RECOMMENDED CUTTING CONDITIONS

■ CUTTING SPEED (m/min)

	Workpiece Material	Hardness	Coated		Carbide
			F7030	VP15TF	UTi20T
P	Mild Steel	≤180HB	**250 (200—300)**	250 (200—300)	150 (100—200)
	Carbon Steel Alloy Steel	180—280HB	**180 (130—220)**	180 (130—220)	140 (100—170)
		280—380HB	**160 (110—190)**	160 (110—190)	100 (70—120)
	Pre-Hardened Steel	35—45HRC	**120 (80—140)**	120 (80—140)	90 (60—100)
	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	Gray Cast Iron	Tensile Strength ≤350MPa	—	**170 (130—220)**	140 (100—170)
	Ductile Cast Iron	Tensile Strength 360—500MPa	—	**140 (100—180)**	120 (80—140)
		Tensile Strength 500—800MPa	—	**110 (80—140)**	90 (70—110)
H	Hardened Steel	45—60HRC	—	**60 (50—100)**	60 (40—70)

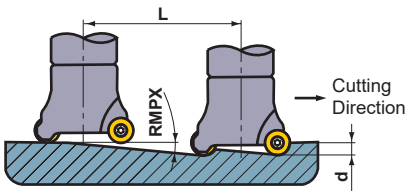
Note 1) Cutting speeds shown in bold type are for the recommended first choice grades.

■ FEED PER TOOTH (mm/t)

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

RAMPING

■ RAMPING ANGLE AND MACHINING LENGTH



Formula to find cutting length "L" at maximum ramping angle.

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

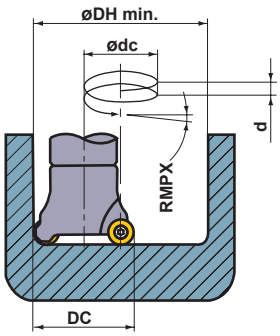
Type	Cutting Edge Diameter (ϕ)	Max. Ramping Angle RMPX	tan RMPX	Cutting Length L at Max. Ramping Angle L(mm)*				
				d=2mm	d=4mm	d=5mm	d=6mm (max.)	d=8mm (max.)
BRP4	12	5.02°	0.088	22	45	—	—	—
	16	12.2°	0.216	9	18	—	—	—
	20	14.52°	0.259	7	15	—	—	—
	25	8.8°	0.155	12	25	—	—	—
BRP5	16	4.52°	0.079	25	50	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

* "L" value is approximate rounded value.

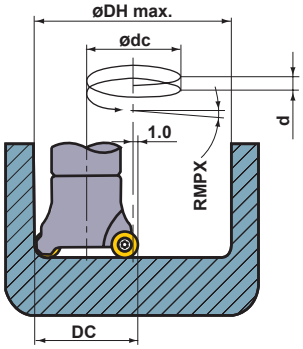
HELICAL DRILLING

■ RELATIONSHIP BETWEEN HOLE DIAMETER AND DEPTH OF CUT

Minimum Hole Diameter



Maximum Hole Diameter



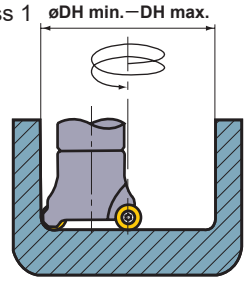
Type	Cutting Edge Diameter DC (mm)	∗1 øDH min.	∗2 ødc	Ramping Angle RMPX d=2mm	d=4mm	d=5mm	d=6mm	d=8mm	∗1 øDH max.	∗2 ødc	Ramping Angle RMPX d=2mm	d=4mm	d=5mm	d=6mm	d=8mm
BRP4	**12**	16	4	d=1mm,RMPX=4.55°					22	10	3.64°	—	—	—	—
	16	24	8	4.55°	9.10°	—	—	—	30	14	2.60°	5.20°	—	—	—
	20	32	12	3.04°	6.08°	—	—	—	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,RMPX=3.04°					30	14	2.60°	5.20°	6.50°	—	—
	20	30	10	3.64°	7.26°	9.10°	—	—	38	18	2.03°	4.05°	5.08°	—	—
	25	40	15	2.43°	4.85°	6.08°	—	—	48	23	1.59°	3.17°	3.98°	—	—
	32	54	22	1.66°	3.31°	4.15°	—	—	62	30	1.22°	2.43°	3.04°	—	—
BRP6	**32**	52	20	1.82°	3.64°	4.55°	5.45°	—	62	30	1.22°	2.43°	3.04°	3.64°	—
	40	68	28	1.30°	2.60°	3.25°	3.90°	—	78	38	0.96°	1.92°	2.40°	2.88°	—
	50	88	38	0.96°	1.92°	2.40°	2.88°	—	98	48	0.78°	1.52°	1.90°	2.28°	—
	63	114	51	0.72°	1.43°	1.79°	2.14°	—	124	61	0.60°	1.20°	1.49°	1.79°	—
	80	148	68	0.54°	1.07°	1.34°	1.61°	—	158	78	0.47°	0.94°	1.17°	1.40°	—
BRP8	**40**	64	24	1.52°	3.04°	3.79°	4.55°	6.06°	78	38	0.96°	1.92°	2.40°	2.88°	3.38°
	50	84	34	1.07°	2.14°	2.68°	3.22°	4.28°	98	48	0.76°	1.52°	1.90°	2.28°	3.04°
	63	110	47	0.78°	1.55°	1.94°	2.33°	3.10°	124	61	0.60°	1.20°	1.49°	1.79°	2.39°
	80	144	64	0.57°	1.14°	1.42°	1.71°	2.28°	158	78	0.47°	0.94°	1.17°	1.40°	1.87°
	100	184	84	0.43°	0.87°	1.09°	1.30°	1.74°	198	98	0.37°	0.74°	0.93°	1.12°	1.49°

∗1 DH=Hole Diameter : ϕ(mm)　∗2 dc=Tool Pass : ϕ(mm)

BRP4 DH min. (Minimum Hole Diameter)=(DC - 4)×2, DH max. (Maximum Hole Diameter)=(DC - 1)×2, d max. (Maximum Depth of Cut)=4(mm)
BRP5 DH min. (Minimum Hole Diameter)=(DC - 5)×2, DH max. (Maximum Hole Diameter)=(DC - 1)×2, d max. (Maximum Depth of Cut)=5(mm)
BRP6 DH min. (Minimum Hole Diameter)=(DC - 6)×2, DH max. (Maximum Hole Diameter)=(DC - 1)×2, d max. (Maximum Depth of Cut)=6(mm)
BRP8 DH min. (Minimum Hole Diameter)=(DC - 8)×2, DH max. (Maximum Hole Diameter)=(DC - 1)×2, d max. (Maximum Depth of Cut)=8(mm)
dc=(Tool Pass)**=DH-D**

◀Note▶ When machining a hole larger than DH max., first machine a pilot hole smaller than DH max. before enlarging to the required size as shown above.

Process 1 **øDH min.—DH max.**



Process 2 **Over øDH max.**