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 cutting speed, V_c (ft/min) and feed rate, V_f (in/tooth). Adjust the cutting speed and/or feed rate based on your cutting conditions.

Not recommended for composites or graphite. The parameters listed are based on an uncoated tools. Coated tools speed can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously increase incrementally to achieve optimum performance.

Diameter	# of Teeth	Low Si Aluminum <10% (1200-1500) SFM (ft/min)	High Si Aluminum >10% (750-1000) SFM (ft/min)	Composites (0-0) SFM (ft/min)	Plastics (1500-2000) SFM (ft/min)	Brass & Copper (400-550) SFM (ft/min)	Graphite (0-0) SFM (ft/min)
		Slotting	Slotting	Slotting	Slotting	Slotting	Slotting
		Rough	Rough	Rough	Rough	Rough	Rough
3/8	8	0.0015	0.0017	-	0.0017	0.0009	-
1/2	10	0.002	0.0023	-	0.0023	0.0013	-
5/8	10	0.0025	0.0028	-	0.0028	0.0016	-
3/4	10	0.003	0.0034	-	0.0034	0.0019	-
7/8	12	0.0035	0.0039	-	0.0039	0.0022	-
1	12	0.004	0.0045	-	0.0045	0.0025	-

Diameter	# of Teeth	Cast Iron (150-350) SFM (ft/min)	Hardened Steel >48 RC (60-140) SFM (ft/min)	Mild Steels (150-400) SFM (ft/min)	Stainless Steels (75-175) SFM (ft/min)	Super Alloys (50-150) SFM (ft/min)	Titanium (75-200) SFM (ft/min)
		Slotting	Slotting	Slotting	Slotting	Slotting	Slotting
		Rough	Rough	Rough	Rough	Rough	Rough
3/8	8	0.0008	0.0006	0.0008	0.0006	0.0006	0.0004
1/2	10	0.0010	0.0008	0.0010	0.0008	0.0008	0.0008
5/8	10	0.0013	0.0009	0.0013	0.0009	0.0009	0.0009
3/4	10	0.0015	0.0011	0.0015	0.0011	0.0011	0.0011
7/8	12	0.0018	0.0013	0.0018	0.0013	0.0013	0.0013
1	12	0.0020	0.0015	0.0020	0.0015	0.0015	0.0015

Speeds and Feeds

Feed Rate, Per Revolution (in/min)

$$v_f = f_n \cdot n$$

Feed Rate, Per Tooth (in/min)

$$v_f = f_z \cdot n \cdot Z$$

Feed Per Revolution (in/rev)

$$f_n = \frac{v_f}{n}$$

Feed Per Tooth (in)

$$f_z = \frac{v_f}{n \cdot Z}$$

Cutting Speed (ft/min)

$$v_c = \frac{\pi \cdot D_{tool} \cdot n}{12}$$

Spindle Speed (rev/min)

$$n = \frac{v_c \cdot 12}{\pi \cdot D_{tool}}$$

Material Removal Rate (in³/min)

$$MMR = a_p \cdot a_e \cdot v_f$$

Inch

Symbol	Definition	Unit
v_f	Feed rate	in/min
f_n	Feed per revolution	in/rev
f_z	Feed per tooth	in
v_c	Cutting speed	ft/min (SFM)
n	Spindle speed	rev/min (RPM)
D_{tool}	Tool cutting diameter	in
MRR	Material removal rate	(in³/min)
a_e	Radial depth of cut	in
a_p	Axial depth of cut	in
Z	Number of teeth/flutes	

TESTED. PROVEN.