MITSUBISHI

TOOLS NEWS

B014G

Radius cutter for molds

BRP

For Ramping, Helical Cutting, Copying...

Lineup of Various Body Series and Insert Sizes. The Best Tools Available.

Miracle Coated VP15TF

Miracle coating displays high welding resistance therefore it can be used for machining a wide range of workpiece materials such as Plain steels, Mild steels, Low carbon steels and Stainless steels.

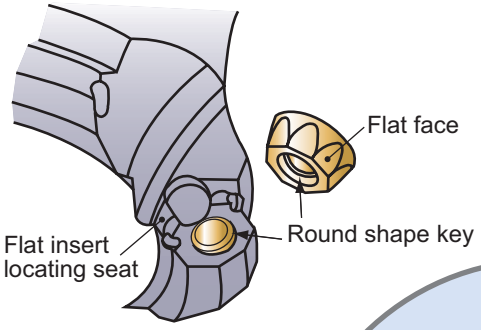
MITSUBISHI CARBIDE

Radius cutter for molds

BRP

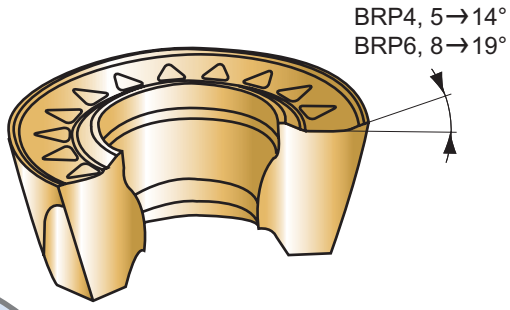
Features

Prevention of insert movement

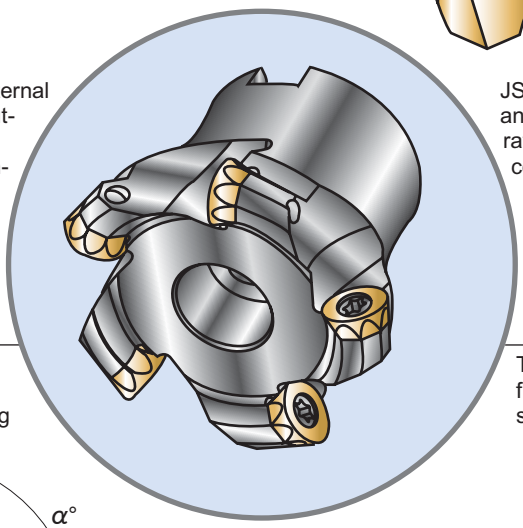


Flat insert locating seat and flat insert external face prevents insert from turning while cutting. Round shape key prevents insert movement by absorbing cutting load of inner cutting edge and centrifugal force caused by tool revolution.

Increased feed rate

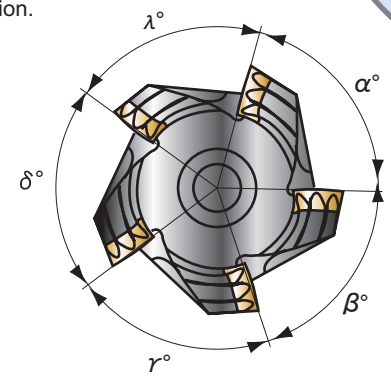


JS breaker which possesses large rake angle gives excellent sharpness. Feed rate is increased by 15%. Improved chip control prevents insert fracturing.



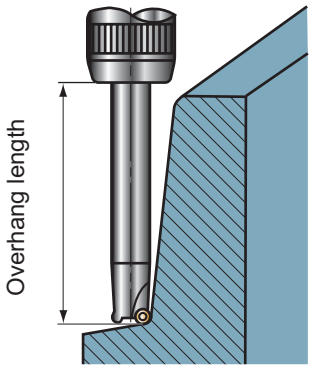
Prevent chattering / vibration

Inserts are arranged in an irregular pitch. This arrangement prevents synchronized vibration resulting in eliminating chattering and vibration.

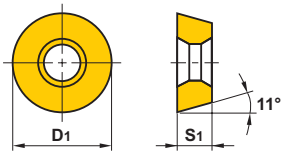
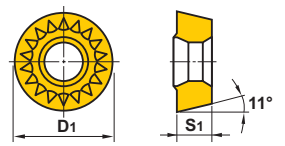


Complete series lineup

The optimum shape can be selected from a variety of insert sizes and body series.



Insert

Shape	Order number	Torelance	Horning type	Coated F7030	Coated F620	Coated VP15TF	Cermet NX4545	Cermet	Carbide UTi20T	Carbide	Geometry	Dimensions (mm) D1	Dimensions (mm) S1
	RPMW08T2M0E	M	Round	●			●					8	2.78
	10T3M0E	M		●			●					10	3.97
	1204M0E	M		●	▲		●		●			12	4.76
	1606M0E	M		●	▲		●		●			16	6.35
	RPMW08T2M0T	M	Chamfer			●						8	2.78
	10T3M0T	M				●						10	3.97
	1204M0T	M				●						12	4.76
	1606M0T	M				●						16	6.35
	RPMT08T2M0E-JS	M	Round	●		●						8	2.78
	10T3M0E-JS	M		●		●						10	3.97
	1204M0E-JS	M		●	▲	●			●			12	4.76
	1606M0E-JS	M		●	▲	●			●			16	6.35

● : Inventory maintained. No mark : Not manufactured.

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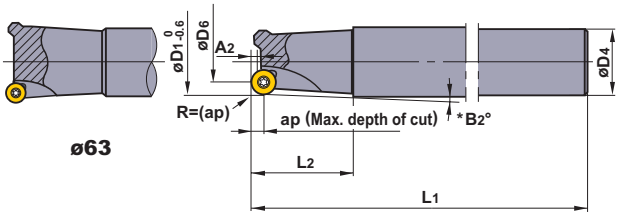
to be replaced by new products.

BRP



*Please allow for an inclination angle of B2°+1°.

Right hand tool holder only. Tolerance when setting with master inserts.

Corner rad. (a)	Shank type	Order number	Stock R	Number of teeth	Dimensions (mm) D1	D6	L1	D4	L2	A2	B2°	Insert	Clamp screw	wrench
4	Standard	BRP4NR121S12	●	1	12	3.7	85	12	25	0.2	0°25'	①RPMW 08T2M0E ②RPMT 08T2M0E-JS	CS250560T	TKY08F
		161S16	●	1	16	7.7	85	16	25	1.0	0°25'		CS250560T	TKY08F
		202S20	●	2	20	11.7	100	20	30	2.0	0°20'		CS250560T	TKY08F
		253S25	●	3	25	16.7	115	25	35	2.0	0°20'		CS250560T	TKY08F
	Long	121LS12	●	1	12	3.7	150	12	70	0.2	0°10'		CS250560T	TKY08F
		161LS16	●	1	16	7.7	150	16	70	1.0	0°10'		CS250560T	TKY08F
		202LS20	●	2	20	11.7	180	20	100	2.0	0°05'		CS250560T	TKY08F
		253LS25	●	3	25	16.7	180	25	100	2.0	0°05'		CS250560T	TKY08F
	Extra long	202ELS20	●	2	20	11.7	250	20	130	2.0	0°05'		CS250560T	TKY08F
		253ELS25	●	3	25	16.7	250	25	130	2.0	0°05'		CS250560T	TKY08F
5	Standard	BRP5NR161S16	●	1	16	5.7	80	16	25	0.3	0°30'	①RPMW 10T3M0E ②RPMT 10T3M0E-JS	CS350760T	TKY15F
		201S20	●	1	20	9.7	100	20	30	1.2	0°25'		CS350760T	TKY15F
		252S25	●	2	25	14.7	115	25	35	2.5	0°20'		CS350860T	TKY15F
		323S32	●	3	32	21.7	125	32	45	2.5	0°15'		CS350860T	TKY15F
	Long	161LS16	●	1	16	5.7	150	16	70	0.3	0°10'		CS350760T	TKY15F
		201LS20	●	1	20	9.7	180	20	100	1.2	0°05'		CS350760T	TKY15F
		252LS25	●	2	25	14.7	180	25	100	2.5	0°05'		CS350860T	TKY15F
		323LS32	●	3	32	21.7	200	32	120	2.5	0°05'		CS350860T	TKY15F
	Extra long	252ELS25	●	2	25	14.7	250	25	130	2.5	0°05'		CS350860T	TKY15F
		323ELS32	●	3	32	21.7	300	32	180	2.5	0°05'		CS350860T	TKY15F
6	Standard	BRP6PR322S32	●	2	32	19.7	125	32	45	4	0°15'	①RPMW 1204M0E ②RPMT 1204M0E-JS	TS43	TKY15D
		403S32	●	3	40	27.8	125	32	45	4	-		TS43	TKY15D
		504S32	●	4	50	37.7	150	32	50	4	-		TS43	TKY15D
		504S42	●	4	50	37.7	150	42	50	4	-		TS43	TKY15D
	Long	322LS32	●	2	32	19.7	200	32	120	4	0°05'		TS43	TKY15D
		403LS32	●	3	40	27.8	200	32	120	4	-		TS43	TKY15D
		504LS32	●	4	50	37.7	250	32	150	4	-		TS43	TKY15D
		504LS42	●	4	50	37.7	250	42	150	4	-		TS43	TKY15D
	Extra long	322ELS32	●	2	32	19.7	300	32	50	4	0°15'		TS43	TKY15D
		403ELS32	●	3	40	27.8	300	32	120	4	-		TS43	TKY15D
		403ELS42	●	3	40	27.8	300	42	50	4	1°30'		TS43	TKY15D
		504ELS42	●	4	50	37.7	300	42	50	4	-		TS43	TKY15D
8	Standard	BRP8PR402S32	●	2	40	23.7	125	32	45	5.5	-	①RPMW 1606M0E ②RPMT 1606M0E-JS	TS54	TKY25D
		503S32	●	3	50	33.7	150	32	50	5.5	-		TS54	TKY25D
		503S42	●	3	50	33.7	150	42	50	5.5	-		TS54	TKY25D
		634S32	●	4	63	46.7	150	32	50	5.5	-		TS54	TKY25D
		634S42	●	4	63	46.7	150	42	50	5.5	-		TS54	TKY25D
	Long	402LS32	●	2	40	23.7	200	32	120	5.5	-		TS54	TKY25D
		503LS32	●	3	50	33.7	250	32	150	5.5	-		TS54	TKY25D
		503LS42	●	3	50	33.7	250	42	150	5.5	-		TS54	TKY25D
		634LS32	●	4	63	46.7	250	32	150	5.5	-		TS54	TKY25D
		634LS42	●	4	63	46.7	250	42	150	5.5	-		TS54	TKY25D
	Extra long	402ELS32	●	2	40	23.7	300	32	50	5.5	-		TS54	TKY25D
		402ELS42	●	2	40	23.7	300	42	50	5.5	1°35'		TS54	TKY25D
		503ELS42	●	3	50	33.7	300	42	50	5.5	-		TS54	TKY25D
		634ELS42	●	4	63	46.7	300	42	50	5.5	-		TS54	TKY25D

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BRP

Light alloy	Cast iron	General steel	Stainless steel	Hardened steel

Fig. 1
ø40

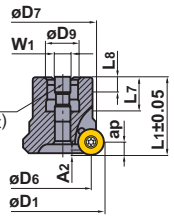


Fig. 2
ø40
ø63
ø80

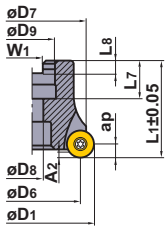
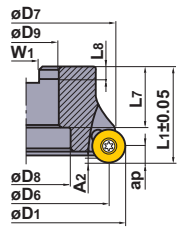


Fig. 3
ø100

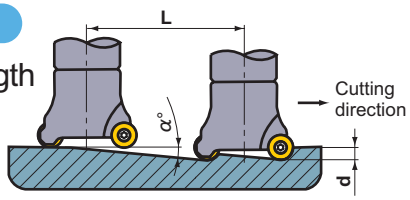


Right hand tool holder only. Tolerance when setting with master inserts.

Corner rad. (a)	Order number	Stock R	Number of teeth	Dimensions (mm) D6	D1	D7	L1	D9	L7	D8	W1	L8	Tool weight (kg)	Max. Depth of cut ap	A2	Figure
6	**BRP6P-040A03R**	●	3	27.8	40	33.8	40	16	18	-	8.4	5.6	0.4	6	4	Fig. 1
	-050A04R	●	4	37.7	50	43.3	50	22	20	11	10.4	6.3	0.5	6	4	Fig. 2
	R05004B	●	4	37.7	50	43.3	63	22.225	29	11	8.4	5	0.5	6	4	Fig. 2
	-063A05R	●	5	50.7	63	56	50	22	20	11	10.4	6.3	0.7	6	4	Fig. 2
	R06305B	●	5	50.7	63	56	63	22.225	29	11	8.4	5	0.7	6	4	Fig. 2
	R08006C	●	6	67.7	80	72.7	50	25.4	26	13	9.5	6	1.2	6	4	Fig. 2
8	**BRP8P-063A04R**	●	4	46.7	63	54.4	50	22	20	11	10.4	6.3	0.7	8	5.5	Fig. 2
	R06304B	●	4	46.7	63	54.4	63	22.225	29	11	8.4	5	0.7	8	5.5	Fig. 2
	R08005C	●	5	63.7	80	70.8	50	25.4	26	13	9.5	6	1.2	8	5.5	Fig. 2
	R10006D	●	6	83.7	100	90.5	50	31.75	32	45	12.7	8	1.6	8	5.5	Fig. 3

Ramping

● Ramp angle and cutting length



Formula for min. cutting length, L min., according to max. ramp angle

$$L = \frac{d}{\tan\alpha} \text{ (mm)}$$

Type	Tool dimameter (Ø)	Max. ramp angle (°) α° max	tanα	Min cutting length according to max. ramp angle L min (mm) * d=2mm	d=4mm	d=5mm	d=6mm(max)	d=8mm(max)
BRP4	12	5.02	0.088	22	45	—	—	—
	16	12.2	0.216	9	18	—	—	—
	20	14.52	0.259	7	15	—	—	—
	25	8.8	0.155	12	25	—	—	—
BRP5	16	4.52	0.079	25	50	63	—	—
	20	11.4	0.202	9	19	24	—	—
	25	14.4	0.257	7	15	19	—	—
	32	8.37	0.147	13	27	33	—	—
BRP6	32	15.91	0.285	7	14	17	21	—
	40	10.29	0.181	11	22	27	33	—
	50	7.12	0.125	16	32	40	48	—
	63	5.08	0.089	22	44	56	67	—
	80	3.69	0.064	31	62	77	93	—
BRP8	40	18.86	0.342	5	11	14	17	23
	50	11.91	0.211	9	18	23	28	37
	63	8.01	0.141	14	28	35	42	56
	80	5.60	0.098	20	40	50	61	81
	100	4.13	0.072	27	55	69	83	110

*Decimal points are omitted for values of L min.

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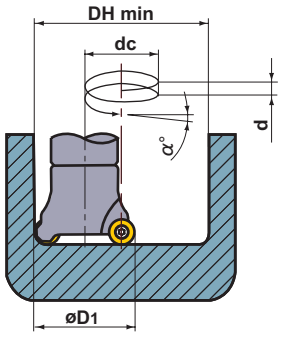
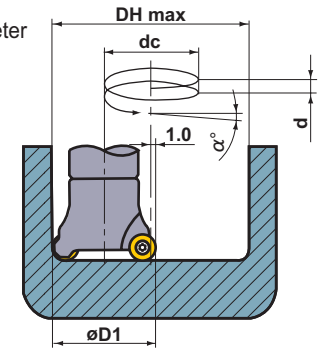
Helical milling

●Cutting hole diameter and depth of cut

Minimum cutting diameter



Maximum cutting diameter



Type	Tool diameter øD1 (mm)	*1 øDH min	*2 ødc	Inclination angle (α°) d=2mm	d=4mm	d=5mm	d=6mm	d=8mm	*1 øDH min	*2 ødc	Inclination angle (α°) d=2mm	d=4mm	d=5mm	d=6mm	d=8mm
BRP4	12	16	4	d=1mm, α°=4.55°					22	10	3.64	—	—	—	—
	16	24	8	4.55	9.10	—	—	—	30	14	2.60	5.20	—	—	—
	20	32	12	3.04	6.08	—	—	—	38	18	2.03	4.05	—	—	—
	25	42	17	2.15	4.29	—	—	—	48	23	1.59	3.17	—	—	—
BRP5	16	22	6	d=1mm, α°=3.04°					30	14	2.60	—	6.50	—	—
	20	30	10	3.64	—	9.10	—	—	38	18	2.03	—	5.08	—	—
	25	40	15	2.43	—	6.08	—	—	48	23	1.59	—	3.98	—	—
	32	54	22	1.66	—	4.15	—	—	62	30	1.22	—	3.04	—	—
BRP6	32	52	20	1.82	3.64	—	5.45	—	62	30	1.22	2.43	—	3.64	—
	40	68	28	1.30	2.60	—	3.90	—	78	38	0.96	1.92	—	2.88	—
	50	88	38	0.96	1.92	—	2.88	—	98	48	0.76	1.52	—	2.28	—
	63	114	51	0.72	1.43	—	2.14	—	124	61	0.60	1.20	—	1.79	—
	80	148	68	0.54	1.07	—	1.61	—	158	78	0.47	0.94	—	1.40	—
BRP8	40	64	24	—	3.04	—	4.55	6.06	78	38	—	1.92	—	2.88	3.38
	50	84	34	—	2.14	—	3.22	4.28	98	48	—	1.52	—	2.28	3.04
	63	110	47	—	1.55	—	2.33	3.10	124	61	—	1.20	—	1.79	2.39
	80	144	64	—	1.14	—	1.71	2.28	158	78	—	0.94	—	1.40	1.87
	100	184	84	—	0.87	—	1.30	1.74	198	98	—	0.74	—	1.12	1.49

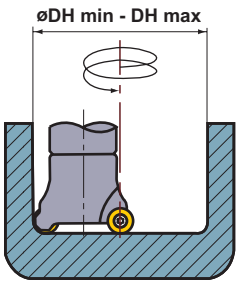
*1 DH=Cutting hole diameter : Ø (mm) *2 dc=Tool pass diameter : Ø (mm)

BRP4	DH min = (D_1 - 4) x 2,	DH max = (D_1 - 1) x 2,	d max = 4 (mm)
BRP5	DH min = (D_1 - 5) x 2,	DH max = (D_1 - 1) x 2,	d max = 5 (mm)
BRP6	DH min = (D_1 - 6) x 2,	DH max = (D_1 - 1) x 2,	d max = 6 (mm)
BRP8	DH min = (D_1 - 8) x 2,	DH max = (D_1 - 1) x 2,	d max = 8 (mm)

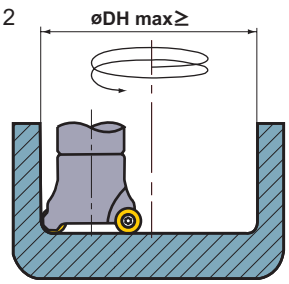
dc= (Tool pass diameter) =DH-D

Caution For machining with cutting diameter larger than DH max, helical milling as shown below is recommended.

Operation 1



Operation 2

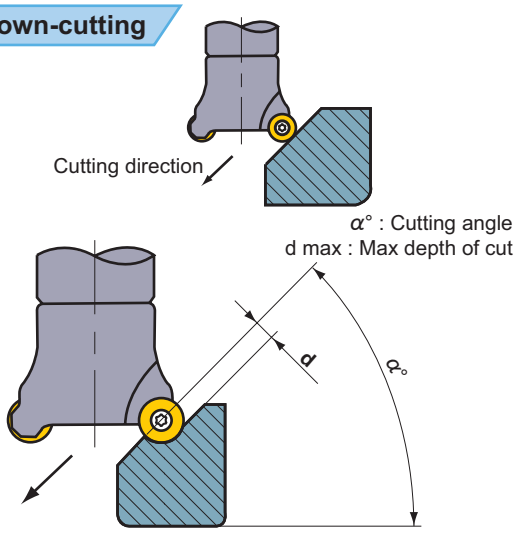


BRP

Copying

● Cutting angle and maximum depth of cut

Oblique down-cutting



● Formulas for d max

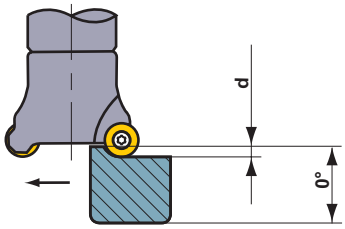
	Formulas for d max
α° ≥ β° (in the table below)	d max = R
α° ≤ β° (in the table below)	d max = R + R x sin (α° - β°)

β° : Angle to select a formula

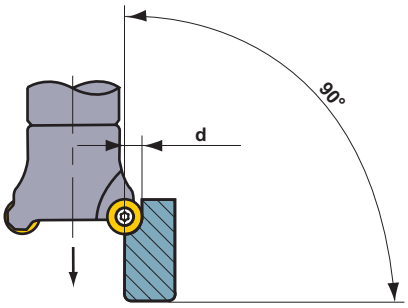
Type	Cutter diameter	β (°)	R
BRP4	ø12	71.8	4
	ø16	48.6	
	ø20, 25	30.0	
BRP5	ø16	70.1	5
	ø20	49.5	
	ø25, 32	30.0	
BRP6	Common for all diameters	19.5	6
BRP8	Common for all diameters	18.2	8

◀ **Caution** ▶ Cutting conditon of α° = 0° or 90°

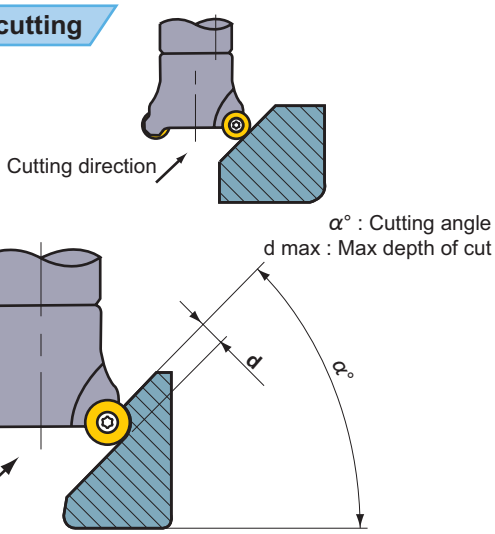
· α° = 0°



· α° = 90°



Oblique up-cutting



● Formulas for d max

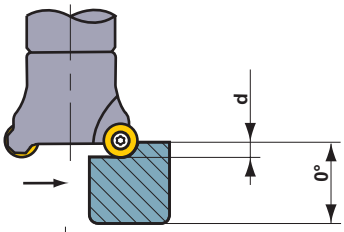
	Formulas for d max
α° ≥ β° (in the table below)	d max = R
α° ≤ β° (in the table below)	d max = R + R x sin (β° - α°)

β° : Angle to select a formula

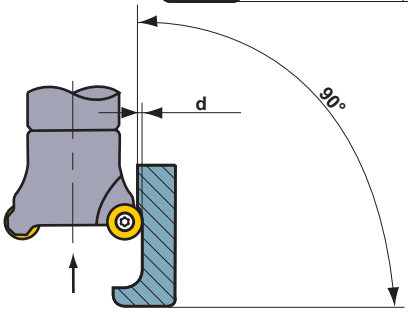
Type	Cutter diameter	β (°)	R
BRP4	ø12	18.2	4
	ø16	15.7	
	ø20, 25	52.2	
BRP5	ø16	21.6	5
	ø20	23.1	
	ø25, 32	53.8	
BRP6	Common for all diameters	48.6	6
BRP8	Common for all diameters	48.6	8

◀ **Caution** ▶ Cutting conditon of α° = 0° or 90°

· α° = 0°



· α° = 90°



Recommended cutting conditions

●Cutting speed (m/min)

	Workpiece	Hardness	Coated		Carbide
			F7030	VP15TF	UTi20T
P	Mild steel	180HB≤	**250 (200 - 300)**	250 (200 - 300)	150 (100 - 200)
P	Carbon steel Alloy steel	180 - 280HB	**180 (130 - 220)**	180 (130 - 220)	140 (100 - 170)
P	Carbon steel Alloy steel	280 - 380HB	**160 (110 - 190)**	160 (110 - 190)	100 (70 - 120)
P	Prehardened steel	35 - 45HRC	**120 (80 - 140)**	120 (80 - 140)	90 (60 - 100)
P	High alloy steel	300HB	**130 (90 - 160)**	130 (90 - 160)	100 (70 - 120)
M	Stainless steel	260HB≤	**180 (130 - 220)**	180 (130 - 220)	140 (100 - 170)
K	Cast iron	Tensile strength ≤ 350N/mm^2	-	**170 (130 - 220)**	140 (100 - 170)
K	Ductile cast iron	Tensile strength 360 - 500N/mm^2	-	**140 (100 - 180)**	120 (80 - 140)
K	Ductile cast iron	Tensile strength 500 - 800N/mm^2	-	**110 (80 - 140)**	90 (70 - 110)
H	Sintered steel	45 - 60HRC	-	**60 (50 - 100)**	60 (40 - 70)

The characters in hold face type indicate the 1st recommended grades.

●Feed per tooth (mm/tooth)

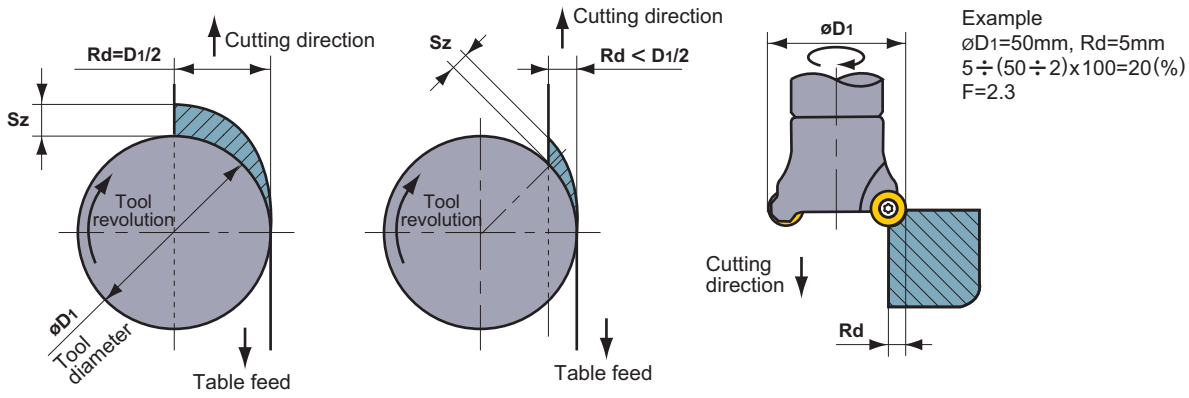
Type	Depth of cut (mm)							
	1	2	3	4	5	6	7	8
BRP4	0.40	0.30	0.20	0.10	—	—	—	—
BRP5	0.40	0.35	0.30	0.20	0.10	—	—	—
BRP6	0.50	0.40	0.30	0.25	0.23	0.20	—	—
BRP8	0.60	0.50	0.45	0.40	0.33	0.30	0.25	0.20

●Correction value of table feed according to cutting width (Rd)

When cutting width is equal or less than 1/2 of tool diameter : It is recommended to modify table feed rate by multiplying calculated table feed by correction value (F).
When cutting width is equal or more than 1/2 of diameter : Cut using the table feed calculated as ¨Feed per tooth¨ in the above table.

*D = Tool diameter Rd = Cutting width

Rd/(D1/2)(%) *	5	10	15	20	25	30	50	75	100
Correction value F	5	3	2.5	2.3	2	1.8	1.5	1.3	1



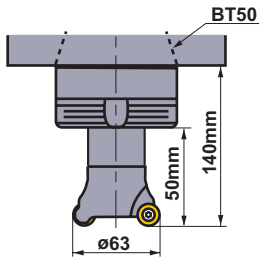
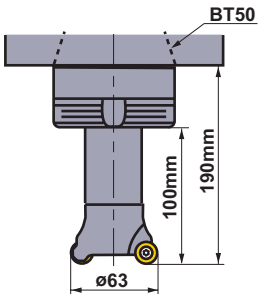
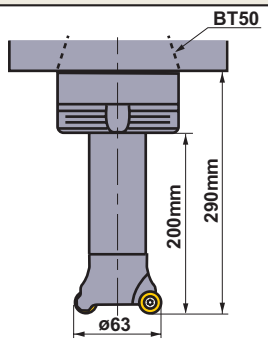
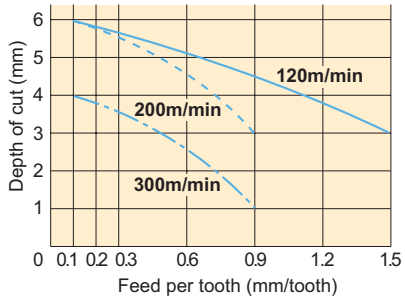
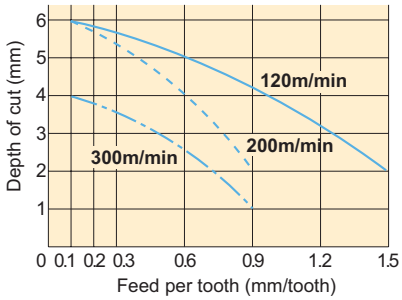
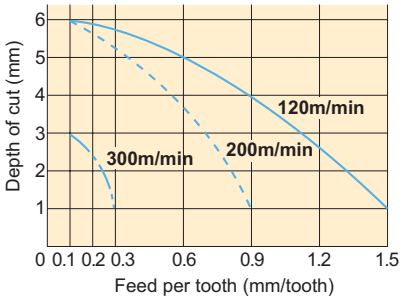
(Reduction of chip thickness)

BRP

Cutting performance

●Valid application range according to tool overhang length (Standard)

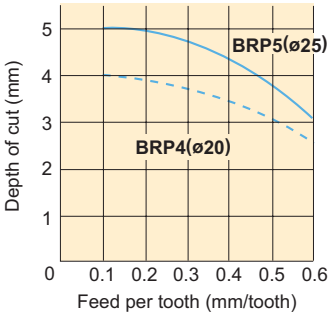
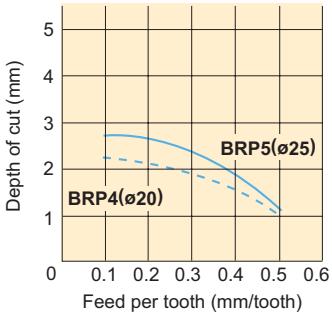
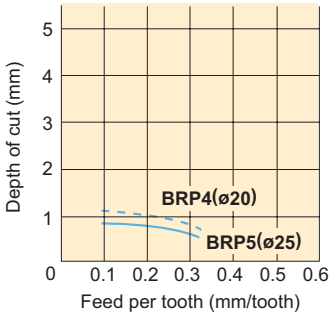
Woekpiece : JIS S50C Cutting width : 31mm
Tool : **BRP8PR634ELS42**

Tool overhang 50mm	Tool overhang 100mm	Tool overhang 200mm
		
		

Note : Valid application range is the area below the graph lines.

●Valid application range according to shank type (Standard)

Woekpiece : JIS S50C Cutting speed : 200m/min
Cutting width : 3/5D Dry cutting

Standard type	Long type	Extra long type
BRP4NR202S20 (Overhang length : 50mm) **BRP5NR252S25** (Overhang length : 60mm)	**BRP4NR202LS20** (Overhang length : 120mm) **BRP5NR252LS25** (Overhang length : 120mm)	**BRP4NR202ELS20** (Overhang length : 170mm) **BRP5NR252ELS25** (Overhang length : 170mm)
		

For Your Safety
●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching chips or spare parts, please use the attached wrench or spanner. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

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(Tools specifications subject to change without notice.)

2003.4.E(-)