

VPX200

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED / DRY CUTTING

Work Material	Properties	Cutting Conditions	Insert		ae					
			Grade	Chip Breaker	<0.25x DC	0.25-0.5 DC	0.5-0.75 DC	1.0 DC		
					Vc (m/min)					
P	Mild Steel	<180HB	● ● ✦	MP6120	M	230 (180-270)	220 (170-260)	180 (140-210)	180 (140-210)	
			● ● ✦	VP15TF	M	230 (180-270)	220 (170-260)	180 (140-210)	180 (140-210)	
	Carbon Steel Alloy Steel Alloy Tool Steel	180-350HB <350HB	● ● ✦	MP6130	M	200 (150-240)	190 (140-230)	150 (110-180)	150 (110-180)	
			● ● ✦	MP6120	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
			● ● ✦	VP15TF	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
			● ● ✦	MP6130	M	150 (110-180)	140 (100-170)	110 (80-130)	110 (80-130)	
Pre-hardened Steel	35-45HRC	● ● ✦	MP6120	M	120 (90-140)	110 (80-130)	100 (70-120)	100 (70-120)		
		● ● ✦	VP15TF	M	120 (90-140)	110 (80-130)	100 (70-120)	100 (70-120)		
M	Austenitic Stainless Steel	<200HB	● ● ✦	MP7130	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
			● ● ✦	VP15TF	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
		>200HB	● ● ✦	MP7130	M	150 (110-180)	140 (100-160)	110 (80-130)	110 (80-130)	
			● ● ✦	VP15TF	M	150 (110-180)	140 (100-160)	110 (80-130)	110 (80-130)	
	Duplex Stainless Steel	<280HB	● ● ✦	MP7130	M	140 (110-170)	130 (90-150)	100 (70-120)	100 (70-120)	
			● ● ✦	VP15TF	M	140 (110-170)	130 (90-150)	100 (70-120)	100 (70-120)	
	Ferritic and Martensitic Stainless Steel		● ● ✦	MP7130	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
			● ● ✦	VP15TF	M	180 (140-210)	170 (130-200)	140 (110-160)	140 (110-160)	
	Precipitation Hardening Stainless Steel	<450HB	● ● ✦	MP7130	M	130 (100-160)	120 (80-140)	90 (60-110)	90 (60-110)	
			● ● ✦	VP15TF	M	130 (100-160)	120 (80-140)	90 (60-110)	90 (60-110)	
	K	Gray Cast Iron	<350MPa	● ● ✦	MC5020	M	250 (200-300)	240 (190-290)	210 (160-260)	210 (160-260)
				● ● ✦	VP15TF	M	200 (150-250)	190 (140-240)	160 (110-210)	160 (110-210)
Ductile Cast Iron		<800MPa	● ● ✦	MC5020	M	180 (150-200)	170 (140-190)	150 (120-170)	150 (120-170)	
			● ● ✦	VP15TF	M	130 (100-150)	120 (90-140)	100 (80-120)	100 (80-120)	
N	Aluminium Alloy	Si<5%	● ● ✦	TF15	M	600 (400-1000)	600 (400-1000)	600 (400-1000)	600 (400-1000)	
H	Hardened Steel	40-55HRC	● ● ✦	VP15TF	M	90 (70-100)	85 (60-100)	70 (50-80)	70 (50-80)	

These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.

If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.

Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommended or below.

A type with fewer teeth is recommended when the depth of cut in the radial direction [ae] is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

Work Material	Properties	ae	Cutting Conditions	DC					
				Ø16-Ø18		Ø20-Ø25		Ø28-Ø63	
				ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)
Mild Steel	<180HB	<0.25DC	● ● ✦	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
		0.25-0.5DC	● ● ✦	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.2
		0.5-0.75DC	● ● ✦	<4	0.08-0.12	<6	0.08-0.12	<6	0.1-0.15
		1.0 DC	● ● ✦	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.12
Carbon Steel Alloy Steel Alloy Tool Steel	180-280HB	<0.25DC	● ● ✦	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
		0.25-0.5DC	● ● ✦	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.2
		0.5-0.75DC	● ● ✦	<4	0.08-0.12	<6	0.08-0.12	<6	0.1-0.15
		1.0 DC	● ● ✦	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.12
Carbon Steel Alloy Steel Alloy Tool Steel	280-350HB <350HB (Annealing)	<0.25DC	● ● ✦	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.2
		0.25-0.5DC	● ● ✦	<5	0.08-0.12	<8	0.08-0.12	<8	0.1-0.15
		0.5-0.75DC	● ● ✦	<4	0.08-0.12	<6	0.06-0.1	<6	0.08-0.12
		1.0 DC	● ● ✦	<2	0.06-0.1	<4	0.06-0.1	<4	0.05-0.1
Pre-hardened Steel	35-45HRC	<0.25DC	● ● ✦	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.2
		0.25-0.5DC	● ● ✦	<5	0.08-0.12	<8	0.08-0.12	<8	0.1-0.15
		0.5-0.75DC	● ● ✦	<4	0.08-0.12	<6	0.06-0.1	<6	0.08-0.12
		1.0 DC	● ● ✦	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1

DEPTH OF CUT / FEED PER TOOTH

Work Material	Properties	ae	Cutting Conditions	DC						
				Ø16-Ø18		Ø20-Ø25		Ø28-Ø63		
				ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)	
M	Austenitic Stainless Steel	-		<0.25 DC	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
				0.25-0.5 DC	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.15
				0.5-0.75 DC	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
				1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
	Duplex Stainless Steel	<280HB		<0.25 DC	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
				0.25-0.5 DC	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.15
				0.5-0.75 DC	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
				1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
	Ferritic and Martensitic Stainless Steel	-		<0.25 DC	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
				0.25-0.5 DC	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.15
				0.5-0.75 DC	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
				1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
Precipitation Hardening Stainless Steel	<450HB		<0.25 DC	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.15	
			0.25-0.5 DC	<5	0.08-0.12	<8	0.08-0.12	<8	0.08-0.12	
			0.5-0.75 DC	<4	0.06-0.1	<6	0.06-0.1	<6	0.06-0.1	
			1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1	
K	Gray Cast Iron	<350MPa		<0.25 DC	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
				0.25-0.5 DC	<5	0.08-0.12	<8	0.08-0.15	<8	0.1-0.2
				0.5-0.75 DC	<4	0.08-0.12	<6	0.08-0.12	<6	0.1-0.15
				1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.15
	Ductile Cast Iron	<800MPa		<0.25 DC	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
				0.25-0.5 DC	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.15
				0.5-0.75 DC	<4	0.08-0.12	<6	0.08-0.12	<6	0.08-0.12
				1.0 DC	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
N	Aluminium Alloy	Si<5%		<0.25 DC	<6	0.1-0.2	<8	0.1-0.25	<8	0.1-0.25
				0.25-0.5 DC	<5	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
				0.5-0.75 DC	<4	0.08-0.12	<6	0.06-0.15	<6	0.08-0.15
				1.0 DC	<2	0.06-0.1	<4	0.06-0.15	<4	0.08-0.15
H	Hardened Steel	40-55HRC		<0.25 DC	<4	0.08-0.15	<4	0.08-0.15	<4	0.08-0.15
				0.25-0.5 DC	<3	0.08-0.12	<3	0.08-0.12	<3	0.08-0.12
				0.5-0.75 DC	<2	0.06-0.1	<2	0.08-0.1	<2	0.06-0.1
				1.0 DC	<1	0.06-0.1	<1	0.06-0.1	<1	0.06-0.1
				1.0 DC	<1	0.06-0.08	<1	0.06-0.08	<1	0.06-0.08

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VPX200

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED/ WET CUTTING

Work Material	Properties	Cutting Conditions	Insert		ae				
			Grade	Chip Breaker	<0.25DC	0.25-0.5DC	0.5-0.75DC	1.0 DC	
					Vc (m/min)				
P	Mild Steel	<180HB	● ●	MP6120	M	140 (100-190)	130 (90-180)	100 (70-120)	100 (70-120)
			● ●	VP15TF	M	140 (100-190)	130 (90-180)	100 (70-120)	100 (70-120)
			✦	MP6130	M	140 (100-190)	130 (90-180)	100 (70-120)	100 (70-120)
	Carbon Steel Alloy Steel Alloy Tool Steel	180-350HB <350HB	● ●	MP6120	M	120 (90-140)	110 (80-130)	100 (70-120)	100 (70-120)
			● ●	VP15TF	M	120 (90-140)	110 (80-130)	100 (70-120)	100 (70-120)
			✦	MP6130	M	120 (90-140)	110 (80-130)	100 (70-120)	100 (70-120)
Pre-hardened Steel	35-45HRC	● ●	MP6120	M	100 (80-120)	90 (70-110)	80 (60-100)	80 (60-100)	
		● ●	VP15TF	M	100 (80-120)	90 (70-110)	80 (60-100)	80 (60-100)	
		✦	MP6130	M	100 (80-120)	90 (70-110)	80 (60-100)	80 (60-100)	
M	Austenitic Stainless Steel	<200HB	● ● ✦	MP7130	M	120 (100-150)	110 (90-140)	90 (70-120)	90 (70-120)
			● ●	VP15TF	M	120 (100-150)	110 (90-140)	90 (70-120)	90 (70-120)
			● ● ✦	MP7130	M	100 (80-130)	90 (70-110)	70 (50-100)	70 (50-100)
	Duplex Stainless Steel	<280HB	● ● ✦	MP7130	M	100 (80-130)	90 (70-120)	70 (50-100)	70 (50-100)
			● ●	VP15TF	M	100 (80-130)	90 (70-120)	70 (50-100)	70 (50-100)
			● ● ✦	MP7130	M	120 (100-150)	110 (90-140)	90 (70-120)	90 (70-120)
Ferritic and Martensitic Stainless Steel	-	● ● ✦	MP7130	M	120 (100-150)	110 (90-140)	90 (70-120)	90 (70-120)	
		● ●	VP15TF	M	120 (100-150)	110 (90-140)	90 (70-120)	90 (70-120)	
Precipitation Hardening Stainless Steel	<450HB	● ● ✦	MP7130	M	90 (70-120)	80 (60-110)	60 (40-90)	60 (40-90)	
		● ●	VP15TF	M	90 (70-120)	80 (60-110)	60 (40-90)	60 (40-90)	
K	Gray Cast Iron	<350MPa	● ●	MC5020	M	180 (160-220)	170 (150-210)	150 (130-190)	150 (130-190)
			● ● ✦	VP15TF	M	130 (100-150)	120 (90-140)	100 (80-120)	100 (80-120)
	Ductile Cast Iron	<800MPa	● ● ✦	MC5020	M	160 (140-180)	150 (130-170)	130 (110-150)	130 (110-150)
N	Aluminium Alloy	Si<5%	● ● ✦	TF15	M	600 (400-1000)	600 (400-1000)	600 (400-1000)	600 (400-1000)
			● ●	MP9120	M	50 (40-70)	50 (40-70)	50 (40-70)	50 (40-70)
			● ●	VP15TF	M	50 (40-70)	50 (40-70)	50 (40-70)	50 (40-70)
S	Titanium Alloy (Ti-6Al-4V,etc.)	-	● ● ✦	MP9130	M	40 (30-60)	40 (30-60)	40 (30-60)	40 (30-60)
			● ●	MP9120	M	30 (20-40)	30 (20-40)	30 (20-40)	30 (20-40)
			● ●	VP15TF	M	30 (20-40)	30 (20-40)	30 (20-40)	30 (20-40)
	Titanium Alloy (Ti-5Al-5V-5Mo-3Cr,etc.)	-	● ● ✦	MP9130	M	30 (20-40)	30 (20-40)	30 (20-40)	30 (20-40)
			● ●	MP9120	M	40 (30-60)	40 (30-60)	40 (30-60)	40 (30-60)
			● ●	VP15TF	M	40 (30-60)	40 (30-60)	40 (30-60)	40 (30-60)
Heat Resistant Alloy	-	● ● ✦	MP9130	M	30 (20-40)	30 (20-40)	30 (20-40)	30 (20-40)	
		● ●	VP15TF	M	90 (70-100)	85 (60-100)	70 (50-80)	70 (50-80)	
H	Hardened Steel	40-55HRC	● ● ✦	VP15TF	M	90 (70-100)	85 (60-100)	70 (50-80)	70 (50-80)

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If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.

Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommended or below. A type with fewer teeth is recommended when the depth of cut in the radial direction (ae) is 0.5 DC or more.

DEPTH OF CUT / FEED PER TOOTH

Work Material	Properties	ae	Cutting Conditions	DC						
				Ø16-Ø18		Ø20-Ø25		Ø28-Ø63		
				ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)	
P	Mild Steel	<180HB	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
			0.25-0.5 DC	● ● *	<5	0.1-0.15	<8	0.1-0.15	<8	0.1-0.2
			0.5-0.75 DC	● ● *	<4	0.08-0.12	<6	0.08-0.12	<6	0.1-0.15
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	180-280HB	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.2
			0.5-0.75 DC	● ● *	<4	0.08-0.12	<6	0.08-0.12	<6	0.1-0.15
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.12
	Carbon Steel Alloy Steel Alloy Tool Steel	280-350HB <350HB	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.2
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.12	<8	0.1-0.15
			0.5-0.75 DC	● ● *	<4	0.08-0.12	<6	0.06-0.1	<6	0.08-0.12
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
Pre-hardened Steel	35-45HRC	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.2	
		0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.12	<8	0.1-0.15	
		0.5-0.75 DC	● ● *	<4	0.08-0.12	<6	0.06-0.1	<6	0.08-0.12	
		1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1	
M	Austenitic Stainless Steel	-	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.15
			0.5-0.75 DC	● ● *	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
	Duplex Stainless Steel	<280HB	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.12
			0.5-0.75 DC	● ● *	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
	Ferritic and Martensitic Stainless Steel	-	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.15	<8	0.08-0.15
			0.5-0.75 DC	● ● *	<4	0.06-0.1	<6	0.08-0.12	<6	0.08-0.12
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.05-0.1
Precipitation Hardening Stainless Steel	<450HB	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.15	<8	0.1-0.15	
		0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.12	<8	0.08-0.12	
		0.5-0.75 DC	● ● *	<4	0.06-0.1	<6	0.06-0.1	<6	0.05-0.1	
		1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.05-0.1	
K	Gray Cast Iron	<350MPa	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.25
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.08-0.15	<8	0.1-0.2
			0.5-0.75 DC	● ● *	<4	0.06-0.1	<6	0.08-0.12	<6	0.1-0.15
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.08-0.15
	Ductile Cast Iron	<800MPa	<0.25 DC	● ● *	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
			0.25-0.5 DC	● ● *	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.15
			0.5-0.75 DC	● ● *	<4	0.08-0.12	<6	0.08-0.12	<6	0.08-0.12
			1.0 DC	● ● *	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1



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RECOMMENDED CUTTING CONDITIONS

DEPTH OF CUT / FEED PER TOOTH

Work Material	Properties	ae	Cutting Conditions	DC					
				Ø16-Ø18		Ø20-Ø25		Ø28-Ø63	
				ap	fz (mm/t.)	ap	fz (mm/t.)	ap	fz (mm/t.)
N Aluminium Alloy	Si<5%	<0.25 DC	● ● ✱	<6	0.1-0.2	<8	0.1-0.25	<8	0.1-0.25
		0.25-0.5 DC	● ● ✱	<6	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
		0.5-0.75 DC	● ● ✱	<5	0.1-0.15	<8	0.1-0.2	<8	0.1-0.2
		1.0 DC	● ● ✱	<5	0.08-0.12	<8	0.1-0.15	<8	0.1-0.15
S Titanium Alloy (Ti-6Al-4V, etc.)	-	0.25-0.5 DC	● ● ✱	<4	0.08-0.12	<6	0.06-0.15	<6	0.08-0.15
		0.5-0.75 DC	● ● ✱	<4	0.06-0.1	<6	0.06-0.15	<6	0.08-0.15
		1.0 DC	● ● ✱	<2	0.06-0.1	<4	0.06-0.15	<4	0.08-0.15
		1.0 DC	● ● ✱	<2	0.06-0.08	<4	0.06-0.12	<4	0.08-0.12
S Titanium Alloy (Ti-5Al-5V-5Mo-3Cr, etc.)	-	1.0 DC	● ● ✱	<6	0.08-0.15	<8	0.08-0.15	<8	0.08-0.15
		0.25-0.5 DC	● ● ✱	<5	0.08-0.12	<8	0.08-0.12	<8	0.08-0.12
		0.5-0.75 DC	● ● ✱	<4	0.06-0.1	<6	0.06-0.1	<6	0.06-0.1
		1.0 DC	● ● ✱	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
Heat Resistant Alloy	-	1.0 DC	● ● ✱	<6	0.08-0.12	<8	0.08-0.12	<8	0.08-0.12
		0.25-0.5 DC	● ● ✱	<5	0.08-0.12	<8	0.08-0.12	<8	0.08-0.12
		0.5-0.75 DC	● ● ✱	<4	0.06-0.1	<6	0.06-0.1	<6	0.06-0.1
		1.0 DC	● ● ✱	<2	0.06-0.1	<4	0.06-0.1	<4	0.06-0.1
H Hardened Steel	40-55HRC	1.0 DC	● ● ✱	<4	0.08-0.15	<4	0.08-0.15	<4	0.08-0.15
		0.25-0.5 DC	● ● ✱	<4	0.08-0.12	<4	0.08-0.12	<4	0.08-0.12
		0.5-0.75 DC	● ● ✱	<3	0.08-0.12	<3	0.08-0.12	<3	0.08-0.12
		1.0 DC	● ● ✱	<3	0.06-0.1	<3	0.06-0.1	<3	0.06-0.1
H Hardened Steel	40-55HRC	0.5-0.75 DC	● ● ✱	<2	0.06-0.1	<2	0.06-0.1	<2	0.06-0.1
		1.0 DC	● ● ✱	<2	0.06-0.1	<2	0.06-0.1	<2	0.06-0.1
		1.0 DC	● ● ✱	<1	0.06-0.1	<1	0.06-0.1	<1	0.06-0.1
		1.0 DC	● ● ✱	<1	0.06-0.1	<1	0.06-0.1	<1	0.06-0.1

These cutting conditions are reference for standard shank types (last letter in designation is S) and arbor shank types.

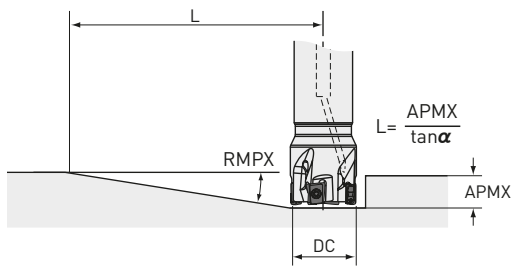
If there is chatter, insert chipping, etc. during machining, alter the conditions accordingly.

Chattering and vibration is more likely under the following circumstances: When the tool overhang is long (using a long shank, screw-in type, etc.), the rigidity of the machine, work material or attachment of work material is low, or at the corner radius during pocket machining. Use cutting conditions at the minimum recommended or below.

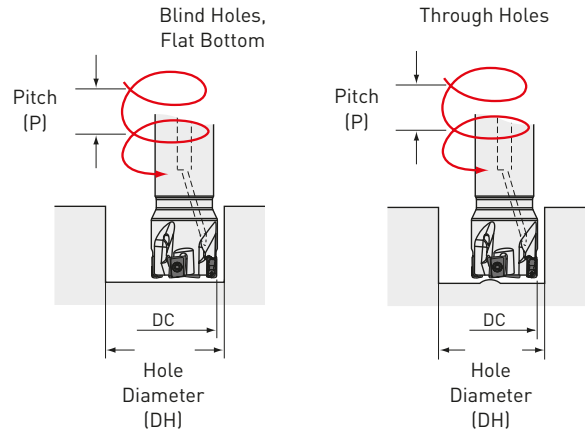
A type with fewer teeth is recommended when the depth of cut in the radial direction [ae] is 0.5 DC or more.

RAMPING / HELICAL MILLING

Ramping



Helical Milling



Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

(mm)

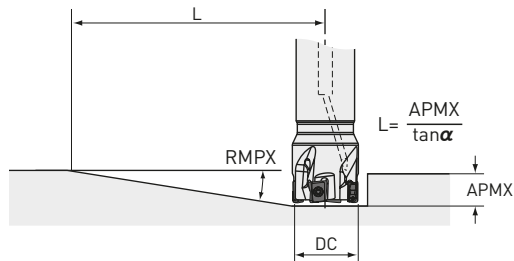
DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
16	0.2	1.85°	248	31	1.5	27.5	1.2	24.2	0.8
	0.4	1.85°	248	30.6	1.5	27.5	1.2	24.2	0.8
	0.8	1.85°	248	29.8	1.4	27.5	1.2	24.2	0.8
	1	1.85°	248	29.4	1.4	27.5	1.2	24.2	0.8
	1.2	1.85°	248	29	1.3	27.5	1.2	24.2	0.8
	1.6	1.85°	248	28.2	1.2	27.5	1.2	24.2	0.8
18	0.2	1.56°	294	35	1.5	31.5	1.2	28.1	0.9
	0.4	1.56°	294	34.6	1.4	31.5	1.2	28.1	0.9
	0.8	1.56°	294	33.8	1.4	31.5	1.2	28.1	0.9
	1	1.56°	294	33.4	1.3	31.5	1.2	28.1	0.9
	1.2	1.56°	294	33	1.3	31.5	1.2	28.1	0.9
	1.6	1.56°	294	32.2	1.2	31.5	1.2	28.1	0.9
20	0.2	1.35°	340	39	1.4	35.5	1.1	32	0.9
	0.4	1.35°	340	38.6	1.4	35.5	1.1	32	0.9
	0.8	1.35°	340	37.8	1.3	35.5	1.1	32	0.9
	1	1.35°	340	37.4	1.3	35.5	1.1	32	0.9
	1.2	1.35°	340	37	1.3	35.5	1.1	32	0.9
	1.6	1.35°	340	36.2	1.2	35.5	1.1	32	0.9
22	0.2	1.16°	396	43	1.3	39.5	1.1	36	0.9
	0.4	1.16°	396	42.6	1.3	39.5	1.1	36	0.9
	0.8	1.16°	396	41.8	1.3	39.5	1.1	36	0.9
	1	1.16°	396	41.4	1.2	39.5	1.1	36	0.9
	1.2	1.16°	396	41	1.2	39.5	1.1	36	0.9
	1.6	1.16°	396	40.2	1.2	39.5	1.1	36	0.9
25	0.2	0.97°	473	49	1.3	45.5	1.1	42	0.9
	0.4	0.97°	473	48.6	1.3	45.5	1.1	42	0.9
	0.8	0.97°	473	47.8	1.2	45.5	1.1	42	0.9
	1	0.97°	473	47.4	1.2	45.5	1.1	42	0.9
	1.2	0.97°	473	47	1.2	45.5	1.1	42	0.9
	1.6	0.97°	473	46.2	1.1	45.5	1.1	42	0.9
28	0.2	0.84°	546	55	1.2	51.5	1.1	48	0.9
	0.4	0.84°	546	54.6	1.2	51.5	1.1	48	0.9
	0.8	0.84°	546	53.8	1.2	51.5	1.1	48	0.9
	1	0.84°	546	53.4	1.2	51.5	1.1	48	0.9
	1.2	0.84°	546	53	1.2	51.5	1.1	48	0.9
	1.6	0.84°	546	52.2	1.1	51.5	1.1	48	0.9
30	0.2	0.77°	596	59	1.2	55.5	1.1	52	0.9
	0.4	0.77°	596	58.6	1.2	55.5	1.1	52	0.9
	0.8	0.77°	596	57.8	1.2	55.5	1.1	52	0.9
	1	0.77°	596	57.4	1.2	55.5	1.1	52	0.9
	1.2	0.77°	596	57	1.1	55.5	1.1	52	0.9
	1.6	0.77°	596	56.2	1.1	55.5	1.1	52	0.9
32	0.2	0.71°	646	62.8	1.2	59.4	1.1	56	0.9
	0.4	0.71°	646	62.4	1.2	59.4	1.1	56	0.9
	0.8	0.71°	646	61.6	1.2	59.4	1.1	56	0.9
	1	0.71°	646	61.2	1.1	59.4	1.1	56	0.9
	1.2	0.71°	646	60.8	1.1	59.4	1.1	56	0.9
	1.6	0.71°	646	60	1.1	59.4	1.1	56	0.9

When machining a highly ductile work material with the ramping angles in the table above, chips may be elongated. Shows the distance until a maximum depth of cut of 8 mm is achieved at the maximum ramping angle L (= 8/tan alpha).

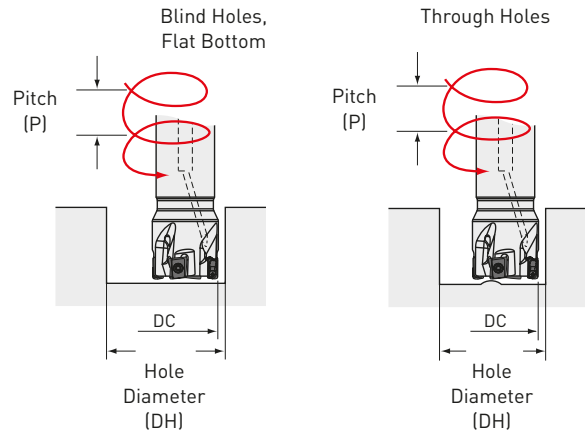
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RAMPING / HELICAL MILLING

Ramping



Helical Milling



Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

DC	RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		RMPX	L*	DH max.	P max.	DH min.	P max.	DH min.	P max.
35	0.2	0.63°	728	69	1.2	65.5	1.1	62	0.9
	0.4	0.63°	728	68.6	1.2	65.5	1.1	62	0.9
	0.8	0.63°	728	67.8	1.1	65.5	1.1	62	0.9
	1	0.63°	728	67.4	1.1	65.5	1.1	62	0.9
	1.2	0.63°	728	67	1.1	65.5	1.1	62	0.9
	1.6	0.63°	728	66.2	1.1	65.5	1.1	62	0.9
40	0.2	0.54°	849	78.8	1.2	75.4	1	72	0.9
	0.4	0.54°	849	78.4	1.1	75.4	1	72	0.9
	0.8	0.54°	849	77.6	1.1	75.4	1	72	0.9
	1	0.54°	849	77.2	1.1	75.4	1	72	0.9
	1.2	0.54°	849	76.8	1.1	75.4	1	72	0.9
	1.6	0.54°	849	76	1.1	75.4	1	72	0.9
50	0.2	0.42°	1092	98.8	1.1	95.4	1	92	1
	0.4	0.42°	1092	98.4	1.1	95.4	1	92	1
	0.8	0.42°	1092	97.6	1.1	95.4	1	92	1
	1	0.42°	1092	97.2	1.1	95.4	1	92	1
	1.2	0.42°	1092	96.8	1.1	95.4	1	92	1
	1.6	0.42°	1092	96	1.1	95.4	1	92	1
63	0.2	0.32°	1433	124.8	1.1	121.4	1	118	1
	0.4	0.32°	1433	124.4	1.1	121.4	1	118	1
	0.8	0.32°	1433	123.6	1.1	121.4	1	118	1
	1	0.32°	1433	123.2	1.1	121.4	1	118	1
	1.2	0.32°	1433	122.8	1.1	121.4	1	118	1
	1.6	0.32°	1433	122	1	121.4	1	118	1

When machining a highly ductile work material with the ramping angles in the table above, chips may be elongated. Shows the distance until a maximum depth of cut of 8 mm is achieved at the maximum ramping angle $L (= 8/\tan \alpha)$.

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RECOMMENDED CUTTING CONDITIONS FOR PLUNGING AND DRILLING

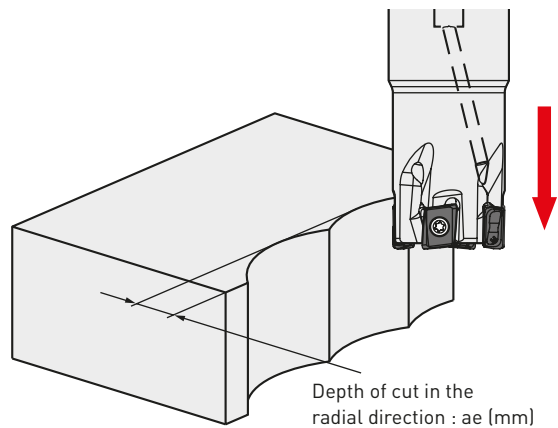
Follow the cutting conditions for slot milling for the feed per tooth and cutting speed.

PLUNGING

(mm)

DC	ae max.
16	3.9
18	3.9
20	3.9
22	4
25	4
28	4
30	4
32	4
35	4
40	4
50	4
63	4

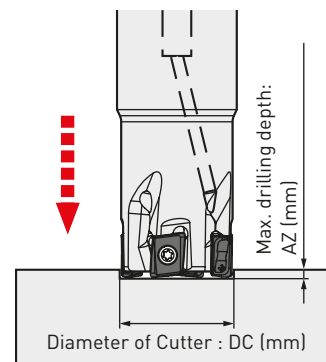
No step feed necessary.



DRILLING

(mm)

DC	AZ max.
16	0.3
18	0.3
20	0.3
22	0.3
25	0.3
28	0.3
30	0.3
32	0.3
35	0.3
40	0.3
50	0.3
63	0.3



Exercise due caution as chips scatter easily.
Use compressed air to eliminate chips (or coolant for when machining aluminium alloy).