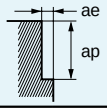
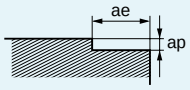
RECOMMENDED CUTTING CONDITIONS

Shoulder milling

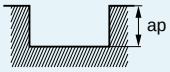
Work material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steels, Titanium alloys Cobalt chromium alloy, Copper, Copper alloy Ck45, 41CrMo4, 36CrNiMo4, X5CrNi189, X5CrNiMo1810, X2CrNiN1810, X2CrNiMoN1813					Heat resistant alloys, Pre-hardened steel, Hardened steel Inconel 718, NAK, X36CrMo17, X40CrMoV51, 55NiCrMoV6, X46Cr13				
Dia. (mm)	Neck Length (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)
0.2	0.6	25	40000	360	0.03	0.01	20	32000	290	0.03	0.01
0.3	0.9	40	40000	480	0.04	0.01	20	21000	250	0.04	0.01
0.3	1.5	40	40000	360	0.04	0.01	20	21000	190	0.04	0.01
0.4	1.2	50	40000	800	0.06	0.02	20	16000	320	0.06	0.02
0.4	2	50	40000	560	0.06	0.02	20	16000	220	0.06	0.02
0.5	1.5	60	38000	910	0.07	0.02	20	13000	310	0.07	0.02
0.5	2.5	60	38000	610	0.07	0.02	20	13000	210	0.07	0.02
0.5	3	60	38000	550	0.07	0.02	20	13000	180	0.07	0.02
0.6	3	60	32000	640	0.09	0.03	20	10500	210	0.09	0.03
0.7	3.5	60	27000	650	0.11	0.03	20	9100	200	0.11	0.03
0.8	2.4	60	24000	960	0.12	0.04	20	8000	260	0.12	0.04
0.8	3	60	24000	860	0.12	0.04	20	8000	230	0.12	0.04
0.8	4	60	24000	670	0.12	0.04	20	8000	190	0.12	0.04
1	5	60	20000	800	0.15	0.05	20	6500	210	0.15	0.05
Depth of cut											

Face milling

Work material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steels, Titanium alloys Cobalt chromium alloy, Copper, Copper alloy Ck45, 41CrMo4, 36CrNiMo4, X5CrNi189, X5CrNiMo1810, X2CrNiN1810, X2CrNiMoN1813					Heat resistant alloys, Pre-hardened steel, Hardened steel Inconel 718, NAK, X36CrMo17, X40CrMoV51, 55NiCrMoV6, X46Cr13				
Dia. (mm)	Neck Length (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)
0.2	0.6	25	40000	360	0.01	≤0.2	20	32000	290	0.015	≤0.1
0.3	0.9	40	40000	480	0.02	≤0.3	20	21000	250	0.025	≤0.1
0.3	1.5	40	40000	360	0.02	≤0.3	20	21000	190	0.02	≤0.1
0.4	1.2	50	40000	800	0.03	≤0.4	20	16000	320	0.03	≤0.2
0.4	2	50	40000	560	0.02	≤0.4	20	16000	220	0.02	≤0.2
0.5	1.5	60	38000	910	0.04	≤0.5	20	13000	310	0.04	≤0.2
0.5	2.5	60	38000	610	0.03	≤0.5	20	13000	210	0.03	≤0.2
0.5	3	60	38000	550	0.03	≤0.5	20	13000	180	0.03	≤0.2
0.6	3	60	32000	640	0.03	≤0.6	20	10500	210	0.035	≤0.3
0.7	3.5	60	27000	640	0.03	≤0.7	20	9100	190	0.035	≤0.3
0.8	2.4	60	24000	960	0.06	≤0.8	20	8000	260	0.06	≤0.4
0.8	3	60	24000	840	0.05	≤0.8	20	8000	230	0.05	≤0.4
0.8	4	60	24000	670	0.04	≤0.8	20	8000	190	0.04	≤0.4
1	5	60	20000	800	0.05	≤1	20	6500	210	0.05	≤0.5
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.

Slotting

Work material		Carbon steel, Alloy steel, Mild steel, Alloy tool steel, Austenitic stainless steels, Titanium alloys Cobalt chromium alloy, Copper, Copper alloy Ck45, 41CrMo4, 36CrNiMo4, X5CrNi189, X5CrNiMo1810, X2CrNiN1810, X2CrNiMoN1813				Heat resistant alloys, Pre-hardened steel, Hardened steel Inconel 718, NAK, X36CrMo17, X40CrMoV51, 55NiCrMoV6, X46Cr13			
Dia. (mm)	Neck Length (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)
0.2	0.6	20	30000	270	0.03	15	24000	220	0.03
0.3	0.9	30	30000	360	0.04	14	15000	180	0.04
0.3	1.5	30	30000	270	0.04	14	15000	140	0.04
0.4	1.2	40	30000	600	0.06	15	12000	240	0.06
0.4	2	40	30000	420	0.06	15	12000	170	0.06
0.5	1.5	45	28000	670	0.07	15	9500	230	0.07
0.5	2.5	45	28000	450	0.07	15	9500	150	0.07
0.5	3	45	28000	390	0.07	15	9500	130	0.07
0.6	3	45	24000	480	0.09	15	7800	160	0.09
0.7	3.5	45	20000	480	0.1	15	6800	140	0.1
0.8	2.4	45	18000	720	0.1	15	6000	190	0.1
0.8	3	45	18000	650	0.1	15	6000	170	0.1
0.8	4	45	18000	500	0.1	15	6000	140	0.1
1	5	45	15000	600	0.1	15	4800	150	0.1
Depth of cut									

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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.