

# 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.**

**HPP – Haas Positive Positive**

Material				Recommended Cutting Speed								Recommended Feed Rate		
Group	Description	Condition	Hardness (HB)	Insert Grades								Application		
				HP30		HMP20		HMP35		HK25		Finishing	Medium Cut	Roughing
				$a_e / D$	$a_e / D$	$a_e / D$	$a_e / D$	$a_e / D$	$a_e / D$	$a_e / D$	$a_e / D$			
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			0.0108	0.0217	
		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			0.0101	0.0201	
		Tempered	275	607	689	574	656	607	689					
		Tempered	300	558	640	525	623	558	640					
High-Alloyed Steel and Tool Steel	Annealed	200	426	492	410	476	426	492			0.0094	0.0187		
	Hardened and Tempered	325	312	344	295	328	312	344						
M Stainless Steel	Stainless Steel	Ferritic/Martensitic	200			410	476	426	492			0.0074	0.0154	
		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	0.0117	0.0240	
		Perlitic/Martensitic	260			525	623			623	722			
	Ductile Cast Iron	Ferritic	160			607	705			722	836	0.0108	0.0217	
		Perlitic	250			410	476			476	558			
	Malleable Cast Iron	Ferritic	130			738	853			869	1000	0.0108	0.0217	
		Perlitic	230			492	574			574	672			



# 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 <sup>3</sup> /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 <sup>3</sup> /min)
$a_e$	Radial depth of cut	in
$a_p$	Axial depth of cut	in
$Z$	Number of teeth/flutes	