M527 Application Guide - Speed & Feed (inch)

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	No. of Flutes	Speed (SFM)	Feed (Inches per Tooth) 1/8	1/4	3/8	1/2	5/8	3/4	1
S	Titanium Alloys	Slotting	.5 x D	1 x D	7	250	.0003	.0007	.0010	.0013	.0016	.0020	.0026
	6Al-4V, 6-2-4	Peripheral - Rough	1 x D	.3 x D	7	300	.0004	.0009	.0013	.0018	.0022	.0027	.0036
		Peripheral - HEM*	3 x D	.05 x D	7	330	.0016	.0032	.0047	.0063	.0079	.0095	.0126
		Finish	1.5 x D	.015 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0036
	Difficult-to-Machine Titanium Alloys	Slotting	.25 x D	1 x D	7	200	.0002	.0005	.0007	.0010	.0012	.0015	.0019
	10-2-3	Peripheral - Rough	1 x D	.25 x D	7	250	.0004	.0007	.0011	.0014	.0018	.0021	.0028
		Peripheral - HEM*	3 x D	.05 x D	7	275	.0012	.0024	.0037	.0049	.0061	.0073	.0098
		Finish	1.5 x D	.01 x D	7	250	.0004	.0008	.0012	.0016	.0021	.0025	.0033
M	Austenitic Stainless Steels, FeNi Alloys	Slotting	.5 x D	1 x D	7	275	.0004	.0009	.0013	.0017	.0021	.0026	.0034
	303, 304, 316, Invar, Kovar	Peripheral - Rough	1.25 x D	.3 x D	7	350	.0006	.0012	.0018	.0023	.0029	.0035	.0047
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0021	.0042	.0063	.0083	.0104	.0125	.0167
		Finish	2 x D	.015 x D	7	350	.0006	.0012	.0018	.0024	.0030	.0036	.0048
	Precipitation Hardening Stainless Steels	Slotting	.5 x D	1 x D	7	250	.0004	.0007	.0011	.0014	.0018	.0021	.0029
	17-4, 15-5, 13-8	Peripheral - Rough	1.25 x D	.3 x D	7	325	.0005	.0010	.0015	.0019	.0024	.0029	.0039
		Peripheral - HEM*	3 x D	.05 x D	7	360	.0017	.0033	.0050	.0067	.0083	.0100	.0133
		Finish	1.5 x D	.015 x D	7	325	.0005	.0010	.0015	.0020	.0025	.0030	.0040
P	Low Carbon Steels <= 38 Rc	Slotting	.5 x D	1 x D	7	325	.0005	.0010	.0015	.0020	.0025	.0030	.0040
	1018, 1020, 12L14, 5120, 8620	Peripheral - Rough	1.25 x D	.3 x D	7	400	.0007	.0014	.0020	.0027	.0034	.0041	.0055
		Peripheral - HEM*	3 x D	.05 x D	7	450	.0022	.0044	.0066	.0088	.0109	.0131	.0175
		Finish	2 x	.015 x D	7	400	.0007	.0014	.0021	.0028	.0035	.0042	.0056
	Medium Carbon Steels <= 48 HRC	Slotting	.5 x D	1 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0037
	1045, 4140, 4340, 5140	Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0019	.0025	.0031	.0037	.0050
		Peripheral - HEM*	3 x D	.05 x D	7	415	.0021	.0043	.0064	.0086	.0107	.0129	.0172
		Finish	2 x D	.015 x D	7	375	.0006	.0013	.0019	.0025	.0032	.0038	.0051
	Tool and Die Steels <= 48 Rc	Slotting	.5 x D	1 x D	7	275	.0004	.0008	.0012	.0015	.0019	.0023	.0031
	A2, D2, O1, S7, P20, H13	Peripheral - Rough	1.25 x D	.3 x D	7	350	.0005	.0011	.0016	.0021	.0026	.0032	.0042
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0018	.0037	.0055	.0074	.0092	.0110	.0147
		Finish	2 x D	.015 x D	7	350	.0005	.0011	.0016	.0021	.0027	.0032	.0043
	Martensitic & Ferritic Stainless Steels	Slotting	.5 x D	1 x D	7	300	.0005	.0009	.0014	.0018	.0023	.0027	.0037
	410, 416, 440	Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0019	.0025	.0031	.0037	.0050
		Peripheral - HEM*	3 x D	.05 x D	7	415	.0021	.0043	.0064	.0086	.0107	.0129	.0172
		Finish	2 x D	.015 x D	7	375	.0006	.0013	.0019	.0025	.0032	.0038	.0051
K	Cast Iron	Slotting	.5 x D	1 x D	7	300	.0004	.0009	.0013	.0018	.0022	.0027	.0035
	Gray	Peripheral - Rough	1.25 x D	.3 x D	7	375	.0006	.0012	.0018	.0023	.0029	.0035	.0047
		Finish	2 x D	.015 x D	7	450	.0006	.0012	.0018	.0024	.0030	.0036	.0048
	Cast Iron	Slotting	.5 x D	1 x D	7	275	.0004	.0007	.0011	.0014	.0018	.0021	.0029
	Malleable	Peripheral - Rough	1.25 x D	.3 x D	7	350	.0005	.0010	.0015	.0019	.0024	.0029	.0039
		Peripheral - HEM*	3 x D	.05 x D	7	390	.0014	.0028	.0043	.0057	.0071	.0085	.0114
		Finish	2 x D	.015 x D	7	350	.0005	.0010	.0015	.0020	.0025	.0030	.0040

D = Tool Diameter *HEM= High-efficiency machining (chip thinning calculations have already been applied to HEM parameters shown)

Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

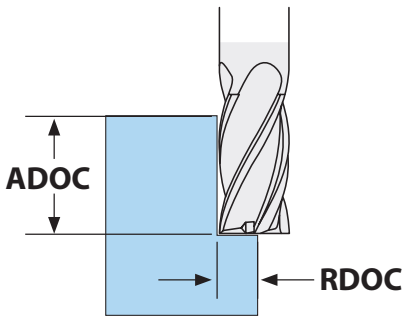
$$SFM = RPM \times D \times .262$$

$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

D Tool Cutting Diameter
R Tool Radius
Z Number of Flutes
RPM Revolutions per Minute
SFM Surface Feet per Minute
IPM Inches per Minute
MRR Metal Removal Rate
RDOC Radial Depth of Cut
ADOC Axial Depth of Cut

Radial Chip Thinning Adjustment $IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$



Apply chip thinning adjustment when RDOC < D