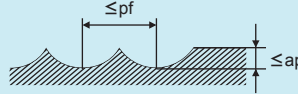


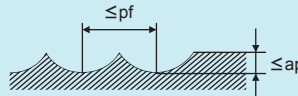
RECOMMENDED CUTTING CONDITIONS

Shoulder milling (grooving)

RE (mm)	Carbon steel, Alloy steel, Mild steel, Pre-hardened steel S45C, SCM440, SS400, S10C, NAK, PX5, SNCM439						Austenitic stainless steel, Titanium alloy, Hardened stainless steels, Cobalt chromium alloy, Ferritic and Martensitic stainless steels SUS304, SUS316, Ti-6Al-4V, SUS630, SUS631, SUS431, SUS420J2									
	$\alpha \leq 15^\circ$			$\alpha > 15^\circ$			Depth of cut ap (mm)	Pick feed pf (mm)	$\alpha \leq 15^\circ$			$\alpha > 15^\circ$			Depth of cut ap (mm)	Pick feed pf (mm)
	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)			Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)		
R 1	250	40000	8000	200	32000	3800	0.17	0.5	230	36000	6500	150	24000	2900	0.17	0.5
R 1.5	300	32000	7700	200	21000	3200	0.25	0.75	230	24000	4800	150	16000	1900	0.25	0.75
R 2	300	24000	5800	200	16000	2800	0.33	1	230	18000	4000	150	12000	1700	0.33	1
R 2.5	300	19000	5300	200	12700	2600	0.42	1.25	230	14400	3500	150	9600	1500	0.42	1.25
R 3	300	16000	4800	200	10600	2100	0.5	1.5	230	12000	3200	150	8000	1400	0.5	1.5
R 4	300	12000	4300	200	8000	1900	0.8	2	230	9000	3200	150	6000	1400	0.8	2
R 5	300	9600	4100	200	6400	1800	1	2.5	230	7200	3000	150	4800	1300	1	2.5
R 6	300	8000	4000	200	5300	1800	1.2	3	230	6000	3000	150	4000	1300	1.2	3



RE (mm)	Copper, Copper alloy						Heat resistant alloys Inconel etc.									
	$\alpha \leq 15^\circ$			$\alpha > 15^\circ$			Depth of cut ap (mm)	Pick feed pf (mm)	$\alpha \leq 15^\circ$			$\alpha > 15^\circ$			Depth of cut ap (mm)	Pick feed pf (mm)
	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)			Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)		
R 1	250	40000	8000	240	38000	4500	0.17	0.5	60	9600	960	40	6400	510	0.08	0.2
R 1.5	360	38000	9100	240	25000	3800	0.25	0.7	60	6400	640	40	4200	340	0.13	0.3
R 2	360	29000	7000	240	19000	3300	0.33	1	60	4800	580	40	3200	260	0.17	0.4
R 2.5	360	23000	6400	240	15000	3100	0.42	1.2	60	3800	530	39	2500	250	0.21	0.5
R 3	360	19000	5700	240	13000	2600	0.5	1.5	60	3200	500	40	2100	210	0.25	0.6
R 4	360	14000	5000	240	9600	2300	0.8	2	60	2400	430	40	1600	190	0.4	0.8
R 5	360	12000	5100	240	7700	2200	1	2.5	63	2000	420	41	1300	180	0.5	1
R 6	360	9600	4800	240	6400	2200	1.2	3	64	1700	350	41	1100	150	0.6	1.2



- SMART MIRACLE coating has reduced electric conductivity; therefore an external contact type (electric transmitted) tool setter may not work. When measuring the tool length, please use an internal contact type (non-electricity type) tool setter or a laser type tool setter.
- Effective cutting of stainless steel, titanium alloys and heat-resistant alloys etc. can be achieved with the use of emulsion.
- Chattering can still occur if the machine rigidity and clamping method are insufficient. In these cases the feed and speed should be reduced proportionately.
- When the depth of cut is smaller than shown the revolution and feed rate can be increased.
- α is the inclination angle of the machined surface.

