

Speeds and Feeds



- 1) Select your material in the ISO colored chart with respect to material description.
- 2) Start with a middle/average value for spindle speed, n (RPM) and feed rate, V_f (mm/min). Adjust the spindle speed and/or feed rate based on your cutting conditions.

End Mill Series – CPR & FPR

Material			Recommended Cutting Values – Slotting											
ISO	Group VDI 3323	Material Description	Width of Cut, a _e	Depth of Cut, a _p	Parameter	Tool Diameter (mm)								
						6	8	10	12	16	20	25	32	
P	1	Non-Alloy Steel	1.0D	1.0D	No. of Flutes	3	3	4	4	4	4	5	6	
					Vc, SMM	26	25	23	26	25	25	26	25	
					Fz, MMPT	0.012	0.020	0.028	0.041	0.051	0.057	0.079	0.079	
					n, RPM	1358	976	747	679	488	391	326	244	
					Vf, MMPM	50	60	85	110	99	89	129	116	
					Vc, SMM	22	19	19	22	19	19	22	19	
			2	1.0D	1.0D	Fz, MMPT	0.010	0.018	0.026	0.035	0.051	0.057	0.069	0.077
						n, RPM	1189	764	611	594	382	306	285	191
						Vf, MMPM	36	42	65	82	78	70	99	88
						Vc, SMM	15	14	15	15	14	13	15	13
						Fz, MMPT	0.012	0.020	0.026	0.035	0.049	0.055	0.071	0.079
						n, RPM	776	546	466	388	273	204	186	127
	3-4	1.0D	1.0D	Vf, MMPM	28	33	49	54	53	45	66	61		
				Vc, SMM	9	8	8	9	8	8	8	8		
				Fz, MMPT	0.010	0.016	0.026	0.037	0.051	0.057	0.077	0.081		
				n, RPM	485	327	262	243	164	131	105	82		
				Vf, MMPM	15	16	28	35	33	30	40	40		
				Vc, SMM	22	19	19	22	19	19	22	19		
		5	1.0D	1.0D	Fz, MMPT	0.010	0.018	0.026	0.035	0.051	0.057	0.069	0.077	
					n, RPM	1189	764	611	594	382	306	285	191	
					Vf, MMPM	36	42	65	82	78	70	99	88	
					Vc, SMM	15	14	15	15	14	13	15	13	
					Fz, MMPT	0.012	0.020	0.026	0.035	0.049	0.055	0.071	0.079	
					n, RPM	776	546	466	388	273	204	186	127	
6	1.0D		1.0D	Vf, MMPM	28	33	49	54	53	45	66	61		
				Vc, SMM	9	8	8	9	8	8	8	8		
				Fz, MMPT	0.010	0.016	0.026	0.037	0.051	0.057	0.077	0.081		
				n, RPM	485	327	262	243	164	131	105	82		
				Vf, MMPM	15	16	28	35	33	30	40	40		
				Vc, SMM	22	19	19	22	19	19	22	19		
	7	1.0D	1.0D	Fz, MMPT	0.010	0.018	0.026	0.035	0.051	0.057	0.069	0.077		
				n, RPM	1189	764	611	594	382	306	285	191		
				Vf, MMPM	36	42	65	82	78	70	99	88		
				Vc, SMM	15	14	15	15	14	13	15	13		
				Fz, MMPT	0.012	0.020	0.026	0.035	0.049	0.055	0.071	0.079		
				n, RPM	776	546	466	388	273	204	186	127		
8-9		1.0D	1.0D	Vf, MMPM	28	33	49	54	53	45	66	61		
				Vc, SMM	9	8	8	9	8	8	8	8		
				Fz, MMPT	0.010	0.016	0.026	0.037	0.051	0.057	0.077	0.081		
				n, RPM	485	327	262	243	164	131	105	82		
				Vf, MMPM	15	16	28	35	33	30	40	40		
				Vc, SMM	22	19	19	22	19	19	22	19		
	10	1.0D	1.0D	Fz, MMPT	0.010	0.018	0.026	0.035	0.051	0.057	0.069	0.077		
				n, RPM	1189	764	611	594	382	306	285	191		
				Vf, MMPM	36	42	65	82	78	70	99	88		
				Vc, SMM	15	14	15	15	14	13	15	13		
				Fz, MMPT	0.012	0.020	0.026	0.035	0.049	0.055	0.071	0.079		
				n, RPM	776	546	466	388	273	204	186	127		
11.1		1.0D	1.0D	Vf, MMPM	28	33	49	54	53	45	66	61		
				Vc, SMM	9	8	8	9	8	8	8	8		
				Fz, MMPT	0.010	0.016	0.026	0.037	0.051	0.057	0.077	0.081		
				n, RPM	485	327	262	243	164	131	105	82		
				Vf, MMPM	15	16	28	35	33	30	40	40		
				Vc, SMM	22	19	19	22	19	19	22	19		



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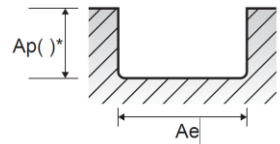
End Mill Series – CPR & FPR

Material			Recommended Cutting Values – Slotting										
ISO	VDI 3323	Material Description	Width of Cut, a_e	Depth of Cut, a_p	Parameter	Tool Diameter (mm)							
						6	8	10	12	16	20	25	32
N	21-22	Aluminum-Wrought Alloy	1.0D	1.0D	No. of Flutes	3	3	4	4	4	4	5	6
					V_c , SMM	63	54	52	55	55	53	55	55
					F_z , MMPT	0.012	0.020	0.028	0.041	0.057	0.067	0.071	0.083
					n , RPM	3339	2165	1664	1471	1104	849	706	552
					V_f , MPPM	122	132	189	239	251	228	251	276
	23-25	Aluminum-Cast Alloy	1.0D	1.0D	V_c , SMM	63	54	52	55	55	53	55	55
					F_z , MMPT	0.012	0.020	0.028	0.041	0.057	0.067	0.071	0.083
					n , RPM	3339	2165	1664	1471	1104	849	706	552
					V_f , MPPM	122	132	189	239	251	228	251	276

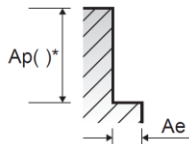
NOTE: All cutting data are target values.

Maximum recommended depth shown.

Above recommendations are based on ideal conditions. Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



Slotting



Side Cutting

Speeds and Feeds



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	