

Speeds and Feeds



HTM 5 Flute Radius End Mills (AlTiN Coated)

Slot Milling

ISO	Material Description	Width of Cut	Depth of Cut	Parameter	Diameter (mm)											
					4	5	6	8	10	12	16	20	25			
P	Non Alloy Steels Low Alloy Steels 125 HB - 300 HB	1.0D	1.0D	Vc, SMM	84	84	84	84	84	84	84	84	84			
				Fz, MMPT	0.0203	0.0254	0.0305	0.0381	0.0483	0.0584	0.0813	0.0914	0.0965			
				n, RPM	6670	5340	4450	3340	2670	2220	1670	1330	1070			
				Vf, MPPM	686	686	686	635	635	660	686	610	508			
	Low Alloy Steels 350 HB	1.0D	1.0D	Vc, SMM	84	84	84	84	84	84	84	84	84			
				Fz, MMPT	0.0127	0.0152	0.0229	0.0279	0.0381	0.0457	0.066	0.0686	0.0762			
				n, RPM	6670	5340	4450	3340	2670	2220	1670	1330	1070			
				Vf, MPPM	432	406	508	457	508	508	559	457	406			
	High Alloy Steels Tool Steels 220 HB - 325 HB	1.0D	0.75D	Vc, SMM	70	70	70	70	70	70	70	70	70			
				Fz, MMPT	0.0203	0.0254	0.0305	0.0381	0.0483	0.0584	0.0813	0.0914	0.0965			
				n, RPM	5580	4460	3720	2790	2230	1860	1390	1120	890			
				Vf, MPPM	559	559	559	533	533	533	559	508	432			
1.0D		0.75D	Vc, SMM	76	76	76	76	76	76	76	76	76				
			Fz, MMPT	0.0127	0.0152	0.0229	0.0279	0.0381	0.0457	0.066	0.0686	0.0762				
			n, RPM	6060	4850	4040	3030	2430	2020	1520	1210	970				
			Vf, MPPM	381	381	457	432	457	457	508	406	381				
M	Stainless Steels Ferritic/Martensitic, Annealed Stainless Steels	1.0D	0.5D	Vc, SMM	69	69	69	69	69	69	69	69				
				Fz, MMPT	0.0127	0.0152	0.0203	0.0229	0.033	0.0406	0.0533	0.0584	0.066			
				n, RPM	5460	4370	3640	2730	2180	1820	1360	1090	870			
	Stainless Steels Austenitic 180 HB	1.0D	0.5D	Vc, SMM	61	61	61	61	61	61	61	61				
				Fz, MMPT	0.0127	0.0152	0.0203	0.0229	0.0305	0.0406	0.0508	0.0533	0.0584			
				n, RPM	4850	3880	3230	2430	1940	1620	1210	970	780			
				Vf, MPPM	305	305	330	279	305	330	305	254	229			
				K	Grey Cast Iron Nodular Cast Iron Malleable Cast Iron 130 HB - 260 HB	1.0D	1.0D	Vc, SMM	79	79	79	79	79	79	79	79
								Fz, MMPT	0.0178	0.0203	0.0254	0.033	0.0406	0.0508	0.0737	0.0787
n, RPM	6310	5050	4200					3150	2520	2100	1580	1260	1010			
				Vf, MPPM	559	508	533	508	508	533	584	508	432			
				S	Heat Resistant Super Alloys 200 HB - 350 HB	1.0D	0.3D	Vc, SMM	20	20	20	20	20	20	20	20
								Fz, MMPT	0.0096	0.0127	0.0203	0.0254	0.0279	0.0381	0.0432	0.0483
n, RPM	1592	1300	980					780	650	490	390	330	240			
Titanium Alloys	1.0D	0.5D	Vc, SMM		49	49	49	49	49	49	49	49				
			Fz, MMPT		0.0102	0.0127	0.0203	0.0254	0.0305	0.0356	0.0483	0.0508	0.0533			
			n, RPM		3880	3100	2590	1940	1550	1290	970	780	620			
				Vf, MPPM	203	203	254	254	229	229	229	203	178			

Speeds and Feeds



HTM 5 Flute Radius End Mills (AlTiN Coated)

Side Cutting - Peel Milling

ISO	Material Description	Width of Cut	Depth of Cut	Parameter	Diameter (mm)								
					4	5	6	8	10	12	16	20	25
P	Non Alloy Steels Low Alloy Steels 125 HB - 300 HB	0.08D	2.0D	Vc, SMM	198	198	198	198	198	198	198	198	198
				Fz, MMPT	0.0381	0.0483	0.0533	0.066	0.0838	0.1041	0.1448	0.16	0.1702
				n, RPM	15770	12610	10510	7880	6310	5260	3940	3150	2520
				Vf, MPPM	2997	3048	2794	2591	2642	2743	2845	2515	2134
	Low Alloy Steels 350 HB	0.08D	2.0D	Vc, SMM	198	198	198	198	198	198	198	198	198
				Fz, MMPT	0.0229	0.0305	0.0406	0.0508	0.0635	0.0787	0.1143	0.1219	0.1321
				n, RPM	15770	12610	10510	7880	6310	5260	3940	3150	2520
				Vf, MPPM	1803	1930	2134	2007	2007	2083	2261	1930	1676
	High Alloy Steels Tool Steels 220 HB - 325 HB	0.08D	2.0D	Vc, SMM	177	177	177	177	177	177	177	177	177
				Fz, MMPT	0.0381	0.0483	0.0533	0.066	0.0838	0.1041	0.1448	0.16	0.1702
				n, RPM	14070	11250	9380	7030	5630	4690	3520	2810	2250
				Vf, MPPM	2692	2718	2489	2311	2362	2438	2540	2261	1905
0.08D		2.0D	Vc, SMM	168	168	168	168	168	168	168	168	168	
			Fz, MMPT	0.0229	0.0305	0.0406	0.0508	0.0635	0.0787	0.1143	0.1219	0.1321	
			n, RPM	13340	10670	8890	6670	5340	4450	3340	2670	2130	
			Vf, MPPM	1524	1626	1803	1702	1702	1753	1905	1626	1397	
M	Stainless Steels Ferritic/Martensitic, Annealed Stainless Steels	0.06D	2.0D	Vc, SMM	107	107	107	107	107	107	107	107	
				Fz, MMPT	0.0203	0.0254	0.0356	0.0406	0.0559	0.0686	0.0965	0.1041	0.1118
				n, RPM	8490	6790	5660	4240	3400	2830	2120	1700	1360
				Vf, MPPM	864	864	1016	864	940	965	1016	889	762
	Stainless Steels Austenitic 180 HB	0.06D	2.0D	Vc, SMM	91	91	91	91	91	91	91	91	
				Fz, MMPT	0.0203	0.0254	0.033	0.0381	0.0533	0.0686	0.0889	0.094	0.1016
K	Grey Cast Iron Nodular Cast Iron Malleable Cast Iron 130 HB - 260 HB	0.07D	2.0D	Vc, SMM	168	168	168	168	168	168	168	168	
				Fz, MMPT	0.0305	0.0381	0.0483	0.0559	0.0711	0.0889	0.127	0.1397	0.1473
				n, RPM	13340	10670	8890	6670	5340	4450	3340	2670	2130
				Vf, MPPM	2032	2032	2134	1854	1905	1981	2134	1854	1575
S	Heat Resistant Super Alloys 200 HB - 350 HB	0.04D	2.0D	Vc, SMM	37	37	37	37	37	37	37	37	
				Fz, MMPT	0.0127	0.0152	0.0229	0.0305	0.0381	0.0457	0.061	0.061	0.0686
				n, RPM	2910	2330	1940	1460	1160	970	730	580	470
				Vf, MPPM	178	178	229	229	229	229	229	178	152
	Titanium Alloys	0.05D	2.0D	Vc, SMM	91	91	91	91	91	91	91	91	
				Fz, MMPT	0.0127	0.0152	0.0229	0.0305	0.0381	0.0457	0.061	0.061	0.0686
				n, RPM	7280	5820	4850	3640	2910	2430	1820	1460	1160
				Vf, MPPM	457	432	559	559	559	559	559	457	406

Speeds and Feeds



HTM 5 Flute Radius End Mills (AlTiN Coated)

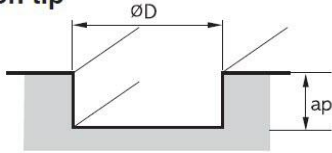
Side Cutting - Heavy Side Milling

ISO	Material Description	Width of Cut	Depth of Cut	Parameter	Diameter (mm)								
					4	5	6	8	10	12	16	20	25
P	Non Alloy Steels Low Alloy Steels 125 HB - 300 HB	0.5D	1.5D	Vc, SMM	152	152	152	152	152	152	152	152	152
				Fz, MMPT	0.0279	0.0356	0.0381	0.0457	0.0584	0.0737	0.1041	0.1143	0.1219
				n, RPM	12130	9700	8090	6060	4850	4040	3030	2430	1940
				Vf, MMPM	1702	1727	1549	1397	1422	1499	1575	1397	1194
	Low Alloy Steels 350 HB	0.5D	1.5D	Vc, SMM	122	122	122	122	122	122	122	122	122
				Fz, MMPT	0.0178	0.0203	0.0279	0.0356	0.0457	0.0584	0.0787	0.0889	0.094
				n, RPM	9700	7760	6470	4850	3880	3230	2430	1940	1550
				Vf, MMPM	864	787	914	864	889	940	965	864	737
	High Alloy Steels Tool Steels 220 HB - 325 HB	0.5D	1.5D	Vc, SMM	137	137	137	137	137	137	137	137	137
				Fz, MMPT	0.0279	0.0356	0.0381	0.0457	0.0584	0.0737	0.1041	0.1143	0.1219
				n, RPM	10910	8730	7280	5460	4370	3640	2730	2180	1750
				Vf, MMPM	1524	1549	1397	1245	1270	1346	1422	1245	1067
0.5D		1.5D	Vc, SMM	122	122	122	122	122	122	122	122	122	
			Fz, MMPT	0.0178	0.0203	0.0279	0.0356	0.0457	0.0584	0.0787	0.0889	0.094	
			n, RPM	9700	7760	6470	4850	3880	3230	2430	1940	1550	
			Vf, MMPM	864	787	914	864	889	940	965	864	737	
M	Stainless Steels Ferritic/Martensitic, Annealed Stainless Steels	0.5D	1.5D	Vc, SMM	76	76	76	76	76	76	76	76	
				Fz, MMPT	0.0152	0.0178	0.0229	0.0305	0.0406	0.0508	0.0686	0.0737	0.0787
				n, RPM	6060	4850	4040	3030	2430	2020	1520	1210	970
	Stainless Steels Austenitic 180 HB	0.5D	1.5D	Vc, SMM	61	61	61	61	61	61	61	61	
				Fz, MMPT	0.0152	0.0178	0.0229	0.0279	0.0381	0.0508	0.0635	0.066	0.0737
				n, RPM	4850	3880	3230	2430	1940	1620	1210	970	780
K	Grey Cast Iron Nodular Cast Iron Malleable Cast Iron 130 HB - 260 HB	0.5D	1.5D	Vc, SMM	113	113	113	113	113	113	113	113	
				Fz, MMPT	0.0203	0.0254	0.033	0.0406	0.0508	0.0635	0.0914	0.0991	0.1041
				n, RPM	8970	7180	5980	4490	3590	2990	2240	1790	1440
S	Heat Resistant Super Alloys 200 HB - 350 HB	0.2D	1.5D	Vc, SMM	27	27	27	27	27	27	27	27	
				Fz, MMPT	0.0127	0.0152	0.0229	0.0305	0.0381	0.0457	0.061	0.061	0.0686
				n, RPM	2180	1750	1460	1090	870	730	550	440	350
				Vf, MMPM	127	127	178	178	178	178	178	127	127
	Titanium Alloys	0.5D	1.5D	Vc, SMM	49	49	49	49	49	49	49	49	
				Fz, MMPT	0.0127	0.0152	0.0229	0.0305	0.0381	0.0457	0.061	0.061	0.0686
				n, RPM	3880	3100	2590	1940	1550	1290	970	780	620
				Vf, MMPM	254	229	305	305	305	305	305	229	203

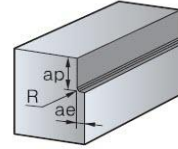
Speeds and Feeds



Application tip



- Slotting depth (a_p)
 - $a_p: \leq 1.0D$



- Shouldering depth (a_p)
 - $a_p: \leq 1.5D$ (All dia.)
 - $a_e: \leq 0.5D$ (All dia.)

※ Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio

Feed Rate, Per Revolution (mm/min)
$v_f = f_n \cdot n$

Feed Rate, Per Tooth (mm/min)
$v_f = f_z \cdot n \cdot Z$

Feed Per Revolution (mm/rev)
$f_n = \frac{v_f}{n}$

Feed Per Tooth (mm)
$f_z = \frac{v_f}{n \cdot Z}$

Cutting Speed (m/min)
$v_c = \frac{\pi \cdot D_{tool} \cdot n}{1000}$

Spindle Speed (rev/min)
$n = \frac{v_c \cdot 1000}{\pi \cdot D_{tool}}$

Material Removal Rate (mm ³ /min)
$MMR = \frac{a_p \cdot a_e \cdot v_f}{1000}$

Metric

Symbol	Definition	Unit
v_f	Feed rate	mm/min
f_n	Feed per revolution	mm/rev
f_z	Feed per tooth	mm
v_c	Cutting speed	m/min (SMM)
n	Spindle speed	rev/min (RPM)
D_{tool}	Tool cutting diameter	mm
MMR	Material removal rate	(mm ³ /min)
a_e	Radial depth of cut	mm
a_p	Axial depth of cut	mm
Z	Number of teeth/flutes	