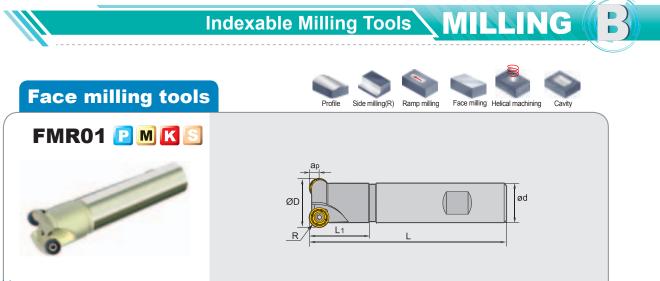
**Profile milling tools** series

E



#### Specification of tools

	Tupo	Stock			Basic dime	nsions(mm)	)		Number of teeth	Weight
	Туре	SIUCK	ØD	ød	L	L1	R	apmax	Z	(kg)
FMR01	-025-XP20-RC10-02		25	20	100	30	5	5	2	0.2
	-032-XP25-RC10-02		32	25	120	35	5	5	2	0.5
	-040-XP32-RC12-03	<b></b>	40	32	120	40	6	6	3	0.7
	-050-XP32-RC12-03	<b></b>	50	32	120	40	6	6	3	0.8

▲Stock available △Make-to-order



Diameter	Insert screw	Wrench	8
ØD	<b>F</b>	-	
Ø25 -Ø32	I60M4×8.4		
Ø40 -Ø50	I60M3.5×10	WT 155	1.50
		$\frown$	
Fools code key Grade se	election guide Figure Technical	data B234-B240	

Face milling tools milling tools

# B MILLING Indexable Milling Tools

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→ Selec	tion of inserts —																								
	S			od working						l wo	orkin	g co	-		_		-		l col	nditi			6		
		Worł	Stainless	stool	(i) (i)	(Ľ) (Ľ)		<u></u>	8				( <u>)</u>			(2)		00 00				© ©			
	ød	<u> </u>	Cast iron		-	U	•	•		<u></u>	$\odot$		•	U	•		•	U 0			<b>V</b>	<u> </u>		$\odot$	e
	7° <u> </u>	e mat	-	ous metal						e	0	<b>V</b>					e	♥.						~	
ØI.C		erial		nt alloy, Ti alloy								$\odot$	"	<u>(</u>	<u> </u>				<u></u>						••
			Tical Tesistal	it alloy, it alloy								<u> </u>	-	•	•				<u> </u>	<b>O</b>					
		Basic o	dimensio	ns(mm)		С	VD	Co	atin	g				Ρ	VD	Co	atin	ıg			Cer	met		eme carb	ented bide
Insert shape	Туре				-	2	-	e	-	2	2	2	2	5	_	2	2	2	<i>с</i>	<i>с</i> о	-	10			
		ØI.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	G10	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101 YD201
					₽	8	ĥ	R	뛰	۳	₽	₽	뛰	R	뛰	۶	۶	۶	몃	몃	¥	₹	γ	9	55
0	RCKT10T3MO-DM	10.0	3.97	4.4	•								•	★											
0	RCKT1204MO-DM	12.0	4.76	4.0	•		•		•	0			•	*		*									
0	RCKT1204MO-DR	12.0	4.76	4.0	0		0		0				•	*											
63	RCKT1204MO-ER	12.0	4.76	4.0				*																	
	RCKT1204MO-NM	12.0	4.76	4.0				0							0	0			0	0				_	
0																									
	*	Recommer	nded grad	e (always	stoc	k av	/aila	ble)		٩	vaila	able	gra	ide	(alw	ays	sto	ck a	avail	abl	e)	0	Ma	ke-tr	o-orde

#### Recommended cutting parameters

					Cutting param	neters	
Wo	orkpiece material	Hardness HB	Insert grade			fz(mm/z)	
				V₀(m/min)	-DM	-DR	-NM
			YBM251 YBC301	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
	Low-carbon steel、	≤180	YBM351 YBC302	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)	
	Soft steel	≪ 160	YBG202 YBG205 YB9320	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)	0.2 (0.1-0.5)
			YBM251 YBC301	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
	High-carbon steel、	180-280	YBM351 YBG302	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)	0.2 (0.1-0.5)
	Alloy steel	100-200	YBG202 YBG205 YB9320	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)	0.2 (0.1-0.5)
			YBM251 YBC301	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
	Alloy tool steel	280-350	YBM351 YBG302	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)	0.2 (0.1-0.4)
	Alloy tool steel	260-350	YBG202 YBG205 YB9320	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)	0.2 (0.1-0.4)
			YBM251	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
M	Stainless steel	≤270	YBM253 YBM351	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)	0.2 (0.1-0.4)
	Stalliess steel	~270	YBG202 YBG205 YB9320	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)	0.2 (0.1-0.4)
K	Cast iron	180-250	YBG302	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)	0.2 (0.1-0.5)
	Cast Iron	100-250	YBD152	240 (180-300)	0.2(0.1-0.3)		
S	hard-to-cut material	≤400	YBS203 YBS303	100 (60-120)			0.15 (0.1-0.3)

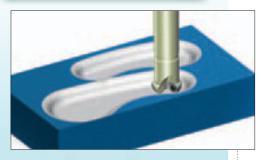


#### Ramp milling, helical interpolation milling

Ramp milling			F	Ramp milling		Helical interpo	plation milling
<u>τα°</u>	Insert	Diameter ØD(mm)	Max.cutting depth	Max.cutting depth	Min.length	Min.diameter	Max.diameter
			ap(mm)	α°	L <sub>m</sub> (mm)	ØD1(mm)	(mm)
$L_{m} = \frac{a_{p}}{tan\alpha}$ $\alpha$ :Plunge angle	RCKT10**	25	5	14.4	19.5	40	5
<ul> <li>Helical interpolation milling</li> </ul>		32	5	8.4	34	54	5
	RCKT12**	40	6	10.3	33.2	68	6
$P=tan_{\alpha}\times\pi\times D_{1}$ $\alpha$ :Helix angle		50	6	7.1	48	88	6

Reduce the feed rate when plunging and circular milling. Attention-drilling lead to long chips.

#### **Case for FMR01**



Workpiece material: 42CrMo (HRC35) Cooling system: Dry cutting Machine: Vertical machining center Cutting parameters: Vc=200m/min ap=3mm fz=0.2mm/z



Tool type: FMR01-025-XP20-RC10-02
Insert type/grade: RCKT10T3MO-DM/YBG202

#### Comparison of insert abrasion

ZCC·CT

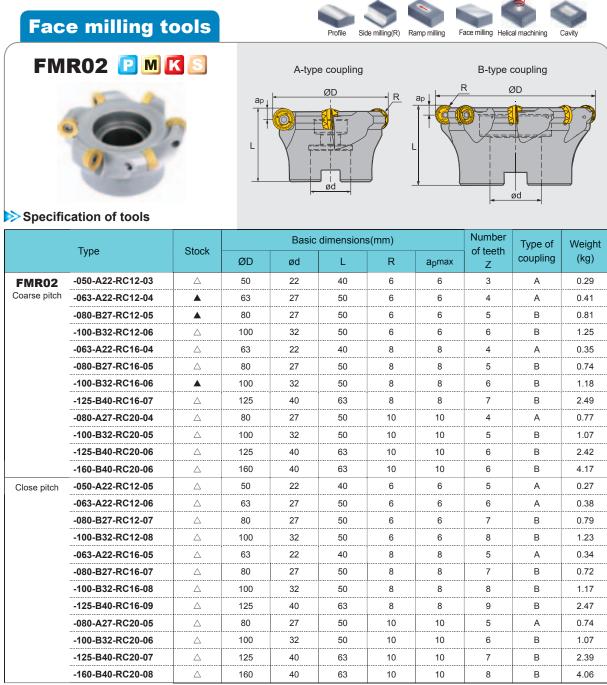


22minutes later



(22minutes later)

# MILLING / Indexable Milling Tools



▲Stock available △Make-to-order

#### Spare parts

Diameter		Insert screw	Wre	nch	
ØD	Insert		689	Y	0
Ø50 -Ø100	RC001204MO-00	I60M3.5×10	WT15IS		- N
Ø63 -Ø125	RC001606MO-00	I60M5×13		WT20IT	
Ø125 -Ø160	RC□□2006MO-□□	I43M6×16		WT25IT	

Tools code key B24-B25

Grade selection guide

B19-B23



2

Technical data B234–B240 Indexable Milling Tools MILLING

Selec	tion of inserts —																							$\overline{}$
ØIC	ød 7°	<u> </u>	Steel Stainless Cast iron Non-ferro		con	"	•	۳			2	0	( <u>)</u>	96		)	rking CO CO			$\bigcirc$			-	
		Basic c	limensior	ns(mm)		С	VD	Co	atin	ıg				PV	D C	oatii	ng			Ceri	met		mer arbio	nted de
Insert shape	Туре	ØI.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S		YD201
	RCKT1204MO-DM	12.0	4.76	4.0	•		•		•	0			•	*	•									
	RCKT1606MO-DM	16.0	6.35	5.56	•										•	•								
	RCKT1204MO-DR	12.0	4.76	4.0	0		0		0				•	*										
9	RCKT1606MO-DR	16.0	6.35	5.56	•				•		0		•	*										
	RCKT2006MO-DR	20.0	6.35	6.55	•				•		0		0	*	•									
(in)	RCKT1204MO-ER	12.0	4.76	4.0				★																
œ.	RCKT1606MO-ER	16.0	6.35	5.56				★																
	RCKT2006MO-ER	20.0	6.35	6.55				★																
	RCKT1204MO-NM	12.0	4.76	4.0				0						C	) C			0	0					
	RCKT1606MO-NM	16.0	6.35	5.56				0						C				0	0					

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

Selec	ction of inserts ——			😇 Good wo	rking condition	( <u></u> Norma	l working co	ndition 🙁 E	Bad working	condition
	ØI.C of ap	S		Workpiece material	iron ferrous metal	©	0	0	٣	
			Basic dime	nsions(mm)	)	PC	BN	Cen	nented car	bide
Insert shape	Туре	ØI.C	S	ød	a <sub>p</sub> max	BK1041	BK2531	YD051	YD101	YD201
	RCMW1204MOBS01225	12.0	4.76	4.1	2.7	0	0			
9	RCMW1204MOAS01225	12.0	4.76	4.1	2.7	0	0			

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

2

Face milling tools milling tools

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#### Recommended cutting parameters

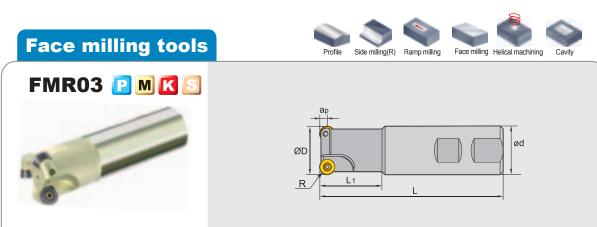
						Cutting par	ameters		
Work	piece material	Hardness HB	Insert grade				fz(mm/z)		
		ПD	grade	V₀(m/min)	-DM	-DR	-ER	-PCBN	-NM
			YBM251 YBC301	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)			
	Low-carbon steel、Soft steel	≤HB180	YBM351 YBG302	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)			0.25 (0.1-0.5)
			YBG202 YBG205 YB9320	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)			0.2 (0.1-0.5)
			YBM251 YBC301	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)			
Р	High-carbon steel、Alloy	HB180-280	YBM351 YBG302	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)			0.25 (0.1-0.5)
	steel		YBG202 YBG205 YB9320	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)			0.2 (0.1-0.5)
			YBM251 YBC301	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)			
	Alloy tool steel	HB280-350	YBM351 YBG302	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)			0.2 (0.1-0.5)
			YBG202 YBG205 YB9320	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)			0.2 (0.1-0.4)
			YBM251	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)			
			YBM253	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)	0.3(0.2-0.6)		0.2 (0.1-0.4)
Μ	Stainless steel	≤HB270	YBM351	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)			
			YBG202 YBG205 YB9320	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)			0.2 (0.1-0.4)
			YBG302	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)			0.2 (0.1-0.5)
			BK2531	150 (100-500)				0.15 (0.1-0.5)	
Κ	Quenching steel、Cast iron	HB180-250	BK1041	800 (500-1200)				0.2 (0.1-0.5)	
			YBD152	240 (180-300)	0.2(0.1-0.3)				
			YBD252	220 (180-300)		0.2 (0.1-0.3)			
S	Difficult-to- machine materials	≤400	YBS203 YBS303	100 (60-120)					0.15 (0.1-0.3)

MILLING Indexable Milling Tools

#### Ramp milling, helical interpolation milling

			F	Ramp milling		Helical interpo	plation milling
	Insert	Diameter ØD(mm)	Max.cutting depth	Max.cutting depth	Min.length	Min.diameter	Max.diameter
Ramp milling			ap(mm)	α°	L <sub>m</sub> (mm)	ØD₁(mm)	(mm)
		50	6	7	48.9	88	6
	RCKT12**	63	6	5.1	67.5	114	6
$L_m = \frac{a_p}{\tan \alpha}$		80	6	3.7	94.1	148	6
$\alpha$ :Plunge angle		100	6	2.7	127.2	188	6
		63	8	8	56.9	110	8
	RCKT16**	80	8	5.6	81.6	144	8
<ul> <li>Helical interpolation milling</li> </ul>	Koltrio	100	8	4.1	110.8	184	8
v v v		125	8	3.4	136.7	234	8
		80	10	8	71.2	140	10
	RCKT20**	100	10	5.7	100.2	180	10
$P=\tan_{\alpha}\times\pi\times D_{1}$ $\alpha$ :Helix angle	NGRIZU	125	10	4.2	136.2	230	10
		160	10	3	190.8	300	10

Reduce the feed rate when plunging and circular milling. Attention-drilling lead to long chips.



MILLING / Indexable Milling Tools

#### Specification of tools

Tuno	Stock				Number of teeth	Weight			
Туре	SIUCK	ØD	ød	L	L1	R	a <sub>p</sub> max	Z	(kg)
 -016-XP16-RD08-02		16	16	100	25	4	4	2	0.1
-025-XP25-RD08-02		25	25	100	30	4	4	2	0.3
-032-XP32-RD10-02		32	32	120	40	5	5	2	0.7
-040-XP32-RD12-03		40	32	120	40	6	6	3	0.7
-050-XP32-RD12-04		50	32	120	40	6	6	4	0.8

▲Stock available △Make-to-order

#### **Spare parts**

Diameter	Insert screw	Wrench	-
ØD	500 C		
Ø16-Ø25	I60M3×7	WT09IP	
Ø32-Ø50	I60M4×10	WT15IP	0





MILLING Indexable Milling Tools

✓ Select	tion of inserts —																									
	0		🙄 Goo	od working	con	ditio	n 🥲	No	orma	l wo	orkin	ig co	ondit	ion	2	Bad	woi	king	g coi	nditi	on					
	s s	ξ 🕻	Steel		<b>(</b>	(***	(***	<b>(</b>	$\odot$					<b>(</b>	0	$\bigotimes$		$\bigcirc$					$\bigotimes$			
		Workpiece material	Stainless	steel	<b>!!</b>	•	<b>(</b>	<u></u>	$\bigotimes$				<u></u>	<u></u>	<b>!!</b>	8		$^{\circ}$			$^{\circ}$	0	$\bigotimes$			
	) ød	e n	Cast iron							<b>(</b>	$\odot$	$^{\odot}$					•	0						0		$\odot$
	15° <u></u>	laterii	Non-ferro	ous metal																					•	8
ØI.C		<u>a</u> [S	Heat resistan	t alloy, Ti alloy								0	<b>(</b>	<b>(</b>	<u>"</u>				<b>(</b>	$(\cong)$						
		Basic o	limensior	ns(mm)		С	VD	Со	atir	ng				P١	/D	Co	atir	ng			Cer	rmet		eme carb		
Insert shape	Туре	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
	RDKW0803MO	8	3.18	3.4	0				0				•	*		0										
9	RDKW10T3MO	10	3.97	4.4	0				•				•	*												
-	RDKW1204MO	12	4.76	4.4	•		•		•				•	*		•										
9	RDKT10T3MO-NM	10	3.97	4.4										0					0	0						

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

#### Recommended cutting parameters

Nor	kpiece material	Hardness HB	Insert grade	Cutting p	arameters
////	kpiece material	naturiess nd	insen grade	V₀(m/min)	fz(mm/z)
			YBM251 YBC301	270 (220-350)	0.2 (0.08-0.45)
	Low-carbon steel、Soft steel	≤180	YBM351 YBG302	220 (180-300)	0.25 (0.15-0.45)
			YBG202 YBG205	270 (200-360)	0.2 (0.1-0.45)
			YBM251 YBC301	240 (200-320)	0.2 (0.08-0.45)
P	High-carbon steel、Alloy steel	180-280	YBM351 YBG302	200 (160-280)	0.25 (0.15-0.45)
			YBG202 YBG205	240 (180-350)	0.2 (0.1-0.45)
			YBM251 YBC301	220 (180-300)	0.2 (0.08-0.45)
	Alloy tool steel	280-350	YBM351 YBG302	180 (150-250)	0.25 (0.15-0.45)
			YBG202 YBG205	220 (170-340)	0.2 (0.1-0.45)
			YBG205	150 (120-240)	0.2 (0.08-0.45)
Μ	Stainless steel	≤270	YBM251	150 (120-240)	0.2 (0.08-0.45)
VI	Stanness Steel	~270	YBM351	150 (100-220)	0.25 (0.1-0.45)
			YBG202 YBG205	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron	180-250	YBG302	210 (120-300)	0.2 (0.1-0.45)
5	Difficult-to- machine materials	≤400	YBS203 YBS303	100 (60-120)	0.15 (0.1-0.3)

#### Ramp milling, helical interpolation milling

			F	Ramp milling	-	Helical interpo	plation milling
Ramp milling	Insert	Diameter ØD(mm)	Max.cutting depth	Max.cutting depth	Min.length	Min.diameter	Max.diameter
			ap(mm)	α°	L <sub>m</sub> (mm)	ØD1(mm)	(mm)
	RD*08**	16	4	12.2	18.5	24	4
$L_m = \frac{a_p}{tan\alpha}$ $\alpha$ :Plunge angle	KD 06	25	4	8.8	25.8	42	4
<ul> <li>Helical interpolation milling</li> <li> <sup>†</sup> <sup>p</sup> </li> </ul>	RD*10**	32	5	8.4	34	54	5
	RD*12**	40	6	10.3	33	68	6
$P=tan\alpha \times \pi \times D1$ $\alpha$ :Helix angle		50	6	7.1	48	88	6

Reduce the feed rate when plunging and circular milling. Attention-drilling lead to long chips.

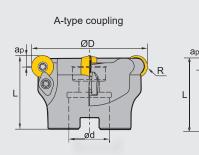
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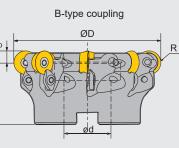


# Face milling tools









#### Specification of tools

	Turne	Chaoli		Basic	dimension	s(mm)		Number	Type of	Weight
	Туре	Stock	ØD	ød	L	R	apmax	of teeth Z	coupling	(kg)
FMR04	-050-A22-RD12-03		50	22	40	6	6	3	A	0.25
Coarse pitch	-063-A22-RD12-04		63	22	40	6	6	4	А	0.37
	-080-B27-RD12-05		80	27	50	6	6	5	В	0.77
	-063-A22-RD16-04	$\triangle$	63	22	40	8	8	4	A	0.32
	-080-B27-RD16-05	Δ	80	27	50	8	8	5	В	0.67
	-100-B32-RD16-06	<b></b>	100	32	50	8	8	6	В	1.18
	-125-B40-RD16-08	Δ	125	40	63	8	8	8	В	2.55
	-125-B40-RD20-06	<b></b>	125	40	63	10	10	6	В	2.33
	-160-B40-RD20-07	<b></b>	160	40	63	10	10	7	В	3.83
Close pitch	-050-A22-RD12-05	$\bigtriangleup$	50	22	40	6	6	5	А	0.23
	-063-A22-RD12-06	$\triangle$	63	22	40	6	6	6	A	0.48
	-080-B27-RD12-07	$\triangle$	80	27	50	6	6	7	В	0.78
	-063-A22-RD16-05	Δ	63	22	40	8	8	5	A	0.3
	-080-B27-RD16-07	$\triangle$	80	27	50	8	8	7	В	0.66
	-100-B32-RD16-08	$\bigtriangleup$	100	32	50	8	8	8	В	1.18
	-125-B40-RD16-10	$\bigtriangleup$	125	40	63	8	8	10	В	2.51
	-125-B40-RD20-08	$\triangle$	125	40	63	10	10	8	В	2.45
	-160-B40-RD20-10	$\bigtriangleup$	160	40	63	10	10	10	В	3.98

▲Stock available △Mak

#### Spare parts

Diameter		Insert screw	Clamp	Clamp screw	Wre	ench	
ØD	Insert	-	0	and the second s	~	×	Contract of the second
Ø50-Ø80	RDKW1204MO	I60M3.5×10	WD-204	I60M4×10	WT15IP		2 Comments
Ø63 -Ø125	RDKW1605MO	I60M5×13	WD-207	I60M5×13		WT20IT	
Ø125 -Ø160	RDKW2006MO	I43M6×16				WT25IT	







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# B MILLING Indexable Milling Tools

Selec	tion of inserts —																								$\overline{}$
	S -I		🙄 Goo Steel	od working			_	No U			orkir	-	ondi		<u>()</u>		wo	rking	g cor	-	-	$\odot$			
		~ _	Stainless	steel				•						<u> </u>				0				0			
	) ød	iece m	Cast iron							۳	$\odot$	0					•	0						0	$\otimes$
Ø	15°	ateria		ous metal									<u></u>		<u></u>				<u></u>					(	<u> </u>
			Heat resistar	nt alloy, Ti alloy								0	<u>(</u>	<b>(</b>	0		-		<u> </u>	8	_				
		Basic o	limensio	ns(mm)		С	VD	Co	atir	ng				P	VD	Со	atir	ng			Cer	met		eme carb	nted ide
Insert shape	Туре	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
	RDKW1204MO	12.0	4.76	4.4	•		•		•				•	*		•									
	RDKW1605MO	16.0	5.56	5.5	0				0				0	★		0									
	RDKW2006MO	20.0	6.35	6.5	0				0					0											

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

#### Recommended cutting parameters

Mar	kniego motorial	Hardness	la contrara do	Cutting pa	arameters
VVOF	kpiece material	HB	Insert grade	Vc(m/min)	f(mm/z)
			YBM251 YBC301	270 (220-350)	0.2 (0.08-0.45)
	Low-carbon steel、Soft steel	≤180	YBM351 YBG302	220 (180-300)	0.25 (0.15-0.45)
			YBG202 YBG205	270 (200-360)	0.2 (0.1-0.45)
			YBM251 YBC301	240 (200-320)	0.2 (0.08-0.45)
P	High-carbon steel、Alloy steel	180-280	YBM351 YBG302	200 (160-280)	0.25 (0.15-0.45)
			YBG202 YBG205	240 (180-350)	0.2 (0.1-0.45)
			YBM251 YBC301	220 (180-300)	0.2 (0.08-0.45)
	Alloy tool steel	280-350	YBM351 YBG302	180 (150-250)	0.25 (0.15-0.45)
			YBG202 YBG205	220 (170-340)	0.2 (0.1-0.45)
			YBG205	150 (120-240)	0.2 (0.08-0.45)
BÆ		< 070	YBM251	150 (120-240)	0.2 (0.08-0.45)
M	Stainless steel	≤270	YBM351 YBG302	150 (100-220)	0.25 (0.1-0.45)
			YBG202 YBG205	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron	180-250	YBG302	210 (120-300)	0.2 (0.1-0.45)

#### Ramp milling, helical interpolation milling

Ramp milling			F	Ramp milling		Helical interpo	plation milling
	Insert	Diameter ØD(mm)	Max.cutting depth	Max.cutting depth	Min.length	Min.diameter	Max.diameter
			ap(mm)	α°	L <sub>m</sub> (mm)	ØD₁(mm)	(mm)
		50	6	7.1	48	88	6
$L_{m} = \frac{a_{p}}{tan\alpha}$ $\alpha$ :Plunge angle	RD*12**	63	6	5.1	67	114	6
Helical interpolation		80	6	3.6	93	148	6
milling		63	8	8	56.5	110	8
	RD*16**	80	8	5.6	81.5	144	8
		100	8	4.1	110.5	184	8
		125	8	3.4	136.5	234	8
	RD*120**	125	10	4.2	136.2	230	10
$\begin{array}{c} P{=}tan_{\alpha\times}\pi{\times}D_{1}\\ \alpha{:}\text{Helix angle} \end{array}$	KD 120***	160	10	3	190.5	300	10

Reduce the feed rate when plunging and circular milling. Attention-drilling lead to long chips.

#### **Case for FMR04**



Workpiece material: 42CrMo (HRC35) Cooling system: Dry cutting Machine: Vertical machining center Cutting parameters: Vc=200m/min ap=3mm fz=0.3mm/z

Tool type: FMR04-063-A22-RD12-04 Insert type/grade: RDKW1204MO/YBG202

### Abrasion comparison after 90 minutes cavity milling

#### Similar overseas products



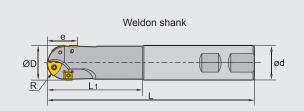




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MIL





#### Specification of tools

	Turne	Stock		Basi	c dime	nsions(	(mm)		Ap	plicable	inserts		Weight
	Туре	SLUCK	R	ØD	е	ød	L	L1	Туре	Quantity	Туре	Quantity	, (kg)
BMR01	-020-XP20-S		10	20	20	20	125	50	ZDET08T2CYR10	2	SPMT060304	2	0.3
	-020-XP20-M		10	20	20	20	150	75	ZDET08T2CYR10	2	SPMT060304	2	0.3
	-020-XP20-L		10	20	20	20	200	100	ZDET08T2CYR10	2	SPMT060304	2	0.4
	-025-XP25-S		12.5	25	23	25	150	70	ZDET1103CYR12.5	2	SPMT060304	2	0.5
	-025-XP25-M		12.5	25	23	25	175	95	ZDET1103CYR12.5	2	SPMT060304	2	0.6
	-025-XP25-L		12.5	25	23	25	200	100	ZDET1103CYR12.5	2	SPMT060304	2	0.7
	-032-XP32-S		16	32	31	32	175	85	ZDET13T3CYR16	2	SDMT090308	2	0.9
	-032-XP32-M		16	32	31	32	200	100	ZDET13T3CYR16	2	SDMT090308	2	1.1
	-032-XP32-L		16	32	31	32	250	150	ZDET13T3CYR16	2	SDMT090308	2	1.4
	-040-XP40-S		20	40	41	40	175	85	ZPNT2204CY(R20)	3	SPMT120408	2	1.4
	-040-XP40-M		20	40	41	40	200	100	ZPNT2204CY(R20)	3	SPMT120408	2	1.7
	-040-XP40-L		20	40	41	40	250	150	ZPNT2204CY(R20)	3	SPMT120408	2	2.1
	-050-XP40-S		25	50	45	40	200	100	ZPNT2204CY(R25)	3	SPMT120408	2	1.8
	-050-XP40-M		25	50	45	40	300	100	ZPNT2204CY(R25)	3	SPMT120408	2	2.8
	-063-XP40-S		31.5	63	52	40	200	100	ZPNT2204CY(R31)	4	SPMT120408	2	3.0
	-063-XP40-M		31.5	63	52	40	300	100	ZPNT2204CY(R31)	4	SPMT120408	2	3.5

▲Stock available  $\triangle$ Make-to-order

#### Spare parts

Diameter	Screw	Wre	ench	
ØD	5 m	~		1 8
Ø20-Ø25	I43M2.5×5.7	WT07IP		
Ø32	I43M4×8		WT15IS	age
Ø40-Ø63	I43M5×11		WT20IS	







# MILLING Indexable Milling Tools

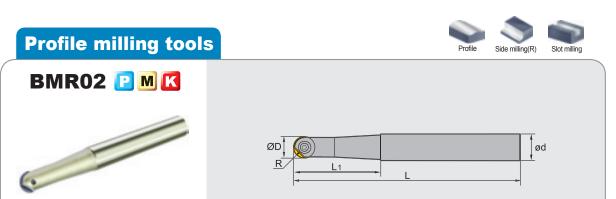
	ction of inserts -																											
			_	(	😕 Goo	od wor	king						al wo	orkir	ng co			<u> </u>	_	wo		g co	ndit					
	α		No	Ste	el			<b>(</b>	<b>(</b>	<b>(</b>	<b>(</b>	$\odot$				_			$\odot$		$^{\odot}$			$^{\circ}$		$\odot$		
ØI.C			rkpie	<b>Sta</b>	inless	steel		<u>.</u>	<u></u>	<u>.</u>	<u>.</u>	8				<u>.</u>	<u>.</u>	<u></u>	8		$^{\circ}$			0	$^{\circ}$	$\odot$		
<u>)</u>	ød de		ce n	Ca	st iron								۳	$\odot$	$^{\circ}$					•	$^{\circ}$						$\bigcirc$	8
R			Workpiece material	No	n-ferro	us me	etal																					
			a	S Hea	t resistan	t alloy, T	i alloy								$\odot$	<b>(</b>	<b>(</b>	<u>"</u>				"	$\odot$					
		Ва	asic o	dimer	nsions	s(mm	1)		С	VD	Со	atir	ng	-			P١	/D	Со	atir	ng		_	Ce	rmet			ented bide
Insert shape	Туре	R	L	ØI.C	S	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101 YD201
	ZDET08T2CYR10	10	8.4	6.75	2.78	2.8	14°			0									0									
0	ZDET1103CYR12.5	12.5	10.6	8.5	3.18	2.8	14°			0									0									
	ZDET13T3CYR16	16	13.2	10.5	3.97	4.4	14°			0									0									
	ZPNT2204CY(R20)	20	16.1	12.7	4.76	5.56	11°			0									0									
0	ZPNT2204CY(R25)	25	16.9	12.7	4.76	5.56	11°			0									0									
	ZPNT2204CY(R31)	31.5	17.6	12.7	4.76	5.56	11°			0									0									
		★Rec	omme	ended	grade	e (alw	ays	stoc	k av	/aila	able	)	•A	vail	able	gra	de (	alw	/ays	sto	ock a	avai	ilab	le)	C	Ma	ake-t	to-orde

😋 Good working condition 😃 Normal working condition 😣 Bad working condition \_90°  $\odot$ Steel 🙂 🙂 😁 😕  $\odot \odot \odot$ Workpiece material •••••• ••••• 00 ØI.C M Stainless steel 😊 😋 🙁 00 øc Cast iron 🙂 🙁 😁 8 28 Non-ferrous metal S Heat resistant alloy, Ti alloy **(!)** 🙁 Cemented CVD Coating PVD Coating Cermet Basic dimensions(mm) carbide YBS203 YBS303 YNG151 YNG151C Insert shape Туре YBC302 YBM251 YBM253 YBM351 YBD152 YBD252 YBG102 YBG202 YBG205 YB9320 YBG302 YBG152 YBG252 YBC301 YC30S YD051 YD101 YD201 ØI.C r S L ød α 0 0 SPMT060304 0.4 6.35 6.35 3.18 2.8 11 SPMT090308 0.8 9.525 9.525 3.18 4.4 0 0 15 SPMT120408 0.8 12.7 12.70 4.76 5.5 11°  $\star$ OMake-to-order

★Recommended grade (always stock available) ●Available grade (always stock available)

#### Recommended cutting parameters

		01			-
M	orkpiece material	Hardness HB	Insert grade	Cutting p	arameters
vvc		TIAIUTESS TID	insert grade	Vc(m/min)	fz(mm/z)
	Low-carbon steel、	≤180	YBM251	180(120-220)	0.25(0.1-0.4)
	Soft steel	≈ 100	YBG302	160(120-220)	0.25(0.1-0.4)
	High-carbon steel、	180-280	YBM251	150(100-200)	0.2(0.1-0.4)
	Alloy steel	180-280	YBG302	120(100-200)	0.2(0.1-0.4)
		280-350	YBM251	100(80-150)	0.2(0.1-0.3)
	Alloy tool steel	200-330	YBG302	100(80-150)	0.2(0.1-0.3)
М	Staiplage steel	≤270	YBM251	100(80-150)	0.2(0.1-0.3)
	Stainless steel	≈270	YBG302	100(80-150)	0.2(0.1-0.3)
K	Cast iron	180-250	YBG302	150(100-180)	0.3(0.2-0.5)



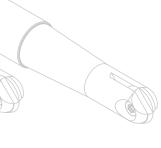
#### Specification of tools

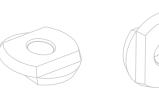
	Туре	Chaoli		Ва	sic dimensions(m	nm)		Weight
	туре	Stock	R	ØD	ød	L	L1	(kg)
BMR02	-012-G16-S		6	12	16	110	40	0.1
	-012-G16-M		6	12	16	130	50	0.2
	-012-G16-L		6	12	16	160	50	0.2
	-016-G20-S		8	16	20	140	45	0.3
	-016-G20-M		8	16	20	170	65	0.3
	-016-G20-L		8	16	20	200	65	0.4
	-020-G25-S		10	20	25	160	60	0.5
	-020-G25-M		10	20	25	200	80	0.6
	-020-G25-L		10	20	25	240	80	0.8

▲Stock available △Make-to-order

#### Spare parts

Diameter	Screw	Wrench	
ØD	<b>(</b>	-	8
Ø12	I70M4×10TT	WT15IS	6.
Ø16	I70M5×12TT	WT20IS	-
Ø20	I70M5×16TT	WT20IS	







Grade selection guide B19-B23

Technical data B234-B240

3

MILLING

# B MILLING Indexable Milling Tools

->> Selec	tion of inserts																									
		. =		😊 Good	working			-	-		l wo	rking	-		-	<u> </u>	-	wor		g cor	-					
		VVC	s PSt	eel		<b>(</b>	<b>(</b>	"	<b>(</b> )	8			1	<b>(</b> )	<b>()</b>	0	$\odot$		0			$\odot$	$\bigcirc$			
	) ød		M St	ainless s	teel	•	<u></u>	<u></u>	<u>••</u>	8			(	<mark>()</mark>	<mark>()</mark>	<mark>!!</mark>	$\otimes$		0			0	0	$\otimes$		
		. ece		ast iron								0	$\odot$					•	0					(	0	$\odot$
	S			on-ferrou	s metal																				C	98
		a	E S He	at resistant a	lloy, Ti alloy							1	0	<u></u>						•	2					
																								Ce	mer	ited
		Basi	ic dime	nsions(	mm)		С	VD	Coa	atin	g				P١	/D (	Coa	atin	ıg			Cer	met		arbio	
Insert shape	Туре					-	2	-	e	-	2	2	2	2	2	_	2	2	2	~	_	-	1C			
		ØI.C	L	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151	YC30S	YD051	YD201 YD201
						ΥB(	ΥB(	ΥBI	ΥBI	ΥBI	ΥBI	ΥBI	ΥB	ΥB(	ΥB(	ΥB	ΥB	ΥB	ΥB(	ΥB	ΥB	ž	ΥŇ	ΥC	۶ ۶	Ϋ́C
	ROHX1203	12	8.5	3	4														0							
2	ROHX1604	16	11.3	4	5														0							
	ROHX2005	20	14.1	5	5														0							

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

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#### Recommended cutting parameters

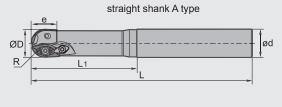
10/	lunia e a meterial	Linda en LID	luce and sure de	Cutting		Diameter	-
VVor	kpiece material	Hardness HB	Insert grade	parameters	Ø12	Ø16	Ø20
				Vc(m/min)	100~200	100~200	100~200
	Carbon steel	HB≤180		fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
	Carbon steel	HB ≈ 180		a <sub>p</sub> max(mm)	0.8	1.0	1.25
				a <sub>e</sub> max(mm)	0.8	1.0	1.25
				Vc(m/min)	80~180	80~180	80~180
	Alloy steel	HB180~280		fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
P	Alloy steel	HB180~280		a <sub>p</sub> max(mm)	0.8	1.0	1.25
				a <sub>e</sub> max(mm)	0.8	1.0	1.25
				Vc(m/min)	60~100	60~100	60~100
	Hardened steel	HRC55~65	YBG252	fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
	i la dened steel	116050-05	1BG202	a <sub>p</sub> max(mm)	0.4	0.5	0.6
				a <sub>e</sub> max(mm)	0.4	0.5	0.6
				Vc(m/min)	70~150	70~150	70~150
M	Stainless steel	HB≤270		fz(mm/z)	0.1~0.2	0.1~0.25	0.1~0.25
	Stairliess Steel	TID≪270		a <sub>p</sub> max(mm)	0.6	0.8	1.0
				a <sub>e</sub> max(mm)	0.6	0.8	1.0
				Vc(m/min)	160~300	160~300	160~300
K	Cast iron	HB180-250		fz(mm/z)	0.2~0.3	0.25~0.35	0.25~0.35
		100-200		a <sub>p</sub> max(mm)	1.0	1.5	1.8
				a <sub>e</sub> max(mm)	1.0	1.5	1.8

Indexable Profile milling tools





MI



straight shank B type

e	Slid	ідпі зпапк в тур	ie -	
ØD				ød
R	L1			
		L		

#### Specification of tools

	Turne	Stock		Ba	asic dime	nsions(m	-	Number of teeth	Weight	Turne	Clama	
	Туре	SLOCK	R	ØD	ød	L	L1	е	Z	(kg)	Туре	Clamp
BMR03	-016-G20-S		8	16	20	150	70	16	2	0.3	В	
	-016-G20-M		8	16	20	180	80	16	2	0.4	В	
	-020-G25-S		10	20	25	180	80	20	2	0.5	В	
	-020-G25-M		10	20	25	200	100	20	2	0.6	В	
	-020-G25-L		10	20	25	250	150	20	2	0.7	В	
	-020-G25-XL		10	20	25	300	110	20	2	1.0	В	
	-025-G25-S		12.5	25	25	180	80	25	2	0.6	В	
	-025-G25-M		12.5	25	25	200	100	25	2	0.7	В	
	-025-G25-L		12.5	25	25	250	110	25	2	0.8	В	
	-025-G25-XL		12.5	25	25	300	120	25	2	1.0	В	
	-030-G32-S	$\bigtriangleup$	15	30	32	200	120	30	2	1.0	А	
	-030-G32-M		15	30	32	250	150	30	2	1.3	А	
	-030-G32-L		15	30	32	300	200	30	2	1.6	А	
	-030-G32-XL	$\bigtriangleup$	15	30	32	350	200	30	2	1.9	А	WD-208
	-032-G32-S		16	32	32	200	120	32	2	1.1	А	VVD-208
	-032-G32-M		16	32	32	250	150	32	2	1.4	А	
	-032-G32-L		16	32	32	300	200	32	2	1.6	А	
	-032-G32-XL	$\triangle$	16	32	32	350	200	32	2	2.0	А	
	-040-G40-S	$\bigtriangleup$	20	40	40	200	120	40	2	1.6	A	
	-040-G40-M		20	40	40	250	150	40	2	2.0	A	CBH5R1
	-040-G40-L		20	40	40	300	200	40	2	2.5	A	CDHOKI
	-040-G40-XL	Δ	20	40	40	350	200	40	2	3.0	А	

▲Stock available △Make-to-order



Grade selection guide B19-B23



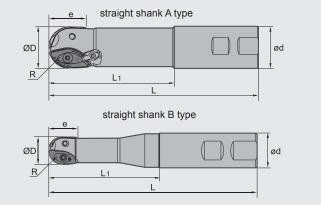
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Profile Side milling(R) Slot milling Helical machining

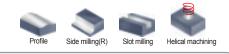




#### Specification of tools

	Tupo	Stock		Ba	asic dimei	nsions(mi	n)	-	Number of teeth	Weight	Tupo	Clamp
	Туре	SLUCK	R	ØD	ød	L	L1	е	Z	(kg)	Туре	Clamp
BMR03	-016-XP20-M		8	16	20	111	60	16	2	0.2	В	
	-020-XP25-M		10	20	25	127	70	20	2	0.3	В	
	-020-XP25-L		10	20	25	150	80	20	2	0.4	В	
	-025-XP25-M		12.5	25	25	137	80	25	2	0.4	В	
	-025-XP25-L		12.5	25	25	200	100	25	2	0.6	В	-
	-030-XP32-M		15	30	32	161	100	30	2	0.8	А	
	-030-XP32-L		15	30	32	250	150	30	2	1.3	А	WD-208
	-032-XP32-M		16	32	32	161	100	32	2	0.8	А	VVD-208
	-032-XP32-L		16	32	32	250	120	32	2	1.3	А	
	-040-XP40-M		20	40	40	175	100	40	2	1.3	А	
	-040-XP40-L		20	40	40	250	120	40	2	2.0	А	
	-050-XP50-M		25	50	50	200	100	50	2	2.5	А	CBH5R1
	-050-XP50-L		25	50	50	250	150	50	2	3.1	А	

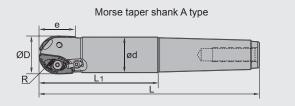
▲Stock available △Make-to-order



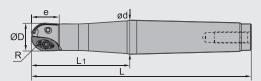
Μ



**Profile milling tools** 



Morse taper shank B type



#### Specification of tools

	Туре	Stock		Ba	asic dime	nsions(mi	n)		Number of teeth	Weight	Туре	Clamp
	туре	SLUCK	R	ØD	ød	L	L1	е	Z	(kg)	Type	Clamp
BMR03	-020-MT3-M		10	20	18.7	156	70	20	2	0.4	В	
	-020-MT3-L	$\triangle$	10	20	18.7	186	100	20	2	0.4	В	
	-025-MT3-M		12.5	25	23.5	156	70	25	2	0.4	В	
	-025-MT3-L		12.5	25	23.5	186	100	25	2	0.4	В	
	-030-MT4-M		15	30	28.2	189	70	30	2	0.8	A	
	-030-MT4-L	Δ	15	30	28.2	229	120	30	2	1.0	A	WD-208
	-032-MT4-M		16	32	29.2	179	70	32	2	0.9	A	VVD-200
	-032-MT4-L	Δ	16	32	29.2	209	100	32	2	0.9	A	
	-040-MT4-M		20	40	36.9	199	100	40	2	1.0	A	
	-040-MT5-L		20	40	36.9	226	90	40	2	1.8	А	
	-040-MT5-XL		20	40	36.9	256	120	40	2	2.0	A	CBH5R1
	-050-MT5-M		25	50	46.8	236	100	50	2	2.2	A	
	-050-MT5-L		25	50	46.8	286	150	50	2	2.9	A	

▲Stock available △Make-to-order



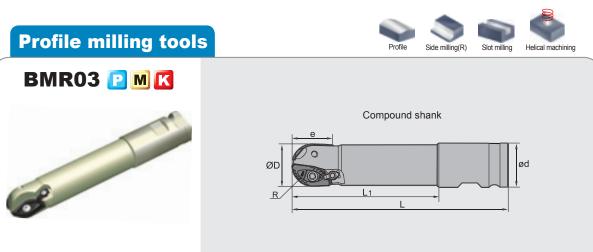
Grade selection guide

B147

2

C

MILLING / Indexable Milling Tools



#### Specification of tools

Indexable milling tools

Profile milling tools

Turpo	Stock		E	Basic dime	nsions(mm	ı)		Number	Weight	Clamp
Туре	SIUCK	R	ØD	ød	L	L1	е	of teeth Z	(kg)	Clamp
-040-XPX-M		20	40	50.8	250	170	40	2	1.3	
-040-XPX-L		20	40	50.8	300	220	40	2	3.1	
-040-XPX-XL		20	40	50.8	350	270	40	2	3.5	CBH5R1
-050-XPX-M		25	50	50.8	250	170	50	2	3.1	CBHOKI
-050-XPX-L		25	50	50.8	300	200	50	2	3.8	
-050-XPX-XL		25	50	50.8	350	270	50	2	4.4	

▲Stock available △Make-to-order

#### **Spare parts**

Diameter	Clamp	Screw	Wre	ench	4
ØD		and the second s	×	100	R
Ø16		I60M2.5×6.5		WT07P	9
Ø20		I60M3.5×08TT		WT10IP	
Ø25		I60M4×10		WT15S	07
Ø30	WD-208	I60M5×13	WT20IT		
Ø32	WD-208	I60M5×13	W12011		1.12
Ø40	CBH5R1	I43M6×16	WT25IT		
Ø50	CBH5R1	I43M8×21	WT25IT		
200	02.101(1	I43M6×16	WT30IT		





Indexable Milling Tools MILLING

Sele	ection of inserts	; —																										_	\
(			_		0	Goo	od working	con	ditio	n 🥲	N	orma	al wo	orkir	ng co	ondit	ion	8	Bad	wor	king		nditi	on					
	S	-	VV.	s P	Stee	l		۳	<b>(</b> )	<b>(</b> )	<b>(</b> )	$\odot$				<b>(</b>	<b>(</b> )	0	$\odot$		0			$\bigcirc$	_				
		T		<b>M</b>			steel	•	<u></u>	<u></u>	•••	_				<b>(</b>	<u></u>	•••	2		0			$^{\circ}$	$\odot$	$\otimes$			
	+ \ød	ţ,			Cast								۳	$\odot$	$^{\circ}$					•	0						$\odot$	6	
R		77	• alcii	P N	Non	ferro	ous metal										_	_										• 6	
			ā	<u>^ S</u>	Heat r	esistar	nt alloy, Ti alloy								$\odot$		<u> </u>	•				<b>(</b>	$\bigcirc$						
		E	Basio	c dim	ensi	ons	(mm)		С	VD	Сс	atir	ng				P١	/D	Coa	atin	ng			Cer	met		eme carb	ented ide	ĺ
Insert shape	Туре	R	ød	S	α	L	Applicable tools	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101 YD201	
	XPHT16R0803-GM	8	3.1	3.18	9°	16	ø16												*										
	XPHT20R10T3-GM	10	4.0	3.97	9°	20	ø20												*										1
	XPHT25R1204-GM	12.5	4.7	4.76	9°	25	ø25												*										
	XPHT30R1506-GM	15	5.8	6.35	11°	30	ø30												*										
	XPHT32R1606-GM	16	5.8	6.35	9°	32	ø32												*										
	XPHT40R2007-GM	20	6.7	7.94	9°	40	ø40												*										
	XPHT50R2507-GM	25	9.2	7.94	9°	50	ø50												*										

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

8

Profile milling tools milling tools

B

B149

Tools code key B24-B25

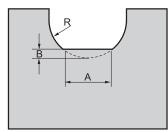
Grade selection guide B19-B23

Technical data B234–B240

## series ball nose end milling tools

- O The unique chipbreaker and big rake angle can effectively control the curling and flowing direction of chips and reduce the cutting force, improving workpiece surface quality and tool life.
- O After precise grinding of periphery and locating surface, the insert can sufficiently ensure the shape accuracy of cutting edge and the precision of installation and location, improving installation security and workpiece precision after machining.
- O The concave structure of the flank can effectively enhance the strength of cutting edge and prevent scraping between the clearance face and workpiece surface. Therefore, it improves the workpiece surface quality and prolongs the life of insert.
- O The designs of cutting edge over center and a large negative rake angle make it possible to cut vertically, thus anti-breakage capability is enhanced.
- O The rough ball nose milling cutters with large diameter adopt the top and hole clamping style, so insert clamping becomes more firm and stable. The machining is also highly efficient even under poor conditions such as long overhang and large vibration, etc.
- O The adapter types include straight shank, Weldon shank, Morse taper shank and combination shank.

#### Slot shape after machining



R	A	В
08	1.7	0.09
10	2.2	0.12
12.5	3.0	0.18
15	3.9	0.20
16	3.5	0.22
20	3.6	0.24
25	3.8	0.26

#### Cautions:

The insert edge should correspond to the locating face of insert pocket in the tool. Don't install the wrong side up.

Before screwing down the insert, confirm the good connection between insert and insert pocket.

Select and adjust the cutting parameters according to machine power and machining conditions.

If vibration occurs in the machining process, cutting speed should be reduced properly.

Opera		ap	-ae - 0	ap	ae	
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium carbon steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~250HB	a <sub>p</sub> (mm)	4	4	8	16	
_	a <sub>e</sub> (mm)		3	4	1.5	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	4	4	8	16	
-	a <sub>e</sub> (mm)		3	4	1.5	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel Hardness	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
150~255HB	a <sub>p</sub> (mm)	4	4	8	16	
_	a <sub>e</sub> (mm)		3	4	1.5	VDC202
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	4	4	8		
_	a <sub>e</sub> (mm)		2	3		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 160~260HB	a <sub>p</sub> (mm)	4	4	8	16	
	a <sub>e</sub> (mm)		3	4	1.5	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	4	4	8	16	
	a <sub>e</sub> (mm)		3	4	1.5	

#### Recommended cutting parameters Diameter Ø16

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

2. Wind cooling to be preferred.

3

MILLING

B151

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Opera	ations	B B	ae o	ap		
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium carbon steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~250HB	a <sub>p</sub> (mm)	5	5	10	20	
100 200110	a <sub>e</sub> (mm)		4	5	2	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	5	5	10	20	
-	a <sub>e</sub> (mm)		4	5	2	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness 150~255HB	a <sub>p</sub> (mm)	5	5	10	20	
-	a <sub>e</sub> (mm)		4	5	2	VECCO
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	5	5	10		
	a <sub>e</sub> (mm)		4	5		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 160~260HB	a <sub>p</sub> (mm)	5	5	10	20	
	a <sub>e</sub> (mm)		4	5	2	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	5	5	10	20	
	a <sub>e</sub> (mm)		4	5	2	

#### Recommended cutting parameters Diameter Ø20

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

2. Wind cooling to be preferred.

Oper	ations	ap ap	-ac - 0	de de	ae de de	
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
material	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
carbon steel Hardness	a <sub>p</sub> (mm)	6	6	12.5	25	
150~250HB	a <sub>e</sub> (mm)		5	6.5	3	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	6	6	12.5	25	
	a <sub>e</sub> (mm)		5	6.5	3	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness 150~255HB	a <sub>p</sub> (mm)	6	6	12.5	25	
	a <sub>e</sub> (mm)		5	6.5	3	
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	6	6	12.5		
	a <sub>e</sub> (mm)		5	6.5		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron Hardness	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
160~260HB	a <sub>p</sub> (mm)	6	6	12.5	25	
	a <sub>e</sub> (mm)		5	6.5	3	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	6	6	12.5	25	
	a <sub>e</sub> (mm)		5	6.5	3	

#### Recommended cutting parameters Diameter Ø25

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

2. Wind cooling to be preferred.

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MILLING

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Opera	ations	ap ap	ae o	ab		
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium carbon steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~250HB	a <sub>p</sub> (mm)	10	10	16	28	
	a <sub>e</sub> (mm)		6	9	6	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	10	10	16	28	
-	a <sub>e(</sub> mm)		6	9	6	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness 150~255HB	a <sub>p</sub> (mm)	10	10	16	28	
-	a <sub>e</sub> (mm)		6	9	6	
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	10	10	16		
	a <sub>e</sub> (mm)		6	9		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 160~260HB	a <sub>p</sub> (mm)	10	10	16	28	
	a <sub>e</sub> (mm)		6	9	6	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	10	10	16	28	
	a <sub>e</sub> (mm)		6	9	6	

#### Recommended cutting parameters Diameter Ø30, Ø32

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

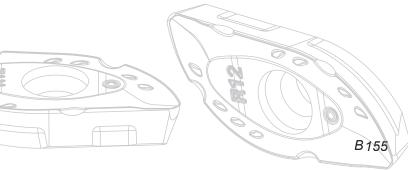
2. Wind cooling to be preferred.

	ations		ae o	de	ae di	
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium carbon steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~250HB	a <sub>p</sub> (mm)	12	10	20	35	
	a <sub>e</sub> (mm)		8	12	8	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	12	10	20	35	
	a <sub>e</sub> (mm)		8	12	8	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness 150~255HB	a <sub>p</sub> (mm)	12	10	20	35	
Ē	a <sub>e</sub> (mm)		8	12	8	VECCO
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	12	10	20		
-	a <sub>e</sub> (mm)		8	12		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 160~260HB	a <sub>p</sub> (mm)	12	10	20	35	
	a <sub>e</sub> (mm)		8	12	8	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	12	10	20	35	
	ae(mm)		8	12	8	
					1	L

#### Recommended cutting parameters Diameter Ø40

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

2. Wind cooling to be preferred.



Profile milling tools milling tools

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MILLING

#### Recommended cutting parameters Diameter Ø50

Oper	ations	e e e e e e e e e e e e e e e e e e e	ae o	ab ab		
Workpiece material	Cutting parameters	Machining of slot	Side milli	ng (slight)	Side milling (deep)	Insert grade
	Vc(m/min)	150~220	150~220	150~220	150~220	
Medium carbon steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~250HB	a <sub>p</sub> (mm)	15	10	25	40	
	a <sub>e</sub> (mm)		10	15	10	
	Vc(m/min)	100~150	100~150	100~150	100~150	
Alloy steel	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness 150~280HB	a <sub>p</sub> (mm)	15	10	25	40	
	a <sub>e</sub> (mm)		10	15	10	
	Vc(m/min)	80~120	80~120	80~120	80~120	
Die steel	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness 150~255HB	a <sub>p</sub> (mm)	15	10	25	40	
	a <sub>e</sub> (mm)		10	15	10	
	Vc(m/min)	80~100	80~100	80~100		YBG302
Hardened steel	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15		
Hardness 40~50HRC	a <sub>p</sub> (mm)	15	10	25		
	a <sub>e</sub> (mm)		10	15		
	Vc(m/min)	250~300	250~300	250~300	250~300	
Gray cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 160~260HB	a <sub>p</sub> (mm)	15	10	25	40	
	a <sub>e</sub> (mm)		10	15	10	
	Vc(m/min)	200~250	200~250	200~250	200~250	
Nodular cast iron	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness 170~300HB	a <sub>p</sub> (mm)	15	10	25	40	
	a <sub>e</sub> (mm)		10	15	10	

Note: 1. Parameters in the table shall be adjusted according to the rigidity of the machine or workpiece.

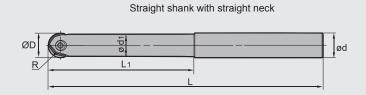
2. Wind cooling to be preferred.



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# Profile milling tools BMR04 PMK



#### Specification of tools

	T	Ote als			Basic dime	nsions(mm)			Weight
	Туре	Stock	R	ØD	ød	ød1	L <sub>1</sub>	L	(kg)
BMR04	-012-G12-M		6	12	12	11	35	125	0.1
	-012-G12-L	Δ	6	12	12	11	45	150	0.1
	-016-G16-M		8	16	16	14	40	150	0.2
	-016-G16-L	Δ	8	16	16	14	55	180	0.3
	-020-G20-M		10	20	20	18	65	180	0.4
	-020-G20-L	Δ	10	20	20	18	100	250	0.6
	-025-G25-M		12.5	25	25	23	70	200	0.7
	-025-G25-L	Δ	12.5	25	25	23	100	250	0.9
	-030-G32-M		15	30	32	27	130	250	1.2
	-030-G32-L	Δ	15	30	32	27	150	300	1.5
	-032-G32-M		16	32	32	29	80	250	1.4
	-032-G32-L	Δ	16	32	32	29	109	300	1.7

▲Stock available △Make-to-order

Indexable milling tools

3

Tools code key B24-B25

Grade selection guide B19-B23

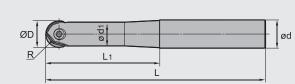


MILLING / Indexable Milling Tools



# Profile milling tools BMR04 PMK





Straight shank with taper neck

#### Specification of tools

Indexable Profile milling tools

	Truce	Oteals			Basic dime	nsions(mm)			Weight
	Туре	Stock	R	ØD	ød	ød1	L <sub>1</sub>	L	(kg)
BMR04	-012-G16-M		6	12	16	11	50	125	0.2
	-012-G16-L		6	12	16	11	60	150	0.2
	-016-G20-M		8	16	20	14	60	150	0.3
	-016-G20-L		8	16	20	14	80	180	0.3
	-020-G25-M		10	20	25	18	75	180	0.6
	-020-G25-L		10	20	25	18	85	200	0.6
	-025-G32-M		12.5	25	32	23	90	200	1.0
	-025-G32-L		12.5	25	32	23	110	250	1.3
	-030-G40-M		15	30	40	27	110	250	2.0
	-030-G40-L		15	30	40	27	125	300	2.4
	-032-G40-M		16	32	40	29	110	250	2.0
	-032-G40-L	$\triangle$	16	32	40	29	125	300	2.4

▲Stock available △Make-to-order



#### >> Spare parts

	Screw	Wr	ench
Diameter	67 <b>8</b>	~	×
Ø12	I70M4×10TT	WT15IP	
Ø16	I70M5×12TT	WT20IP	
Ø20	I70M5×16TT	WT20IP	
Ø25	I70M6×20TT	WT20IP	
Ø30	I70M8×25TT		WT30IT
Ø32	I70M8×25TT		WT30IT

->> Selec	tion of inserts																											
R			Workp	Ste	eel	od working s steel	•	<b>(</b>		<b>(</b>		al wo	orkin	g co	<b>(</b> )	_	0	_	woi	rking CO CO	CO	nditi	0	© ©				
¥.			<u></u> .	Ca	ist iror							<b>(</b>	8				_		٢	0						0		8
-	Øi.C S		a	S Hea	it resista	nt alloy, Ti alloy								0	<u> </u>	<b>(</b>	•				<u> </u>	$\otimes$					mta	
		В	asic d	imen	sion	s(mm)		C	VD	Со	atir	ng				P	VD	Co	atir	ng			Cer	rmet		eme carb		
Insert shape	Туре	R	ØI.C	S	ød	Applicable insert ØD	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ZOHX1203-GF	6	12	3	4	Ø12														*								
	ZOHX1604-GF	8	16	4	5	Ø16														*								
0	ZOHX2005-GF	10	20	5	5	Ø20														*								
	ZOHX2506-GF	12.5	25	6	6	Ø25														0								
	ZOHX3007-GF	15	30	7	8	Ø30														0								
	ZOHX3207-GF	16	32	7	8	Ø32														0								
	ZOHX1203-GM	6	12	3	4	Ø12														*								
	ZOHX1604-GM	8	16	4	5	Ø16														*								
0	ZOHX2005-GM	10	20	5	5	Ø20														*								
5	ZOHX2506-GM	12.5	25	6	6	Ø25														*								
	ZOHX3007-GM	15	30	7	8	Ø30														*								
	ZOHX3207-GM	16	32	7	8	Ø32														*								

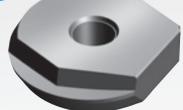
★Recommended grade (always stock available)
●Available grade (always stock available)
○Make-to-order

Profile milling tools milling tools



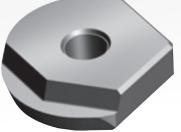
# BING BALL DE COMPANY D

4.2



# -GF

O With positive rake angle and double clearance angle, the design of curved cutting edge combines sharpness and strength. The edge with high precision is applicable under stable machining conditions and in conditions requiring high workpiece profile precision.



## -GM

O° rake angle, only one clearance angle, high edge strength, suitable for conditions requiring high cutting efficiency.

The inserts are a combination of ultra-fine cemented carbide substrate and nano coating grade YBG252. With excellent cutting performance, they are suitable for semi-finish to finish machining.

#### \_Calculation of cutting speed for BMR02/04 series ball nose end mills

1. When the tool axial line is vertical to the surface being machined,

$$N = \frac{1000Vc}{\pi Dc} (r/min)$$
$$Dc = 2\sqrt{a_P(D-a_P)}$$

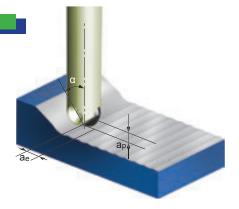
N: rotating speed
Vc: actual cutting speed
Dc: effective cutting diameter
D: tool nominal diameter
ap: axial cutting depth

2. When there is an inclined angle between the tool axial line and the surface being machined, the recommended cutting speed should be multiplied by a factor in the table below to obtain the cutting speed used for programming.

Diamet	er(mm)	Ø12		Ø16		Ø20		Ø	25	Ø	30	Ø32		
Cutting ap(r	g depth mm)	0.2	0.5	0.2	0.5	0.5	1	0.5	1	0.5	1.5	0.5	1.5	
	15°	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.01	1.00	1.00	1.00	1.00	
	30°	1.04	1.01	1.05	1.01	1.02	1.04	1.03	1.04	1.04	1.01	1.04	1.00	
Inclined	45°	1.16	1.07	1.18	1.10	1.12	1.06	1.14	1.08	1.16	1.06	1.16	1.06	
angle α	60°	1.42	1.24	1.47	1.30	1.34	1.21	1.38	1.25	1.42	1.21	1.43	1.22	
	75°	2.02	1.60	2.14	1.73	1.83	1.53	1.93	1.62	2.01	1.53	2.04	1.55	
	90°	3.92	2.50	4.48	2.87	3.20	2.29	3.57	2.55	3.9	2.29	4.03	2.37	

#### Recommended cutting parameters

Wo	orkpiece	Hardness	lass and succede	Cutting			Tool spe	cification		
m	aterial	HB	Insert grade	parameters	Ø12	Ø16	Ø20	Ø25	Ø30	Ø32
				Vc(m/min)	100~200	100~200	100~200	100~200	100~200	100~200
	Carbon	HB≤180		fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
	steel	HB≪ 100		a <sub>p</sub> max(mm)	0.8	1.0	1.25	1.5	2.0	2.0
				aemax(mm)	0.8	1.0	1.25	1.5	2.0	2.0
				Vc(m/min)	80~180	80~180	80~180	80~180	80~180	80~180
		HB180~280		fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
P	Alloy stee	HB180~280		a <sub>p</sub> max(mm)	0.8	1.0	1.25	1.5	2.0	2.0
				aemax(mm)	0.8	1.0	1.25	1.5	2.0	2.0
				Vc(m/min)	60~100	60~100	60~100	60~100	60~100	60~100
	Hardened		YBG252	fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
	steel	HRC55~65	YBG252	a <sub>p</sub> max(mm)	0.4	0.5	0.6	0.8	1.0	1.0
				aemax(mm)	0.4	0.5	0.6	0.8	1.0	1.0
				Vc(m/min)	70~150	70~150	70~150	70~150	70~150	70~150
RA	Stainless	UD < 070		fz(mm/z)	0.1~0.2	0.1~0.25	0.1~0.25	0.2~0.3	0.2~0.3	0.2~0.3
M	steel	HB≤270		a <sub>p</sub> max(mm)	0.6	0.8	1.0	1.25	1.5	1.5
				aemax(mm)	0.6	0.8	1.0	1.25	1.5	1.5
				Vc(m/min)	160~300	160~300	160~300	160~300	160~300	160~300
	Orations	110400.050		fz(mm/z)	0.2~0.3	0.25~0.35	0.25~0.35	0.3~0.4	0.3~0.4	0.3~0.4
K	Cast iron	HB180~250		a <sub>p</sub> max(mm)	1.0	1.5	1.8	2.0	2.5	2.5
				a <sub>e</sub> max(mm)	1.0	1.5	1.8	2.0	2.5	2.5



Indexable milling tools

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# B MILLING Indexable Milling Tools

### **Case for BMR04**



Indexable hilling tools

Profile milling tools

Workpiece material: 42CrMo (HRC35) Cooling system: Dry cutting Machine: Vertical machining center Cutting parameters: Vc=150m/min ap=0.1mm fz=0.2mm/Z

Tool type: BMR04-020-G25-M Insert type/grade: ZOHX2005-GM/YBG252

• Abrasion comparison of inserts after milling curved face

#### ZCC·CT

Other company product





clearance face 0.08

After 120 minutes of cutting





Abrasion on the clearance face 0.12



Abrasion on the clearance face 0.10



Abrasion on the clearance face 0.16