## **Speeds and Feeds**



1) Select your material in the ISO colored chart.

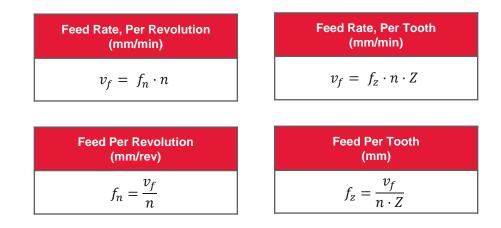
2) Start with the recommended cutting speed, v<sub>c</sub> (m/min) and feed per tooth, f<sub>z</sub> (mm). Adjust the cutting speed and/or feed based on your cutting conditions. Calculated RPM HAPN - Haas Parallelogram may exceed the maximum RPM of the cutter body. WARNING: Never exceed the maximum RPM rating of the cutter body.

IIIay	may exceed the maximum RPM of the cutter body. WARNING: Never exceed the maximum RPM rating of the cutter body.						Positive Negative					
Material				Recommended Cutting Speed					Recommended Feed Per Tooth			
	Description	Condition		Insert Grades					Application			
Group			Hardness (HB)	HP30		HMP20		HN25				
				a <sub>e</sub> / D	a <sub>e</sub> / D	a <sub>e</sub> / D	a <sub>e</sub> / D	a <sub>e</sub> / D	a <sub>e</sub> / D	Finishing	Medium Cut	Roughing
				1/1   3/4	1/5	1/1   3/4	1/5	1/1   3/4	1/5			rtougrinig
	Unalloyed Steel	0.15% C Annealed	125	245	285	220	255			0.12	0.17	0.23
Р		0.45% C Annealed	190	210	245	190	220					
		0.45% C Tempered	250	200	230	180	205					
		0.75% C Annealed	270	175	200	155	180					
		0.75% C Tempered	300	160	190	145	170					
	Low-alloyed Steel	Annealed	180	210	245	190	220			0.11	0.16	0.21
Steel		Tempered	275	175	200	155	180					
		Tempered	300	160	190	145	170					
		Tempered	350	135	160	125	145					
	High-Alloyed Steel and Tool Steel	Annealed	200	125	145	110	130			0.1	0.15	0.2
		Hardened and Tempered	325	90	100	80	90					
	Stainless Steel	Ferritic/Martensitic	200			110	130			0.08	0.12	0.16
М		Martensitic	240			95	110					
Stainless Steel		Austenitic	180			120	140					
Steel		Austenitic/Ferritic	230			95	110					
<b>N</b> Non- Ferrous	Aluminum Alloys Wrought	Cannot be Hardened	60					1205	1390	0.1	0.15	0.2
		Hardened	100					980	1140			
	Cast Aluminum Alloys	≤ 12% Si, not Hardened	75					435	500	0.1	0.15	0.2
		≤ 12% Si, Hardened	90					350	405			
		> 12% Si, not Hardened	130					180	205			
	Copper and Copper Alloys (Bronze/Brass)	Machining Steel, PB> 1%	110					140	160	0.09	0.13	0.18
		CuZn, CuSnZn	90					170	200			
		CuSn, Pb-free Copper, Electrolytic Copper	100					310	360			



## **Speeds and Feeds**





Cutting Speed (m/min)					
$v_c = \frac{\pi \cdot D_{tool} \cdot n}{1000}$					

Spindle Speed (rev/min)
$v_c \cdot 1000$
$n = \frac{1}{\pi \cdot D_{tool}}$

Material Removal Rate (cm³/min)				
$MMR = \frac{a_p \cdot a_e \cdot}{1000}$	$v_f$			

## Metric

Symbol	Definition	Unit	
$V_f$	Feed rate	mm/min	
$f_n$	Feed per revolution	mm/rev	
$f_z$	Feed per tooth	mm	
V <sub>C</sub>	Cutting speed	m/min (SMM)	
п	Spindle speed	rev/min (RPM)	
D <sub>tool</sub>	Tool cutting diameter	тт	
MRR	Material removal rate	(cm³/min)	
a <sub>e</sub>	Radial depth of cut	mm	
$a_p$	Axial depth of cut	mm	
Ζ	Number of teeth/flutes		



HaasTooling.com | HaasCNC.com