Speeds and Feeds

1) Select your material in the ISO colored chart.
2) Start with the recommended cutting speed, v_c (ft/min) and feed rate, v_f (in/min). Adjust the cutting speed and/or feed rate based on your cutting conditions. Calculated RPM may exceed the maximum RPM of the cutter body. **WARNING: Never exceed the maximum RPM rating of the cutter body.**

HS6NP – Haas Sq. Shoulder 6 Negative Positive

Material				Recommended Cutting Speed										Recommended Feed Rate		
				Insert Grades										Application		
				HP30		HMP20		HMP35		HK25		HN25				
Group	Description	Condition	Hardness (HB)	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	a_e / D	Finishing	Medium Cut	Roughing
				1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5			
P Steel	Unalloyed Steel	0.15% C Annealed	125	853	984	804	935	853	984						0.0098	
		0.45% C Annealed	190	738	836	689	804	738	836							
		0.45% C Tempered	250	689	787	656	754	689	787							
		0.75% C Annealed	270	607	689	574	656	607	689							
		0.75% C Tempered	300	558	640	525	623	558	640							
	Low-alloyed Steel	Annealed	180	738	836	689	804	738	836						0.0092	
		Tempered	275	607	689	574	656	607	689							
		Tempered	300	558	640	525	623	558	640							
		Tempered	350	476	541	443	525	476	541							
	High-Alloyed Steel and Tool Steel	Annealed	200	426	492	410	476	426	492						0.0087	
		Hardened and Tempered	325	312	344	295	328	312	344							
M Stainless Steel	Stainless Steel	Ferritic/Martensitic	200			410	476	426	492						0.0069	
		Martensitic	240			344	394	361	426							
		Austenitic	180			426	508	459	525							
		Austenitic/Ferritic	240			344	394	361	426							
K Cast Iron	Grey Cast Iron	Perlitic/Ferritic	180			886	1033			1050	1214				0.0108	
		Perlitic/Martensitic	260			525	623			623	722					
	Ductile Cast Iron	Ferritic	160			607	705			722	836				0.0098	
		Perlitic	250			410	476			476	558					
	Malleable Cast Iron	Ferritic	130			738	853			869	1000				0.0098	
		Perlitic	230			492	574			574	672					
N Non-Ferrous	Aluminum Alloys Wrought	Cannot be Hardened	60									4936	5691		0.0084	
		Hardened	100									4018	4658			
	Cast Aluminum Alloys	≤ 12% Si, not Hardened	75									1771	2034		0.0084	
		≤ 12% Si, Hardened	90									1427	1656			
		> 12% Si, not Hardened	130									722	836			
	Copper and Copper Alloys (bronze/brass)	Machining Steel, PB> 1%	110									558	640		0.0075	
		CuZn, CuSnZn	90									689	804			
		CuSn, Pb-free Copper, Electrolytic Copper	100									1263	1460			

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 (in^3/min)
$MMR = a_p \cdot a_e \cdot v_f$

Imperial

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	*(in^3/min)*
a_e	Radial depth of cut	*in*
a_p	Axial depth of cut	*in*
Z	Number of teeth/flutes	