

CUTTING CONDITIONS


Milling | Endmills | Cutting conditions

AE-VMSS


Square Type / Right Angle Type*

Slot milling

* For right angle type, please use 70% of the speed and feed shown in the table below as reference.

	Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm²		Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC		Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC		Stainless Steel SUS304 • SUS420 ≤200HB		Precipitation Stainless Steel SUS630		Titanium Alloy Ti-6Al-4V		Ni-Based Alloy Inconel 718		
	Cutting Speed 100 (80-120) (m/min)		90 (70-110) (m/min)		80 (60-100) (m/min)		70 (50-80) (m/min)		70 (60-80) (m/min)		60 (50-70) (m/min)		25 (20-30) (m/min)		
Ø	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	
1	28.700	570	25.500	460	22.300	360	19.100	340	25.620	320	22.280	300	9.550	120	
1,5	19.100	610	17.000	480	14.900	420	12.700	360	16.980	360	14.850	340	6.370	130	
2	14.300	630	12.700	510	11.100	440	9.600	380	12.810	360	11.140	350	4.770	140	
2,5	11.500	780	10.200	570	8.900	460	7.600	430	10.190	410	8.910	390	3.820	150	
3	10.600	930	9.600	690	8.500	510	7.400	470	8.540	430	7.430	410	3.180	160	
4	8.000	960	7.200	720	6.400	510	5.600	490	6.410	460	5.570	440	2.390	170	
5	6.400	1.020	5.700	800	5.100	610	4.500	560	5.120	490	4.460	470	1.910	180	
6	5.300	1.060	4.800	900	4.200	670	3.700	370	4.270	480	3.710	460	1.590	180	
8	4.000	910	3.600	720	3.200	640	2.800	370	2.750	450	2.390	430	1.190	200	
10	3.200	840	2.900	700	2.500	550	2.200	350	2.200	420	1.910	400	950	180	
12	2.700	810	2.400	670	2.100	550	1.900	330	1.830	420	1.590	400	800	180	
Depth of cut								Dc		ap					
								Dc≤6		0,5D					
								Dc>6		1D					

Side milling

	Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm²		Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC		Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC		Stainless Steel SUS304 • SUS420 ≤200HB		Precipitation Stainless Steel SUS630		Titanium Alloy Ti-6Al-4V		Ni-Based Alloy Inconel 718		
	Cutting Speed		130 (100-150) (m/min)		120 (100-150) (m/min)		100 (80-120) (m/min)		80 (60-100) (m/min)		80 (70-90) (m/min)		70 (60-80) (m/min)		30 (25-40) (m/min)
Ø	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	
1	38.200	840	28.700	690	25.500	510	22.300	450	29.280	370	25.460	350	12.730	160	
1,5	25.500	920	21.200	760	17.000	540	14.900	460	19.520	410	16.980	400	8.490	180	
2	19.900	1.430	17.500	840	14.300	630	11.100	470	14.640	440	12.730	420	6.370	190	
2,5	15.900	1.590	14.000	900	11.500	690	8.900	480	11.710	480	10.190	460	5.039	210	
3	13.800	1.660	12.700	1.070	10.600	760	8.000	480	9.760	510	8.490	480	4.240	220	
4	10.400	1.830	9.600	1.150	8.000	800	6.000	530	7.320	550	6.370	530	3.180	240	
5	8.300	1.990	7.600	1.220	6.400	900	4.800	560	5.860	560	5.090	540	2.550	250	
6	6.900	2.070	6.400	1.540	5.300	1.060	4.200	640	4.880	580	4.240	550	2.120	250	
8	5.200	1.770	4.800	1.540	4.000	1.040	3.200	610	3.200	450	2.790	430	1.590	230	
10	4.100	1.640	3.800	1.370	3.200	900	2.500	580	2.560	430	2.230	410	1.270	220	
12	3.500	1.400	3.200	1.280	2.700	760	2.100	530	2.140	420	1.860	400	1.060	210	
Depth of cut															
							ap 1,5D		ae 0,2D						

1. The above milling condition is a guideline for the overhang length is 3×D.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustment may be necessary depending on the rigidity of the workpiece fixture and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.
6. Please use water-soluble oil when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.
8. Adjust the speed and feed accordingly when the overhang length is longer than specified.


CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

AE-VMSS


Long Neck Type

Side milling

	Mild Steel • Carbon Steel • Cast Iron		Alloy Steel • Tool Steel		Prehardened Steel • Hardened Steel		Stainless Steel		Precipitation Stainless Steel		Titanium Alloy		Ni-Based Alloy					
	SS400 • S55C • FC250 ~750N/mm ²		SCM • SKS • SKD ~30HRC		PX5 • NAK80 30~45HRC		SUS304 • SUS420 ≤200HB		SUS630		Ti-6Al-4V		Inconel 718					
Cutting Speed	105 (80-120) (m/min)		95 (70-110) (m/min)		70 (50-90) (m/min)		60 (40-80) (m/min)		60 (50-70) (m/min)		50 (40-60) (m/min)		30 (20-35) (m/min)					
Ø	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)				
6	5.520	1.660	5.120	1.230	3.710	740	2.940	450	3.420	410	2.970	390	1.480	180				
8	4.160	1.420	3.840	1.230	2.800	730	2.240	430	2.240	320	1.950	300	1.110	160				
10	3.280	1.310	3.040	1.100	2.240	630	1.750	410	1.790	300	1.560	290	890	150				
12	2.800	1.120	2.560	1.020	1.890	530	1.470	370	1.500	290	1.300	280	740	150				
Depth of cut	<table><tr><td>ap</td><td>ae</td></tr><tr><td>1,5D</td><td>0,2D</td></tr></table>														ap	ae	1,5D	0,2D
ap	ae																	
1,5D	0,2D																	
<p>1. Use a rigid and precise machine and holder.</p> <p>2. The rotational speed is calculated by the median of the recommended cutting speed. Adjustment may be necessary depending on the rigidity of the workpiece fixture and machine.</p> <p>3. Please use a suitable fluid with high smoke retardant properties.</p> <p>4. During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.</p> <p>5. Please use water-soluble oil when machining stainless steel.</p> <p>6. Reduce speed and feed as well as depth of cut when high precision is required.</p>																		

Fix rate cutting condition

DC≥Ø6

	Work Material	Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm ²		Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC		Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC		Stainless Steel SUS304 • SUS420 ≤200HB		Precipitation Stainless Steel SUS630		Titanium Alloy Ti-6Al-4V		Ni-Based Alloy Inconel 718	
Ø	L/D	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)
Side Milling	4	80%		70%		70%		60%		60%		50%		50%	
	5	70%		60%		60%		50%		50%		50%		50%	
Slotting	4	90%		90%		80%		70%		70%		60%		60%	
	5	80%		80%		70%		70%		70%		60%		60%	