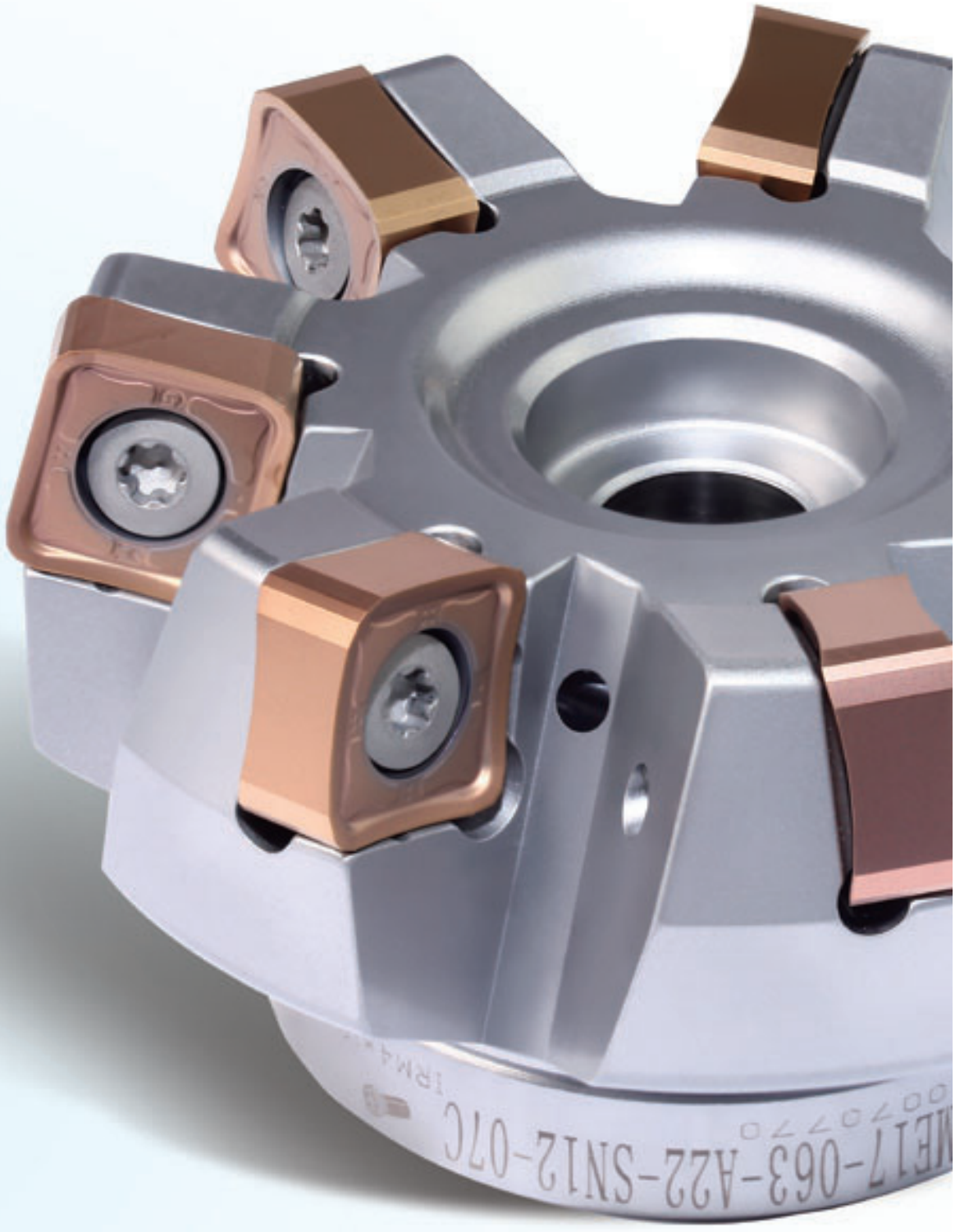


Milling Tools

Indexable milling tools

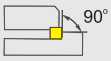
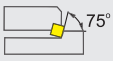
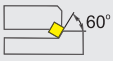
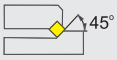
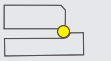

FMA11 series
With outstanding economy and high performance
FMA11-125-B40-SN12-08
YBD152


FMA12 series
High Performance Face Milling
with 16 edges for outstanding
economy Milling
FMA14 series


WHIRLWIND
FMD02
milling cutter series

Indexable milling tools code key

Cutter type	
FM	Face milling
EM	Square shoulder milling
HM	Helical end milling
SM	Side and face milling
BM	Profile milling
CM	Chamfer milling
XM	Special milling
TM	T-slot milling
AM	Aluminum alloy high speed milling

Approach angle		
P	90°	
E	75°	
D	60°	
A	45°	
R		

Series code

Cutting diameter ØD

Side and face milling tool : diameter X cutting edge width

Coupling structurebe (see below)

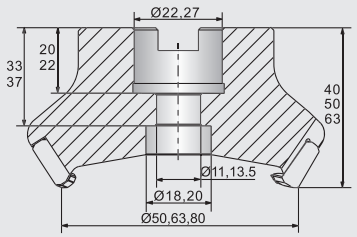
A	A-type coupling	XP	Weldon shank
B	B-type coupling	G	Straight shank
C	C-type coupling	MW	Morse adapter with a conical hole and without a flat tail
D	D-type coupling		

Coupling size(mm) (see below)

FM E 03 - 100 - B 32

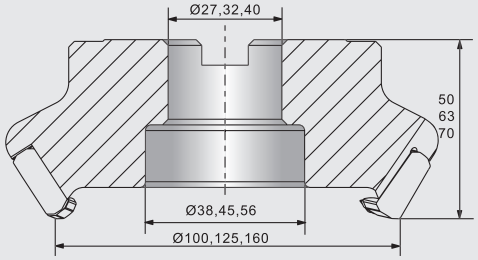
Coupling structure of arbor

A-type coupling



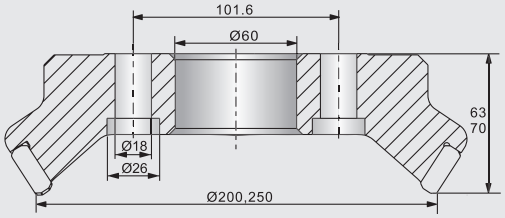
Ø50- Ø80 arbor face milling cutter as per GB5342-96

B-type coupling



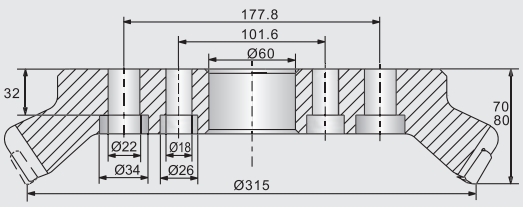
Ø100- Ø160 arbor face milling cutter as per GB5342-96

C-type coupling



Ø200- Ø250 arbor face milling cutter as per GB5342-96

D-type coupling



D≥Ø315 arbor face milling cutter as per GB5342-96

For coupling methods of Weldon shank, straight shank and Morse taper shank, etc., see technical information of tooling systems.

Insert shape	
80° C	55° D
R	S
60° T	L
H	O

Insert clearance angle	
N	0°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

Length of cutting edge

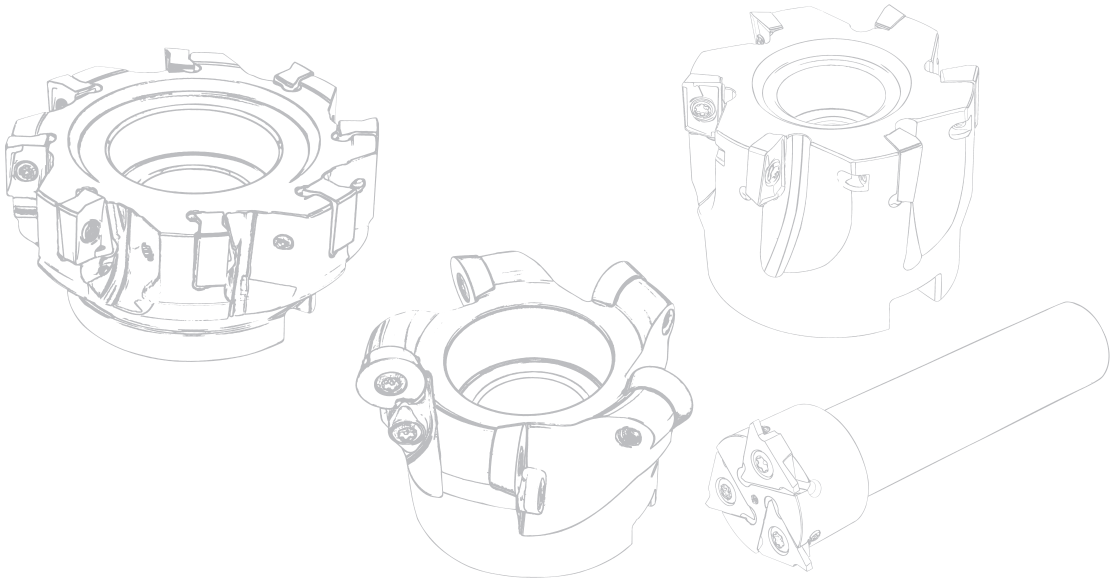
Diameter of insert's inscribed circle	Insert shape					
	C	D	R	S	T	L
5.556	—	—	—	—	09	—
6.350	06	07	—	—	11	—
9.525	09	11	09	09	16	—
12.700	12	15	12	12	22	—
15.875	16	19	15	15	27	—
19.050	19	—	19	19	33	—
25.400	25	—	25	25	44	2

-SP12-06LC

Number of teeth
(number of flute in the case of helical end mills)

Cutting direction
(R: Right L: Left R style as the default)

Internal cooling structure

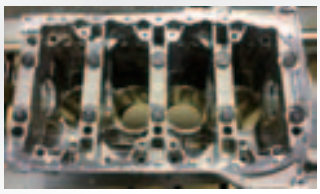


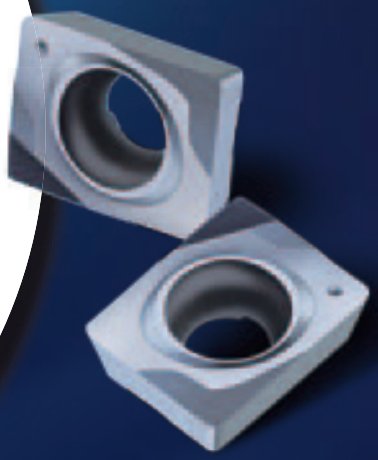
AMA01
AMP01 Series

High-speed High-precision milling tools

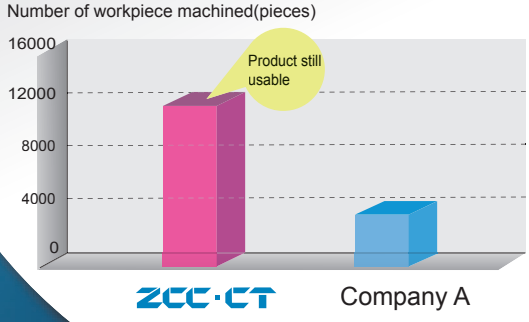
Machining case of AMP01 series high-speed high-precision milling tools

Area of machining：Bottom surface of cylinder housing
Machine：Machining center
Coolant：Internal
Workpiece material：Aluminum alloy（HB 110）
Operation：Face milling
Cutting data：n= 11141r/min fz=0.1mm/z





●Comparison of tool life



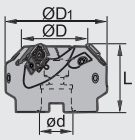
Results:：
ZCC-CT：12000 pcs
（Still usable）
Product of company A: 3500 pcs

AMA01 Series High-speed High-precision milling tools

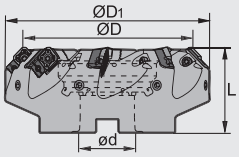
Kr:45° Face milling Chamfering

AMA01 NK

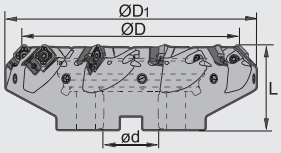
A-type coupling



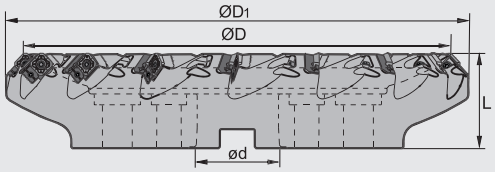
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)				Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L			
AMA01	-050-A22-SE12-03C	▲	△	50	64	22	40	3	A	0.17
	-063-A27-SE12-04C	▲	△	63	77	27	40	4	A	0.27
	-080-A27-SE12-05C	▲	△	80	94	27	50	5	A	0.49
	-100-A32-SE12-06C	▲	△	100	114	32	50	6	A	0.84
	-125-B40-SE12-08C	▲	△	125	139	40	63	8	B	1.20
	-160-B40-SE12-10C	▲	△	160	173	40	63	10	B	2.11
	-160-C40-SE12-10C	▲	△	160	173	40	63	10	C	2.15
	-200-C60-SE12-12C	▲	△	200	213	60	63	12	C	3.36
	-250-C60-SE12-14C	▲	△	250	263	60	63	14	C	4.96
	-315-D60-SE12-16	▲	△	315	328	60	80	16	D	8.68
	-400-D60-SE12-18	▲	△	400	413	60	80	18	D	10.1
	-500-D60-SE12-20	▲	△	500	513	60	80	20	D	14.3

▲Stock available △Make-to-order

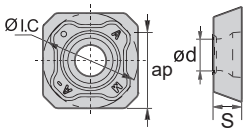
Cutter with a diameter of 250mm or more have no internal cooling, and cutter with a diameter of 200mm or more have no dynamic balance. Type A and Type B connectors are equipped with internal cooling screws.

Spare parts

Diameter ØD	Locator screw	Balancing screw	Adjusting screw	Insert screw	Locator	Wrench	Wrench
Ø50	M4×12-TP	M8×8(GB77-85)	I20M3×10X	I60M4×8.4	AMA0101	WT15IP	WT09P
Ø63							
Ø80		M8×12(GB77-85)			AMA0102	WT15IS	
Ø100-Ø160							
Ø200		--					
Ø250-Ø500		--			AMA0103		

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



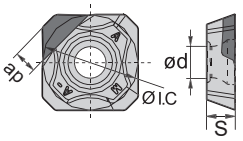
Good working condition Normal working condition Bad working condition

Workpiece material				
K	Cast iron		😊	☹
N	Non-ferrous metal	😐		😐

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	a_{pmax}	DN1021	BK1021	YD201
	**SEHT12T3AFFN-AL**	12.7	3.97	4.4	6.6			★

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Selection of inserts



Good working condition Normal working condition Bad working condition

Workpiece material				
K	Cast iron		😊	☹
N	Non-ferrous metal	😐		😐

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	a_{pmax}	DN1021	BK1021	YD201
	**SEHT12T308AFFN-PCD**	12.7	3.97	4.4	2.5	★		
	SEHT12T308AFFN-CBN	12.7	3.97	4.4	2		○	

CBN insert edge can be treated as per machining requirements

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Insert material	Cutting parameters	
			V_c(m/min)	f_z(mm/z)
K	Cast iron	BK1021	800(500-1200)	0.2(0.1-0.5)
N	Aluminum alloy (Si content≤12%)	DN1021	1500(800-3000)	0.1(0.08-0.3)
		YD201	600(300-1000)	0.15(0.05-0.3)

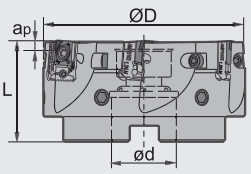
AMA01 Series High-speed High-precision milling tools

Kr:90° Face milling Step shoulder

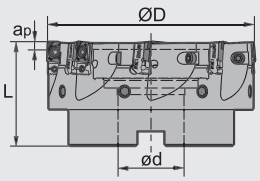
AMP01 N K

Close even pitch

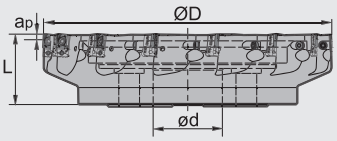
A-type coupling



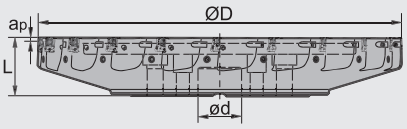
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)			Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ød	L			
AMP01	-050-A22-AP12-03C	▲	△	50	22	40	3	A	0.17
	-063-A27-AP12-05C	▲	△	63	27	40	5	A	0.27
	-080-A27-AP12-06C	▲	△	80	27	50	6	A	0.49
	-100-A32-AP12-06C	▲	△	100	32	50	6	A	0.84
	-125-B40-AP12-08C	▲	△	125	40	63	8	B	1.20
	-160-B40-AP12-10C	▲	△	160	40	63	10	B	2.11
	-160-C40-AP12-10C	▲	△	160	40	63	10	C	2.15
	-200-C40-AP12-12C	▲	△	200	60	63	12	C	3.36
	-250-C60-AP12-14C	▲	△	250	60	63	14	C	4.96
	-315-D60-AP12-16	▲	△	315	60	80	16	D	8.68
	-400-D60-AP12-18	▲	△	400	60	80	18	D	10.1
	-500-D60-AP12-20	▲	△	500	60	80	20	D	14.3

▲Stock available △Make-to-order

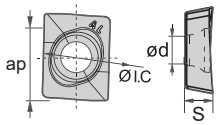
Cutter with a diameter of 250mm or more have no internal cooling, and cutter with a diameter of 200mm or more have no dynamic balance. Type A and Type B connectors are equipped with internal cooling screws.

Spare parts

Diameter ØD	Locator screw	Balancing screw	Adjusting screw	Insert screw	Locator	Wrench	Wrench
Ø50-Ø63	M4×12-TP	M8×8(GB77-85)	I20M3×10X	I60M4×8.4	AMP0101	WT15IP	WT09P
Ø80-Ø160		M8×12(GB77-85)			AMP0102	WT15IS	
Ø200		--					
Ø250-Ø500		--			AMP0103		

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



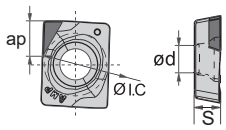
Good working condition Normal working condition Bad working condition

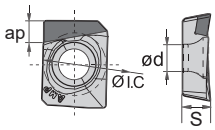
Workpiece material				
K	Cast iron		😊	☹
N	Non-ferrous metal	😐		😐

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	a_{pmax}	DN1021	BK1021	YD201
	**APHT12T304PPFR-AL**	12.7	3.97	4.4	12			★

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Selection of inserts





Good working condition Normal working condition Bad working condition

Workpiece material				
K	Cast iron		😊	☹
N	Non-ferrous metal	😐		😐

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	a_{pmax}	DN1021	BK1021	YD201
	**APHT12T304PPFR-PCD**	12.7	3.97	4.4	3	★		
	**APHT12T304PPFR-CBN**	12.7	3.97	4.4	2		○	
	**APHT12T304-W**	12.7	3.97	4.4	1	★	★	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Insert material	Cutting parameters	
			V_c(m/min)	f_z(mm/z)
K	Cast iron	BK1021	800(500-1200)	0.2(0.1-0.5)
N	Aluminum alloy (Si content≤12%)	DN1021	1500(800-3000)	0.1(0.08-0.3)
		YD201	600(300-1000)	0.15(0.05-0.3)

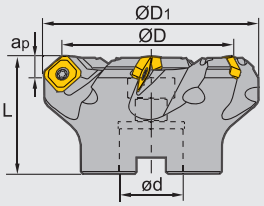
Face milling tools

Kr:45°

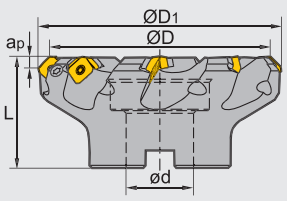
Face milling Chamfering

FMA01 P M K N S

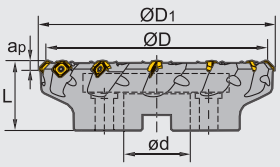
A-type coupling



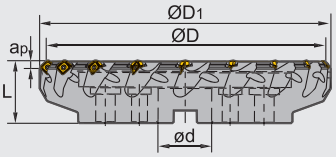
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA01 Coarse pitch	**-050-A22-SE12-04**	▲	△	50	61	22	40	6	4	A	0.3
	-063-A22-SE12-05	▲	△	63	74	22	40	6	5	A	0.5
	-080-A27-SE12-06	▲	△	80	91	27	50	6	6	A	1.2
	-100-B32-SE12-07	▲	△	100	107	32	50	6	7	B	1.52
	-125-B40-SE12-08	▲	△	125	136	40	63	6	8	B	2.6
	-160-B40-SE12-07	▲	△	160	174	40	63	6	7	B	4.548
	-160-B40-SE12-10	▲	△	160	170	40	63	6	10	B	4.92
	-200-C60-SE12-08	▲	△	200	214	60	63	6	8	C	6.175
	-200-C60-SE12-12	▲	△	200	210	60	63	6	12	C	7.6
	-250-C60-SE12-10	▲	△	250	264	60	63	6	10	C	12.596
	-250-C60-SE12-14	▲	△	250	260	60	63	6	14	C	13.5
	-315-D60-SE12-18	▲	△	315	325	60	70	6	18	D	20.8
	-100-B32-SE18-04	▲	△	100	120	32	63	10.4	4	B	2.22
	-125-B40-SE18-05	▲	△	125	145	40	63	10.4	5	B	3.15
	-160-B40-SE18-06	▲	△	160	180	40	63	10.4	6	B	5.01
	-200-C60-SE18-08	▲	△	200	220	60	63	10.4	8	C	6.9
	-250-C60-SE18-10	▲	△	250	270	60	63	10.4	10	C	13.1
	-315-D60-SE18-12	▲	△	315	335	60	80	10.4	12	D	24.5

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Insert	Insert screw	Shim	Shim screw	Wrench	Wrench
Ø50-Ø100	SEET12□□-□□	I60M3.5×10	--	--	WT15IS	--
Ø50-Ø315	SEET12□□-□□	I60M3.5×12	S13BS	SM5×7XA		WH35L
Ø100-Ø315	SEET18□□-□□	I60M5×17	S18BS	SM8×9XA	WT20IT	WH50L

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Face milling tools

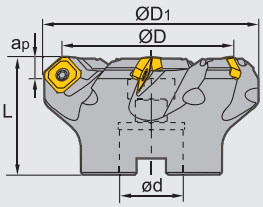
Kr:45°

Face milling Chamfering

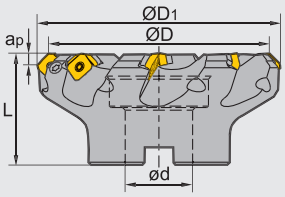
FMA01 P M K N S

Close and equal pitch

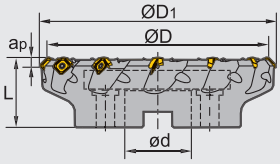
A-type coupling



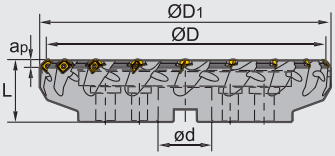
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	$a_p$max			
FMA01 Close pitch	**-050-A22-SE12-05**	▲	△	50	63	22	40	6	5	A	0.427
	-063-A22-SE12-06	▲	△	63	74	22	40	6	6	A	0.53
	-080-A27-SE12-08	▲	△	80	93	27	50	6	8	A	1.37
	-100-B32-SE12-10	▲	△	100	114	32	50	6	10	B	1.755
	-125-B40-SE12-12	▲	△	125	136	40	63	6	12	B	3.06
	-160-B40-SE12-16	▲	△	160	174	40	63	6	16	B	5.21
	-200-C60-SE12-20	▲	△	200	214	60	63	6	20	C	9.32
	-250-C60-SE12-24	▲	△	250	264	60	63	6	24	C	15.892
	-100-B32-SE18-06	▲	△	100	114	32	63	10.4	6	B	2.98
	-125-B40-SE18-07	▲	△	125	144	40	63	10.4	7	B	3.803
	-200-C60-SE18-12	▲	△	200	220	60	63	10.4	12	C	7.191
	-250-C60-SE18-14	▲	△	250	265	60	63	10.4	14	C	14.9

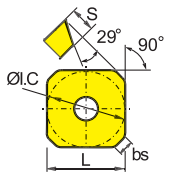
▲Stock available △Make-to-order

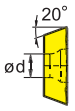
Spare parts

Diameter ØD	Insert	Insert screw	Shim	Shim screw	Wrench	Wrench
Ø50-Ø100	SEET12□□-□□	I60M3.5×10	--	--	WT15IS	--
Ø50-Ø315	SEET12□□-□□	I60M3.5×12	S13BS	SM5×7XA		WH35L
Ø100-Ø315	SEET18□□-□□	I60M5×17	S18BS	SM8×9XA	WT20IT	WH50L

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



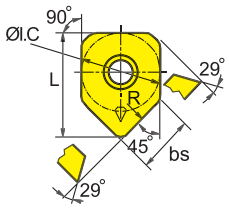


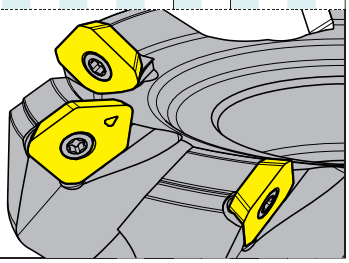
Good working condition Normal working condition Bad working condition

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, Ti alloy

Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	bs	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SEET12T3-DF	13.4	13.4	3.97	4.1	2.55	--	●	★	●							★		○										
	SEET12T3-CF	13.4	13.4	3.97	4.1	2.55	--						○		★		★		○										
	SEET12T3-EF	13.4	13.4	3.97	4.1	2.55	--										★		○				●						
	SEET12T3-DM	13.4	13.4	3.97	4.1	2.55	--	●	★	●		○					★		★										
	SEET12T3-CM	13.4	13.4	3.97	4.1	2.55	--						★				★		○										
	SEET12T3-EM	13.4	13.4	3.97	4.1	2.55	--			●		●					★		★				●						
	SEET18T6-DM	18.0	18.0	6.1	5.5	1.5	--		○		○																		
	SEET18T6-EM	18.0	18.0	6.1	5.5	1.5	--				○							○											
	SEET12T3-DR	13.4	13.4	3.97	4.1	2.55	--	●	★			●					★		★										
	SEET12T3-CR	13.4	13.4	3.97	4.1	2.55	--	●					★				★		★										
	SEET12T3-LH	13.4	13.4	3.97	4.1	2.55	--																				○	★	
	SEET12T3-W	17.82	13.4	3.97	4.1	9.46	500		★	●			★				★							★					
	SEET18T6-W	24.78	18.0	6.1	5.5	11.0	500										○												





★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Chipbreaker selection for FMA01 milling inserts

Classification \ Function	For finishing	For semi-finishing	For roughing
P	-DF	-DM	-DR
M, S	-EF	-EM	
K	-CF	-CM	-CR
N		-LH	

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V_c(m/min)	f_z(mm/z)		
					-DF	-DM	-DR
P	Low-carbon steel、Soft steel	≤180	YBM251 YBC301	270(220-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG205 YB9320	270(200-360)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302 YBM253	230(170-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	High-carbon steel、Alloy steel	180-280	YBM251 YBC302 YBC301	240 (200-320)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG205 YB9320	240 (180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302 YBM253	220 (150-330)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	Alloy tool steel	280-350	YBM251 YBM351 YBC301	220 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG205 YB9320	220 (170-340)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302 YBM253	190 (130-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
M					-EF	-EM	
	Stainless steel	≤270	YBM251	150 (120-240)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			YBG205 YB9320	160 (110-270)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			YBG302	140 (100-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
K					-CF	-CM	-CR
	Cast iron	180-250	YBG102	210 (120-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBD152	240 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
N					-LH		
	Al alloy steel	--	YD101	300-	0.25 (0.1-0.4)		
			YD201	300-			
S					-EF	-EM	
	High-temperature alloy	≤400	YBG102	50(20-60)	0.1 (0.1-0.2)	0.15 (0.1-0.3)	
			YBS303	100(60-120)	0.1 (0.1-0.2)	0.15 (0.1-0.25)	

Case for FMA01

Workpiece material：1Cr18Ni9Ti (HB180)
Cooling system： Dry cutting
Machine： Vertical machining center
Cutting parameters：
Vc=160m/min
a_p=1mm
fz=0.2mm/z
a_e=60mm

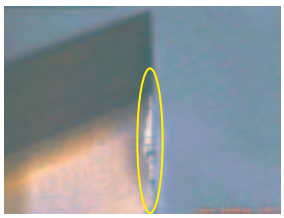
Tool type：FMA01-080-A27-SE12-06
Insert type/grade：SEET12T3-EM/YBG302

Surface roughness of workpiece:

ZCC-CT:Ra1.2

Similar overseas products：Ra1.6

●Comparison of insert abrasion

	ZCC-CT	Similar overseas products
17'30"		
29'30"		
33'30"		

Face milling tools

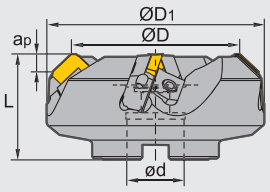
Kr:45°


Face milling

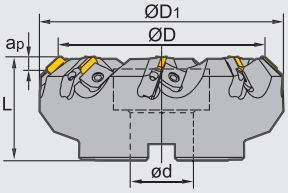

Chamfering

FMA03 P M K

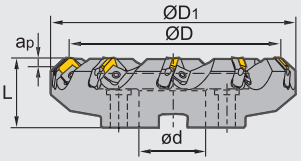
A-type coupling



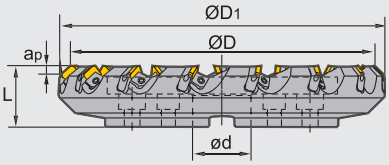
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA03	**-080-A27-SE12-04**	▲	△	80	103	27	50	5.5	4	A	1.8
	-100-B32-SE12-05	▲	△	100	122	32	50	5.5	5	B	2.4
	-125-B40-SE12-06	▲	△	125	147	40	63	5.5	6	B	4.4
	-160-B40-SE12-08	▲	△	160	181	40	63	5.5	8	B	6.4
	-200-C60-SE12-10	▲	△	200	221	60	63	5.5	10	C	8.5
	-250-C60-SE12-12	▲	△	250	270	60	63	5.5	12	C	14.1
	-315-D60-SE12-15	▲	△	315	353	60	63	5.5	15	D	22.2
	-080-A27-SE15-04	▲	△	80	103	27	50	7.5	4	A	1.7
	-100-B32-SE15-05	▲	△	100	122	32	50	7.5	5	B	2.3
	-125-B40-SE15-06	▲	△	125	147	40	63	7.5	6	B	4.2
	-160-B40-SE15-08	▲	△	160	181	40	63	7.5	8	B	6.1
	-200-C60-SE15-10	▲	△	200	221	60	63	7.5	10	C	8.3
	-250-C60-SE15-12	▲	△	250	270	60	63	7.5	12	C	13.6
	-315-D60-SE15-15	▲	△	315	353	60	63	7.5	15	D	21.8

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Locator	Wedge	Wedge screw	Locator screw	Wrench
Ø80-Ø315	SE12	LSE12R/L	W05R/L	DM8×21X	LOM5×15.1	WT20T WH40T
Ø80-Ø315	SE15	LSE15R/L	W01R/L			

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Face milling tools

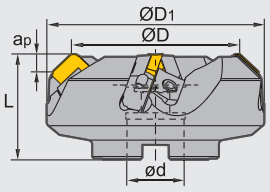
Kr:45°


Face milling

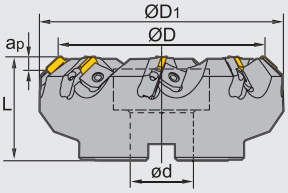

Chamfering

FMA03A P M K

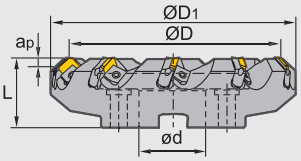
A-type coupling



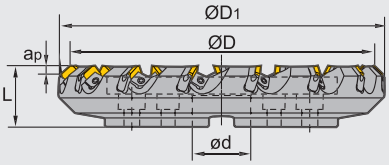
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA03A	**-160-B2.00"-SE12-08R/L**	▲	△	160	177	2.00"	63	5.5	8	B	6.9
	-200-C1.875"-SE12-10R/L	▲	△	200	217	1.875"	63	5.5	10	C	9.1
	-250-C1.875"-SE12-12R/L	▲	△	250	267	1.875"	63	5.5	12	C	14.6
	-315-C1.875"-SE12-14R/L	▲	△	315	332	1.875"	63	5.5	14	C	22.7
	-350-C1.875"-SE12-16R/L	▲	△	350	367	1.875"	63	5.5	16	C	28.9
	-250-C1.875"-SE15-12R/L	▲	△	250	267	1.875"	63	7.5	12	C	7.3
	-315-C1.875"-SE15-14R/L	▲	△	315	340	1.875"	63	7.5	14	C	9.5
	-350-C1.875"-SE15-16R/L	▲	△	350	370	1.875"	63	7.5	16	C	15.1

▲Stock available △Make-to-order

1.875"=47.625mm 2.00"=50.8mm

Cutter diameter — Insert type — Left cutter

FMA03A - 160 - B2.00" - SE12 - 08R/L

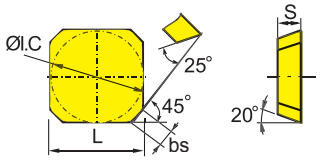
Cutter type — Coupling type — Right cutter

Spare parts

Diameter ØD	Inserts	Shim	Wedge	Wedge screw	Insert screw	Wrench
Ø160-Ø350	SE□□12□□□□	S15BSX	W27R/L	DM10X21X	M4X10-S12B	WH50T
	SE□□15□□□□					

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts

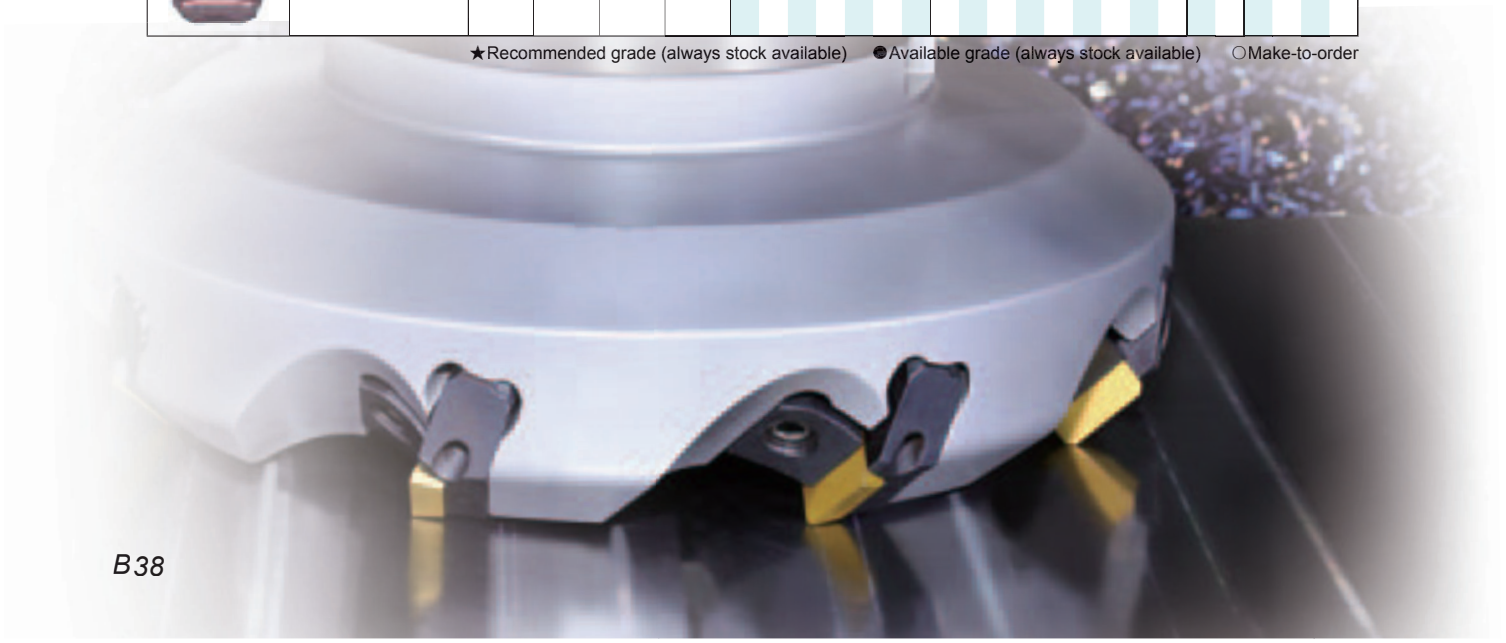


Good working condition Normal working condition Bad working condition

Workpiece material	
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, Ti alloy

Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEEN1203AFTN**	12.7	12.7	3.18	1.8									○								●					
	SEKN1203AFFN	12.7	12.7	3.18	1.8								★														
	SEKN1203AFN	12.7	12.7	3.18	1.8	●								○										●			○
	SEKN1203AFTN	12.7	12.7	3.18	1.8	●		●		●				★			○							●			●
	**SEKR1203AFN**	12.7	12.7	3.18	1.8	●								○			○										
	**SEMR1203AN-M**	12.7	12.7	3.3	-										●												
	**SEKR1203AN-M**	12.7	12.7	3.3	-										●												
	**SEKN1504AFN**	15.875	15.875	4.76	1.6	●		●																			●
	SEKN1504AFTN	15.875	15.875	4.76	1.6	○		●		●							○							●			●
	**SEKR1504AFN**	15.875	15.875	4.76	1.6							★					★							●			
	**SEMR1504AN-M**	15.875	15.875	4.9	-										●												
	**SEKR1504AN-M**	15.875	15.875	4.9	-										●												

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order



Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V_c(m/min)	f_z(mm/z)
P	Low-carbon steel、Soft steel	≤180	YNG151	430 (340-500)	0.2 (0.1-0.4)
			YBM251 YBC301 YBG205	270 (220-350)	0.2 (0.1-0.4)
			YBM351	220 (180-300)	0.25 (0.15-0.3)
			YBG202 YBG302	270 (200-360)	0.2 (0.1-0.3)
			YC30S	140 (100-220)	0.27 (0.1-0.4)
	High-carbon steel、Alloy steel	180-280	YNG151	400 (320-480)	0.2 (0.1-0.4)
			YBM251 YBC301 YBG205	240 (200-320)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.25 (0.15-0.3)
			YBG202 YBG302	240 (180-350)	0.2 (0.1-0.3)
			YC30S	120 (80-200)	0.27 (0.1-0.4)
	Alloy tool steel	280-350	YNG151	350 (300-450)	0.2 (0.1-0.4)
			YBM251 YBC301 YBG205	220 (180-300)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.25 (0.15-0.3)
			YBG202 YBG302	220 (170-340)	0.2 (0.1-0.3)
			YC30S	100 (60-180)	0.27 (0.1-0.4)
M	Stainless steel	≤270	YNG151	220 (160-280)	0.2 (0.1-0.4)
			YBM251 YBG205	130 (100-220)	0.2 (0.1-0.4)
			YBM351	140 (100-240)	0.25 (0.15-0.3)
			YBG202 YBG302	140 (100-250)	0.2 (0.1-0.3)
K	Cast iron	180-250	YBG102	210 (120-300)	0.2 (0.1-0.3)
			YBD252	200 (150-250)	0.2 (0.1-0.4)
			YD201	100 (80-160)	0.25 (0.1-0.4)

Face milling tools

Kr:45°

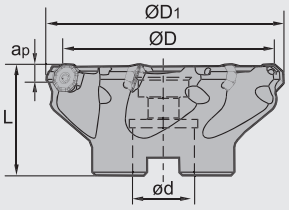

Face milling


Chamfering

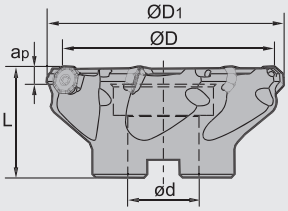
FMA04 P M K N

Screw clamping

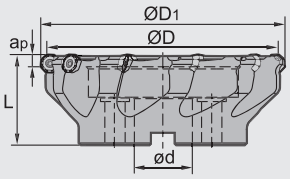
A-type coupling



B-type coupling



C-type coupling



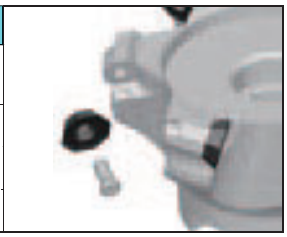
Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA04	**-050-A22-OF05-04**	▲	△	50	56	22	40	3.5	4	A	0.3
	-050-A22-OF05-05	△	△	50	56	22	40	3.5	5	A	0.4
	-063-A22-OF05-05	▲	△	63	69	22	40	3.5	5	A	0.5
	-080-A27-OF05-06	▲	△	80	86	27	50	3.5	6	A	0.8
	-100-B32-OF05-07	▲	△	100	106	32	50	3.5	7	B	1.2
	-125-B40-OF05-08	▲	△	125	130	40	63	3.5	8	B	2.7
	-160-B40-OF05-10	▲	△	160	165	40	63	3.5	10	B	5.1
	-160-C40-OF05-10	△	△	160	165	40	63	3.5	10	C	4.1

▲Stock available △Make-to-order

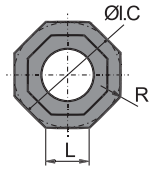
Spare parts

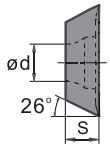
Diameter ØD	Insert screw	Wrench
Ø50- Ø63	I60M4×8.4	WT15IS
Ø80 -Ø160	I60M4×10	



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Good working condition Normal working condition Bad working condition

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, Ti alloy

Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**OFKT05T3-DF**	5.26	12.7	3.97	4.4	0.5								○	★	★											
	**OFKT05T3-DM**	5.26	12.7	3.97	4.4	0.5			○			○	○	★	★	★	★	★										
	**OFKT05T3-LH**	5.26	12.7	3.97	4.4	0.5																				○	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				Vc(m/min)	fz(mm/z)	
					-DF	-DM
P	Low-carbon steel、Soft steel	≤180	YBM251	270 (220-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG202	270 (200-360)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302 YB9320 YBG205	230 (170-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	High-carbon steel、Alloy steel	180-280	YBM251	240 (200-320)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202	240 (180-350)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG302 YB9320 YBG205	220 (150-330)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	Alloy tool steel	280-350	YBM251	220 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202	220 (170-340)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG302 YB9320	190 (130-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
M	Stainless steel	≤270	YBG202	160 (110-270)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG302 YB9320 YBG205	140 (100-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM251	150 (120-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
K	Cast iron	180-250	YBG102 YBD152 YBD252	210 (120-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
N					-LH	
	Al alloy steel	-	YD101	300-	0.15 (0.05-0.3)	

Face milling tools

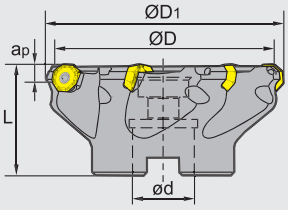
Kr:45°

Face milling Chamfering

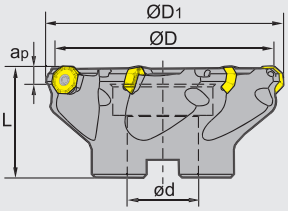
FMA04 P M K N S

Screw clamping

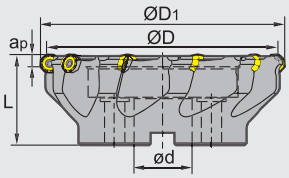
A-type coupling



B-type coupling



C-type coupling

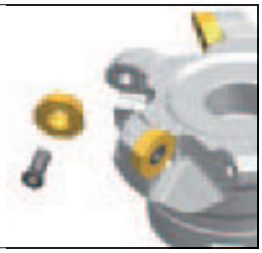


Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA04 Coarse pitch	**-050-A22-OD06-04C**	▲	△	50	60	22	40	4	4	A	0.284
	-063-A22-OD06-05C	▲	△	63	73	22	40	4	5	A	0.409
	-080-A27-OD06-06C	▲	△	80	90	27	50	4	6	A	1.017
	-100-A32-OD06-07C	▲	△	100	110	32	50	4	7	A	1.536
	-125-B40-OD06-08	▲	△	125	135	40	63	4	8	B	2.931
	-160-C40-OD06-10	▲	△	160	170	40	63	4	10	C	3.838
Close pitch	**-050-A22-OD06-05C**	▲	△	50	60	22	40	4	5	A	0.298
	-063-A22-OD06-06C	▲	△	63	73	22	40	4	6	A	0.425
	-080-A27-OD06-07C	▲	△	80	90	27	50	4	7	A	1.025
	-100-A32-OD06-09C	▲	△	100	110	32	50	4	9	A	1.521
	-125-B40-OD6-10	▲	△	125	135	40	63	4	10	B	2.919
	-160-C40-OD6-12	▲	△	160	170	40	63	4	12	C	3.825

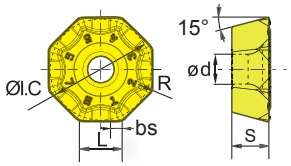
▲Stock available △Make-to-order

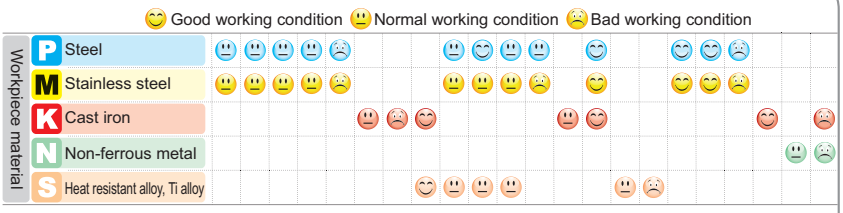
Spare parts

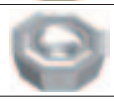
Diameter ØD	Insert screw	Wrench	
			
Ø50-Ø160	I60M5×13	WT20IP WT20IS	

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	R	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ODHT060508-GL**	6.5	15.875	5.56	5.4	0.8	1.6				●		●				●	●											
	**ODHT060508-GM**	6.5	15.875	5.56	5.4	0.8	1.6				●		●				●	●					●						
	**ODMT060512-GM**	6.5	15.875	5.56	5.4	1.2	--				●		●				●	●					●						
	**ODHT060508-GH**	6.5	15.875	5.56	5.4	0.8	1.6				●		●				●	●											
	**ODHT060508-LH**	6.5	15.875	5.56	5.4	0.8	1.6																					●	●

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Chipbreaker selection for FMA04 milling inserts

Classification \ Function	For finishing	For semi-finishing	Heavy-load machining
P	-GM	-GL	-GH
M	-GM	-GL	-GH
K	-GM	-GL	-GH
S	-GM	--	--
N	-LH		

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V_c(m/min)	f_z(mm/z)		
					-GL	-GM	-GH
P	Low-carbon steel、Soft steel	≤180	YBM253	270(220-350)	0.15 (0.1-0.2)	0.25 (0.15-0.35)	0.3 (0.15-0.4)
			YBG205	270(200-360)			
			YB9320	270(200-360)			
	High-carbon steel、Alloy steel	180-280	YBM253	240(200-320)	0.15 (0.1-0.2)	0.15 (0.1-0.3)	0.25 (0.15-0.4)
			YBG205	240(180-350)			
			YB9320	240(180-350)			
	Alloy tool steel	280-350	YBM253	220(180-200)	0.15 (0.1-0.2)	0.15 (0.1-0.3)	0.25 (0.15-0.4)
			YBG205	220(170-340)			
			YB9320	220(170-340)			
M	Stainless steel	≤270	YBM253	230(180-300)	0.15 (0.1-0.2)	0.15 (0.1-0.3)	0.25 (0.15-0.4)
			YBG205	150(120-250)			
			YB9320	150(120-250)			
K	Cast iron	180-250	YBD152	200(150-250)	0.15 (0.1-0.2)	0.25 (0.15-0.35)	0.3 (0.15-0.4)
S	High-temperature alloy	≤400	YBS303	100(60-120)	--	0.15 (0.1-0.25)	--
N					-LH		
	Aluminium alloy	--	YD101	300-	0.15 (0.05-0.3)		
			YD201				

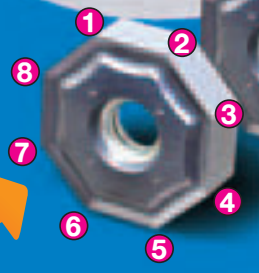
HURRICANE

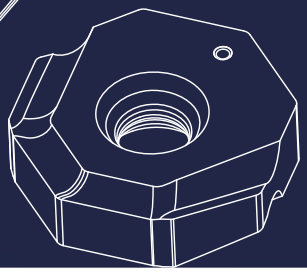
FMA07 milling cutter series

New generation of high economy milling cutters

16 cutting edges high economy

⑧×2=16 edges





- Double negative rake angle structure, both axial and radial direction, super thick insert with outstanding toughness.
- Has good wiper capability, especially under the high feed rate, the wiper effect is better in comparison with similar tools.
- The unique hole design makes the insert clamp more secured.
- Tool diameters from 25 to 315mm and 3 geometries available, -PF, -PM and -W (wiper).

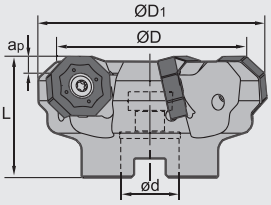
Face milling tools

Kr:45°

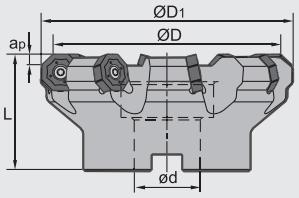
Face milling Chamfering

FMA07 P M K

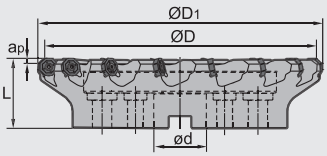
A-type coupling



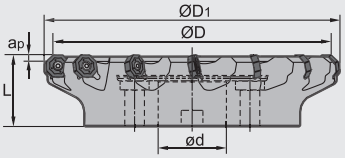
B-type coupling



C-type coupling



D-type coupling



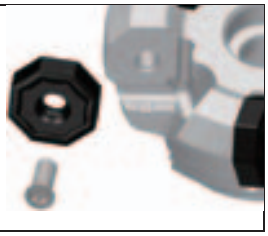
Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMA07	-050-A22-ON06-05	▲	△	50	62	22	40	4	5	A	0.3
	-063-A22-ON06-06	▲	△	63	75	22	40	4	6	A	0.5
	-080-B27-ON06-07	▲	△	80	92	27	50	4	7	B	1.0
	-100-B32-ON06-08	▲	△	100	112	32	63	4	8	B	1.9
	-125-B40-ON06-09	▲	△	125	137	40	63	4	9	B	3.5
	-160-C40-ON06-11	▲	△	160	172	40	63	4	11	C	4.3
	-200-C60-ON06-13	▲	△	200	212	60	63	4	13	C	6.4
	-250-C60-ON06-15	▲	△	250	262	60	63	4	15	C	13.4
	-315-D60-ON06-17	▲	△	315	327	60	80	4	17	D	21.9
	-063-A22-ON08-05	▲	△	63	78	22	40	5	5	A	0.5
	-080-B27-ON08-06	▲	△	80	95	27	50	5	6	B	0.9
	-100-B32-ON08-07	▲	△	100	115	32	63	5	7	B	1.8
	-125-B40-ON08-08	▲	△	125	140	40	63	5	8	B	3.1
	-160-C40-ON08-10	▲	△	160	175	40	63	5	10	C	4.1
	-200-C60-ON08-12	▲	△	200	215	60	63	5	12	C	6.1
	-250-C60-ON08-14	▲	△	250	265	60	63	5	14	C	12.0
	-315-D60-ON08-16	▲	△	315	330	60	80	5	16	D	21.0

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Insert screw	Wrench	
				
Ø50 -Ø315	ONHU06□□□□-PF/PM	I60M4×10	--	WT15IS
Ø63 -Ø315	ONHU08□□□□-PF/PM/W	I60M5×13	WT20IT	--



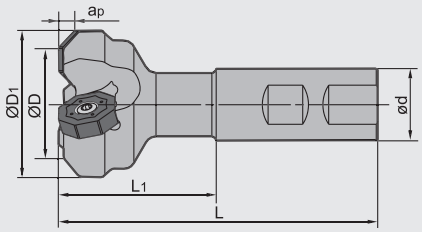
Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Face milling tools

Kr:45°

Face milling Chamfering

FMA07 P M K



Specification of tools

Type		Stock		Basic dimensions(mm)						Number of teeth Z	Weight (kg)
		R	L	ØD	ØD1	ød	L	L1	apmax		
FMA07	-025-XP20-ON06-02	▲	△	25	37	20	95	45	4	2	0.2
	-040-XP25-ON06-03	▲	△	40	52	25	106	50	4	3	0.4
	-032-XP25-ON08-02	▲	△	32	47	25	111	55	5	2	0.4
	-040-XP25-ON08-03	▲	△	40	55	25	111	55	5	3	0.5
	-050-XP25-ON08-04	▲	△	50	65	25	111	55	5	4	0.6

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Insert screw	Wrench	
Ø25 -Ø40	ONHU06□□□□-PF/PM	I60M4×10	--	WT15IS
Ø32 -Ø50	ONHU08□□□□-PF/PM/W	I60M5×13	WT20IT	--

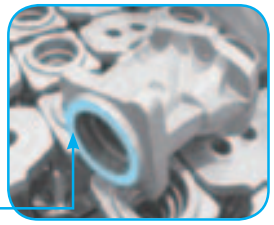
Tools code key B24–B25 Grade selection guide B19–B23 Technical data B234–B240

Case for FMA07

Tool type：FMA07-100-B32-ON08-07

Insert type/grade：ONHU08T508-PM/YBD152

Part: Gear pump body
Workpiece material：HT400
Hardness：HRC22
Cooling system: Dry cutting
Machine: Vertical machining center
Cutting parameters：V_c=267m/min
a_p=1.5mm
f_z=0.42mm/z
a_e=80mm
Milling style: Down milling
Area of machining: End surface



●Comparison of insert abrasion

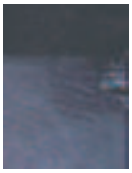
Abrasion on rake face

ZCC-CT

similar product of company A

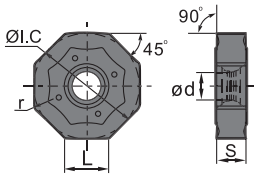
Abrasion on clearance face

ZCC-CT



similar product of company A

Selection of inserts

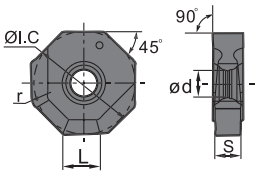


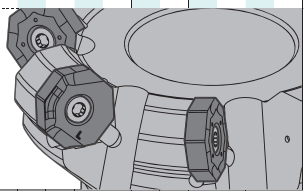
Good working condition Normal working condition Bad working condition

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant alloy, Ti alloy

Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ONHU060408-PF**	6.58	15.875	4.76	4.4	0.83		★		●		★			★	★												
	ONHU08T508-PF	8.37	20.2	5.77	5.3	0.83		★		●		★			★	★	●											
	**ONHU060408-PM**	6.58	15.875	4.76	4.4	0.83		★		★		★		●		●												
	ONHU08T508-PM	8.37	20.2	5.79	5.3	0.83		★		★		★																
	**ONHU08T508-W**	6.9	20.5	6.00	5.3	0.80		★				★		★														





★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V_c(m/min)	f_z(mm/z)	a_{pmax}(mm)
P	Low-carbon steel、Soft steel	≤180	YBG102 YBM253 YBG202 YBC302 YBG205 YB9320	270 (220-350)	0.2 (0.1-0.4)	4.0 (ONHU06) 5.0 (ONHU08)
P	High-carbon steel、Alloy steel	180-280	YBG102 YBM253 YBG202 YBC302 YBG205 YB9320	260 (200-320)	0.2 (0.1-0.4)	
P	Alloy tool steel	280-350	YBG102 YBM253 YBG202 YBC302 YBG205 YB9320	240 (180-300)	0.2 (0.1-0.4)	
M	Stainless steel	≤270	YBM253 YBG205 YB9320	230(180-300)	0.2(0.1-0.3)	
K	Cast iron	180-250	YBD152	270 (150-300)	0.4 (0.1-0.5)	

Note: The recommended feed rate per tooth for inserts with wiper fz≤0.25mm/z.

FMA11 Kr:45° Series

With outstanding economy and high performance

4 × 2=8 edge

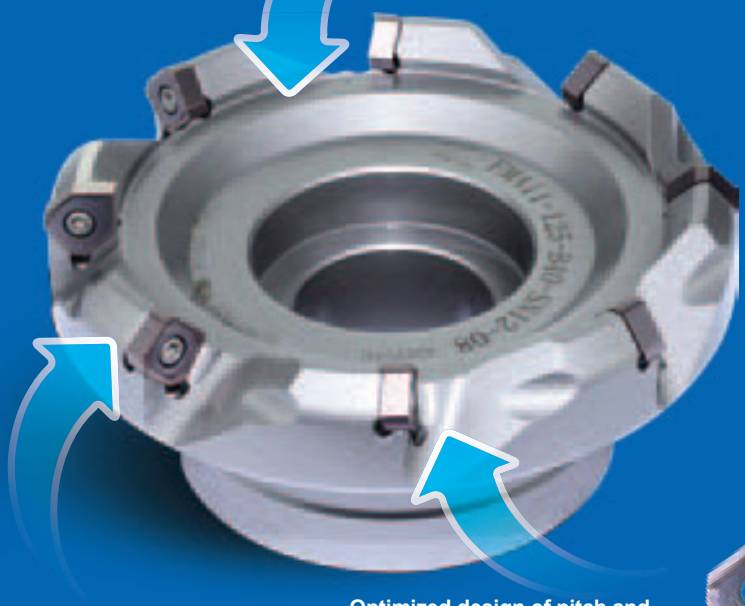
Cutter body with PVD coating for superior corrosion and heat resistance resulting in longer service life.

Comprehensive upgrading of -GM geometry, good chip breaking performance, large rake angle, reduced cutting force.

New -HGR geometry, high edge strength, excellent breakage resistance.

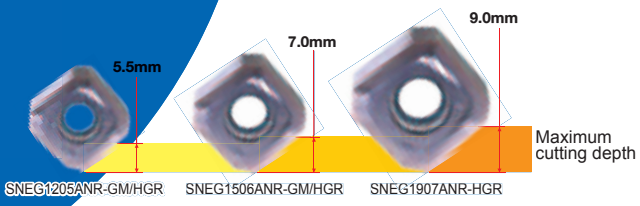
Insert with wiper, smoother surface roughness.

Complete range of insert specifications and geometries, for different cutting depths and different machining demands.



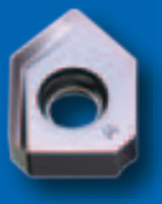
Double negative structure, excellent impact resistance.

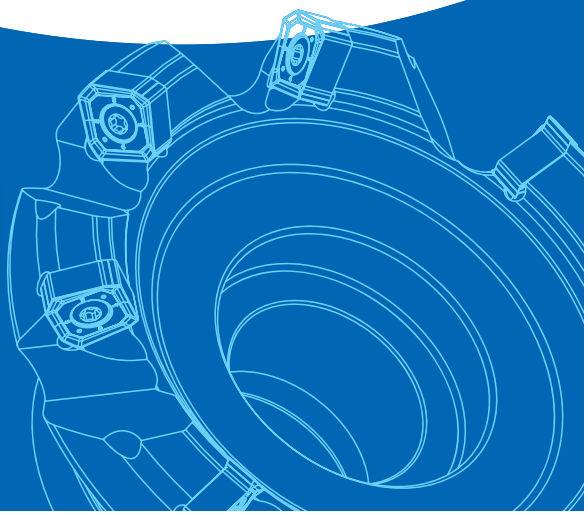
Optimized design of pitch and chip pocket, for unobstructed chip flow, and higher cutting efficiency.



-W special wiper geometry, wiper designed with large arc to improve surface quality the workpiece;

Large effective wiper length, more suitable for semi-finishing/finishing of large-diameter cutter heads.





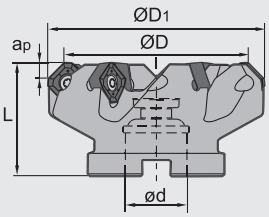
Face milling tools

Kr:45°

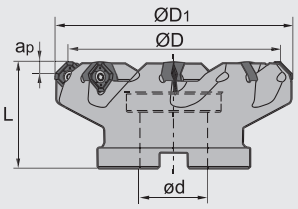
Face milling Chamfering

FMA11 P K M S

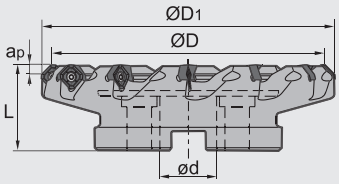
A-type coupling



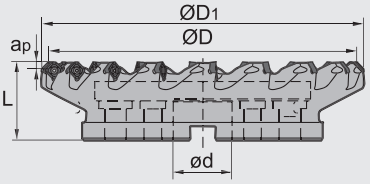
B-type coupling



C-type coupling



D-type coupling



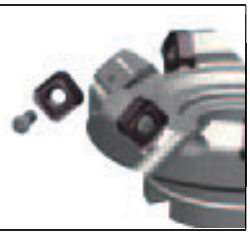
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	ØD	ØD1	ød	L	apmax			
FMA11 Coarse pitch	**-063-A22-SN12-05C**	▲	63	75.2	22	40	5.5	5	A	0.55
	-080-A27-SN12-06C	▲	80	92.2	27	50	5.5	6	A	1.14
	-100-B32-SN12-07	▲	100	112.2	32	50	5.5	7	B	1.42
	-125-B40-SN12-08	▲	125	137.2	40	63	5.5	8	B	2.86
	-160-C40-SN12-10	▲	160	172.2	40	63	5.5	10	C	4.06
	-063-A22-SN15-05C	▲	63	78.4	22	40	7.0	5	A	0.56
	-080-A27-SN15-06C	▲	80	95.4	27	50	7.0	6	A	1.06
	-100-B32-SN15-07	▲	100	115.4	32	50	7.0	7	B	1.47
	-125-B40-SN15-08	▲	125	140.4	40	63	7.0	8	B	2.70
	-160-C40-SN15-10	▲	160	175.4	40	63	7.0	10	C	3.92
	-200-C60-SN15-12	▲	200	215.4	60	63	7.0	12	C	5.46
	-250-C60-SN15-14	▲	250	265.4	60	63	7.0	14	C	11.26
	-315-D60-SN15-18	▲	315	330.4	60	80	7.0	18	D	20.00
	-125-B40-SN19-07	▲	125	144.4	40	63	9.0	7	B	3.00
	-160-C40-SN19-09	▲	160	179.4	40	63	9.0	9	C	4.25
	-200-C60-SN19-11	▲	200	219.4	60	63	9.0	11	C	6.18
	-250-C60-SN19-13	▲	250	269.4	60	63	9.0	13	C	11.55
	-315-D60-SN19-16	▲	315	334.4	60	80	9.0	16	D	20.90

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Insert screw	Wrench	
Ø63 -Ø160	SNEG1205ANR-GM/HGR/W	I60M3.5×10	--	WT15IS
Ø63 -Ø315	SNEG1506ANR-GM/HGR/W	I60M5×13	WT20IT	--
Ø125 -Ø315	SNEG1907ANR-HGR	I43M6×16	WT25IT	--



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

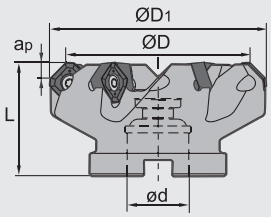
Face milling tools

Kr:45°

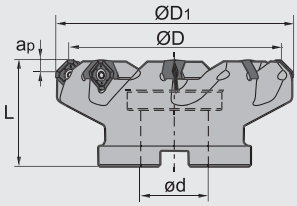
Face milling Chamfering

FMA11 P K M S

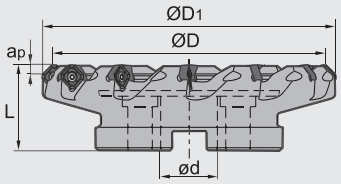
A-type coupling



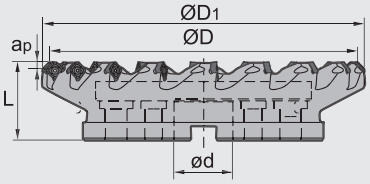
B-type coupling



C-type coupling



D-type coupling



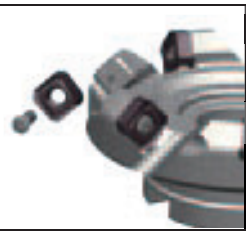
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	ØD	ØD1	ød	L	apmax			
FMA11 Close pitch	**-063-A22-SN12-06C**	▲	63	74.2	22	40	5.5	6	A	0.58
	-080-A27-SN12-08C	▲	80	91.9	27	50	5.5	8	A	1.16
	-100-B32-SN12-10C	▲	100	111.2	32	50	5.5	10	B	1.71
	-125-B40-SN12-12C	▲	125	136.2	40	63	5.5	12	B	3.29
	-160-C40-SN12-15	▲	160	171.6	40	63	5.5	15	C	4.40
	-063-A22-SN15-06C	▲	63	78.3	22	40	7.0	6	A	0.56
	-080-A27-SN15-07C	▲	80	95.3	27	50	7.0	7	A	1.05
	-100-B32-SN15-08C	▲	100	115.3	32	50	7.0	8	B	1.67
	-100-B32-SN15-09C	▲	100	115.3	32	50	7.0	9	B	1.67
	-125-B40-SN15-10C	▲	125	140.3	40	63	7.0	10	B	3.10
	-160-C40-SN15-12	▲	160	175.3	40	63	7.0	12	C	4.20
	-160-C40-SN15-13	▲	160	175.3	40	63	7.0	13	C	4.14
	-200-C60-SN15-15	▲	200	215.3	60	63	7.0	15	C	5.84
	-250-C60-SN15-18	▲	250	265.3	60	63	7.0	18	C	11.68
	-315-D60-SN15-22	▲	315	330.3	60	80	7.0	22	D	20.59

▲Stock available △Make-to-order

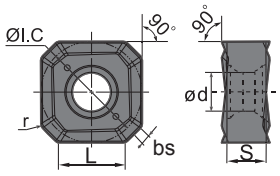
Spare parts

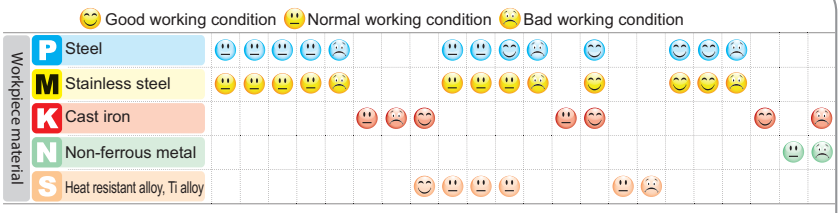
Diameter ØD	Inserts	Insert screw	Wrench	
Ø63 -Ø160	SNEG1205ANR-GM/HGR/W	I60M3.5×10	--	WT15IS
Ø63 -Ø315	SNEG1506ANR-GM/HGR/W	I60M5×13	WT20IT	--
Ø125 -Ø315	SNEG1907ANR-HGR	I43M6×16	WT25IT	--



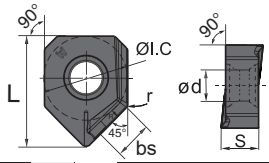
Tools code key B24–B25 Grade selection guide B19–B23 Technical data B234–B240

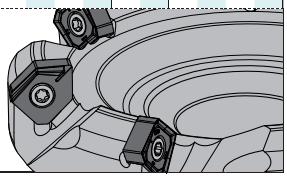
Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	bs	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SNEG1205ANR-GM**	7.6	12.0	4.76	1.05	4.6	0.8		★		★		★				★	★					○						
	SNEG1506ANR-GM	9.4	15.0	5.54	1.30	5.5	0.9		★		★		★				★	★					○						
	**SNEG1205ANR-HGR**	7.6	12.0	4.76	1.05	4.6	0.8		★		★			○			★	★											
	SNEG1506ANR-HGR	9.4	15.0	5.54	1.30	5.5	0.9		★		★			○			★	★											
	SNEG1907ANR-HGR	12.1	19.0	7.0	1.67	7.2	1.0		★		★			○			★	★											
	**SNEG1205ANR-W**	15.9	12.0	4.76	4.07	4.6	0.6										●												
	SNEG1506ANR-W	19.9	15.0	5.54	4.97	5.5	0.9										●												





★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

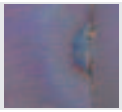
Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V_c(m/min)	f_z(mm/z)	a_{pmax}(mm)
P	Low-carbon steel、Soft steel	⩽180	YBM253 YBC302 YBG205 YB9320	270 (220-350)	0.2 (0.1-0.4)	5.5(SN12) 7.0(SN15) 9.0(SN19)
P	High-carbon steel、Alloy steel	180-280	YBM253 YBC302 YBG205 YB9320	260 (200-320)	0.2 (0.1-0.4)	
P	Alloy tool steel	280-350	YBM253 YBC302 YBG205 YB9320	240 (180-300)	0.2 (0.1-0.4)	
K	Cast iron	180-250	YBD152	270 (150-300)	0.3(0.1-0.5)	
K	Cast iron	180-250	YBD252	200 (150-250)	0.4 (0.2-0.6)	
M	Stainless steel	⩽70	YBG205 YB9320	220 (160-250)	0.2 (0.1-0.4)	
M	Stainless steel	⩽70	YBM253	230 (180-300)	0.25 (0.15-0.35)	
S	High-temperature alloy	⩽400	YBS203 YBS303	100 (60-120)	0.15 (0.08-0.3)	

Case for FMA11

Workpiece material: NAK80
Operation: Face milling
Tool: FMA11-125-B40-SN12-08
Insert: SNEG1205ANR-HGR/YBG205
Cutting parameters: Vc=200m/min, fz=0.2mm/z,
Ap=2mm, Ae=50mm

●Tool Life Comparison

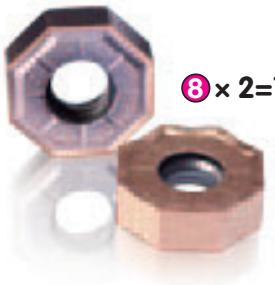
	Product of company A	-HGR/YBG205
Test Group 1		
Life	22 minutes	35 minutes wear 0.02mm
Test Group 1		
Life	27 minutes	35 minutes wear 0.01mm

FMA12 Series

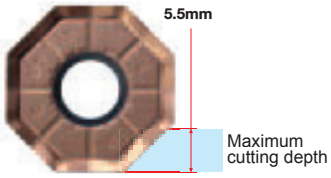
Kr:45°

High Performance Face Mill with 16 edges for outstanding economy

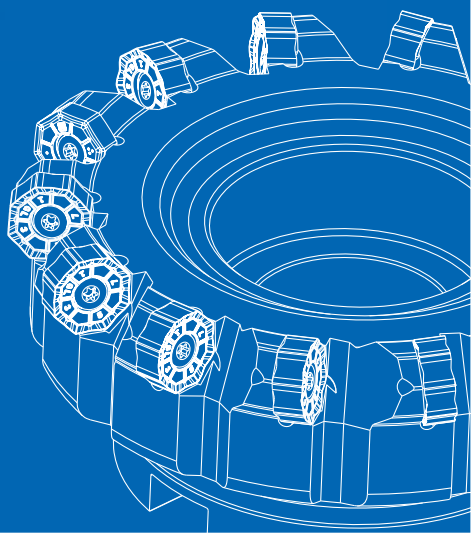
Double negative rake angle, in combination with helical insert structure, achieves double positive axial angle, which will help reduce cutting resistance and improve chip evacuation.



8 × 2=16 edges



ONHU09T508ANN-GM



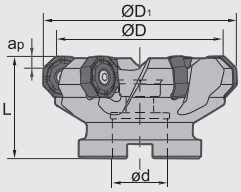
Face milling tools

Kr:45°

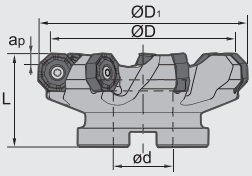
Face milling Chamfering

FMA12 P M K S

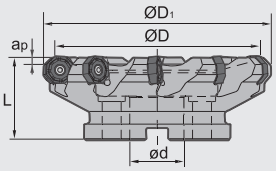
A-type coupling



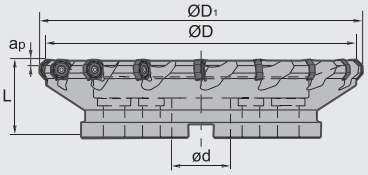
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
			ØD	ØD1	ød	L	apmax			
FMA12 Coarse pitch	**-050-A22-ON06-04C**	△	50	59	22	40	4	4	A	0.309
	-063-A27-ON06-05C	△	63	72	27	50	4	5	A	0.645
	-080-A27-ON06-07C	△	80	90	27	50	4	7	A	1.071
	-100-A32-ON06-08C	△	100	110	32	50	4	8	A	1.599
	-125-B40-ON06-10	△	125	135	40	63	4	10	B	3.114
	-160-C40-ON06-12	△	160	170	40	63	4	12	C	4.504
	-200-C60-ON06-18	▲	200	210	60	63	4	18	C	6.35
	-250-C60-ON06-20	▲	250	260	60	63	4	20	C	12.47
	-315-D60-ON06-22	▲	315	325	60	80	4	22	D	21.25
	-400-D60-ON06-28	▲	400	410	60	80	4	28	D	39.78
	-063-A22-ON09-04C	▲	63	76	22	50	5.5	4	A	0.7
	-080-A27-ON09-05C	▲	80	93	27	50	5.5	5	A	1.1
	-100-A32-ON09-06C	▲	100	113	32	50	5.5	6	A	1.6
	-125-B40-ON09-08	△	125	138	40	63	5.5	8	B	3.1
	-160-C40-ON09-10	△	160	173	40	63	5.5	10	C	3.982
	-200-C60-ON09-12	△	200	303	60	63	5.5	12	C	4.987
	-250-C60-ON09-16	△	250	260	60	63	5.5	16	C	11.89
	-315-D60-ON09-20	△	315	325	60	80	5.5	20	D	20.97
	-400-D60-ON09-24	△	400	410	60	80	5.5	24	D	38.69

▲Stock available △Make-to-order

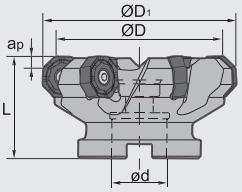
Face milling tools

Kr:45°

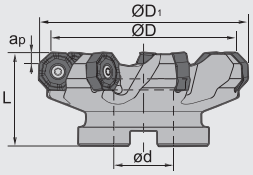
Face milling Chamfering

FMA12 P M K S

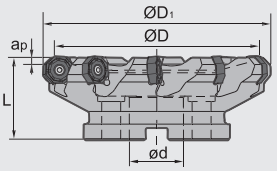
A-type coupling



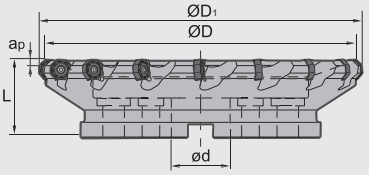
B-type coupling



C-type coupling



D-type coupling



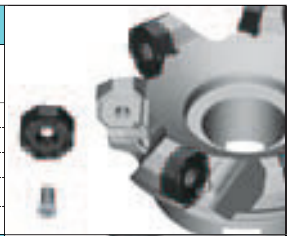
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
			ØD	ØD1	ød	L	apmax			
FMA12 Coarse pitch	**-050-A22-ON06-05C**	△	50	59	22	40	4	5	A	0.352
	-063-A27-ON06-07C	△	63	72	27	50	4	7	A	0.695
	-080-A27-ON06-09C	△	80	90	27	50	4	9	A	1.098
	-100-A32-ON06-11C	△	100	110	32	50	4	11	A	1.616
	-125-B40-ON06-14	△	125	135	40	63	4	14	B	3.151
	-160-C40-ON06-18	△	160	170	40	63	4	18	C	4.568
	-063-A22-ON09-06C	▲	63	76	22	50	5.5	6	A	0.84
	-080-A27-ON09-07C	▲	80	93	27	50	5.5	7	A	1.24
	-100-A32-ON09-10C	▲	100	113	32	50	5.5	10	A	1.809
	-125-B40-ON09-12C	▲	125	138	40	63	5.5	12	B	3.648
	-160-C40-ON09-15	▲	160	173	40	63	5.5	15	C	4.303
	-200-C60-ON09-18	▲	200	303	60	63	5.5	18	C	5.754
	-125-B40-ON06-14W2	▲	125	138	40	63	4	12+2	B	3.626
	-160-B40-ON06-18W3	△	160	173	40	63	4	15+3	B	4.787
	-200-C60-ON06-24W4	△	200	303	60	63	4	20+4	C	6.231

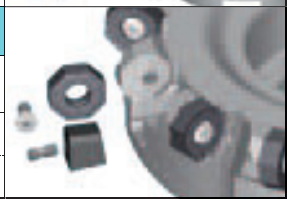
▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Insert screw	Wrench
			
Ø50-Ø63	ONMU06□□□□-GM/GH ONHU06□□□□ANN-GM/GH/GL	IRM4X10	WT15IP
Ø80-Ø125			WT15IS
Ø160			WT15IT
Ø63-Ø125	ONMU09□□□□-GM/GH ONHU09□□□□ANN-GM/GH/GL	I60M5X13	WT20IS
Ø160-Ø400			WT20IT

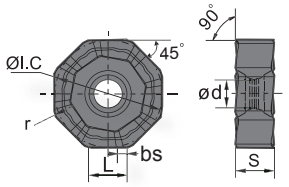


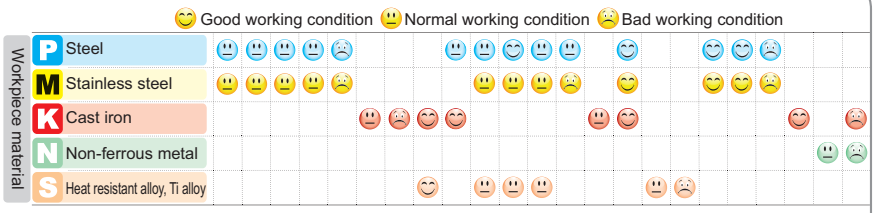
Diameter ØD	Inserts	Insert screw	Adjustment block	Insert screw	Wrench
					
Ø125	ONMU06□□□□-GM/GH ONHU06□□□□ANN-GM/GH/GL ONHU0604AN-W	DM6X20A	ADJ-M6X1.0A	IRM4X10	WT15IS
Ø160-Ø200					WT15IT



Tools code key B24–B25 Grade selection guide B19–B23 Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating									Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG105	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ONHU060404ANN-GL	6.15	15.875	5.54	6	0.4	1.2				●		●					●	●					●						
	ONHU09T508ANN-GL	8.0	20.2	5.8	7	0.8	1.2				●		●					●	●					●						
	ONHU060408ANN-GM	6.15	15.875	5.54	6	0.8	1				●		●					●	●					●						
	ONMU060408-GM	6.15	15.875	5.54	6	0.8	-				●		●					●	●											
	ONHU09T508ANN-GM	8.0	20.2	5.8	7	0.8	1.2				●		●					●	●					●						
	ONMU09T512-GM	8.0	20.2	5.8	7	1.2	-				●		●					●	●											
	ONMU060408-GH	6.15	15.875	5.54	6	0.8	-				●		●					●	●					●						
	ONHU060408ANN-GH	6.15	15.875	5.54	6	0.8	1				●		●					●	●					●						
	ONHU09T508ANN-GH	8.0	20.2	5.8	7	0.8	1.2				●		●					●	●					●						
	ONMU09T512-GH	8.0	20.2	5.8	7	1.2	-				●		●					●	●											
	ONHU0604AN-W	6.15	15.875	4.97	6	0.8	-									●														

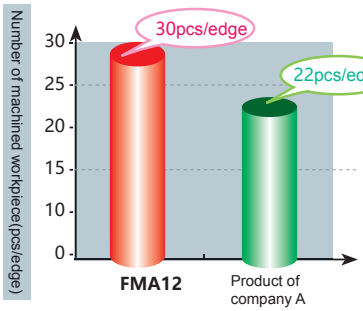
●Inserts are suitable for both left and right cuts ★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V_c(m/min)	f_z(mm/z)	a_{pmax}(mm)
P	Low carbon steel	≤180	YBM253 YBG205 YB9320	270(220-350)	0.2(0.1-0.3)	4.0(0N06) 5.5(0N09)
P	Alloy steel	180-350	YBM253 YBG205 YB9320	240(180-320)	0.15(0.1-0.3)	
M	Stainless steel	≤270	YBM253 YBG205 YB9320	230 (180-300) 160 (110-270)	0.15 (0.1-0.3)	
K	Cast iron	180-260	YBD152	270(150-300)	0.2(0.1-0.3)	
S	Hard-to-cut material	≤400	YBS303	100(60-120)	0.15 (0.08-0.3)	

Case for FMA12

Workpiece: Elevator brake
Workpiece material: Alloy steel (HB190-240)
Machining location: Panel
Tool: FMA12-160-C40-ON09-10
Insert: ONHU09T508ANN-GM/YB9320
Cutting data: V_c=300m/min, f_z=0.25mm/z, a_p=3.5mm, a_e=120mm
System of cooling: External

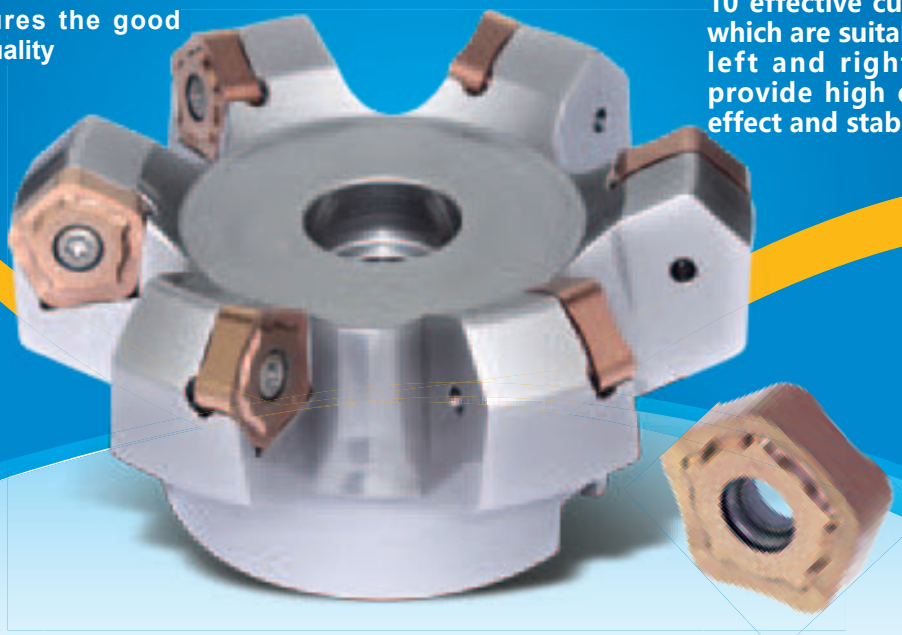


Tool Life comparison
Being compared to the similar product of company A, our FMA12 has longer cutting tool life.

FMA14

The general milling cutter with high-effective multiple cutting edges

- The balanced design with 45 clearance angle to achieve low cutting resistance for high-effective machining
- The upgraded new design of the chipbreaker which is suitable for different machining of steel and nodular cast iron
- The great anti-vibration tool ensures the good surface quality
- The pentagon design with 10 effective cutting edges which are suitable for both left and right cut, also provide high economical effect and stability



The helical cutting edge design could reduce cutting resistance to achieve light cut

The optimized chipbreaker design ensures the strength which significantly reduces the cutting edge breakage risk.

The abundant chipbreaker series could deal with different machining condition

-GL: Emphasis on stable machining

Suitable for low cutting forces and the insufficient machine load situation

-GM: First choice for P material machining

The large radius cutting edge with optimized cutting edge design

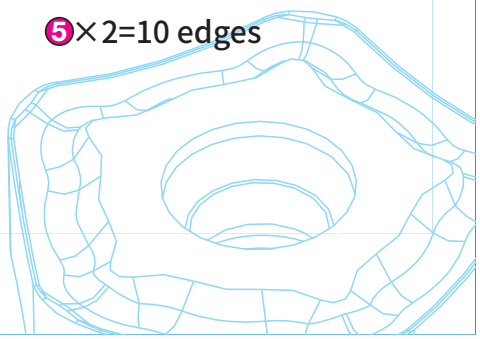
-GH: Emphasis on anti-breakage machining

The high strength of the cutting edge significantly control the breakage risks

To combine with new grade YB9320 to achieve long tool life and stable machining

-GL/-GM/-GH

⑤×2=10 edges



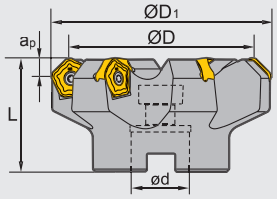
Face milling tools

Kr:45°

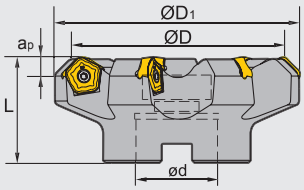
Face milling Chamfering

FMA14 P M K

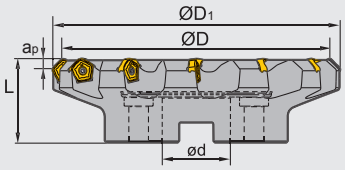
A-type coupling



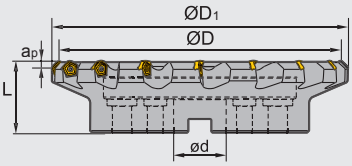
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
			ØD	ØD1	L	ød	apmax			
FMA14 Coarse pitch	**-050-A22-PN11-04**	▲	50	66.7	50	22	5.5	4	A	0.571
	-063-A22-PN11-05	▲	63	79.7	50	22	5.5	5	A	0.77
	-080-A27-PN11-06	▲	80	96.7	50	27	5.5	6	A	1.09
	-100-B32-PN11-07	▲	100	116.7	50	32	5.5	7	B	1.48
	-125-B40-PN11-08	▲	125	141.7	63	40	5.5	8	B	3.39
	-160-B40-PN11-10	▲	160	176.7	63	40	5.5	10	B	5.93
	-200-C60-PN11-12	▲	200	216.7	63	60	5.5	12	C	6.28
	-250-C60-PN11-14	▲	250	266.7	63	60	5.5	14	C	11.84
	-315-D60-PN11-16	▲	315	331.7	80	60	5.5	16	D	19.8
Close pitch	**-050-A22-PN11-05**	▲	50	66.7	50	22	5.5	5	A	0.6
	-063-A22-PN11-06	▲	63	79.7	50	22	5.5	6	A	0.9
	-080-A27-PN11-08	▲	80	96.7	50	27	5.5	8	A	1.2
	-100-B32-PN11-10	▲	100	116.7	50	32	5.5	10	B	1.9
	-125-B40-PN11-12	▲	125	141.7	63	40	5.5	12	B	3.5
	-160-B40-PN11-14	▲	160	176.7	63	40	5.5	14	B	6.4
	-200-C60-PN11-16	▲	200	216.7	63	60	5.5	16	C	8.5
	-250-C60-PN11-18	▲	250	266.7	63	60	5.5	18	C	18.0
	-315-D60-PN11-26	▲	315	331.7	80	60	5.5	26	D	24.5

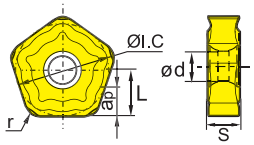
▲Stock available △Make-to-order

Spare parts

Inserts	Insert screw	Wrench	
			
PNEG11□□□□-GL/GM/GH	I60M4×10	WT15IS	

Tools code key B24–B25 Grade selection guide B19–B23 Technical data B234–B240

Selection of inserts



Good working condition Normal working condition Bad working condition

Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant alloy, Ti alloy

Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	a_{pmax}	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	PNEG110512-GL	7.5	15.875	5.56	4.64	1.2	5.5				●						●	★											
	PNEG110530-GM	7.5	15.875	5.56	4.64	3.0	5.5				●						●	★											
	PNEG110530-GH	7.5	15.875	5.56	4.64	3.0	5.5				●						●	★											

●Inserts are suitable for both left and right cuts ★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

ISO	Workpiece material	Hardness HB	Insert grade	Cutting parameters						a_{pmax}
				-GL		-GM		-GH		
				V_c(m/min)	f_z(mm/z)	V_c(m/min)	f_z(mm/z)	V_c(m/min)	f_z(mm/z)	
P	Low-carbon steel	≤HB180	YB9320 YBG205 YBM253	170(100~250)	0.25(0.1~0.4)	170(100~250)	0.3(0.15~0.5)	160(100~230)	0.4(0.2~0.6)	5.5mm
P	High-carbon steel	180~280	YB9320 YBG205 YBM253	160(100~230)	0.8(0.1~0.4)	160(100~230)	0.3(0.15~0.5)	160(100~230)	0.4(0.2~0.6)	
P	Alloy steel	180~280	YB9320 YBG205 YBM253	150(100~220)	0.2(0.1~0.3)	150(100~220)	0.25(0.15~0.4)	150(100~220)	0.35(0.2~0.5)	
P	Tool steel	280~350	YB9320 YBG205 YBM253	150(100~220)	0.2(0.1~0.3)	150(100~220)	0.3(0.15~0.5)	150(100~220)	0.35(0.2~0.5)	
M	Stainless steel	≤270	YB9320 YBG205 YBM253	130(90~180)	0.25(0.1~0.4)	130(90-180)	0.2(0.1~0.3)	130(90~180)	0.4(0.2~0.6)	
K	Cast iron、Ductile iron、High nickel cast iron	180~250	YB9320 YBG205	180(100~260)	0.2(0.1~0.3)	160(100-240)	0.25(0.15~0.4)	160(100-240)	0.35(0.2~0.5)	

Case for FMA14

Workpiece material: 42CrMo

Tool: FMA14-125-B40-PN11-08

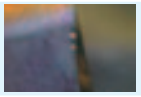
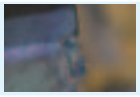
Insert: PNEG110530-GM/YB9320

Cutting data: Vc=140m/min，fz=0.4mm/z，ap=2mm，ae=72mm

Machine: 3-axis machining center

Cooling system: Dry cutting

Comparison of insert abrasion

	PNEG110530-GM	similar product of company A
Time	135min	65min
Abrasion on clearance face		
Abrasion on rake face		

Result:Our FMA14 not only has obvious better tool life than the similar product from Company A, but also have better performance on anti-breakage and wear-resistance.

Face milling tools

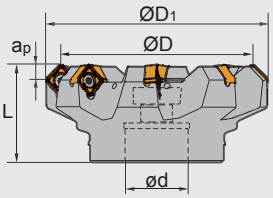
Kr:45°


Face milling

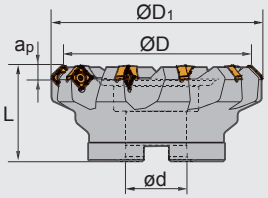

Chamfering

FMA17 P M K S

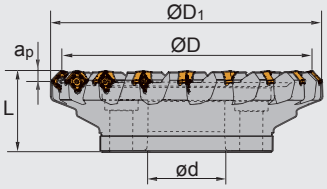
A-type coupling



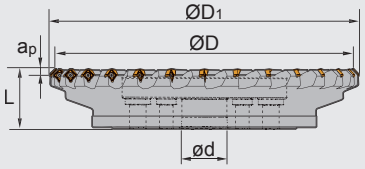
B-type coupling



C-type coupling



D-type coupling



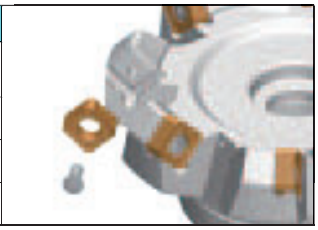
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
			ØD	ØD1	ød	L	apmax			
FMA17 Coarse pitch	**-050-A22-SN12-04C**	▲	50	65	22	40	6.5	4	A	0.384
	-063-A22-SN12-06C	▲	63	78	22	40	6.5	6	A	0.717
	-080-A27-SN12-07C	▲	80	95	27	50	6.5	7	A	1.085
	-100-A32-SN12-08	▲	100	115	32	50	6.5	8	A	1.558
	-125-B40-SN12-10	▲	125	140	40	63	6.5	10	B	3.012
	-160-C40-SN12-12	▲	160	175	40	63	6.5	12	C	4.358
	-200-C60-SN12-18	▲	200	215	60	63	6.5	18	C	6.337
	-250-C60-SN12-20	▲	250	265	60	63	6.5	20	C	12.360
	-315-D60-SN12-22	▲	315	330	60	80	6.5	22	D	21.224
	-400-D60-SN12-28	▲	400	415	60	80	6.5	28	D	39.535
Close pitch	**-050-A22-SN12-06C**	▲	50	65	22	40	6.5	6	A	0.381
	-063-A22-SN12-08C	▲	63	78	22	40	6.5	8	A	0.717
	-080-A27-SN12-10C	▲	80	95	27	50	6.5	10	A	1.105
	-100-A32-SN12-12C	▲	100	115	32	50	6.5	12	A	1.656
	-125-B40-SN12-16	▲	125	140	40	63	6.5	16	B	3.103
	-160-C40-SN12-20	▲	160	175	40	63	6.5	20	C	4.600
	-200-C60-SN12-24	▲	200	215	60	63	6.5	24	C	6.569

▲Stock available △Make-to-order

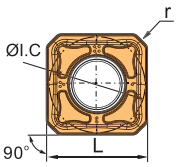
Spare parts

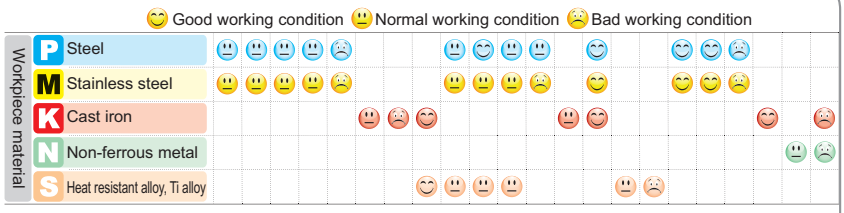
Diameter ØD	Insert screw	Wrench
Ø50-Ø63	IRM4×10	WT15IP
Ø80-Ø160		WT15IS
Ø200-Ø400		WT15IT



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	$a_p$max	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SNGX1205ANN-GL	12.7	12.7	6.5	5.9	0.8	6.5				●		●					★											
	SNMX120512-GL	12.7	12.7	6.5	5.9	1.2	6.5				●		●					★											
	SNGX1205ANN-GM	12.7	12.7	6.5	5.9	0.8	6.5				●		●					★					●					
	SNMX1205ANN-GM	12.7	12.7	6.5	5.9	0.8	6.5				●		●					★					●					
	SNMX120512-GM	12.7	12.7	6.5	5.9	1.2	6.5				●		●					★					●					
	SNGX1205ANN-GH	12.7	12.7	6.5	5.9	0.8	6.5				●		●					★										
	SNMX120512-GH	12.7	12.7	6.5	5.9	1.2	6.5				●		●					★										

●Inserts are suitable for both left and right cuts ★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

ISO	Workpiece material	Hardness HB	Insert grade	Cutting parameters			
				V_c(m/min)	f_z(mm/z)		
					-GL	-GM	-GH
P	Low-carbon steel、Soft steel	⩽ 180	YBM253 YB9320	270(220-350)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
	High-carbon steel、Alloy steel	180-280	YBM253 YB9320	260(220-320)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
	Alloy tool steel	280-350	YBM253 YB9320	240(180-300)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
M	Stainless steel	⩽ 270	YBM253 YB9320	160(110-270)	0.1(0.08-0.2)	0.15(0.1-0.3)	0.2(0.1-0.3)
K	Cast iron、Ductile iron、High nickel cast iron	180-250	YBD152	270(150-300)	0.2(0.1-0.3)	0.3(0.1-0.4)	0.4(0.2-0.5)
S	Difficult-to-machine materials	⩽ 400	YBS303	100(60-120)	--	0.15(0.1-0.25)	--

Case for FMA17

Workpiece: Gear box housing

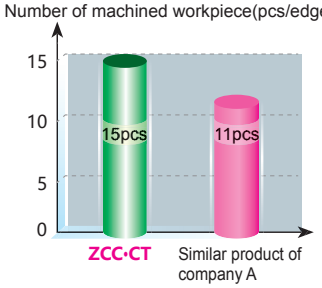
The material of workpiece: HT250(HB220)

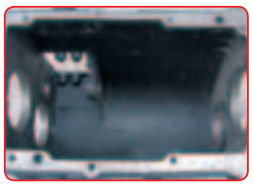
Tool: FMA17-160-C40-SN12-12

Insert: SNGX1205ANN-GM/YBD152

Cutting parameter: Vc=160m/min, fz=0.15mm/z，ap=2mm, ae=100mm

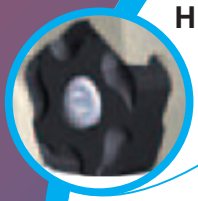
Type of cooling: External cooling



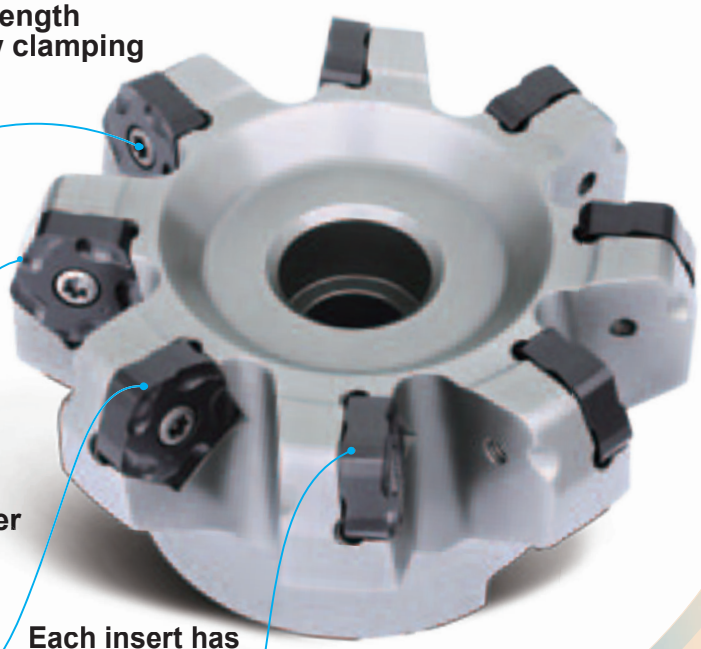


WHIRLWIND FMD02 milling cutter series

The optimized design of the acute angle clamping method has good self-locking performance and high clamping precision which provides enough resisting power to ensure the stability of the machining.

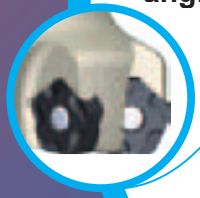


High strength screw clamping



67° approach angle

The open flute and large rake angle design could satisfy the machining requirement of different machine load.



Wiper

The inserts with wiper design which helps to achieve the stable surface quality under different feed rate.

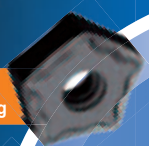
Each insert has 10 cutting edges

The good economical effect and abundant chipbreaker selections could satisfy multiple working conditions.

General face milling for steel and cast iron.
-CF -CM -CR
5×2=10 edges

General face milling for cast iron
-PF -PM -PR
5×2=10 edges

New chipbreaker for cast iron
-KH -KM -KL

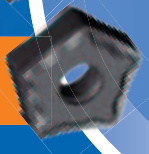


-KH

The optimized cutting edge design emphasis on anti-breakage machining

-KM

general machining chipbreaker. The first choice for cast iron machining



-KL

Emphasizing low cutting force machining to prevent vibration and control burrs to ensure the surface quality.

The helical cutting design with chamfered double-rake angle which can perfectly match different cutting depth requirement.

The high economical inserts with 10 cutting edges could be suitable for both left and right cuts with a high performance-to-cost ratio.

The optimized cutting edge design with high strength of cutting edges and outstanding wear resistance performance greatly increases the tool life.

The low cutting forces design could effectively control the vibration. The combination of the FMD02 could achieve high-performance cast iron machining.

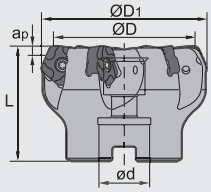
Face milling tools

Kr:67°

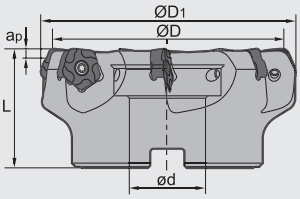

Face milling

FMD02 P K

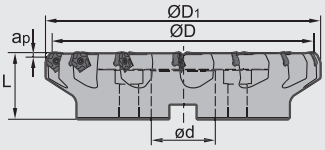
A-type coupling



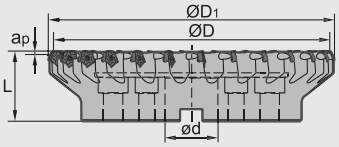
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMD02 Coarse pitch (unequal pitch)	**-050-A22-PN11-04**	▲	△	50	60.1	22	50	5/6.5/7.5	4	A	0.6
	-063-A22-PN11-05	▲	△	63	73.1	22	50	5/6.5/7.5	5	A	0.8
	-080-A27-PN11-06	▲	△	80	90.1	27	50	5/6.5/7.5	6	A	1.1
	-100-B32-PN11-07	▲	△	100	110.1	32	50	5/6.5/7.5	7	B	1.8
	-125-B40-PN11-08	▲	△	125	135.1	40	63	5/6.5/7.5	8	B	2.9
	-160-B40-PN11-10	▲	△	160	170.1	40	63	5/6.5/7.5	10	B	5.6
	-200-C60-PN11-12	▲	△	200	210.1	60	63	5/6.5/7.5	12	C	7.9
	-250-C60-PN11-14	▲	△	250	260.1	60	63	5/6.5/7.5	14	C	13.4
Close pitch	**-050-A22-PN11-05**	▲	△	50	60.1	22	50	5/6.5/7.5	5	A	0.6
	-063-A22-PN11-06	▲	△	63	73.1	22	50	5/6.5/7.5	6	A	0.9
	-080-A27-PN11-08	▲	△	80	90.1	27	50	5/6.5/7.5	8	A	1.2
	-100-B32-PN11-10	▲	△	100	110.1	32	50	5/6.5/7.5	10	B	1.9
	-125-B40-PN11-12	▲	△	125	135.1	40	63	5/6.5/7.5	12	B	3.2
	-160-B40-PN11-14	▲	△	160	170.1	40	63	5/6.5/7.5	14	B	6.4
	-200-C60-PN11-16	▲	△	200	210.1	60	63	5/6.5/7.5	16	C	8.5
	-250-C60-PN11-18	▲	△	250	260.1	60	63	5/6.5/7.5	18	C	18.0
	-315-D60-PN11-26	▲	△	315	325.1	60	80	5/6.5/7.5	26	D	24.5

▲Stock available △Make-to-order

Spare parts

Diameter ØD	Insert screw	Wrench
		
Ø50 -Ø315	I60M4×10	WT15IS

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

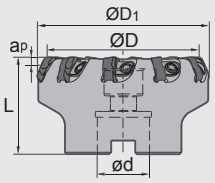
Face milling tools

Kr:67°

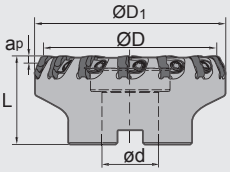

Face milling

FMD02 P K

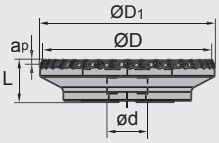
A-type coupling



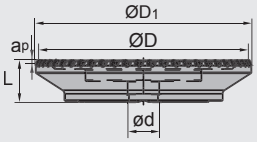
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMD02 Extra close pitch	**-080-A27-PN11-10**	▲	△	80	90.1	27	50	5/6.5/7.5	10	A	1.3
	-100-B32-PN11-14	▲	△	100	110.1	32	50	5/6.5/7.5	14	B	1.6
	-125-B40-PN11-18	▲	△	125	135.1	40	63	5/6.5/7.5	18	B	3.2
	-160-B40-PN11-22	▲	△	160	170.1	40	63	5/6.5/7.5	22	B	5.8
	-200-C60-PN11-28	▲	△	200	210.1	60	63	5/6.5/7.5	28	C	9.7
	-250-C60-PN11-36	▲	△	250	260.1	60	63	5/6.5/7.5	36	C	19.8
	-315-D60-PN11-44	▲	△	315	325.1	60	80	5/6.5/7.5	44	D	32.5

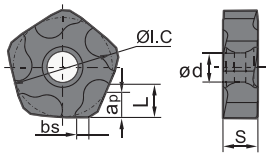
▲Stock available △Make-to-order

Spare parts

Diameter ØD	Wedge	Screw	Wrench
			
Ø80 -Ø125	W18N	DM6×20A	WT15IS
Ø160 -Ø315			WT15IT

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



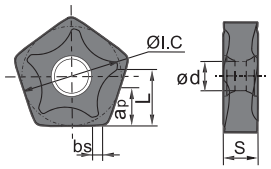
Good working condition Normal working condition Bad working condition

Workpiece material		
P	Steel	😊 😐 😐 😐 ☹ / 😐 😊 😐 😐 / 😊 / 😊 😊 ☹
M	Stainless steel	😐 😐 😐 😐 ☹ / 😐 😐 😐 ☹ / 😊 / 😊 😊 ☹
K	Cast iron	😐 ☹ 😊 / 😐 😊 / 😊 ☹
N	Non-ferrous metal	😐 ☹
S	Heat resistant alloy, Ti alloy	😊 😐 😐 😐 / 😐 ☹

Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating									Cermet		Cemented carbide			
		L	ØI.C	S	ød	bs	$a_p$max	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	PNEG110512R-CF	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512L-CF	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512R-CM	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512L-CM	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512R-CR	5.4	15.875	5.56	4.64	1.6	5						●	●															
	PNEG110512L-CR	5.4	15.875	5.56	4.64	1.6	5						●	●															

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Selection of inserts



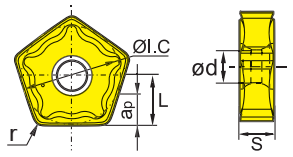
Good working condition Normal working condition Bad working condition

Workpiece material		
P	Steel	😊 😐 😐 😐 ☹ / 😐 😊 😐 😐 / 😊 / 😊 😊 ☹
M	Stainless steel	😐 😐 😐 😐 ☹ / 😐 😐 😐 ☹ / 😊 / 😊 😊 ☹
K	Cast iron	😐 ☹ 😊 / 😐 😊 / 😊 ☹
N	Non-ferrous metal	😐 ☹
S	Heat resistant alloy, Ti alloy	😊 😐 😐 😐 / 😐 ☹

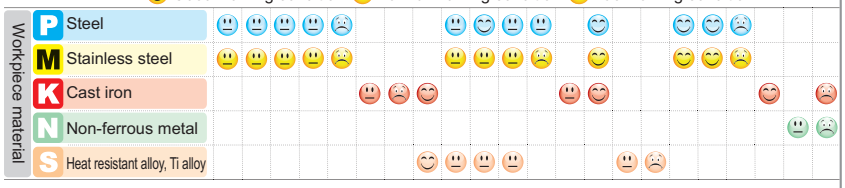
Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating									Cermet		Cemented carbide			
		L	ØI.C	S	ød	bs	$a_p$max	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	PNEG110512R-PF	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		
	PNEG110512L-PF	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		
	PNEG110512R-PM	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		
	PNEG110512L-PM	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		
	PNEG110512R-PR	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		
	PNEG110512L-PR	7.5	15.875	5.56	4.64	1.4	7.5		★		●																		

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Selection of inserts



Good working condition Normal working condition Bad working condition



Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	PNEG110512-KL	6.5	15.875	5.56	4.64	1.2	6.5						●	●														
	PNEG110512-KM	6.5	15.875	5.56	4.64	1.2	6.5						●	●														
	PNEG110512-KH	6.5	15.875	5.56	4.64	1.2	6.5						●	●														

●Inserts are suitable for both left and right cuts

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters				
				Vc(m/min)	fz(mm/z)			apmax(mm)
					-PF	-PM	-PR	
P	Low-carbon steel、Soft steel	≤180	YBM253 YBC302	270 (220-350)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
P	High-carbon steel、Alloy steel	180-280	YBM253 YBC302	260 (200-320)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
P	Alloy tool steel	280-350	YBM253 YBC302	240 (180-300)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
K	Cast iron	180-250			-CF	-CM	-CR	5.0
K	Cast iron	180-250	YBD152	270 (150-300)	0.15(0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	5.0
K	Cast iron	180-250	YBD252	240 (150~280)	0.25(0.2~0.4)	0.3(0.2~0.5)	0.4(0.2~0.6)	5.0
K	Grey cast iron	180~250			-KL	-KM	-KH	6.5
K	Grey cast iron	180~250	YBD152	270 (150~300)	0.25(0.1~0.4)	0.3(0.2~0.5)	0.4(0.2~0.6)	6.5
K	Grey cast iron	180~250	YBD252	240 (150~280)	0.25(0.2~0.4)	0.3(0.2~0.5)	0.4(0.2~0.6)	6.5

Case for FMD02

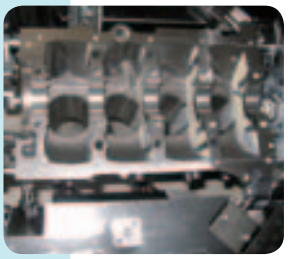
Application case

ZCC-CT

Cutting parameters:
D=100mm, a_p=3~5mm,
Vc=243m/min, f_z=0.15mm/z,
T=145~155 piece

similar product of company A

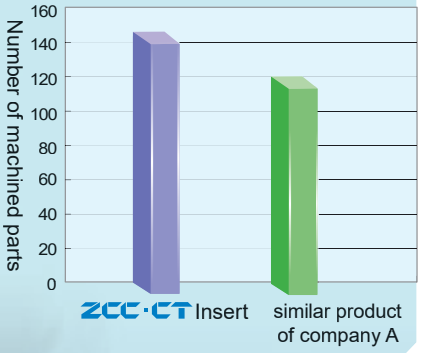
Cutting parameters:
D=100mm, a_p=3~5mm,
Vc=243m/min, f_z=0.12mm/z,
T=120~133 piece



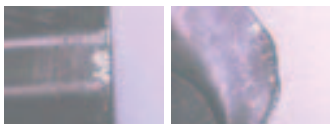
Tool type: FMD02-100-B32-PN11-10

Insert type/grade: PNEG110512R-CR/YBD152

(The inserts without clearance angle to have a total of 10 cutting edges)



● Comparison of insert abrasion

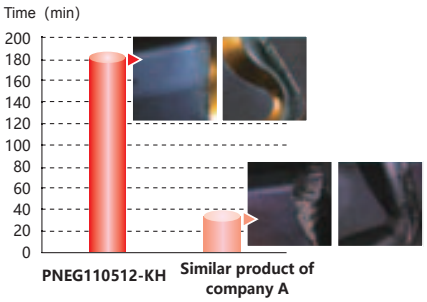


ZCC-CT insert after 80 minutes machining

Insert of company A after 48 minutes machining

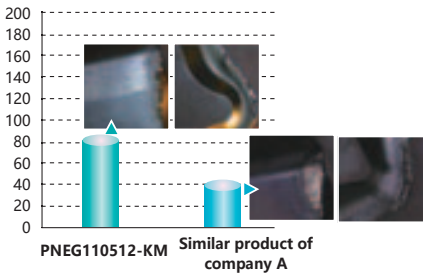
Application case

Workpiece material	Grey cast iron 250	Insert	PNEG110512-KM/YBD152 PNEG110512-KH/YBD252
Tool type	FMD02-125-B40-PN11-08	Cutting method	single pitch dry cut



Abrasion comparision

Cutting parameters: Vc=240m/min, fz=0.3mm/z, Ap=3mm, Ae=70mm



Abrasion comparision

Cutting parameters: Vc=300m/min, fz=0.2mm/z, Ap=2mm, Ae=70mm

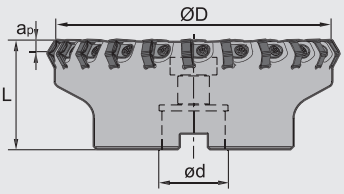
Face milling tools

Kr:55°

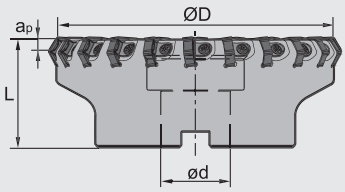
Face milling

FMD02 K

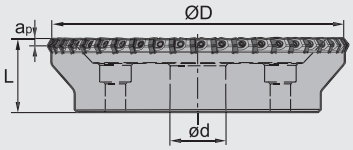
A-type coupling



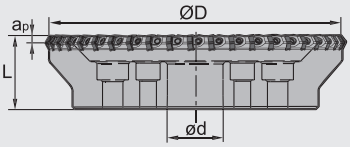
B-type coupling



C-type coupling



D-type coupling



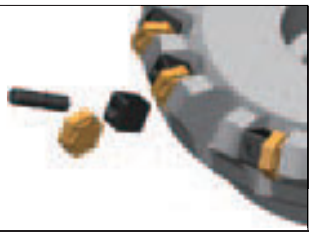
Specification of tools

Type		Stock		Basic dimensions(mm)				Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	d	L	apmax			
FMD02	**-080-A27-HN09-10**	▲	△	80	27	50	6	10	A	1.1
	-100-B32-HN09-14	▲	△	100	32	63	6	14	B	2.6
	-125-B40-HN09-18	▲	△	125	40	70	6	18	B	3.7
	-160-B40-HN09-22	▲	△	160	40	63	6	22	B	5.6
	-200-C60-HN09-28	▲	△	200	60	63	6	28	C	6.3
	-250-C60-HN09-36	▲	△	250	60	63	6	36	C	10.3
	-315-D60-HN09-44	▲	△	315	60	63	6	44	D	21.7

▲Stock available △Make-to-order

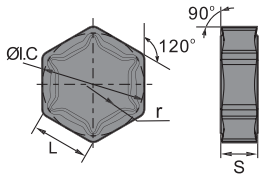
Spare parts

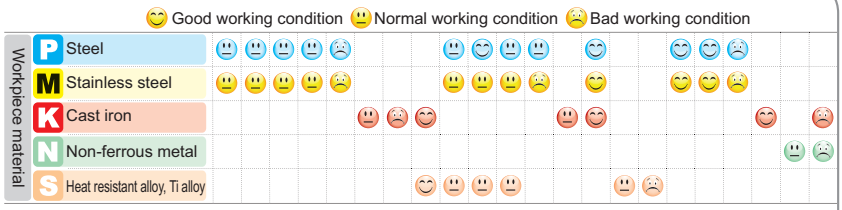
Diameter ØD	Wedge	Wedge screw	Wrench
			
Ø80-Ø315	W18N	DM6×20A	WT15IT



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**HNEX090512-DF**	9.16	15.875	5.56	1.2						★																
	**HNEX090512-DM**	9.16	15.875	5.56	1.2						★																
	**HNEX090512-DR**	9.16	15.875	5.56	1.2						○ ★																

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Chipbreaker selection for FMD02 milling inserts

Classification \ Function	For finishing	For semi-finishing	For roughing
K	-DF	-DM	-DR

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V_c(m/min)	f_z(mm/z)		
					-DF	-DM	-DR
K	Cast iron	180-250	YBD152	180 (110-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.5)
			YBD252	130 (110-200)	0.2(0.1-0.2)	0.25 (0.1-0.3)	0.3(0.2-0.5)

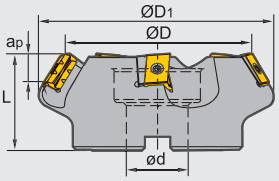
Face milling tools

Kr:60°

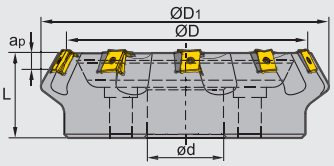
Face milling

FMD03 P M K

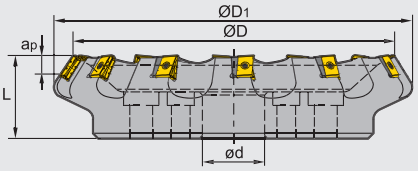
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Style of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FMD03	-125-B40-LN20-06	▲	△	125	153	40	63	12	6	B	4.5
	-160-C40-LN20-08	▲	△	160	187	40	63	12	8	C	6.9
	-200-C60-LN20-10	▲	△	200	227	60	70	12	10	C	10.5
	-250-C60-LN20-12	▲	△	250	276	60	70	12	12	C	13.4
	-315-D60-LN20-15	▲	△	315	339	60	80	12	15	D	26.2
	-125-B40-LN25-05	▲	△	125	154	40	63	17	5	B	4.5
	-160-C40-LN25-06	▲	△	160	189	40	63	17	6	C	6.9
	-200-C60-LN25-08	▲	△	200	229	60	70	17	8	C	10.5
	-250-C60-LN25-10	▲	△	250	278	60	70	17	10	C	16.7
	-315-D60-LN25-12	▲	△	315	346	60	80	17	12	D	27.3
	-400-D60-LN25-16	▲	△	400	427	60	80	17	16	D	47.1

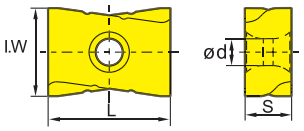
▲Stock available △Make-to-order

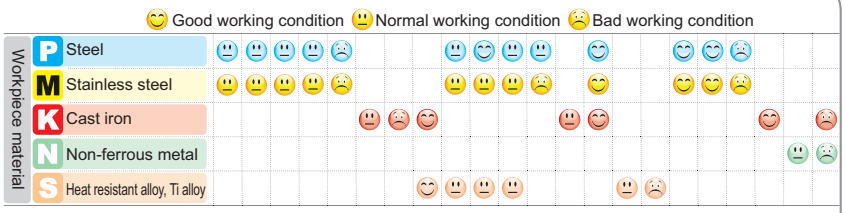
Spare parts

Inserts	Shim	Shim screw	Insert screw	Wrench	
LNKT2007DN-ZR	LLN20R-ZR	I60M3×7	I60M4×15	WT15IS	WT10IS
LNKT2510-ZR	LLN25R-ZR	I60M3.5×10.4	I60M5×17	WT20IT	WT15IS

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	I.W	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNKT2007DN-ZR**	20	17	7.94	4.6					○	○						★										
	**LNKT2510-ZR**	25	18	9.525	5.5					○		○					★										

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

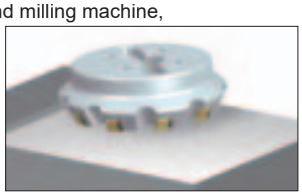
Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V_c(m/min)	f_z(mm/z)
P	Low-carbon steel、Soft steel	⩽180	YBG302	180 (150-300)	0.5 (0.2-0.8)
			YBM351	180 (150-300)	0.5 (0.2-0.8)
	High-carbon steel、Alloy steel	180-280	YBG302	150 (120-280)	0.5 (0.2-0.8)
			YBM351	140 (120-280)	0.5 (0.2-0.8)
	Alloy tool steel	280-350	YBG302	120 (80-250)	0.45 (0.2-0.6)
			YBM351	100 (80-250)	0.45 (0.2-0.6)
M	Stainless steel	⩽270	YBG302	120 (80-200)	0.45 (0.2-0.6)
			YBM351	100 (80-200)	0.45 (0.2-0.6)
K	Cast iron	180-250	YBD152	220 (150-300)	0.5 (0.2-0.8)
			YBD252	210 (150-300)	0.5 (0.2-0.8)
			YBG302	200 (150-300)	0.5 (0.2-0.8)

Note: Cutting parameters can be adjusted according to the Max. power of machine.

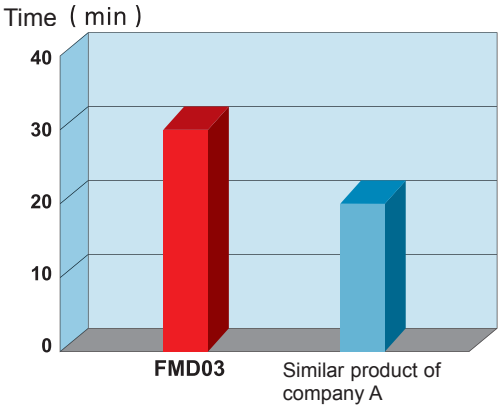
Case for FMD03

Workpiece material：ASTM A743 CA-6NM(HB200)
Cooling system: Dry cutting
Machine: NC floor type boring and milling machine,
spindle power⩾30KW
Cutting parameters：
Vc=120m/min
a_p=12mm
f_z=0.55mm/z
a_e=230mm



Tool type：FMD03-315-D60-LN25-12
Insert type/grade：LNKT2510-ZR/YBG302

●Comparison of machining time



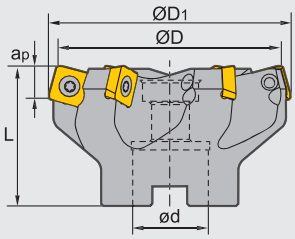
Face milling tools

Kr:75°

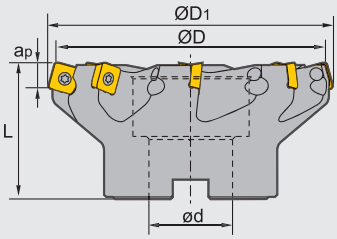
Face milling

FME02 P M K

A-type coupling



B-type coupling



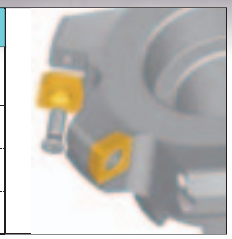
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
			ØD	ØD1	ød	L	apmax			
FME02	-050-A22-SP12-04	△	50	54	22	40	6	4	A	0.3
	-063-A22-SP12-05	△	63	66	22	50	6	5	A	0.6
	-080-A27-SP12-06	△	80	83	27	50	6	6	A	0.9
	-100-B32-SP12-07	△	100	103	32	50	6	7	B	1.4
	-125-B40-SP12-08	△	125	128	40	63	6	8	B	2.5

▲Stock available △Make-to-order

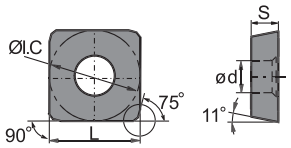
Spare parts

Diameter ØD	Insert screw	Wrench
		
Ø50-Ø125	I60M5×13.2	WT20IS



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



Good working condition 😃 Normal working condition ☹ Bad working condition

Workpiece material

P	Steel	😃 😃 😃 😃 ☹ 😊 😃 😊 😃 😃 😊 😊 😊 ☹
M	Stainless steel	😃 😃 😃 😃 ☹ 😃 😃 😃 ☹ 😊 😊 😊 ☹
K	Cast iron	😃 ☹ 😊 😃 😊 😊 ☹
N	Non-ferrous metal	😃 ☹
S	Heat resistant alloy, Ti alloy	😊 😃 😃 😃 😃 ☹

Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPKW1204EDFR**	12.7	12.7	4.76	5.56									○													
	SPKW1204EDSR	12.7	12.7	4.76	5.56									○													
	**SPKT1204EDR**	12.7	12.7	4.76	5.56									★													

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Cutting edge treatment selection for FME02 milling inserts

Classification \ Function	For finishing	For semi-finishing	For roughing
P	EDFR	EDR	EDSR
M	EDFR	EDR	
K	EDFR	EDR	

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V_c(m/min)	f_z(mm/z)
P	Low-carbon steel、Soft steel	⩽180	YBG202	270(200-360)	0.2 (0.1-0.3)
P	High-carbon steel、Alloy steel	180-280	YBG202	240 (180-350)	0.2 (0.1-0.3)
P	Alloy tool steel	280-350	YBG202	220 (170-340)	0.2 (0.1-0.3)
M	Stainless steel	⩽270	YBG202	160 (110-270)	0.2 (0.1-0.3)
K	Cast iron	180-250	YBG202	160 (120-200)	0.2 (0.1-0.3)

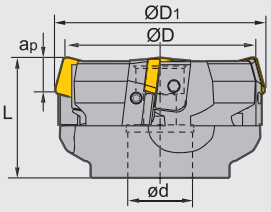
Face milling tools

Kr:75°

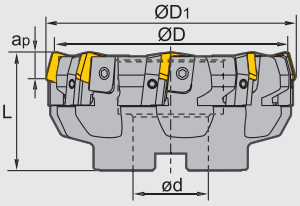
Face milling

FME03 P M K

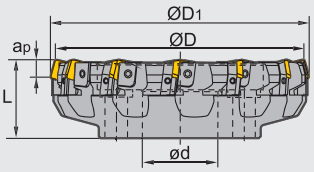
A-type coupling



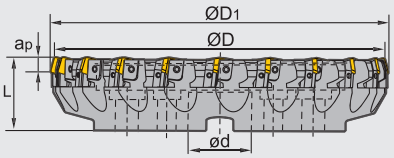
B-type coupling



C-type coupling



D-type coupling

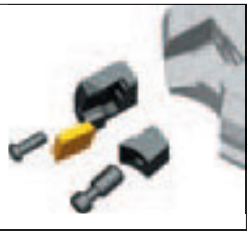


Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FME03	**-080-A27-SP12-04**	▲	△	80	84	27	50	6	4	A	1.1
	-100-B32-SP12-06	▲	△	100	104	32	50	6	6	B	1.9
	-125-B40-SP12-08	▲	△	125	129	40	63	6	8	B	3.5
	-160-B40-SP12-10	▲	△	160	164	40	63	6	10	B	5.7
	-200-C60-SP12-12	▲	△	200	203	60	63	6	12	C	8.2
	-250-C60-SP12-16	▲	△	250	253	60	63	6	16	C	13.8
	-315-D60-SP12-20	▲	△	315	318	60	70	6	20	D	23.5
	-080-A27-SP15-04	▲	△	80	84	27	50	8	4	A	1.0
	-100-B27-SP15-06	▲	△	100	104	27	50	8	6	B	1.8
	-125-B40-SP15-08	▲	▲	125	129	40	63	8	8	B	3.3
	-160-B40-SP15-10	▲	▲	160	164	40	63	8	10	B	5.4
	-200-C60-SP15-12	▲	▲	200	204	60	63	8	12	C	7.9
	-250-C60-SP15-16	▲	▲	250	253	60	63	8	16	C	13.6
	-315-D60-SP15-20	▲	▲	315	318	60	70	8	20	D	23.1

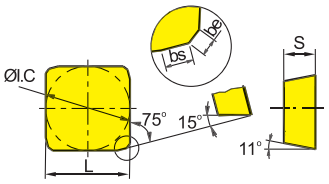
▲Stock available △Make-to-order

Spare parts

Diameter ØD	Inserts	Locator	Wedge	Wedge Screw	Locator screw	Wrench	
Ø80-Ø100	SP12	LSP12R/L	W04R/L	WM8×17	LOM5×15.1	WT20T WT25T	
Ø125-Ø315				WM8×22			
Ø80-Ø315	SP15	LSP15R/L	W04R/L	WM8×22			

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts



Good working condition Normal working condition Bad working condition

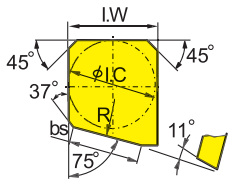
Workpiece material		
P	Steel	😊 😐 😐 😐 😐 ☹ 😊 😐 😊 😐 😐 😊 😊 😊 ☹
M	Stainless steel	😐 😐 😐 😐 ☹ 😐 😐 😐 ☹ 😊 😊 😊 ☹
K	Cast iron	☹ ☹ 😊 ☹ 😊 😊 😊
N	Non-ferrous metal	😐 ☹
S	Heat resistant alloy, Ti alloy	😊 😐 😐 😐 ☹ ☹

Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	be	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPKN1203EDER	12.7	12.7	3.18	1	1.4									○													
	SPKN1203EDEL	12.7	12.7	3.18	1	1.4									○													
	SPKN1203EDFR	12.7	12.7	3.18	1	1.4								★	○													●
	SPKN1203EDFL	12.7	12.7	3.18	1	1.4								○	○													○
	SPKN1203EDSKR	12.7	12.7	3.18	1	1.4												○							○			
	SPKN1203EDSKL	12.7	12.7	3.18	1	1.4												○							○			
	SPKN1203EDTKR	12.7	12.7	3.18	1	1.4	●				●				○			★							●			○
	SPKN1203EDTKL	12.7	12.7	3.18	1	1.4									○			○							○			○
	SPKN1203EDS31R	12.7	12.7	3.18	1	1.4												○							○			
	SPKN1203EDS31L	12.7	12.7	3.18	1	1.4												○							○			
	SPKN1203EDT31R	12.7	12.7	3.18	1	1.4	●				●				○			★							●			○
	SPKN1203EDT31L	12.7	12.7	3.18	1	1.4									○			○							○			○
	SPKR1203EDR-GM	12.7	12.7	3.18	1	1.4			●						★			★							●			●
	SPKR1203EDL-GM	12.7	12.7	3.18	1	1.4			●						★			★							●			●
	SPKN1504EDER	15.875	15.875	4.76	1	1.4									○													
	SPKN1504EDEL	15.875	15.875	4.76	1	1.4									○													
	SPKN1504EDFR	15.875	15.875	4.76	1	1.4								○	○													○
	SPKN1504EDFL	15.875	15.875	4.76	1	1.4								○	○													○
	SPKN1504EDSKR	15.875	15.875	4.76	1	1.4												○							○			
	SPKN1504EDSKL	15.875	15.875	4.76	1	1.4												○							○			
	SPKN1504EDTKR	15.875	15.875	4.76	1	1.4	●								★			○							●			●
	SPKN1504EDTKL	15.875	15.875	4.76	1	1.4									○			○							○			●
	SPKN1504EDS32R	15.875	15.875	4.76	1	1.4												○							○			
	SPKN1504EDS32L	15.875	15.875	4.76	1	1.4												○							○			
	SPKN1504EDT32R	15.875	15.875	4.76	1	1.4	●								★			○							●			●
	SPKN1504EDT32L	15.875	15.875	4.76	1	1.4									○			○							○			●
	SPKR1504EDR-GM	15.875	15.875	4.76	1	1.4			●						★			★							●			●
	SPKR1504EDL-GM	15.875	15.875	4.76	1	1.4			●						★			★							●			●

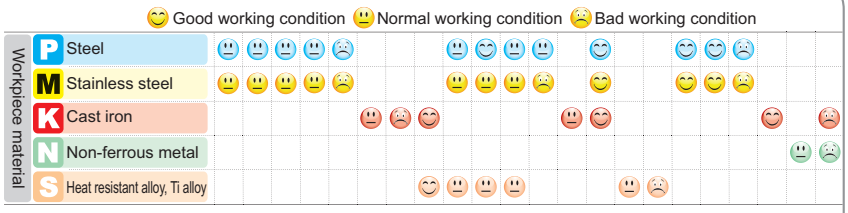
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Ordering guide: **SPKN1203EDT3 1 R** chamfering angle 20°, chamfering width 0.15mm. For other edge shapes, see inserts code key standard.

Selection of inserts



Good working condition Normal working condition Bad working condition



Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		A	ØI.C	I.W	S	bs	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
inserts with wiper 	**SPEX1203EDL-1**	15	12.7	12.7	3.18	10	500																						●
	SPEX1203EDR-1	15	12.7	12.7	3.18	10	500																						●
	SPEX1504EDL-1	18.2	15.875	15.875	4.76	10	500																				○		●
	SPEX1504EDR-1	18.2	15.875	15.875	4.76	10	500																				○		●

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Cutting edge treatment selection for FME03 milling inserts

Treatment of cutting edge	Recommended selection
SP□□EDER/L	Honing edge is suitable for semi-finish and finish machining of steel and stainless steel.
SP□□EDFR/L	Sharp cutting edge is suitable for finish machining of cast iron materials.
SP□□EDSKR/L **SP□□EDS□□R/L**	After chamfering and honing, the edge has strong anti-breakage capability, suitable for rough machining of steel parts under poor working conditions.
SP□□EDTKR/L **SP□□EDT□□R/L**	The Chamfered edge is suitable for semi-finishing and finishing machining of steel, stainless steel and cast iron materials.
SP□□EDR/L-GM	3D chipbreaker can reduce cutting force, reinforce the capability of chip control, and improve insert life. It is widely applied in semi-finish machining of steel, stainless steel and cast iron materials.

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V_c(m/min)	f_z(mm/z)
P	Low-carbon steel、Soft steel	≤180	YBG202	270 (200-360)	0.2 (0.1-0.4)
			YBG302	230 (170-350)	0.24 (0.1-0.3)
			YBM251 YBC301	270(220-350)	0.2 (0.1-0.4)
			YBM351	220 (180-300)	0.25 (0.15-0.3)
			YC30S	140 (100-220)	0.22 (0.1-0.3)
	High-carbon steel、Alloy steel	180-280	YBG202	240 (180-350)	0.2 (0.1-0.3)
			YBG302	220 (150-330)	0.24 (0.1-0.3)
			YBM251 YBC301	240 (200-320)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.25 (0.15-0.3)
			YC30S	120 (80-200)	0.22 (0.1-0.3)
	Alloy tool steel	280-350	YBG202	220 (170-340)	0.2 (0.1-0.3)
			YBG302	190 (130-300)	0.24 (0.1-0.3)
			YBM251 YBC301	220 (180-300)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.25 (0.15-0.3)
			YC30S	100 (60-180)	0.22 (0.1-0.3)
M	Stainless steel	≤270	YBG202	160 (110-270)	0.2 (0.1-0.3)
			YBG302	140 (100-250)	0.24 (0.1-0.3)
			YBM251	150 (120-240)	0.2 (0.1-0.4)
			YBM351	140 (100-240)	0.25 (0.15-0.3)
K	Cast iron	180-250	YBG102	210 (120-300)	0.12 (0.08-0.3)
			YBG302	160 (120-200)	0.2 (0.1-0.3)
			YD201	100 (80-160)	0.24 (0.15-0.4)

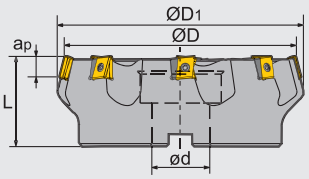
Face milling tools

Kr:75°

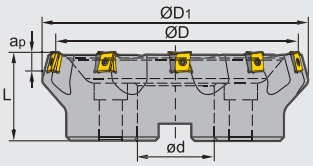
Face milling

FME04 P M K

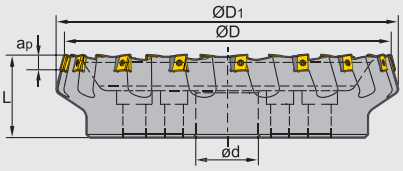
B-type coupling



C-type coupling



D-type coupling



Specification of tools

Type		Stock		Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
		R	L	ØD	ØD1	ød	L	apmax			
FME04	-125-B40-LN15-06	▲	△	125	137	40	63	12	6	B	3.8
	-160-B40-LN15-08	▲	△	160	170	40	63	12	8	B	6.6
	-200-C60-LN15-10	▲	△	200	208	60	70	12	10	C	9.6
	-250-C60-LN15-12	▲	△	250	257	60	70	12	12	C	13.4
	-315-D60-LN15-16	▲	△	315	328	60	80	12	16	D	25.2

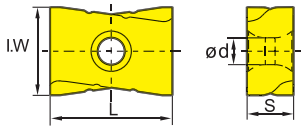
▲Stock available △Make-to-order

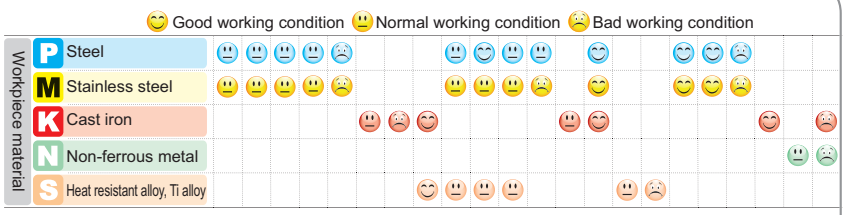
Spare parts

Diameter ØD	Shim	Shim screw	Insert screw	Wrench	
					
Ø125-Ø315	LLN15-ZR	I60M3×7	I60M4×12	WT15IS, WT09IS	

Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





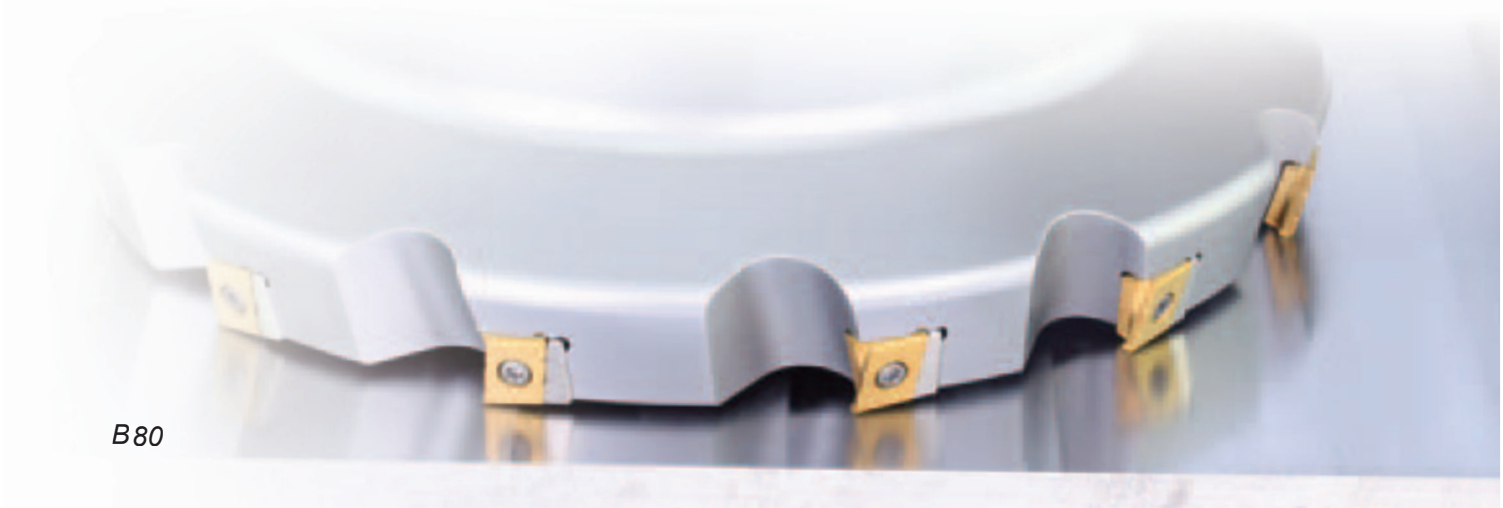
Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	I.W	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNKT1506EN-ZR**	15.875	14	6.35	4.6					○	○						★										

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V_c(m/min)	f_z(mm/z)
P	Low-carbon steel、Soft steel	≤180	YBG302	180 (150-300)	0.5 (0.2-0.8)
			YBM351	180 (150-300)	0.5 (0.2-0.8)
	High-carbon steel、Alloy steel	180-280	YBG302	150 (120-280)	0.5 (0.2-0.8)
			YBM351	140 (120-280)	0.5 (0.2-0.8)
	Alloy tool steel	280-350	YBG302	120 (80-250)	0.45 (0.2-0.6)
			YBM351	100 (80-250)	0.45 (0.2-0.6)
M	Stainless steel	≤270	YBG302	120 (80-200)	0.45 (0.2-0.6)
			YBM351	100 (80-200)	0.45 (0.2-0.6)
K	Cast iron	180-250	YBD152	220 (150-300)	0.5 (0.2-0.8)
			YBG302	200 (150-300)	0.5 (0.2-0.8)

Note: Cutting parameters can be adjusted according to the Max. power of machine.



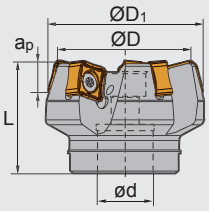
Face milling tools

Kr:75°

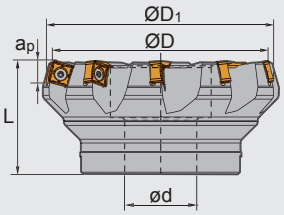
Face milling

FME17 P M K S

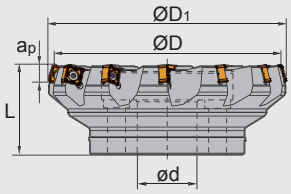
A-type coupling



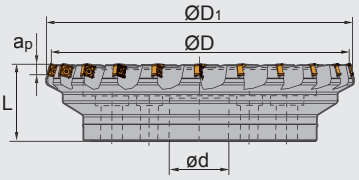
B-type coupling



C-type coupling



D-type coupling



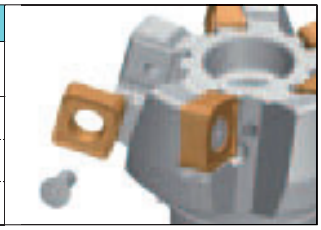
Specification of tools

Type		Stock	Basic dimensions(mm)					Number of teeth Z	Type of coupling	Weight (kg)
			ØD	ØD1	ød	L	apmax			
FME17 Coarse pitch	**-050-A22-SN12-04C**	▲	50	60	22	40	8.0	4	A	0.361
	-063-A22-SN12-05C	▲	63	73	22	40	8.0	5	A	0.520
	-080-A27-SN12-06C	▲	80	90	27	50	8.0	6	A	1.101
	-100-A32-SN12-08C	▲	100	110	32	50	8.0	8	A	1.663
	-125-B40-SN12-10	▲	125	135	40	63	8.0	10	B	3.099
	-160-C40-SN12-12	▲	160	170	40	63	8.0	12	C	4.535
	-200-C60-SN12-14	▲	200	210	60	63	8.0	14	C	6.450
	-250-C60-SN12-18	▲	250	260	60	63	8.0	18	C	12.980
	-315-D60-SN12-22	▲	315	325	60	80	8.0	22	D	21.932
	-400-D60-SN12-28	▲	400	410	60	80	8.0	28	D	41.555
Close pitch	**-050-A22-SN12-05C**	▲	50	60	22	40	8.0	5	A	0.337
	-063-A22-SN12-07C	▲	63	73	22	40	8.0	7	A	0.530
	-080-A27-SN12-09C	▲	80	90	27	50	8.0	9	A	1.112
	-100-A32-SN12-11C	▲	100	110	32	50	8.0	11	A	1.577
	-125-B40-SN12-14	▲	125	135	40	63	8.0	14	B	3.145
	-160-C40-SN12-18	▲	160	170	40	63	8.0	18	C	4.647
	-200-C60-SN12-22	▲	200	210	60	63	8.0	22	C	6.552

▲Stock available △Make-to-order

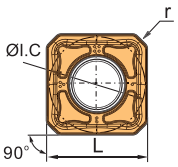
Spare parts

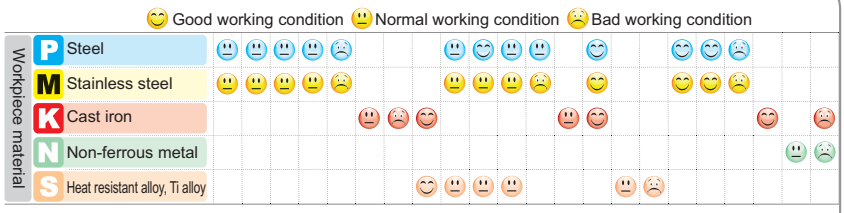
Diameter ØD	Insert screw	Wrench
Ø50-Ø63	IRM4×10	WT15IP
Ø80 ~ Ø125		WT15IS
Ø160 ~ Ø400		WT15IT



Tools code key B24–B25
Grade selection guide B19–B23
Technical data B234–B240

Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating								Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SNGX1205ENN-GL	12.7	12.7	6.5	5.9	0.8	8.0				●		●					★											
	SNMX120512-GL	12.7	12.7	6.5	5.9	1.2	8.0				●		●					★											
	SNGX1205ENN-GM	12.7	12.7	6.5	5.9	0.8	8.0				●		●					★					●						
	SNMX120512-GM	12.7	12.7	6.5	5.9	1.2	8.0				●		●					★					●						
	SNGX1205ENN-GH	12.7	12.7	6.5	5.9	0.8	8.0				●		●					★											
	SNMX120512-GH	12.7	12.7	6.5	5.9	1.2	8.0				●		●					★											

●Inserts are suitable for both left and right cuts

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recommended cutting parameters

ISO	Workpiece material	Hardness HB	Insert grade	Cutting parameters			
				V_c (m/min)	f_z(mm/z)		
					-GL	-GM	-GH
P	Low-carbon steel、Soft steel	⩽ 180	YBM253 YB9320	270(220-350)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
	High-carbon steel、Alloy steel	180-280	YBM253 YB9320	260(220-320)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
	Alloy tool steel	280-350	YBM253 YB9320	240(180-300)	0.15(0.1-0.3)	0.2(0.1-0.4)	0.3(0.2-0.5)
M	Stainless steel	⩽ 270	YBM253 YB9320	160(110-270)	0.1(0.08-0.2)	0.15(0.1-0.3)	0.2(0.1-0.3)
K	Cast iron、Ductile iron、High nickel cast iron	180-250	YBD152	270(150-300)	0.2(0.1-0.3)	0.3(0.1-0.4)	0.4(0.2-0.5)
S	Difficult-to-machine materials	⩽ 400	YBS303	100(60-120)	--	0.15(0.1-0.25)	--

Case for FME17

Workpiece：Transmission

The material of workpiece: 40cr(HRC25-40)

Processing part：Upper face

Tool: FME17-125-B40-SN12-10

Insert: SNGX1205ENN-GM/YB9320

Cutting parameter: Vc=255m/min,fz=0.08mm/z，ap=5mm,ae=75mm

Type of cooling:External cooling

Number of machined workpiece(pcs/edge)