.8	M8	0.03	With
HWD07R020MM10-04	3.5	13	4	20	49	30	15	17.8	M10	0.06	With
HWD07R025MM12-05	3.5	18	5	25	57	35	17	20.8	M12	0.1	With
HWD07R030MM16-05	3.5	23	5	30	63	40	22	28.8	M16	0.2	With

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch
HWD07**M...	CSTB-2.5S	M-1000	T-8D

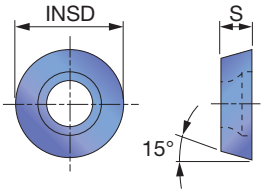
*Recommended clamping torque (N·m) :CSTB-2.5S=1

Reference pages: Inserts, Standard cutting conditions → H222, TungFlex → H210

INSERT

RDMW05/07/10





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

★ : First choice
☆ : Second choice

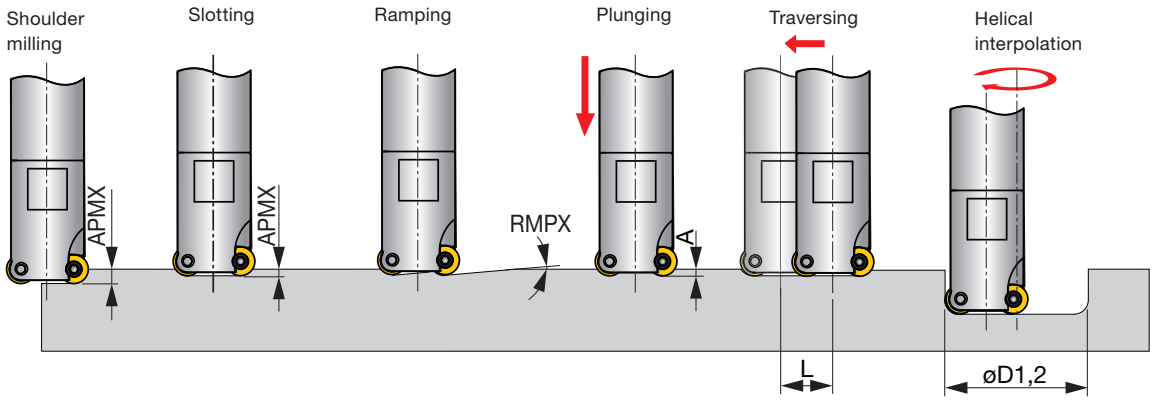
Designation	APMX	Coated AH120	INSD	S
RDMW0501M0	2.5	●	5	1.4
RDMW0702M0	3.5	●	7	2.38
RDMW1003M0	5.0	●	10	3.18

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Depth of cut: APMX (mm)		
					Cutter dia. ø10, 12	Cutter dia. ø15, 20	Cutter dia. ø25
P	Carbon steels S15C, SS400, etc. C45, etc. < 300 HB	AH120	200 ~ 500	0.15 ~ 0.45	~ 0.5	~ 0.7	~ 1
P	Alloy steels S55C, SCM440, etc. 42CrMo4, etc. < 300 HB	AH120	120 ~ 350	0.15 ~ 0.35	~ 0.5	~ 0.7	~ 1
P	Die steels SKD61, etc. X40CrMoV5-1, etc. < 300 HB	AH120	100 ~ 300	0.1 ~ 0.3	~ 0.5	~ 0.7	~ 1
K	Cast irons FC250, etc. 250, etc.	AH120	200 ~ 500	0.2 ~ 0.5	~ 0.5	~ 0.7	~ 1
H	Hardened steels, Prehardened steels < 40HRC	AH120	70 ~ 200	0.1 ~ 0.25	~ 0.5	~ 0.7	~ 1

APPLICATION RANGE



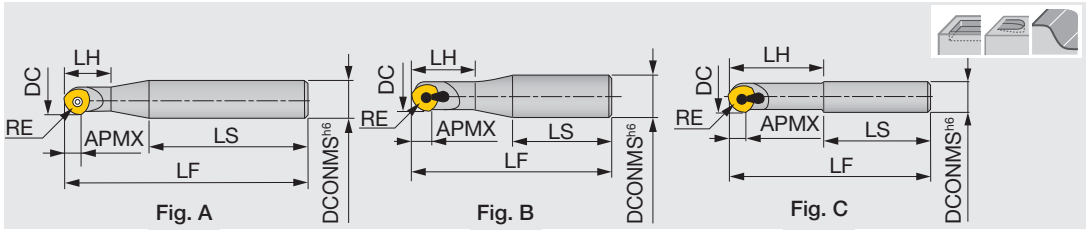
Designation	Tool-ø DCX	Max. depth of cut APMX	Max. ramping RMPX	Max. plunging depth A	Machining length for removing uncut portion L	Max. machining øD1	*Max. machining øD2
HWD07R015MM08-03	15	3.5	25°	2	ø*D*c - 6	23	28
HWD07R020MM10-04	20	3.5	11°	2	ø*D*c - 6	33	38
HWD07R025MM12-05	25	3.5	7°	2	ø*D*c - 6	43	48
HWD07R030MM16-05	30	3.5	5.5°	2	ø*D*c - 6	53	58

*For flat bottom hole

TBN1000

Ball nose endmill for semi-finishing





Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	RE	Insert	Fig.
TBN1100S	5	10	1	16	60	15	90	5	ZNCA1002FN2	A
TBN1120S	6	12	1	16	70	20	110	6	ZNCA1203FN	A
TBN1160S	8	16	1	20	85	25	130	8	ZNCA1603FN	A
TBN1200S	10	20	1	25	100	35	160	10	ZN**2004...	A
TBN1250S	12.5	25	1	32	100	45	175	12.5	ZN**2505...	B
TBN1300S	15	30	1	32	100	90	190	15	ZN**3005...	C

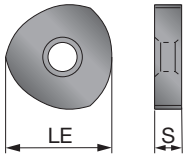
SPARE PARTS

Designation	Clamping screw	Clamp	Adjusting screw	Wewnch
TBN1100S	CSTB-2.5B	-	-	T-8D
TBN1120S	CSTB-3S	-	-	T-9D
TBN1160S	CSTB-4S	-	-	T-15D
TBN1200S	CSTA-5SS	-	-	T-15D
TBN1250S, 1300S	CSTA-5S	CP536	DS-6T	T-15D

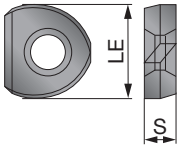
*Recommended clamping torque (N·m) : CSTB-2.5B=1.3, CSTB-3S=2.3, CSTB-4S/CSTA-5S/CSTA-5SS=3.5

INSERT

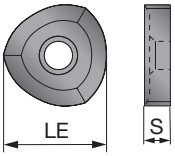
ZNCA-FN



ZNCA-FN2



ZNMM-EN



		UX30	TH10	LE	S
		Uncoated			
P	Steel	★			
M	Stainless				
K	Cast iron		★		
N	Non-ferrous				
S	Superalloys				
H	Hard materials				
Designation					
ZNCA1002FN2		●	●	7.958	2.5
ZNCA1203FN		●	●	9.735	3
ZNCA1603FN		●	●	12.772	3.5
ZNCA2004FN		●	●	15.862	4
ZNCA2505FN		●	●	19.826	5
ZNCA3005FN		●	●	23.618	5
ZNMM2004EN		●		15.862	4
ZNMM2505EN		●		19.826	5
ZNMM3005EN		●		23.618	5.5

★ : First choice
☆ : Second choice
●: Line up

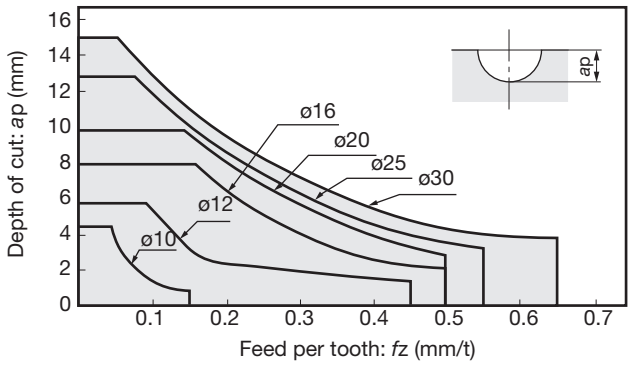
Reference pages: Standard cutting conditions→ H224

STANDARD CUTTING CONDITIONS

For finishing

ISO	Workpiece material	Grade	Cutting Speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Pick feed *Pf* (mm)
P	High carbon steel S45C, S55C, etc. C45, C55, etc.	UX30	80 - 120	0.1 - 0.3	0.3 - 0.5
P	Tool steel SK, SKH, etc. X153CrMoV12, etc.	UX30	60 - 100	0.08 - 0.25	0.3 - 0.5
K	Cast iron FC250, FCD400, etc. 250, 400-15S, etc.	TH10	80 - 120	0.1 - 0.5	0.3 - 0.5

GUIDELINES FOR SELECTING DEPTH OF CUT AND FEED

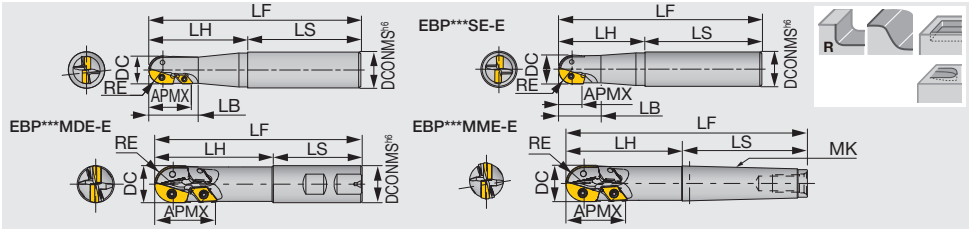


Workpiece material: Carbon steel (JIS S55C)
Insert grade: UX30
Machine power: ø10 ~ ø16: 7.5 kW
ø20 ~ ø30: 22.5 kW
No. of revolutions: ø10 ~ ø16: 2000 min^{-1}
ø20 ~ ø30: 1500 min^{-1}

EBP

Ball nose endmill for semi-finishing





Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	LB	RE	MK	Insert 1	Insert 2
EBP020SD-E	16	20	2	20	56	60	116	-	10	-	ZPET2004-MJ	-
EBP020SS	16	20	2	25	80	60	140	30	10	-	ZPET2004-MJ	-
EBP020MDE-E	29.5	20	2 (4)	20	56	70	126	-	10	-	ZPET2004-MJ	DCMW070204TN
EBP020MME-E	29.5	20	2 (4)	-	69	70	139	-	10	MK2	ZPET2004-MJ	DCMW070204TN
EBP020MSE	29.5	20	2 (4)	25	80	70	150	35	10	-	ZPET2004-MJ	DCMW070204TN
EBP020LSE	29.5	20	2 (4)	25	180	70	250	35	10	-	ZPET2004-MJ	DCMW070204TN
EBP025SD-E	21	25	2	25	60	70	130	-	12.5	-	ZPET2505-MJ	-
EBP025SS	21	25	2	32	80	70	150	35	12.5	-	ZPET2505-MJ	-
EBP025MDE-E	41	25	2 (4)	25	60	80	140	-	12.5	-	ZPET2505-MJ	DCMW11T304TN
EBP025MME-E	41	25	2 (4)	-	86	-	166	-	12.5	MK3	ZPET2505-MJ	DCMW11T304TN
EBP025MSE	41	25	2 (4)	32	100	80	180	50	12.5		ZPET2505-MJ	DCMW11T304TN
EBP025LSE	41	25	2 (4)	32	220	80	300	50	12.5	-	ZPET2505-MJ	DCMW11T304TN
EBP030SS	24	30	2	32	80	80	160	40	15	-	ZPET3006-MJ	-
EBP030MSE	45	30	2 (4)	32	100	100	200	55	15	-	ZPET3006-MJ	DCMW11T304TN
EBP030LSE	45	30	2 (4)	32	250	100	350	55	15	-	ZPET3006-MJ	DCMW11T304TN
EBP032SD-E	25	32	2	32	60		140	-	16	-	ZPET3206-MJ	-
EBP032MDE-E	46	32	2 (4)	32	60	100	160	-	16	-	ZPET3206-MJ	DCMW11T304TN
EBP032MME-E	46	32	2 (4)	-	109	100	209	-	16	MK4	ZPET3206-MJ	DCMW11T304TN

SPARE PARTS

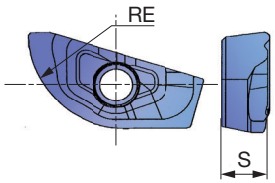


Designation	Clamping screw for Insert 1	Clamping screw for Insert 2	Lubricant	Wewnch 1 for Insert 1	Wewnch 2 for Insert 2
EBP020SS/SD-E	CSTD-3T	-	M-1000	T-10D	-
EBP025SS/SD-E	CSTB-4S	-	M-1000	T-15D	-
EBP030SS/032SD-E	CSTB-5S	-	M-1000	T-20D	-
EBP020*SE/M*E-E	CSTB-2.5S	CSTD-3T	M-1000	T-10D	T-8D
EBP025*SE/M*E-E	CSTB-4S	-	M-1000	T-15D	-
EBP030*SE/032M*E-E	CSTB-4S	CSTB-5S	M-1000	T-15D	T-20D

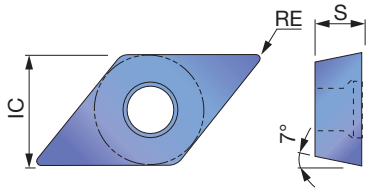
*Recommended clamping torque (N·m) : CSTB-2.5S=1.3, CSTD-3T=2.5, CSTB-4S=3.5, CSTB-5S=5

INSERT

ZPET-MJ (For R edge)



DCMW-TN (For P edge)



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

★ : First choice
☆ : Second choice

Designation	RE	Coated AH120	Coated AH330	IC	S
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

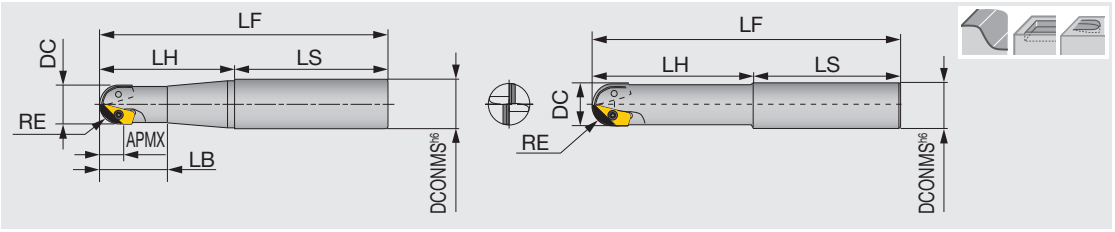
ZPET30... : 5 piece per package
●: Line up

Reference pages: Standard cutting conditions→ H226

EBB

Ball nose endmill for semi-finishing, for CBN inserts





Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	LB	RE	Insert
EBB020MS	12	20	2	25	80	70	150	35	10	ZPCW2003-QBN
EBB025MS	15.5	25	2	32	100	80	180	50	12.5	ZPCW25H3-QBN
EBB030MS	18	30	2	32	100	100	200	-	15	ZPCW30T3-QBN
EBB040MS	23	40	2	42	100	150	250	-	20	ZPCW4004-QBN
EBB050MS	28	50	2	50	100	150	250	-	25	ZPCW5004-QBN

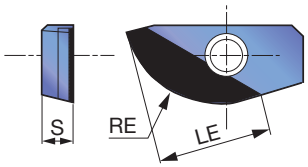
SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch	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	CSTB-5	M-1000	T-20D	CSP22
EBB050MS	CSTB-5	M-1000	T-20D	CSP22

*Recommended clamping torque (N·m) : CSTB-3S=2.3, CSTB-3.5/CSTB-4S=3.5, CSTB-5=5

INSERT

ZPCW-QBN



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

★ : First choice
☆ : Second choice

Designation	RE	CBN BX950	S	LE
ZPCW2003-QBN	10	●	3.18	12
ZPCW25H3-QBN	12.5	●	3.5	15.5
ZPCW30T3-QBN	15	●	3.97	18
ZPCW4004-QBN	20	●	4.76	23
ZPCW5004-QBN	25	●	4.76	28

●: Line up
BX950 : 1 piece per package

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	No. of revolutions n (min^{-1})	Feed per tooth fz (mm/t)	Depth of cut APMX (mm)	Pick feed Pf(mm)
K	Cast irons FC250, etc. 250, etc.	5,000 ~ 15,000	0.2 ~ 0.5	~ 1	~ 3
	Ductile cast irons FCD500, etc. 600-3, etc.	5,000 ~ 15,000	0.2 ~ 0.5	~ 1	~ 3

EBD

Ball nose endmill for roughing



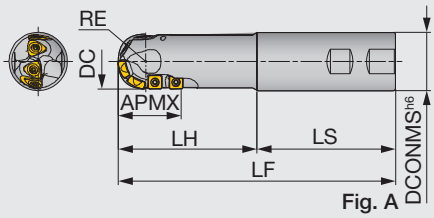


Fig. A

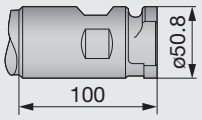
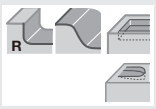


Fig. B



Combination shank

Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	RE	Fig.	Insert R	Insert P
EBD040SSE	45	40	4 (7)	42	100	100	200	20	A	ZDMT4005-MJ	SCMT09T308-23
EBD040MSE	45	40	4 (7)	42	100	150	250	20	A	ZDMT4005-MJ	SCMT09T308-23
EBD050SSE	59	50	4 (7)	42	100	100	200	25	A	ZDMT5006-MJ	SCMT120408-23
EBD050MSE	59	50	4 (7)	42	100	150	250	25	A	ZDMT5006-MJ	SCMT120408-23
EBD050SCE	59	50	4 (7)	50.8	100	100	200	25	B	ZDMT5006-MJ	SCMT120408-23
EBD050MCE	59	50	4 (7)	50.8	100	150	250	25	B	ZDMT5006-MJ	SCMT120408-23

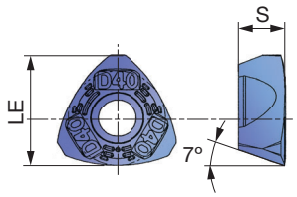
SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch
EBD040*SE	CSTB-4M	M-1000	T-15T
EBD050**-E	CSTB-5	M-1000	T-20T

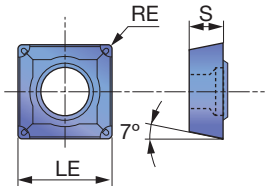
*Recommended clamping torque (N·m) ：CSTB-4M=3.5, CSTB-5=5

INSERT

ZDMT-MJ (For R edge)



SCMT-23 (For P edge)



		Coated
		AH120
P	Steel	☆
M	Stainless	
K	Cast iron	★
N	Non-ferrous	
S	Superalloys	
H	Hard materials	☆

★ : First choice
☆ : Second choice

Designation	RE	AH120	LE	S
ZDMT4005-MJ	-	●	13	5.5
ZDMT5006-MJ	-	●	16.2	6.5
SCMT09T308-23	0.8	●	9.525	3.97
SCMT120408-23	0.8	●	12.7	4.76

●: Line up

Reference pages: Standard cutting conditions→ H228

STANDARD CUTTING CONDITIONS

EBP

ISO	Workpiece material	Grade	Machining type	Cutting speed *Vc* (m/min)	Table feed: *Vf* (mm/min)		
					Tool dia. ø20	Tool dia. ø25	Tool dia. ø30
P	Carbon steels S55C, etc. C55, etc. < 300 HB	AH120	(1)	200 (170 ~ 230)	760 (610 ~ 910)	610 (460 ~ 760)	510 (360 ~ 660)
		AH120	(2)	230 (200 ~ 260)	1100 (900 ~ 1300)	880 (680 ~ 1080)	730 (530 ~ 930)
		AH120	(3)	180 (150 ~ 200)	570 (420 ~ 350)	460 (310 ~ 610)	380 (230 ~ 530)
	Alloy steels SCM440, etc. 42CrMo4, etc. < 300 HB	AH120	(1)	180 (150 ~ 210)	680 (530 ~ 830)	550 (400 ~ 700)	450 (300 ~ 600)
		AH120	(2)	210 (180 ~ 240)	1000 (800 ~ 1200)	800 (600 ~ 400)	670 (470 ~ 870)
		AH120	(3)	160 (130 ~ 180)	510 (360 ~ 660)	400 (250 ~ 550)	340 (190 ~ 490)
	Die steels SKD11, etc. X96CrMoV12, etc. < 300 HB	AH330	(1)	150 (120 ~ 180)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
		AH330	(2)	180 (150 ~ 210)	860 (660 ~ 1060)	690 (490 ~ 890)	570 (370 ~ 770)
		AH330	(3)	130 (100 ~ 150)	410 (260 ~ 560)	330 (180 ~ 480)	280 (130 ~ 430)
K	Cast irons FC250, etc. 250, etc.	AH120	(1)	200 (170 ~ 230)	950 (800 ~ 1100)	760 (610 ~ 910)	640 (490 ~ 790)
		AH120	(2)	230 (200 ~ 260)	1200 (900 ~ 1400)	1000 (700 ~ 1200)	830 (530 ~ 1030)
		AH120	(3)	180 (150 ~ 200)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
H	Hardened steels Prehardened steels < 45 HRC	AH120	(1)	80 (60 ~ 100)	250 (150 ~ 350)	200 (100 ~ 300)	160 (100 ~ 260)
		AH120	(2)	100 (70 ~ 130)	310 (160 ~ 460)	250 (100 ~ 400)	210 (100 ~ 360)
		AH120	(3)	60 (40 ~ 80)	190 (140 ~ 240)	150 (100 ~ 200)	130 (80 ~ 180)

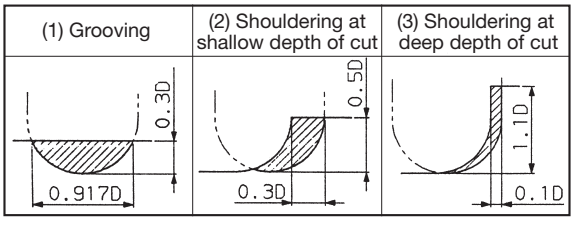
Notes:
- Cutting speeds shown in the left table are of the most outer diameter of the tool.
- When the depth of cut is the upper limit shown in the above figures, set the cutting conditions to the lowest values shown left.
- When using long edge types (MSE), set the cutting speed and feed to 60 to 80 % of values shown in the table.
- When using long shank types (LSE), set the cutting speed and feed to 20 to 50 % of values shown in the table, bearing in mind the overhang length.

EBD

ISO	Workpiece material	Grade	Machining type	Cutting speed *Vc* (m/min)	Table feed: *Vf* (mm/min)	
					Tool dia. ø40	Tool dia. ø50
P	Carbon steels S55C, etc. C55, etc. < 300 HB	AH120	(1)	180 (150 ~ 210)	490 (400 ~ 570)	390 (330 ~ 460)
		AH120	(2)	200 (170 ~ 230)	480 (410 ~ 550)	380 (330 ~ 440)
		AH120	(3)	160 (130 ~ 190)	260 (210 ~ 300)	200 (160 ~ 240)
	Alloy steels SCM440, etc. 42CrMo4, etc. < 300 HB	AH120	(1)	160 (130 ~ 190)	430 (350 ~ 510)	350 (280 ~ 410)
		AH120	(2)	180 (150 ~ 210)	430 (360 ~ 500)	340 (290 ~ 400)
		AH120	(3)	140 (110 ~ 170)	220 (180 ~ 270)	180 (140 ~ 220)
	Die steels SKD11, etc. X96CrMoV12, etc. < 300 HB	AH120	(1)	140 (110 ~ 170)	380 (300 ~ 460)	300 (240 ~ 370)
		AH120	(2)	160 (130 ~ 190)	380 (310 ~ 460)	310 (250 ~ 360)
		AH120	(3)	120 (90 ~ 150)	190 (140 ~ 240)	150 (120 ~ 190)
K	Cast irons FC250, etc. 250, etc.	AH120	(1)	200 (170 ~ 230)	640 (510 ~ 680)	510 (410 ~ 540)
		AH120	(2)	220 (190 ~ 250)	600 (510 ~ 680)	480 (410 ~ 540)
		AH120	(3)	180 (150 ~ 210)	340 (290 ~ 400)	280 (230 ~ 320)
H	Hardened steels Prehardened steels < 45 HRC	AH120	(1)	90 (70 ~ 110)	210 (160 ~ 260)	170 (130 ~ 210)
		AH120	(2)	100 (80 ~ 120)	200 (160 ~ 250)	160 (130 ~ 200)
		AH120	(3)	60 (50 ~ 90)	100 (80 ~ 140)	80 (60 ~ 120)

Notes:
- Cutting speeds shown in the left table are of the most outer diameter of the tool.
- The values of the cutting speeds and feeds shown in the table are of under general cutting conditions. The values should be modified depending on the power and rigidity of the machine to be used, and work holding conditions.
- When using the long shank type, the depth of cut, pick feed, cutting speed, and table feed should be reduced to 70 %-90 % of the values shown in the tables.

Machining types



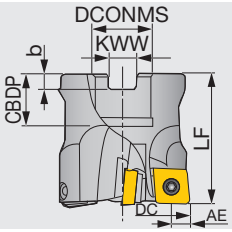
Z-FEEDMILL

TZP12

Plunge mill for roughing, with screw clamp system

GAMP = +26°, GAMF = -2°





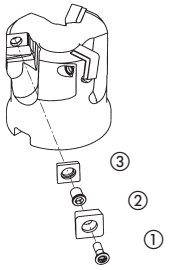


Designation	DC	CICT	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZP12050R	50	3	22	20	50	6	10	0.38	APMT120416PR-MJ
TZP12050R-E	50	3	22	20	50	6.3	10.4	0.38	APMT120416PR-MJ
TZP12063R	63	3	22	20	50	6	10	0.72	APMT120416PR-MJ
TZP12063R-E	63	3	22	20	50	6.3	10.4	0.72	APMT120416PR-MJ
TZP12080R	80	4	31.75	32	63	8	12.7	1.51	APMT120416PR-MJ

SPARE PARTS

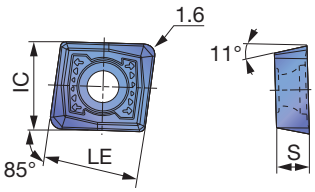
Designation	①Clamping screw	Lubricant	②Shim screw	③Shim	Wewnch1 (For ①)	Wewnch2 (For ②)
TZP12	CSTB-3.5T	M-1000	DTS5-3.5SS	ZSA1102	T-20D	P-3.5

*Recommended clamping torque (N·m) :CSTB-3.5T=5



INSERT

APMT120416-MJ



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

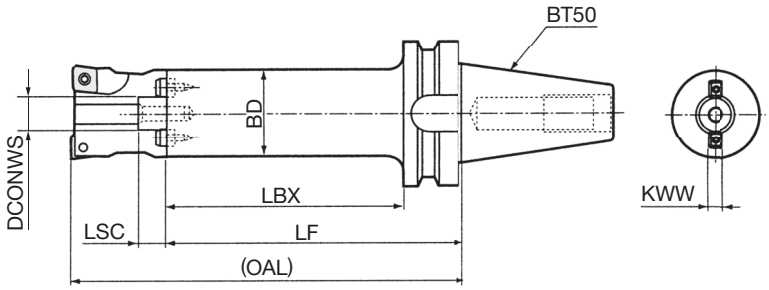
★ : First choice
☆ : Second choice

Designation	RE	AE	Coated AH120	Coated T3130	IC	LE	S
APMT120416PR-MJ	1.6	10	●	●	12.7	13.5	4.76

●: Line up

Reference pages: Standard cutting conditions→ H231

ARBOR



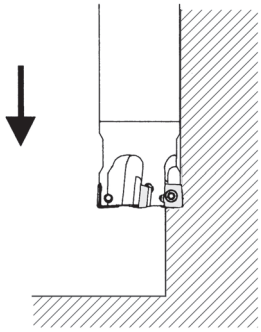
Designation	Dimension (mm)							WT (kg)	Applicable mill
	LF	LBX	(OAL)	BD	DCONWS	LSC	KWW		
BT50-FMC22-343-47	343	305	393	47	22	18	10	7.9	TZP12050R...
BT50-FMC22-293-47	293	255	343	47	22	18	10	7.2	TZP12050R...
BT50-FMC22-243-47	243	205	293	47	22	18	10	6.5	TZP12050R...
BT50-FMC22-433-59	433	395	483	59	22	18	10	12.2	TZP12063R...
BT50-FMC22-373-59	373	335	423	59	22	18	10	10.9	TZP12063R...
BT50-FMC22-308-59	308	270	358	59	22	18	10	9.5	TZP12063R...
BT50-FMA31.75-455-76	455	417	518	76	31.75	30	12.7	18.6	TZP12080R...
BT50-FMA31.75-375-76	375	337	438	76	31.75	30	12.7	15.8	TZP12080R...
BT50-FMA31.75-295-76	295	257	358	76	31.75	30	12.7	12.9	TZP12080R...

Note: (GL) is a length with TZP12 cutter mounted.

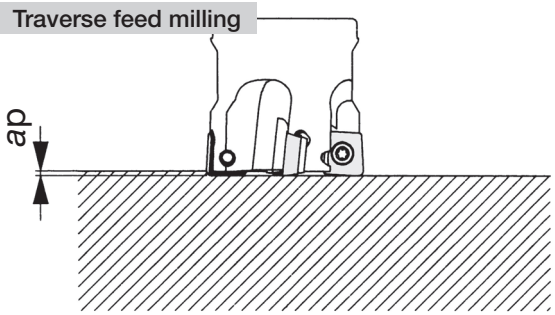
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting Speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels, Alloy steels	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Die steels < 300 HB	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Prehardened steels < 45 HRC	AH120	60 ~ 120	0.1 ~ 0.2
K	Cast irons	AH120	100 ~ 200	0.1 ~ 0.3

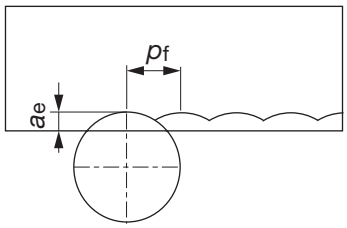
Z-feed milling



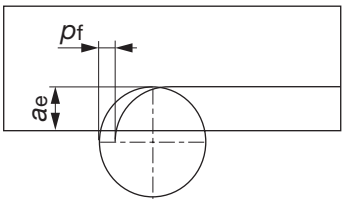
Traverse feed milling



Machining method (1)



Machining method (2)



Machining method	Z-feed milling		Traverse feed milling
	Pick feed p_f (mm)	Radial depth of cut *ae* (mm)	Depth of cut *ap* (mm)
(1)	Tool dia. øD/2	Within effective cutting edge length	~ 0.5
(2)	Within effective cutting edge length	Tool dia. øD/2	

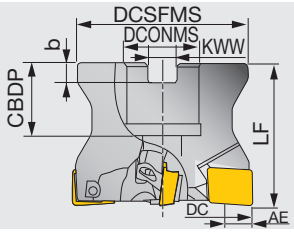
Note: In Z-feed milling, select either of the machining method (1) or (2) and decide the depth of cut according to the application.

TZP19

Plunge mill for roughing, with wedge clamp system

GAMP = +16°, GAMF = -2°



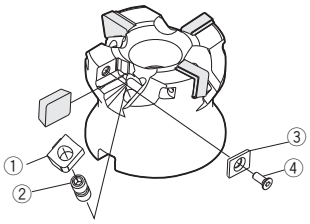


Designation	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZP19080R	80	4	76	31.75	32	63	8	12.7	1.32	APMR190616PR-MJ
TZP19100R	100	5	96	31.75	32	63	8	12.7	2.41	APMR190616PR-MJ
TZP19125R	125	6	98	38.1	38	63	10	15.9	3.17	APMR190616PR-MJ

SPARE PARTS

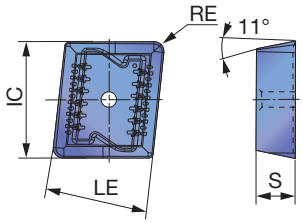
Designation	④Clamping screw	②Adjusting screw	③Shim	①Wedge	Wewnch1 (For ④)	Wewnch 2 (For ②)
TZP19	CSTA-4	FDS-8ST	ZSA1502	WPP16R	T-15D	T-27T

*Recommended clamping torque (N·m) : CSTA-4=3.5



INSERT

APMR190616-MJ



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

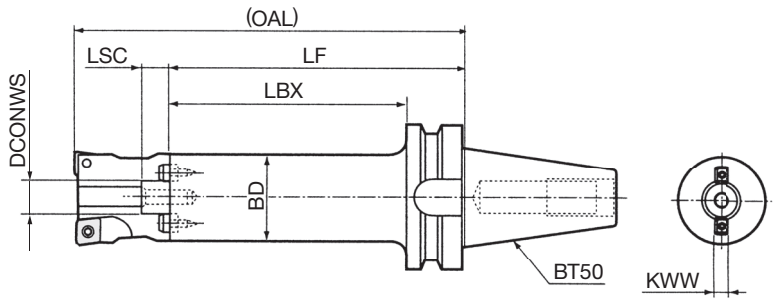
★ : First choice
☆ : Second choice

Designation	RE	AE	Coated		IC	LE	S
			AH120	T3130			
APMR190616PR-MJ	1.6	17	●	●	19.05	15.875	6.35

●: Line up

Reference pages: Standard cutting conditions → H233

ARBOR

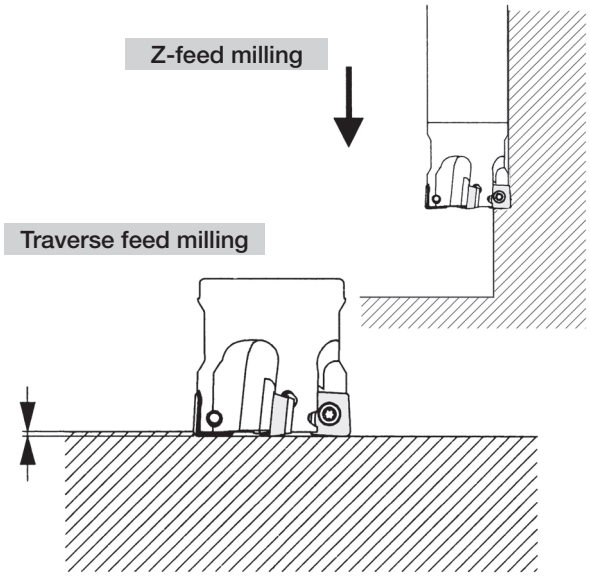


Designation	Dimension (mm)							WT (kg)	Applicable mill
	LF	LBX	(OAL)	BD	DCONWS	LSC	KWW		
BT50-FMA31.75-455-76	455	417	518	76	31.75	30	12.7	18.6	TZP19080R
BT50-FMA31.75-375-76	375	337	438	76	31.75	30	12.7	15.8	TZP19080R
BT50-FMA31.75-295-76	295	257	358	76	31.75	30	12.7	12.9	TZP19080R
BT50-FMA31.75-375-96	375	337	438	96	31.75	30	12.7	23	TZP19100R
BT50-FMA38.1-375-98	375	337	438	98	38.1	34	15.9	23.8	TZP19125R

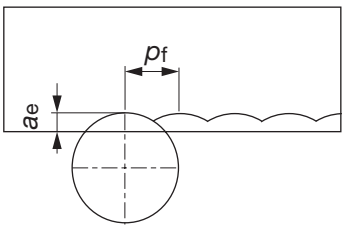
Note: (GL) is a length with TZP19 cutter mounted.

STANDARD CUTTING CONDITIONS

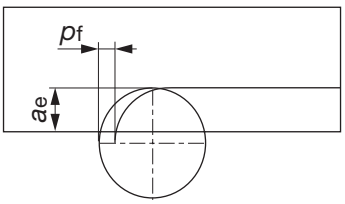
ISO	Workpiece material	Grade	Cutting Speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels, Alloy steels	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Die steels (JIS SKD) < 300 HB	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Prehardened steels < 45 HRC	AH120	60 ~ 120	0.1 ~ 0.2
K	Cast irons (JIS FC and FCD)	AH120	100 ~ 200	0.1 ~ 0.3



Machining method (1)



Machining method (2)



Machining method	Z-feed milling		Traverse feed milling
	Pick feed p_f (mm)	Radial depth of cut *ae* (mm)	Depth of cut *ap* (mm)
(1)	Tool dia. øD/2	Within effective cutting edge length	~0.5
(2)	Within effective cutting edge length	Tool dia. øD/2	

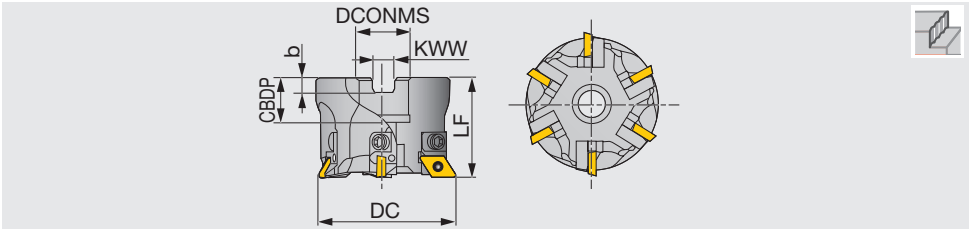
Note: In Z-feed milling, select either of the machining method (1) or (2) and decide the depth of cut according to the application.

TZF11

High precision plunge mill

GAMP = 0°, GAMF = -6°~ 0°



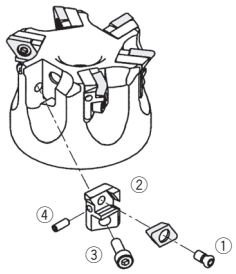


Designation	CICT	DC	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZF11050R	4	50	22	20	45	6	10	0.38	DPCW11T3ZFR
TZF11050R-E	4	50	22	20	45	6.3	10.4	0.38	DPCW11T3ZFR
TZF11063R	6	63	22	20	45	6	10	0.72	DPCW11T3ZFR
TZF11063R-E	6	63	22	20	45	6.3	10.4	0.72	DPCW11T3ZFR
TZF11080R	7	80	31.75	32	63	8	12.7	1.51	DPCW11T3ZFR

SPARE PARTS

Designation	①Clamping screw	②Cartridge	Lubricant	③Cartridge fixing screw	④Cartridge fixing screw	Shell locking bolt	Wewnch (For ①)	Wewnch 1 (For ④)	Wewnch 2 (For ③)
TZF11050R*	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHM3-10	FSHM10-40	T-15D	P-1.5	P-3
TZF11063R*	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHM3-10	-	T-15D	P-1.5	P-3
TZF11080R	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHM3-10	-	T-15D	P-1.5	P-3

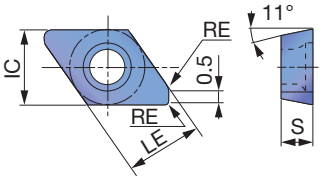
*Recommended clamping torque (N·m) ：CSTB-4S=3.5



INSERT

DPCW11T3

High precision ground insert (for plunging)



		Coated		Cermet					
		AH120	AH740	NS740					
P	Steel		☆	★					
M	Stainless								
K	Cast iron	★	☆						
N	Non-ferrous								
S	Superalloys								
H	Hard materials		☆						

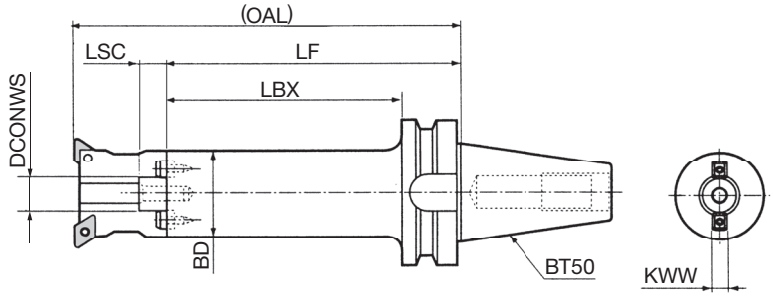
★ : First choice
☆ : Second choice

Designation	RE	AH120	AH740	NS740	LE	IC	S
DPCW11T3ZFR	1	●	●	●	9.525	9.525	3.97

●: Line up

Reference pages: Standard cutting conditions → H235

ARBOR



Designation	Dimension (mm)							WT	Applicable mill
	LF	LBX	(OAL)*	BD	DCONWS	LSC	KWW	(kg)	
BT50-FMC22-343-47	343	305	388	47	22	18	10	7.9	TZF11050R...
BT50-FMC22-293-47	293	255	338	47	22	18	10	7.2	TZF11050R...
BT50-FMC22-243-47	243	205	288	47	22	18	10	6.5	TZF11050R...
BT50-FMC22-433-59	433	395	478	59	22	18	10	12.2	TZF11063R...
BT50-FMC22-373-59	373	335	418	59	22	18	10	10.9	TZF11063R...
BT50-FMC22-308-59	308	270	353	59	22	18	10	9.5	TZF11063R...
BT50-FMA31.75-455-76	455	417	518	76	31.75	30	12.7	18.6	TZF11080R...
BT50-FMA31.75-375-76	375	337	438	76	31.75	30	12.7	15.8	TZF11080R...
BT50-FMA31.75-295-76	295	257	358	76	31.75	30	12.7	12.9	TZF11080R...

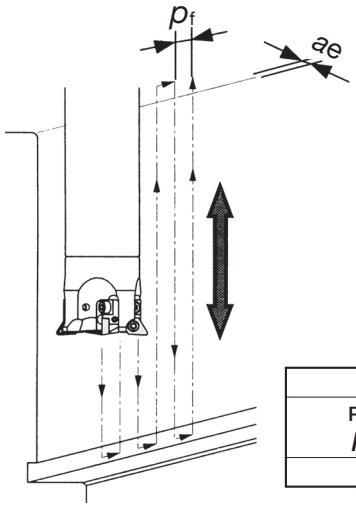
Note: (OAL) is a length with TZF11 cutter mounted.

STANDARD CUTTING CONDITIONS

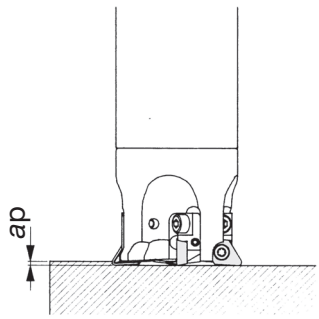
ISO	Workpiece material	Grade	Cutting Speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels, Alloy steels, Mild steels < 300 HB	NS740	300 (150 ~ 400)	0.15 (0.05 ~ 0.2)
		AH740	250 (150 ~ 350)	0.15 (0.05 ~ 0.2)
K	Cast irons 250, etc.	AH120	300 (200 ~ 500)	0.15 (0.05 ~ 0.2)
	Ductile cast irons 600-3, etc.	AH740	250 (150 ~ 350)	0.15 (0.05 ~ 0.2)
H	Prehardened steels, Hard materials 40-55 HRC	AH740	150 (100 ~ 200)	0.1 (0.05 ~ 0.15)

- Dry cutting (or air blow) at a depth of cut up *ae* to 0.3 mm (allowable max. 0.5 mm) and a pick feed *pf* from 0.5 to 1.0 mm is recommended.
- TZF11 type cutters are not designed to adjust dynamic balance. Therefore, when the tool's overhang ratio (cutter diameter-to-length) exceeds 6:1, special care should be taken with the revolution speed. (At first, start the machining at 50 % of the speed shown in the table of the standard cutting conditions, and then gradually increase the speed whilst confirming safety.)
- To produce highly accurate surface finish, use the cutter on a machine with sufficient rigidity.

Z-feed milling



Traverse feed milling



Z-feed milling		Traverse feed milling
Pick feed *pf* (mm)	Radial depth of cut *ae* (mm)	Depth of cut *ap* (mm)
0.5 ~ 1	~ 0.5	~ 0.5

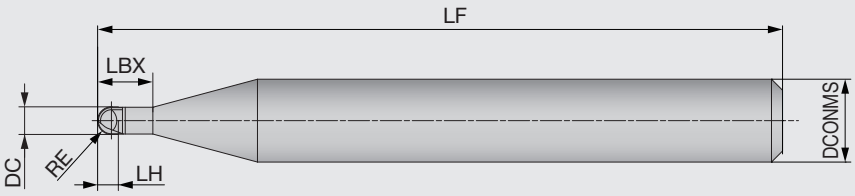
●Cautionary points in use

- Use the cutter for finish milling of vertical wall surfaces requiring long tool-overhang of L/D > 6.
- Radial cutting edge run-out should be adjusted within 0.01 mm.
- In addition to Z-feed milling, TZF11 type cutters can be also used for traverse feed milling. (*ap* ≤ 0.5 mm)

BBB2000

T-CBN ball nose endmill for dies and molds





Designation	BX850	NOF	RE	DC	LH	LBX	LF	DCONMS
BBB2006	●	2	0.3	0.6	0.5	1.2	50	6
BBB2008	●	2	0.4	0.8	0.6	1.6	50	6
BBB2010	●	2	0.5	1	0.7	2	50	6
BBB2020	●	2	1	2	1.5	4	50	6

●: Line up

Tolerance (BBB2000)

R	*R* Tolerance	Tolerance on shank
0.3 ~ 1	±0.005	h6

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hard-ness	No. of revolutions *n* (min^{-1})	Ball radius (RE) 0.3 Depth of cut APMX × *pf* (mm)	0.3 Feed rate (mm/min)	0.4 Depth of cut APMX × *pf* (mm)	0.4 Feed rate (mm/min)	0.5 Depth of cut APMX × *pf* (mm)	0.5 Feed rate (mm/min)	1 Depth of cut APMX × *pf* (mm)	1 Feed rate (mm/min)
H	Prehardened steel (NAK80, etc.) Die steel (JIS SKD61, etc.)	~ 52 HRC	50,000	0.02 × 0.03	2,000	0.03 × 0.05	2,000	0.05 × 0.05	3,000	0.10 × 0.10	5,000
	Die steel (JIS SKD11, DRM1 & 2, etc.)	~ 62 HRC	50,000	0.01 × 0.02	2,000	0.02 × 0.03	2,000	0.03 × 0.05	3,000	0.05 × 0.05	5,000
	High speed steel, Die steel (JIS SKH, DRM3, etc.)	~ 70 HRC	50,000	0.01 × 0.02	1,500	0.01 × 0.03	1,500	0.02 × 0.03	2,000	0.03 × 0.05	3,000

Notes:
- Depths of cut (APMX) shown in the table are the allowable maximum values.
- Mist cooling or air blow is recommended.
- The maximum number of revolutions of the machine to be used is lower than 50,000 min^{-1}, the revolutions and feed rate should be modified at same rate.
- Use smallest possible overhang.

Ball radius (RE)	Inclined angle of workpiece (θ1) / Effective neck length (Z)			
0.3	0°30′/1.25	1°/1.30	2°/1.35	3°/1.45
0.4	0°30′/1.65	1°/1.70	2°/1.80	3°/1.90
0.5	0°30′/2.05	1°/2.10	2°/2.25	3°/2.40
1	0°30′/4.15	1°/4.25	2°/4.50	3°/4.80