

RECOMMENDED CUTTING CONDITIONS

Shoulder milling

Work material	Carbon steel, Alloy steel, Mild steel					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel					Austenitic, Ferritic and Martensitic stainless steels, Titanium alloys					Hardened stainless steels, Cobalt chromium alloy				
	Ck45, 41CrMo4, St44-2, Ck10					NAK, X36CrMo17, 40CrNiMoA, X210Cr12, SKT					X5CrNi189, X8CrNiMo173, Ti6Al4V					X5CrNiCuNb16-4, X7CrNiAl17-7				
Dia. (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
2	130	21000	700	5	0.2	130	16000	510	5	0.2	80	13000	390	5	0.1	75	12000	360	5	0.1
3	130	14000	960	7.5	0.3	130	11000	680	7.5	0.3	80	8500	490	7.5	0.15	75	8000	460	7.5	0.15
4	130	10000	1000	10	0.4	130	8000	690	10	0.4	80	6400	540	10	0.2	75	6000	510	10	0.2
5	130	8300	1100	12.5	0.5	130	6400	730	12.5	0.5	80	5100	570	12.5	0.25	75	4800	540	12.5	0.25
6	130	6900	1200	15	0.6	130	5300	810	15	0.6	80	4200	630	15	0.3	75	4000	600	15	0.3
8	130	5200	1200	20	0.8	130	4000	840	20	0.8	80	3200	640	20	0.4	75	3000	600	20	0.4
10	130	4100	1100	25	1	130	3200	810	25	1	80	2500	590	25	0.5	75	2400	570	25	0.5
12	130	3400	1100	30	1.2	130	2700	780	30	1.2	80	2100	550	30	0.6	75	2000	520	30	0.6
16	130	2600	920	40	1.6	130	2000	640	40	1.6	80	1600	450	40	0.8	75	1500	420	40	0.8
20	130	2100	820	50	2	130	1600	570	50	2	80	1300	420	50	1	75	1200	390	50	1
16	150	3000	1200	24	4.8	120	2400	720	24	4.8	100	2000	720	24	4.8	75	1500	450	24	3.2
20	150	2400	970	30	6	120	1900	570	30	6	100	1600	580	30	6	75	1200	360	30	4
Depth of cut																				

Work material	Copper, Copper alloy					Heat resistant alloys				
						Inconel718				
Dia. (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Cutting speed (m/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
2	160	25000	830	5	0.2	40	6400	90	5	0.04
3	160	17000	1200	7.5	0.3	40	4200	130	7.5	0.06
4	160	13000	1300	10	0.4	40	3200	190	10	0.08
5	160	10000	1300	12.5	0.5	40	2500	180	12.5	0.1
6	160	8500	1500	15	0.6	40	2100	180	15	0.12
8	160	6400	1500	20	0.8	40	1600	170	20	0.16
10	160	5100	1300	25	1	40	1300	170	25	0.2
12	160	4200	1300	30	1.2	40	1100	140	30	0.24
16	160	3200	1100	40	1.6	40	800	110	40	0.32
20	160	2500	970	50	2	40	640	80	50	0.4
16	150	3000	1200	24	4.8	120	2400	720	24	4.8
20	150	2400	970	30	6	120	1900	570	30	6
Depth of cut										

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