

SPEEDS & FEEDS

EF-5 TORNADO

EF-5 Tornado Application Guide - Speeds and Feeds (Inch)

Material Information						Feed (Inches Per Tooth)									
Work Material	Type of Cut	Axial DOC	Radial DOC	Flutes	Speed (SFM)	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
Cast Iron	Slotting	0.5 x D	1 x D	5	300	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.003	0.0036	0.0048
Gray	Peripheral - Rough	1.25 x D	.3 x D	5	375	0.0008	0.0012	0.0016	0.002	0.0025	0.0029	0.0033	0.0041	0.0049	0.0065
ASTM-A48 Class 20, 25, 30, 35 & 40	Finish	2 x D	.015 x D	5	375	0.0008	0.0012	0.0017	0.0021	0.0025	0.0029	0.0033	0.0042	0.005	0.0067
	Slotting	.5 x D	1 x D	5	275	0.0005	0.0008	0.001	0.0013	0.0015	0.0018	0.002	0.0025	0.003	0.004
Cast Iron	Peripheral - Rough	1.25 x D	.3 x D	5	350	0.0007	0.001	0.0014	0.0017	0.002	0.0024	0.0027	0.0034	0.0041	0.0055
Malleable	Peripheral - HEM*	3 x D	.05 x D	5	390	0.002	0.003	0.004	0.005	0.006	0.007	0.0081	0.0101	0.0121	0.0161
	Finish	2 x D	.015 x D	5	350	0.0007	0.001	0.0014	0.0017	0.0021	0.0024	0.0028	0.0035	0.0042	0.0056
	Slotting	.5 x D	1 x D	5	325	0.0007	0.0011	0.0014	0.0018	0.0021	0.0025	0.0028	0.0035	0.0042	0.0056
Low Carbon Steels ≤ 38 Rc	Peripheral - Rough	1.25 x D	.3 x D	5	400	0.001	0.0014	0.0019	0.0024	0.0029	0.0033	0.0038	0.0048	0.0057	0.0076
1018, 1020, 12L14, 5120, 8620	Peripheral - HEM*	3 x D	.07 x D	5	450	0.0028	0.0042	0.0056	0.007	0.0084	0.0098	0.0112	0.014	0.0168	0.0224
	Finish	2 x D	.015 x D	5	400	0.001	0.0015	0.0019	0.0024	0.0029	0.0034	0.0039	0.0049	0.0058	0.0078
	Slotting	.5 x D	1 x D	5	300	0.0006	0.001	0.0013	0.0016	0.0019	0.0022	0.0026	0.0032	0.0038	0.0051
Medium Carbon Steels ≤ 48 HRC	Peripheral - Rough	1.25 x D	.3 x D	5	375	0.0009	0.0013	0.0017	0.0022	0.0026	0.0031	0.0035	0.0044	0.0052	0.007
1045, 4140, 4340, 5140	Peripheral - HEM*	3 x D	.05 x D	5	415	0.0026	0.0039	0.0052	0.0065	0.0077	0.009	0.0103	0.0129	0.0155	0.0207
	Finish	2 x D	.015 x D	5	375	0.0009	0.0013	0.0018	0.0022	0.0027	0.0031	0.0036	0.0044	0.0053	0.0071
	Slotting	.5 x D	1 x D	5	275	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0022	0.0027	0.0032	0.0043
Tool and Die Steels ≤ 48 Rc	Peripheral - Rough	1.25 x D	.3 x D	5	350	0.0007	0.0011	0.0015	0.0018	0.0022	0.0026	0.0029	0.0037	0.0044	0.0059
c A2, D2, O1, S7, P20, H13	Peripheral - HEM*	3 x D	.05 x D	5	390	0.0022	0.0032	0.0043	0.0054	0.0065	0.0076	0.0087	0.0108	0.013	0.0173
	Finish	2 x D	.015 x D	5	350	0.0007	0.0011	0.0015	0.0019	0.0022	0.0026	0.003	0.0037	0.0045	0.006
	Slotting	.5 x D	1 x D	5	300	0.0006	0.001	0.0013	0.0016	0.0019	0.0022	0.0026	0.0032	0.0038	0.0051
Martensitic & Ferritic Stainless Steels	Peripheral - Rough	1.25 x D	.3 x D	5	375	0.0009	0.0013	0.0017	0.0022	0.0026	0.0031	0.0035	0.0044	0.0052	0.007
410, 416, 440	Peripheral - HEM*	3 x D	.05 x D	5	415	0.0026	0.0039	0.0052	0.0065	0.0077	0.009	0.0103	0.0129	0.0155	0.0207
	Finish	2 x D	.015 x D	5	375	0.0009	0.0013	0.0018	0.0022	0.0027	0.0031	0.0036	0.0044	0.0053	0.0071
	Slotting	.5 x D	1 x D	5	275	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.003	0.0036	0.0048
Austenitic Stainless Steels, FeNi Alloys	Peripheral - Rough	1.25 x D	.3 x D	5	350	0.0008	0.0012	0.0016	0.002	0.0025	0.0029	0.0033	0.0041	0.0049	0.0065
303, 304, 316, Invar, Kovar	Peripheral - HEM*	3 x D	.05 x D	5	390	0.0025	0.0037	0.0049	0.0062	0.0074	0.0086	0.0099	0.0123	0.0148	0.0198
	Finish	2 x D	.015 x D	5	350	0.0008	0.0012	0.0017	0.0021	0.0025	0.0029	0.0033	0.0042	0.005	0.0067
	Slotting	.5 x D	1 x D	5	250	0.0005	0.0008	0.001	0.0013	0.0015	0.0018	0.002	0.0025	0.003	0.004
Precipitation Hardening Stainless Steels	Peripheral - Rough	1.25 x D	.3 x D	5	325	0.0007	0.001	0.0014	0.0017	0.002	0.0024	0.0027	0.0034	0.0041	0.0055
17-4, 15-5	Peripheral - HEM*	3 x D	.05 x D	5	360	0.002	0.003	0.004	0.0049	0.0059	0.0069	0.0079	0.0099	0.0119	0.0158
	Finish	1.5 x D	.015 x D	5	325	0.0007	0.001	0.0014	0.0017	0.0021	0.0024	0.0028	0.0035	0.0042	0.0056
	Slotting	.5 x D	1 x D	5	250	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0023	0.0028	0.0037
Titanium Alloys	Peripheral - Rough	1 x D	.3 x D	5	300	0.0006	0.0009	0.0013	0.0016	0.0019	0.0022	0.0025	0.0031	0.0038	0.005
6Al-4V, 6-2-4	Peripheral - HEM*	3 x D	.05 x D	5	330	0.0018	0.0027	0.0036	0.0046	0.0055	0.0064	0.0073	0.0091	0.0109	0.0146
	Finish	1.5 x D	.015 x D	5	300	0.0006	0.001	0.0013	0.0016	0.0019	0.0022	0.0026	0.0032	0.0038	0.0051
Difficult-to-Machine Titanium Alloys	Slotting	.25 x D	1 x D	5	200	0.0003	0.0005	0.0007	0.0009	0.001	0.0012	0.0014	0.0017	0.002	0.0027
10-2-3	Peripheral - Rough	1 x D	.25 x D	5	250	0.0005	0.0007	0.001	0.0012	0.0015	0.0017	0.002	0.0025	0.0029	0.0039
Precipitation Hardening Stainless Steels	Peripheral - HEM*	3 x D	.05 x D	5	275	0.0015	0.0022	0.003	0.0037	0.0045	0.0052	0.0059	0.0074	0.0089	0.0119
13-8	Finish	1.5 x D	.01 x D	5	250	0.0006	0.0009	0.0012	0.0014	0.0017	0.002	0.0023	0.0029	0.0035	0.0046

- Speed and feed recommendations are for **profile milling** (side cut) operations up to 20% of the cutter diameter
- Decrease values by 20% for **slotting operations**
- Rates based on **HIGH** values are for optimum working conditions