Speeds and Feeds

1) Select your material in the ISO colored chart.
2) Start with the appropriate feed per tooth, f_z (in) for your application. Start with a middle/average value for cutting speed, V_c (ft/min). Adjust the cutting speeds and/or feed based on your cutting conditions.
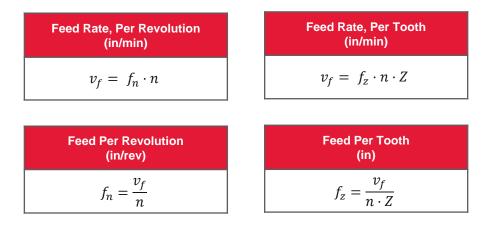
ISO Material		Parameter	Series Name	Engraving Cutter
			Coating	TiAlN
			Tool Diameter	1/8" Ø
P	Steels (1.0)	Cutting Speed, V_c	SFM MIN	230
			SFM MAX	350
		Feed per Tooth, f_z	Slotting	0.0006
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	
M	Stainless Steels (.60)	Cutting Speed, V_c	SFM MIN	130
			SFM MAX	280
		Feed per Tooth, f_z	Slotting	0.0006
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	
K	Cast Iron (1.25)	Cutting Speed, V_c	SFM MIN	250
			SFM MAX	400
		Feed per Tooth, f_z	Slotting	0.001
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	

ISO Material		Parameter	Series Name	Engraving Cutter
			Coating	TiAlN
			Tool Diameter	1/8" Ø
S	Super Alloys (Nickel based, Inconel) (.20)	Cutting Speed, V_c	SFM MIN	80
			SFM MAX	120
		Feed per Tooth, f_z	Slotting	0.0003
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	
	Titanium (.35)	Cutting Speed, V_c	SFM MIN	120
			SFM MAX	200
		Feed per Tooth, f_z	Slotting	0.0003
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	
H	Hardened Steels > 48 RC (.75)	Cutting Speed, V_c	SFM MIN	80
			SFM MAX	130
		Feed per Tooth, f_z	Slotting	0.0008
			Plunge/Ramp	
			Rough Profile	
			HEM	
			Finish	

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Speads 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
MMR	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.