



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

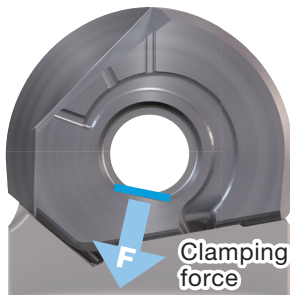


Reference pages: BallFinishNose → **H206 - H209**, BallRoughNose → **H204 - H205**, DoMini-Mill → **H211**



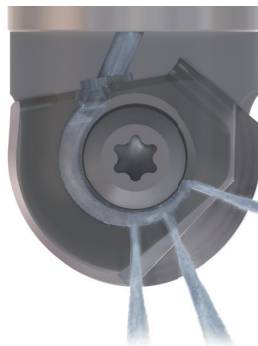
Indexable endmill for high precision finishing!

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

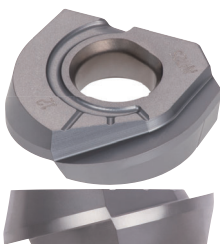


- The coolant channel on insert surface, delivers coolant to the cutting edge from three directions.
- Excellent chip evacuation and cooling effect provides good surface finish and long tool life in machining of hardened steel.

Two insert varieties

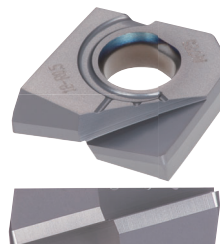
MJ chipbreaker

Ball nose type: ZFBM



- Suitable for finishing and three-dimensional milling of die & mold
- Applicable for a wide range of operations

Radius type: ZFRM



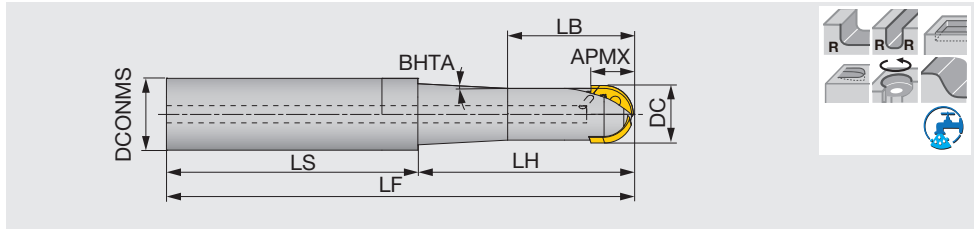
- Suitable for finishing of die & mold
- Designed for milling with high productivity

Reference pages: **H206 - H209**



BALL^{ROUGH}NOSE 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...

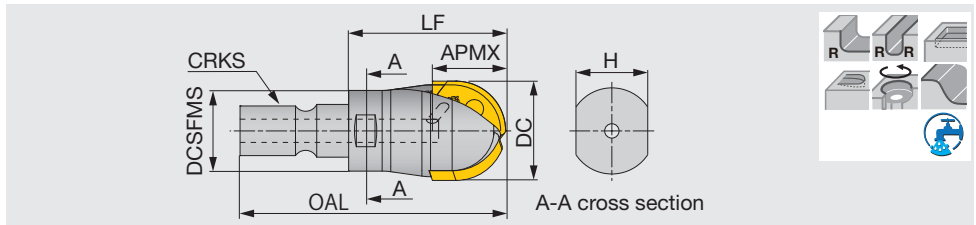
SPARE PARTS

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

BALL^{ROUGH}NOSE 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

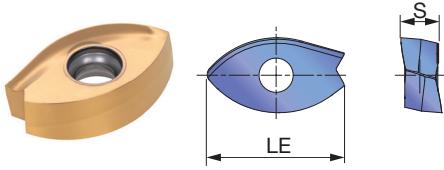
Designation	Clamping screw	Wrench
HBRM16...	TS25064I	T-8D
HBRM20...	TS30085I/HG	T-9D
HBRM25...	TS35085I/HG	T-15D

*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										LE	S	
		APH730												
ZRBM160-MM	8	●											12.4	3.7
ZRBM200-MM	10	●											14.9	4.8
ZRBM250-MM	12.5	●											18.9	5.9

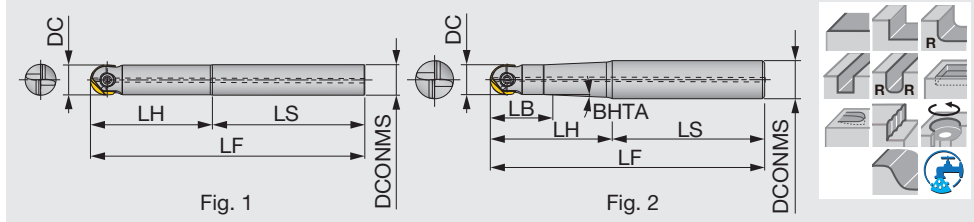
● : Line up
5 piece per package

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Selection criteria	Recommended grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel S15C, etc. C15, etc.	- 300HB	First choice	APH730	MM	150 - 350	0.08 - 0.6
	High carbon and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	- 300HB	First choice	APH730	MM	120 - 320	0.05 - 0.5
	Prehardened steels NAK80, PX5 etc.	30 - 40HRC	First choice	APH730	MM	100 - 200	0.05 - 0.5
M	Austenitic stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	- 200HB	First choice	APH730	MM	100 - 280	0.05 - 0.6
	Martensitic stainless steel SUS420J1, etc. X20Cr13, etc.	- 200HB	First choice	APH730	MM	100 - 300	0.05 - 0.6
K	Gray cast irons FC250, etc. 250, etc.	150 - 250HB	First choice	APH730	MM	120 - 380	0.08 - 0.6
	Ductile cast iron FCD600, etc. 600-3, etc.	150 - 250HB	First choice	APH730	MM	100 - 280	0.08 - 0.6
S	Titanium alloy Ti-6Al-4V, etc.	-	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.

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



Designation	DC	DCONMS	LS	LH	LF	LB	BHTA	Air hole	Fig.	Shank material	Insert
EBFM08T12S100	8	12	80	20	100	10	9.5°	With	2	Steel	ZFBM080...
EBFM08S08C100	8	8	70	30	100	-	-	Without	1	Carbide	ZFBM080...
EBFM08S08C140	8	8	75	65	140	-	-	Without	1	Carbide	ZFBM080...
EBFM10T12S100	10	12	75	25	100	15	5°	With	2	Steel	ZFBM100...
EBFM10S10C140	10	10	65	75	140	-	-	Without	1	Carbide	ZFBM100...
EBFM10S10C220	10	10	80	140	220	-	-	Without	1	Carbide	ZFBM100...
EBFM12S12S110	12	12	80	30	110	-	-	With	1	Steel	ZF*M120...
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...

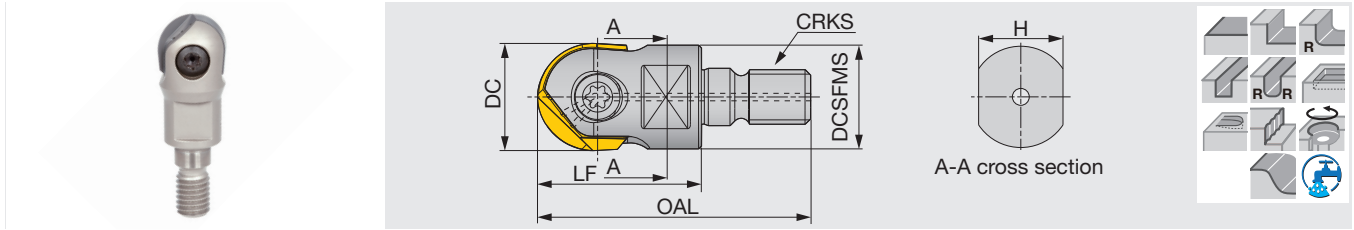
SPARE PARTS

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](#)

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

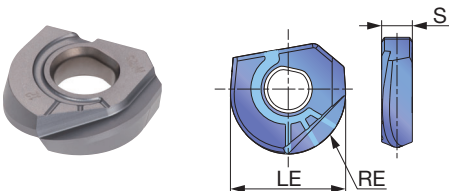
*Recommended clamping torque (N·m) : TS 25F080A=1.3, TS 30F100A=2.5, TS 40F120A=3.5, TS 50F160A=5, TS 60F200A=7, TS 70F250A=7, TS 80F300A=10



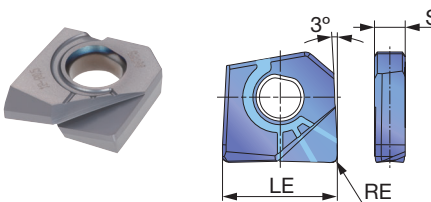


INSERT

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.

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

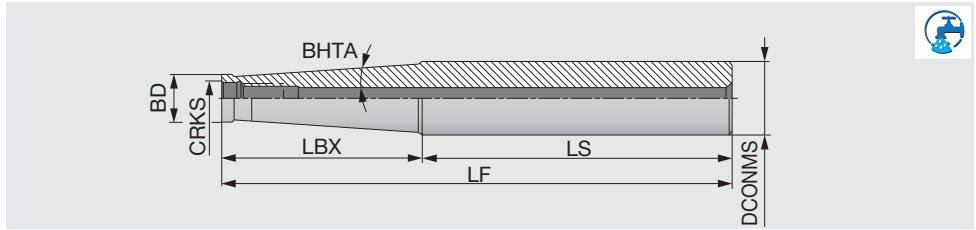




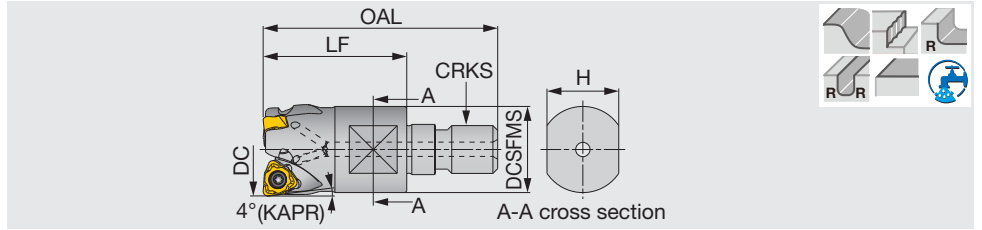
High Feed Milling
Face Milling
Shoulder Milling
Slot Milling
Profile Milling

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



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.

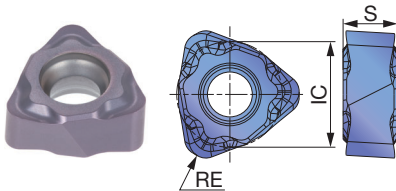
SPARE PARTS

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		IC	S
			AH110			
WXHU040305R-MJ	0.5	0.5	●		6.35	3.18
WXHU040310R-MJ	1	1	●		6.35	3.18

* For plunging, the maximum cutting width is 2 mm.

● : Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	High carbon steel S45C, S55C, etc. C45, C55, etc. Alloy steel SCM440, etc. 42CrMo4, SCr145, etc.	200 - 300 HB	AH110	100 - 300	0.1 - 0.3
	Prehardened steel NAK80, PX5, etc.	150 - 300 HB	AH110	100 - 300	0.1 - 0.3
		30 - 40 HRC	AH110	100 - 300	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	AH110	80 - 130	0.1 - 0.3
		SKD11, etc. X153CrMoV12, etc.	AH110	50 - 100	0.05 - 0.15

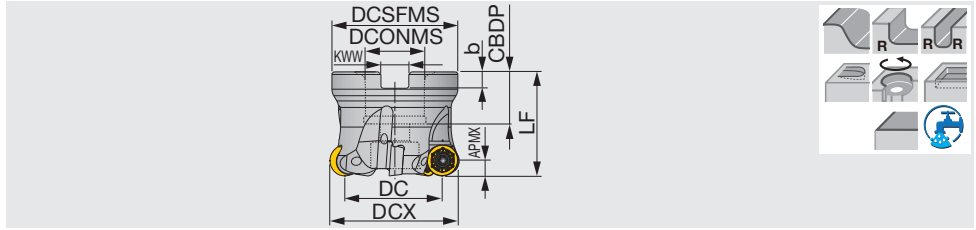




FIXRMILL

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



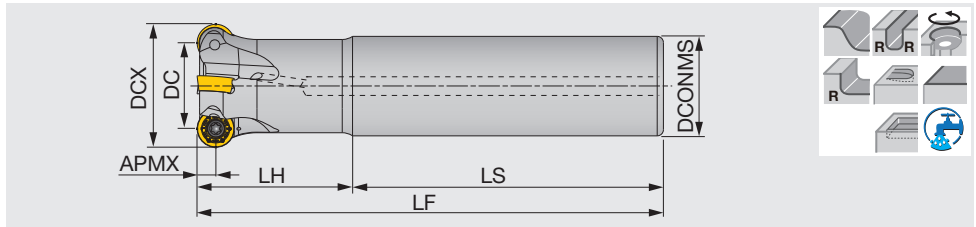
Designation	Clamping screw	Grip	Lubricant	Shell locking bolt	Torx bit
TRP10R040M16.0E05	CSPB-3.5S	H-TBS	M-1000	FSHM8-30H	BLDIP15/S7
TRP12R050 - 063M22.0...	CSTR-4L100	H-TBS	M-1000	CM10X30H	BT15S
TRP12R066M27.0E06	CSTR-4L100	H-TBS	M-1000	CM12X30H	BT15S
TRP16R063M22.0E05	CSPB-5	H-TBS	M-1000	CM10X30H	BLDIP20/S7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

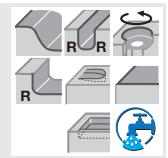
FIXRMILL

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

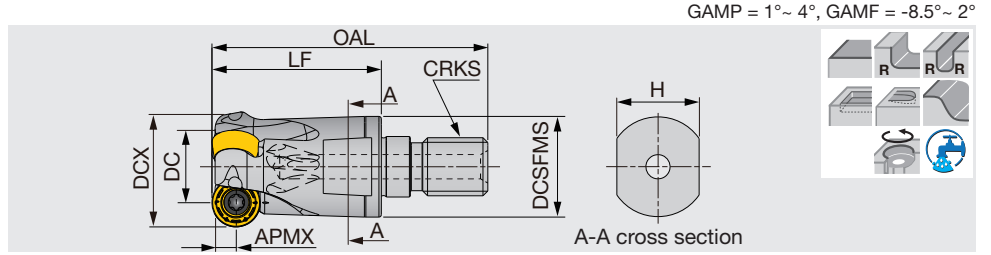


Designation	Clamping screw	Lubricant	Wrench
ERP10R...	CSPB-3.5S	M-1000	IP-15D
ERP12R...	CSTR-4L100	M-1000	T-15DB
ERP16R...	CSPB-5	M-1000	IP-20D

*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)



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.

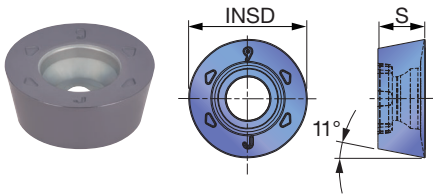
SPARE PARTS

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

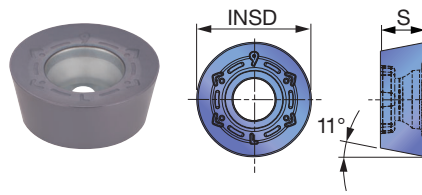
*Recommended clamping torque (N·m) : CSPB-3.5S/CSTR-4L100=3.5

INSERT

RPMT-MJ



RPMT-ML



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



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
< 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

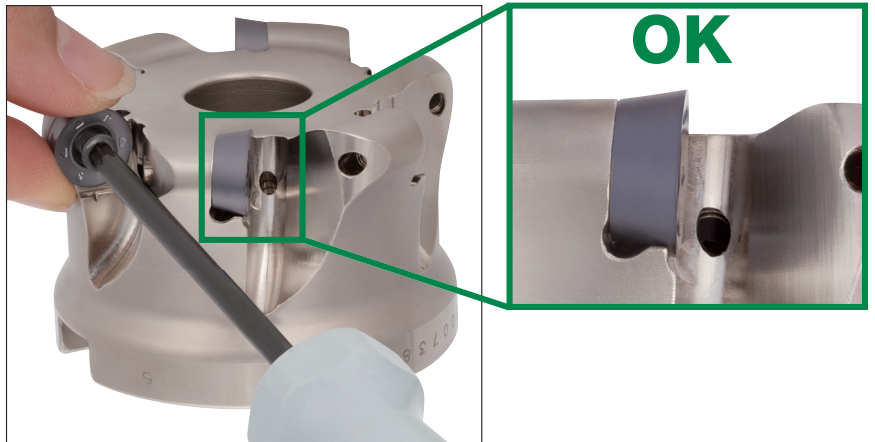
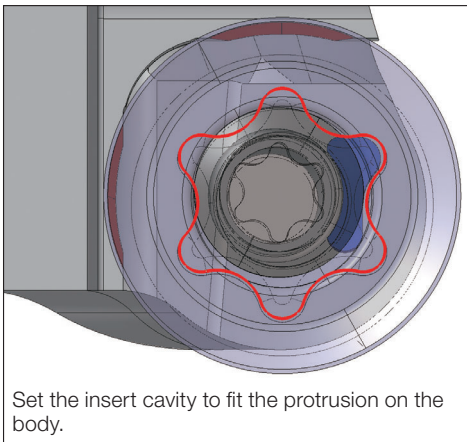
- Use air blast to remove chips from the work area in slot milling or pocketing operation.
- When machining at high cutting speeds of more than Vc = 1000 m/min, the dynamic balance of the tools must be adjusted.
- Cutting conditions are limited by machine power, workpiece rigidity and spindle output. 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: V_f (mm/min), Depth of cut: $a_p = 2.0$ mm

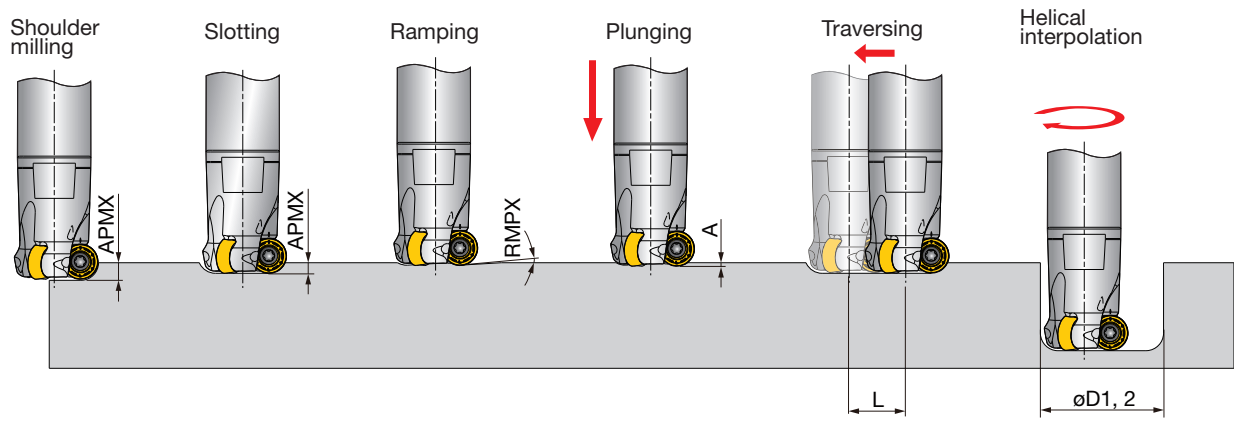
ø20		ø25		ø32			ø35			ø40			ø50		ø63			
n	V_f	n	V_f	n	V_f		n	V_f		n	V_f		n	V_f		n	V_f	
	E/HRP10		E/HRP10, E/HRP12		E/HRP10E/HRP12			ERP10			TRP10	ERP12		ERP16	ERP12		TRP12	TRP16
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280	
$V_c = 180$ m/min, $f_z = 0.5$ mm/t																		
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280	
$V_c = 180$ m/min, $f_z = 0.5$ mm/t																		
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720	
$V_c = 170$ m/min, $f_z = 0.4$ mm/t																		
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720	
$V_c = 170$ m/min, $f_z = 0.4$ mm/t																		
2070	1240	1660	1000	1290	1550	1160	1180	1420	1030	1550	1240	620	830	1250	660	1190	990	
$V_c = 130$ m/min, $f_z = 0.3$ mm/t																		
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720	
$V_c = 170$ m/min, $f_z = 0.4$ mm/t																		
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720	
$V_c = 170$ m/min, $f_z = 0.4$ mm/t																		
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020	
$V_c = 200$ m/min, $f_z = 0.4$ mm/t																		
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020	
$V_c = 200$ m/min, $f_z = 0.4$ mm/t																		
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280	
$V_c = 180$ m/min, $f_z = 0.5$ mm/t																		
2390	2390	1910	1910	1490	2980	2240	1360	2720	1190	2980	2380	1190	950	2380	760	2280	1900	
$V_c = 150$ m/min, $f_z = 0.5$ mm/t																		
1590	630	1270	510	990	790	590	910	730	800	800	640	320	640	640	510	610	510	
$V_c = 100$ m/min, $f_z = 0.2$ mm/t																		
640	150	510	120	400	190	140	360	170	320	190	150	75	250	150	200	140	120	
$V_c = 40$ m/min, $f_z = 0.12$ 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.



APPLICATION RANGE



Designation	Tool- ϕ 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 $\phi D1$ (mm)	*Max. machining $\phi D2$ (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

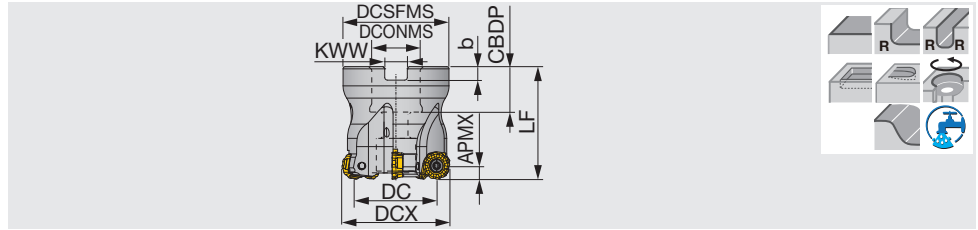
*For flat bottom hole

ROUNDSPLIT

TRC12/16

Face mill, for round inserts with 6mm or 8mm radius

GAMP = +0°, GAMF = -1° ~ -5°

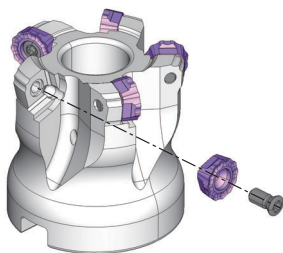


Designation	APMX	DCX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TRC12R040M16.0-04	6	28	4	40	35	40	16	18	8.2	5.6	0.2	With	RCMT1204...
TRC12R040M16.0E04	6	28	4	40	35	40	16	19	8.4	5.6	0.2	With	RCMT1204...
TRC12R050M22.0-05	6	38	5	50	47	50	22	20	10	6	0.4	With	RCMT1204...
TRC12R050M22.0E05	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](#)

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



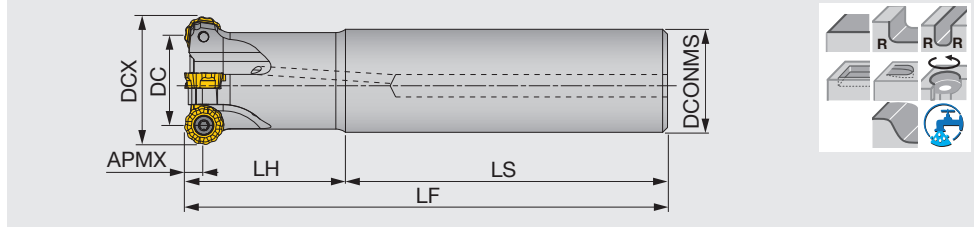


ROUNDSPLIT

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



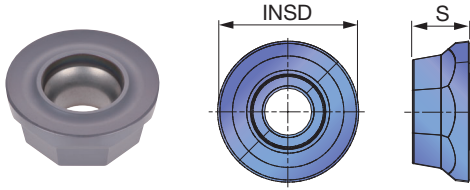
Designation	Clamping screw	Wewnch
ERC12R...	CSTB-4L090	T-15DB
ERC16R040...	CSTB-5L105	T-20DB
ERC16R050...	CSTB-5L120	T-20DB

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

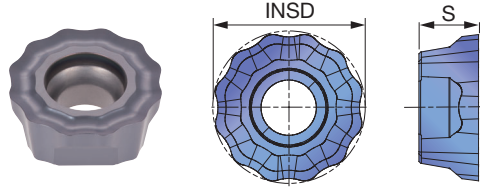
Reference pages: Inserts, Standard cutting conditions → [H219](#)

INSERT

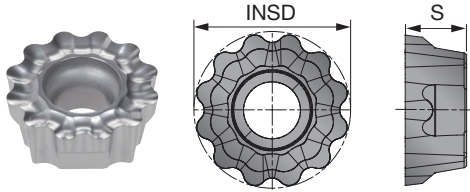
RCMT-MJ



RCMT-NMJ



RCMT-NAJ



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

★ : First choice
☆ : Second choice

Designation	APMX	Coated		Uncoated	INSD	S
		AH120	AH140	AH725		
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

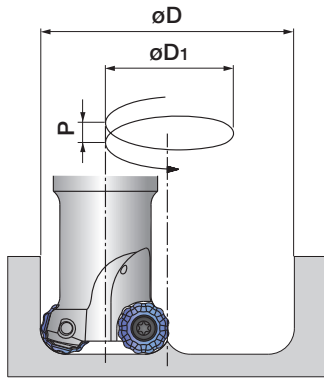
ISO	Workpiece material	Hardness HB	Grade	Cutting speed Vc (m/min)	Feed per tooth: fz (mm/t) each chipbreaker		
					MJ	NMJ	NAJ
P	Low carbon steels S15C, SS400, etc. C15E4, E275A, etc.	~ 200	AH725	100 - 220	0.2 - 0.7	0.17 - 0.3	-
	High carbon steels S45C, S55C, etc. C45, C55, etc.	200 ~ 300	AH725	100 - 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.



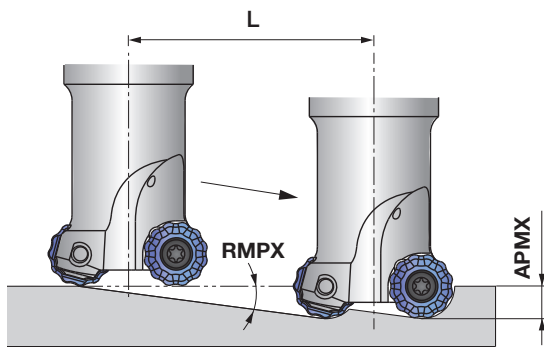
Holemaking with helical feed



Designation	Tool ϕ DCX (mm)	Min. machining diameter (mm)		Max. machining diameter (mm)		Pitch P (mm)
		ϕD	$\phi D1$	ϕD	$\phi D1$	
ERC12R032...	$\phi 32$	52	20	62	30	< 6
ERC12R033...	$\phi 33$	54	21	64	31	< 6
T/ERC12R040...	$\phi 40$	68	28	78	38	< 6
T/ERC12R050...	$\phi 50$	88	38	98	48	< 6
TRC12R063...	$\phi 63$	114	51	124	61	< 6
TRC12R080...	$\phi 80$	148	68	158	78	< 6
ERC16R040...	$\phi 40$	64	24	78	38	< 8
T/ERC16R050...	$\phi 50$	84	34	98	48	< 8
TRC16R063...	$\phi 63$	110	47	124	61	< 8
TRC16R080...	$\phi 80$	144	64	158	78	< 8
TRC16R100...	$\phi 100$	184	84	198	98	< 8
TRC16R125...	$\phi 125$	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

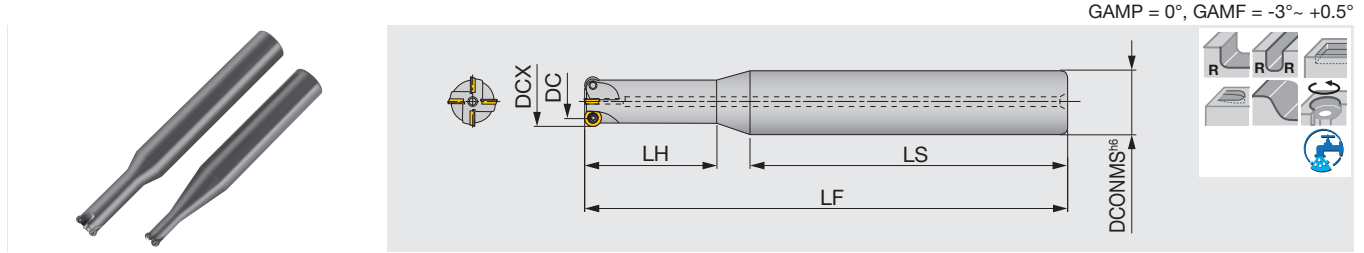


Designation	Tool ϕ DCX (mm)	Max. ramping angle RMPX	L: tool pass length when ramping angle is 2 degrees				
			ap (mm)				
			2	3	4	6	8
ERC12R032...	$\phi 32$	10°	57	85	114	171	-
ERC12R033...	$\phi 33$	9°	57	85	114	171	-
T/ERC12R040...	$\phi 40$	6°	57	85	114	171	-
T/ERC12R050...	$\phi 50$	4°	57	85	114	171	-
TRC12R063...	$\phi 63$	3°	57	85	114	171	-
TRC12R080...	$\phi 80$	2.3°	57	85	114	171	-
ERC16R040...	$\phi 40$	12°	57	85	114	171	229
T/ERC16R050...	$\phi 50$	7.4°	57	85	114	171	229
TRC16R063...	$\phi 63$	6°	57	85	114	171	229
TRC16R080...	$\phi 80$	4.3°	57	85	114	171	229
TRC16R100...	$\phi 100$	3°	57	85	114	171	229
TRC16R125...	$\phi 125$	2.4°	57	85	114	171	229

Tool pass length: $L = ap / \tan \text{RMPX}$, 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



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...

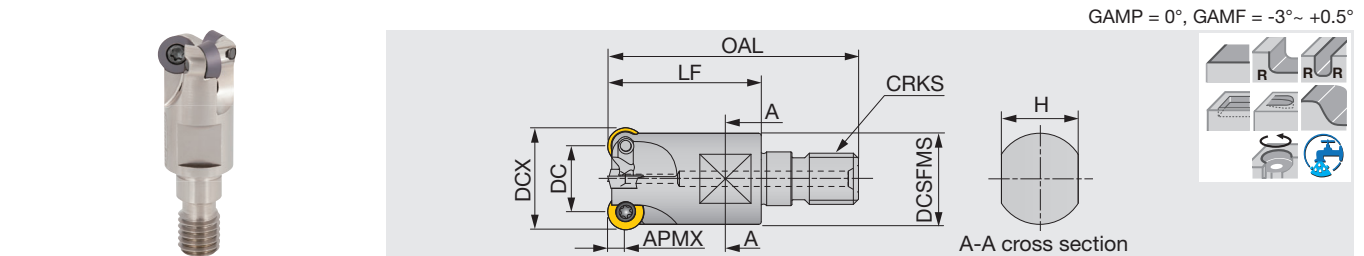
SPARE PARTS

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)



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

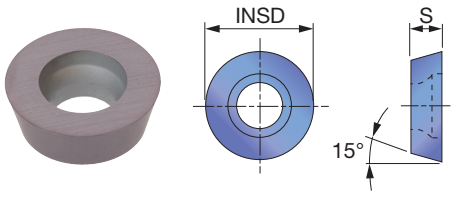
Designation	Clamping screw	Lubricant	Wewnch
HWD07**M...	CSTB-2.5S	M-1000	T-8D

*Recommended clamping torque (N-m) : CSTB-2.5S=1



INSERT

RDMW05/07/10



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

★ : First choice
☆ : Second choice

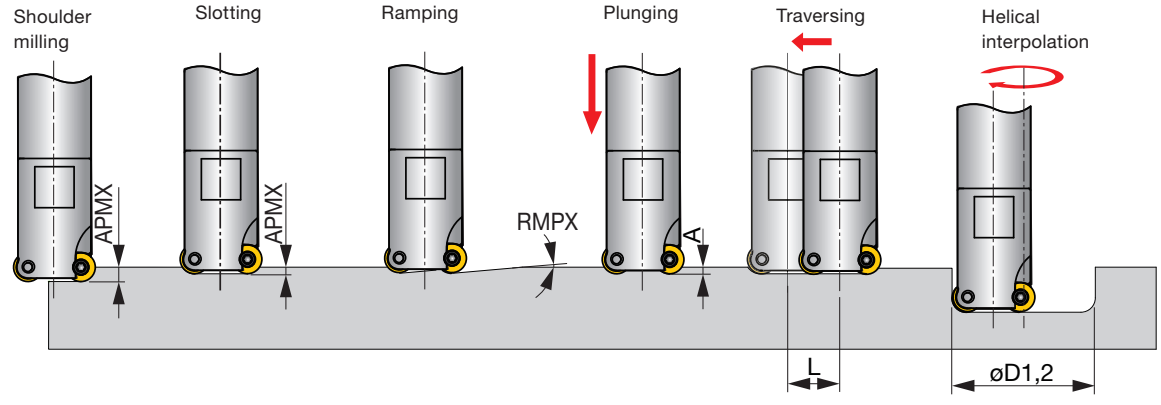
Designation	APMX	Coated								INSD	S
		AH120									
RDMW0501M0	2.5	●								5	1.4
RDMW0702M0	3.5	●								7	2.38
RDMW1003M0	5.0	●								10	3.18

● : Line up

STANDARD CUTTING CONDITIONS

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
	Alloy steels S55C, SCM440, etc. 42CrMo4, etc. < 300 HB	AH120	120 ~ 350	0.15 ~ 0.35	~ 0.5	~ 0.7	~ 1
	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

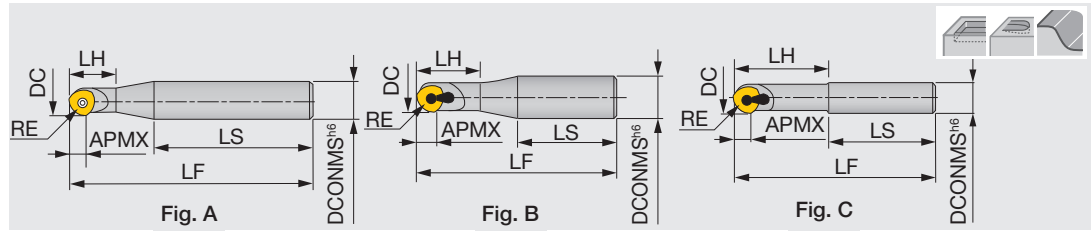


Designation	Tool-ø	Max. depth of cut	Max. ramping	Max. plunging depth	Machining length for removing uncut portion	Max. machining	*Max. machining
	DCX	APMX	RMPX	A	L	øD1	øD2
HWD07R015MM08-03	15	3.5	25°	2	øDc - 6	23	28
HWD07R020MM10-04	20	3.5	11°	2	øDc - 6	33	38
HWD07R025MM12-05	25	3.5	7°	2	øDc - 6	43	48
HWD07R030MM16-05	30	3.5	5.5°	2	øDc - 6	53	58

*For flat bottom hole

TBN1000

Ball nose endmill for semi-finishing



Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	RE	Insert	Fig.
TBN1100S	5	10	1	16	60	15	90	5	ZNCA1002FN2	A
TBN1120S	6	12	1	16	70	20	110	6	ZNCA1203FN	A
TBN1160S	8	16	1	20	85	25	130	8	ZNCA1603FN	A
TBN1200S	10	20	1	25	100	35	160	10	ZN**2004...	A
TBN1250S	12.5	25	1	32	100	45	175	12.5	ZN**2505...	B
TBN1300S	15	30	1	32	100	90	190	15	ZN**3005...	C

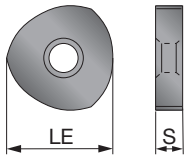
SPARE PARTS

Designation	Clamping screw	Clamp	Adjusting screw	Wewnch
TBN1100S	CSTB-2.5B	-	-	T-8D
TBN1120S	CSTB-3S	-	-	T-9D
TBN1160S	CSTB-4S	-	-	T-15D
TBN1200S	CSTA-5SS	-	-	T-15D
TBN1250S, 1300S	CSTA-5S	CP536	DS-6T	T-15D

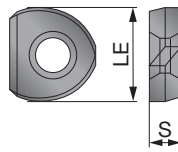
*Recommended clamping torque (N·m) : CSTB-2.5B=1.3, CSTB-3S=2.3, CSTB-4S/CSTA-5S/CSTA-5SS=3.5

INSERT

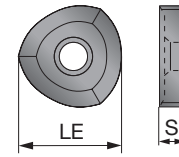
ZNCA-FN



ZNCA-FN2



ZNMM-EN



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

★ : First choice
☆ : Second choice

Designation	Uncoated										LE	S
	UX30	TH10										
ZNCA1002FN2	●	●									7.958	2.5
ZNCA1203FN	●	●									9.735	3
ZNCA1603FN	●	●									12.772	3.5
ZNCA2004FN	●	●									15.862	4
ZNCA2505FN	●	●									19.826	5
ZNCA3005FN	●	●									23.618	5
ZNMM2004EN	●										15.862	4
ZNMM2505EN	●										19.826	5
ZNMM3005EN	●										23.618	5.5

● : Line up

Reference pages: Standard cutting conditions → [H224](#)



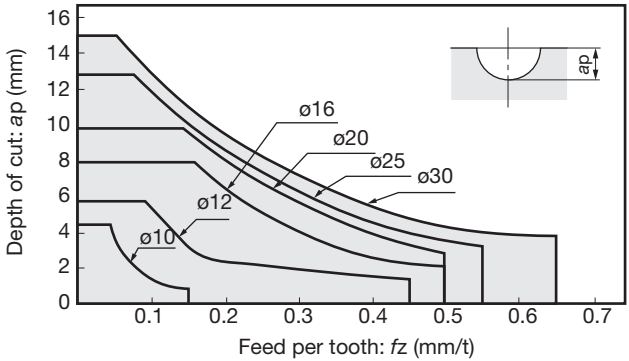


STANDARD CUTTING CONDITIONS

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. Tool steel	UX30	80 - 120	0.1 - 0.3	0.3 - 0.5
	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

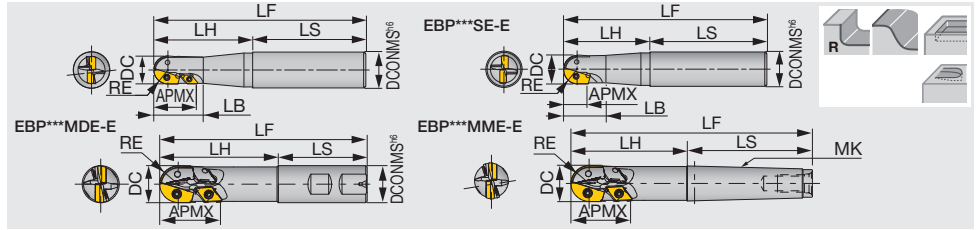
GUIDELINES FOR SELECTING DEPTH OF CUT AND FEED



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

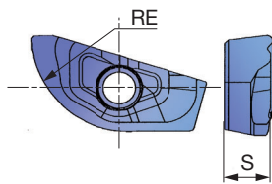
SPARE PARTS

Designation	Clamping screw for Insert 1	Clamping screw for Insert 2	Lubricant	Wewunch 1 for Insert 1	Wewunch 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

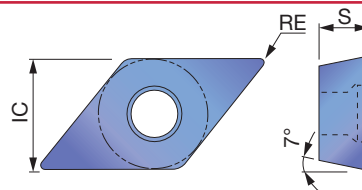
*Recommended clamping torque (N·m) :
CSTB-2.5S=1.3, CSTD-3T=2.5,
CSTB-4S=3.5, CSTB-5S=5

INSERT

ZPET-MJ (For R edge)



DCMW-TN (For P edge)



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

★ : First choice
☆ : Second choice

Designation	RE	Coated		IC	S
		AH120	AH330		
ZPET2004-MJ	10	●	●	-	4.5
ZPET2505-MJ	12.5	●	●	-	5.63
ZPET3006-MJ	15	●	●	-	6.75
DCMW070204TN	0.4	●	●	6.4	2.4
DCMW11T304TN	0.4	●	●	9.5	4

Reference pages: Standard cutting conditions → **H226**

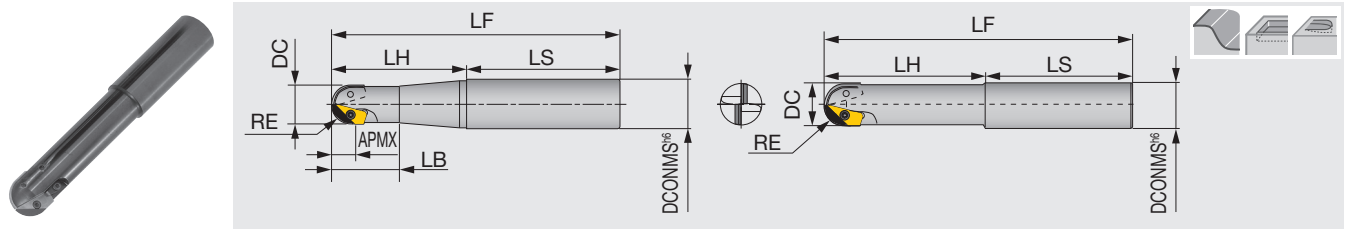
ZPET30... : 5 piece per package
● : Line up





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

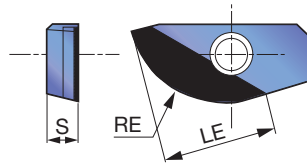
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Clamp set
EBB020MS	CSTB-3S	M-1000	T-9D	-
EBB025MS	CSTB-3.5	M-1000	T-15D	-
EBB030MS	CSTB-4S	M-1000	T-15D	-
EBB040MS	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



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

★ : First choice
☆ : Second choice

Designation	RE	CBN								S	LE
		BX950									
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

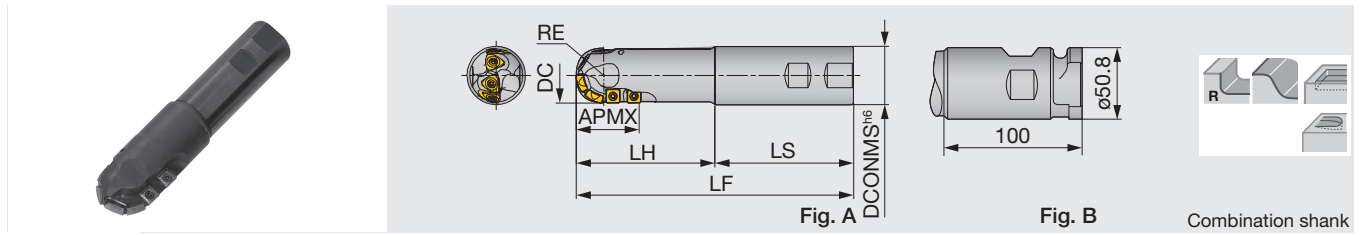
● : Line up
BX950 : 1 piece per package

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



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

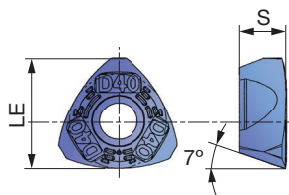
SPARE PARTS

Designation	Clamping screw	Lubricant	Wewnch
EBD040*SE	CSTB-4M	M-1000	T-15T
EBD050**E	CSTB-5	M-1000	T-20T

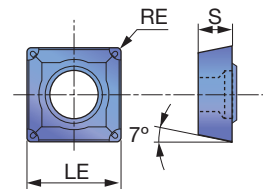
*Recommended clamping torque (N·m) : CSTB-4M=3.5, CSTB-5=5

INSERT

ZDMT-MJ (For R edge)



SCMT-23 (For P edge)



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

★ : First choice
☆ : Second choice

Designation	RE	Coated								LE	S
		AH120									
ZDMT4005-MJ	-	●								13	5.5
ZDMT5006-MJ	-	●								16.2	6.5
SCMT09T308-23	0.8	●								9.525	3.97
SCMT120408-23	0.8	●								12.7	4.76

● : Line up



STANDARD CUTTING CONDITIONS

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.

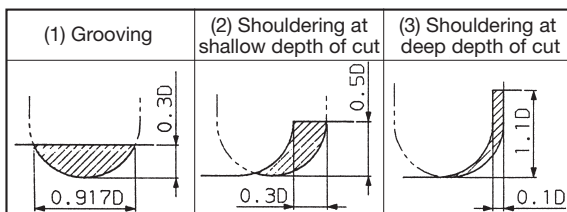
EBD

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

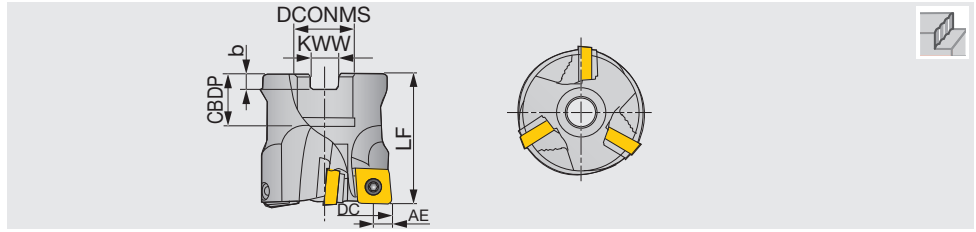


Z-FEEDMILL

TZP12

Plunge mill for roughing, with screw clamp system

GAMP = +26°, GAMF = -2°

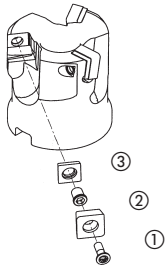


Designation	DC	CICT	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZP12050R	50	3	22	20	50	6	10	0.38	APMT120416PR-MJ
TZP12050R-E	50	3	22	20	50	6.3	10.4	0.38	APMT120416PR-MJ
TZP12063R	63	3	22	20	50	6	10	0.72	APMT120416PR-MJ
TZP12063R-E	63	3	22	20	50	6.3	10.4	0.72	APMT120416PR-MJ
TZP12080R	80	4	31.75	32	63	8	12.7	1.51	APMT120416PR-MJ

SPARE PARTS

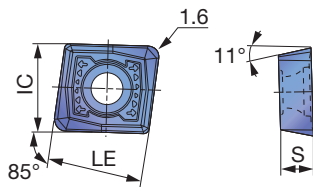
Designation	①Clamping screw	Lubricant	②Shim screw	③Shim	Wewnch1 (For ①)	Wewnch2 (For ②)
TZP12	CSTB-3.5T	M-1000	DTS5-3.5SS	ZSA1102	T-20D	P-3.5

*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								IC	LE	S	
			AH120	T3130										
APMT120416PR-MJ	1.6	10	●	●								12.7	13.5	4.76

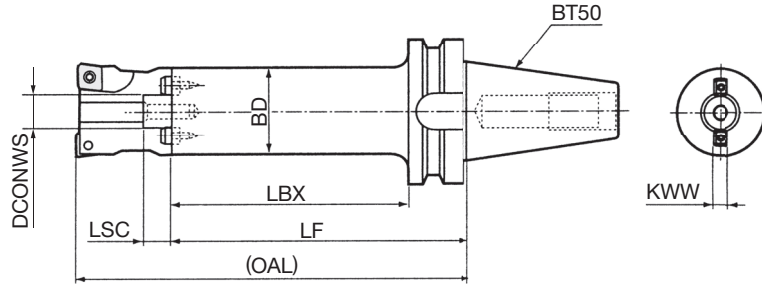
● : Line up

Reference pages: Standard cutting conditions → H231





ARBOR

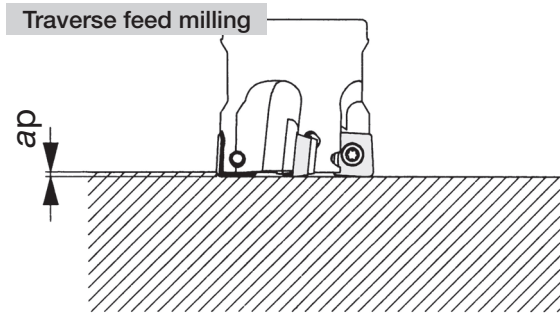
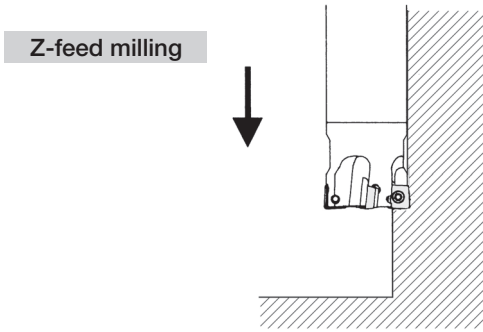


Designation	Dimension (mm)							WT (kg)	Applicable mill
	LF	LBX	(OAL)	BD	DCONWS	LSC	KWW		
BT50-FMC22-343-47	343	305	393	47	22	18	10	7.9	TZP12050R...
BT50-FMC22-293-47	293	255	343	47	22	18	10	7.2	TZP12050R...
BT50-FMC22-243-47	243	205	293	47	22	18	10	6.5	TZP12050R...
BT50-FMC22-433-59	433	395	483	59	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...

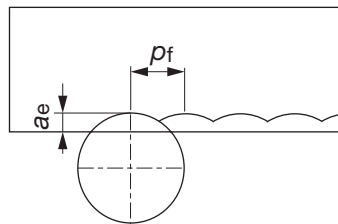
Note: (GL) is a length with TZP12 cutter mounted.

STANDARD CUTTING CONDITIONS

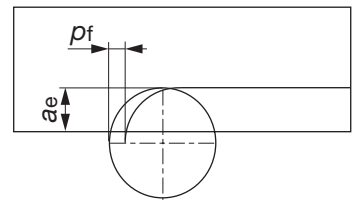
ISO	Workpiece material	Grade	Cutting Speed V_c (m/min)	Feed per tooth f_z (mm/t)
P	Carbon steels, Alloy steels	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Die steels < 300 HB	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Prehardened steels < 45 HRC	AH120	60 ~ 120	0.1 ~ 0.2
K	Cast irons	AH120	100 ~ 200	0.1 ~ 0.3



Machining method (1)



Machining method (2)



Machining method	Z-feed milling		Traverse feed milling
	Pick feed p_f (mm)	Radial depth of cut a_e (mm)	Depth of cut a_p (mm)
(1)	Tool dia. $\phi D/2$	Within effective cutting edge length	~ 0.5
(2)	Within effective cutting edge length	Tool dia. $\phi D/2$	

Note: In Z-feed milling, select either of the machining method (1) or (2) and decide the depth of cut according to the application.

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

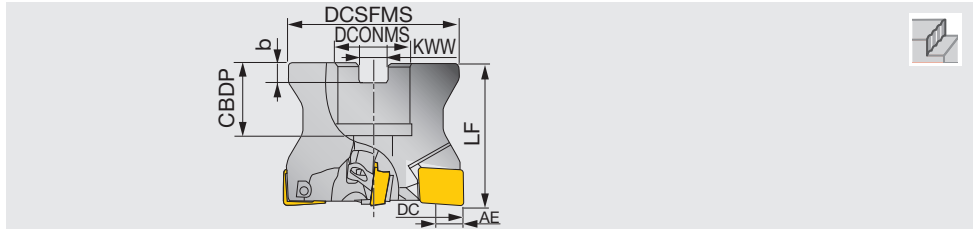




TZP19

Plunge mill for roughing, with wedge clamp system

GAMP = +16°, GAMF = -2°

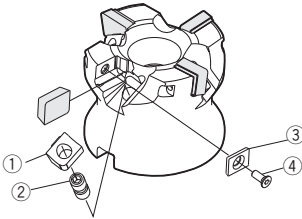


Designation	DC	CICT	DCSFMS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZP19080R	80	4	76	31.75	32	63	8	12.7	1.32	APMR190616PR-MJ
TZP19100R	100	5	96	31.75	32	63	8	12.7	2.41	APMR190616PR-MJ
TZP19125R	125	6	98	38.1	38	63	10	15.9	3.17	APMR190616PR-MJ

SPARE PARTS

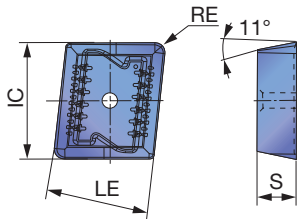
Designation	④ Clamping screw	② Adjusting screw	③ Shim	① Wedge	Wewnch1 (For ④)	Wewnch 2 (For ②)
TZP19	CSTA-4	FDS-8ST	ZSA1502	WPP16R	T-15D	T-27T

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



INSERT

APMR190616-MJ



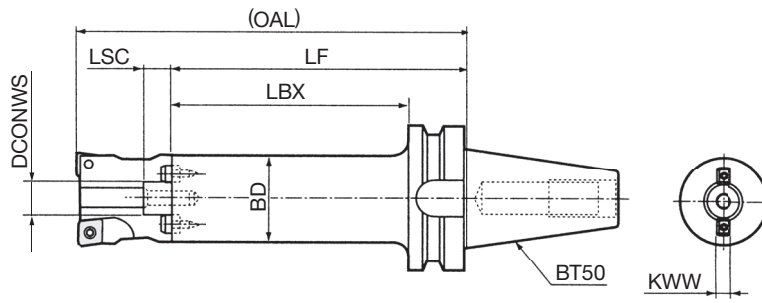
P	Steel	☆	★							
M	Stainless									
K	Cast iron	★								
N	Non-ferrous									
S	Superalloys									
H	Hard materials									

★ : 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**

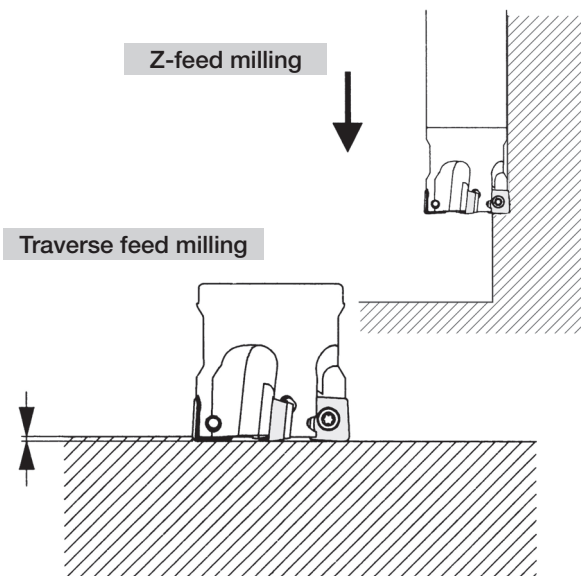


Designation	Dimension (mm)							WT (kg)	Applicable mill
	LF	LBX	(OAL)	BD	DCONWS	LSC	KWW		
BT50-FMA31.75-455-76	455	417	518	76	31.75	30	12.7	18.6	TZP19080R
BT50-FMA31.75-375-76	375	337	438	76	31.75	30	12.7	15.8	TZP19080R
BT50-FMA31.75-295-76	295	257	358	76	31.75	30	12.7	12.9	TZP19080R
BT50-FMA31.75-375-96	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

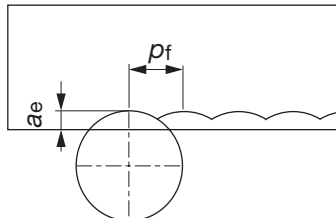
Note: (GL) is a length with TZP19 cutter mounted.

STANDARD CUTTING CONDITIONS

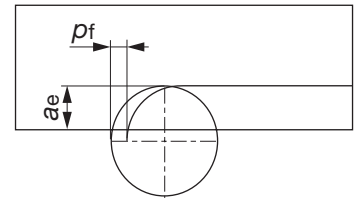
ISO	Workpiece material	Grade	Cutting Speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Carbon steels, Alloy steels	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Die steels (JIS SKD) < 300 HB	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Prehardened steels < 45 HRC	AH120	60 ~ 120	0.1 ~ 0.2
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 pf (mm)	Radial depth of cut ae (mm)	Depth of cut ap (mm)
(1)	Tool dia. $\phi D/2$	Within effective cutting edge length	-0.5
(2)	Within effective cutting edge length	Tool dia. $\phi D/2$	

Note: In Z-feed milling, select either of the machining method (1) or (2) and decide the depth of cut according to the application.

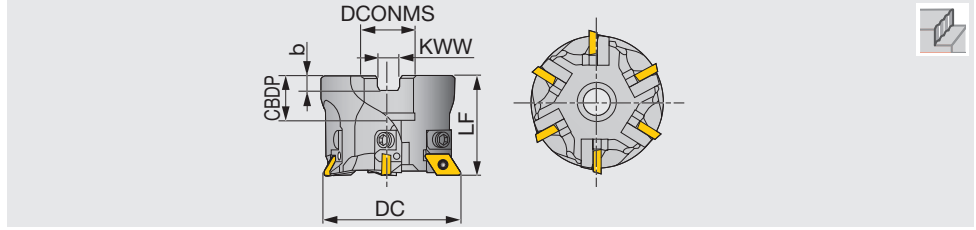




TZF11

High precision plunge mill

GAMP = 0°, GAMF = -6° ~ 0°

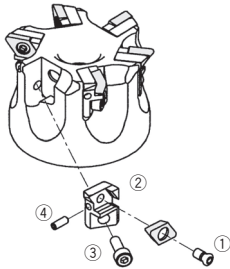


Designation	CICT	DC	DCONMS	CBDP	LF	b	KWW	WT(kg)	Insert
TZF11050R	4	50	22	20	45	6	10	0.38	DPCW11T3ZFR
TZF11050R-E	4	50	22	20	45	6.3	10.4	0.38	DPCW11T3ZFR
TZF11063R	6	63	22	20	45	6	10	0.72	DPCW11T3ZFR
TZF11063R-E	6	63	22	20	45	6.3	10.4	0.72	DPCW11T3ZFR
TZF11080R	7	80	31.75	32	63	8	12.7	1.51	DPCW11T3ZFR

SPARE PARTS

Designation	① Clamping screw	② Cartridge	Lubricant	③ Cartridge fixing screw	④ Cartridge 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

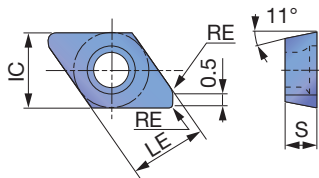
*Recommended clamping torque (N·m) : CSTB-4S=3.5



INSERT

DPCW11T3

High precision ground insert (for plunging)



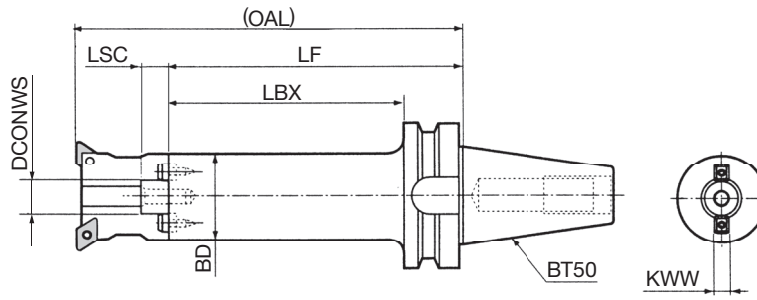
P	Steel	☆	★							
M	Stainless									
K	Cast iron	★	☆							
N	Non-ferrous									
S	Superalloys									
H	Hard materials	☆								

★ : First choice
☆ : Second choice

Designation	RE	Coated		Cermet	LE	IC	S
		AH120	AH740	NS740			
DPCW11T3ZFR	1	●	●	●	9.525	9.525	3.97

● : Line up

Reference pages: Standard cutting conditions → [H235](#)



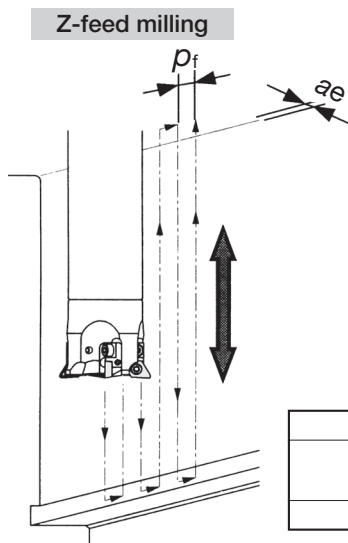
Designation	Dimension (mm)							WT (kg)	Applicable mill
	LF	LBX	(OAL)*	BD	DCONWS	LSC	KWW		
BT50-FMC22-343-47	343	305	388	47	22	18	10	7.9	TZF11050R...
BT50-FMC22-293-47	293	255	338	47	22	18	10	7.2	TZF11050R...
BT50-FMC22-243-47	243	205	288	47	22	18	10	6.5	TZF11050R...
BT50-FMC22-433-59	433	395	478	59	22	18	10	12.2	TZF11063R...
BT50-FMC22-373-59	373	335	418	59	22	18	10	10.9	TZF11063R...
BT50-FMC22-308-59	308	270	353	59	22	18	10	9.5	TZF11063R...
BT50-FMA31.75-455-76	455	417	518	76	31.75	30	12.7	18.6	TZF11080R...
BT50-FMA31.75-375-76	375	337	438	76	31.75	30	12.7	15.8	TZF11080R...
BT50-FMA31.75-295-76	295	257	358	76	31.75	30	12.7	12.9	TZF11080R...

Note: (OAL) is a length with TZF11 cutter mounted.

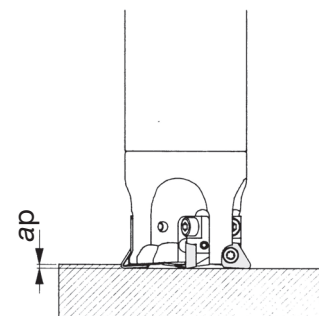
STANDARD CUTTING CONDITIONS

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. Ductile cast irons 600-3, etc.	AH120	300 (200 ~ 500)	0.15 (0.05 ~ 0.2)
		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 a_e to 0.3 mm (allowable max. 0.5 mm) and a pick feed p_f 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.



Traverse feed milling



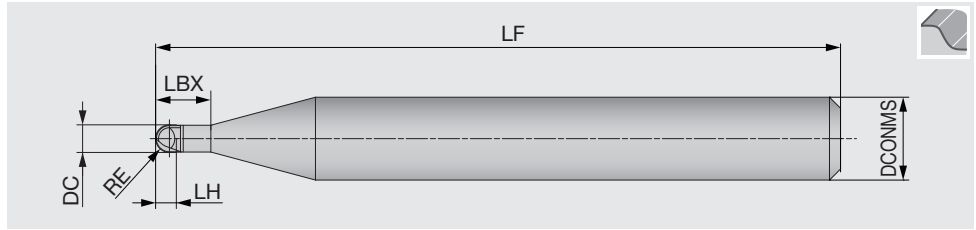
Z-feed milling		Traverse feed milling
Pick feed p_f (mm)	Radial depth of cut a_e (mm)	Depth of cut a_p (mm)
0.5 ~ 1	~ 0.5	~ 0.5

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. ($a_p \leq 0.5$ 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	Hardness	No. of revolutions n (min ⁻¹)	Ball radius (RE)							
				0.3		0.4		0.5		1	
				Depth of cut APMX × pf (mm)	Feed rate (mm/min)	Depth of cut APMX × pf (mm)	Feed rate (mm/min)	Depth of cut APMX × pf (mm)	Feed rate (mm/min)	Depth of cut APMX × pf (mm)	Feed rate (mm/min)
H	Prehardened steel (NAK80, etc.) Die steel (JIS SKD61, etc.)	~ 52 HRC	50,000	0.02 × 0.03	2,000	0.03 × 0.05	2,000	0.05 × 0.05	3,000	0.10 × 0.10	5,000
	Die steel (JIS SKD11, DRM1 & 2, etc.)	~ 62 HRC	50,000	0.01 × 0.02	2,000	0.02 × 0.03	2,000	0.03 × 0.05	3,000	0.05 × 0.05	5,000
	High speed steel, Die steel (JIS SKH, DRM3, etc.)	~ 70 HRC	50,000	0.01 × 0.02	1,500	0.01 × 0.03	1,500	0.02 × 0.03	2,000	0.03 × 0.05	3,000

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 (θ_1) / Effective neck length (Z)			
0.3	0°30'/1.25	1°/1.30	2°/1.35	3°/1.45
0.4	0°30'/1.65	1°/1.70	2°/1.80	3°/1.90
0.5	0°30'/2.05	1°/2.10	2°/2.25	3°/2.40
1	0°30'/4.15	1°/4.25	2°/4.50	3°/4.80