

# Speeds and Feeds



- 1) Select your material in the ISO colored chart.
- 2) Start with the recommended cutting speed,  $v_c$  (m/min) and feed rate,  $v_f$  (mm/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.**

## HSHF – Haas Square High Feed

Material				Recommended Cutting Speed						Recommended Feed Rate					
Group	Description	Condition	Hardness (HB)	Insert Grades						Application					
				HP30		HMP20		HMP35		Face Milling		Plunge Milling		Circular Milling	
				$a_e / D$		$a_e / D$		$a_e / D$		2.0" $\emptyset$	3.0" $\emptyset$	2.0" $\emptyset$	3.0" $\emptyset$	2.0" $\emptyset$	3.0" $\emptyset$
				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	260	300	245	285	260	300	0.0144	0.024	0.003	0.0036	0.0115	0.0168
		0.45% C Annealed	190	225	255	210	245	225	255						
		0.45% C Tempered	250	210	240	200	230	210	240						
		0.75% C Annealed	270	185	210	175	200	185	210						
		0.75% C Tempered	300	170	195	160	190	170	195						
	Low-alloyed Steel	Annealed	180	225	255	210	245	225	255	0.0134	0.0223	0.0028	0.0034	0.0107	0.0156
		Tempered	275	185	210	175	200	185	210						
		Tempered	300	170	195	160	190	170	195						
		Tempered	350	145	165	135	160	145	165						
	High-Alloyed Steel and Tool Steel	Annealed	200	130	150	125	145	130	150	0.0101	0.0168	0.0027	0.0031	0.0101	0.0148
Hardened and Tempered		325	95	105	90	100	95	105							
M Stainless Steel	Stainless Steel	Ferritic/Martensitic	200			125	145	130	150	0.0072	0.012	0.0022	0.0025	0.008	0.0118
		Martensitic	240			105	120	110	130						
		Austenitic	180			130	155	140	160						
		Austenitic/Ferritic	240			105	120	110	130						
K Cast Iron	Grey Cast Iron	Perlitic/Ferritic	180			270	315			0.013	0.0216	0.0034	0.004	0.0127	0.0185
		Perlitic/Martensitic	260			160	190								
	Ductile Cast Iron	Ferritic	160			185	215			0.013	0.0216	0.003	0.0036	0.0115	0.0168
		Perlitic	250			125	145								
	Malleable Cast Iron	Ferritic	130			225	260			0.0144	0.024	0.003	0.0036	0.0115	0.0168
		Perlitic	230			150	175								



# Speeds and Feeds



Feed Rate, Per Revolution (mm/min)
$v_f = f_n \cdot n$

Feed Rate, Per Tooth (mm/min)
$v_f = f_z \cdot n \cdot Z$

Feed Per Revolution (mm/rev)
$f_n = \frac{v_f}{n}$

Feed Per Tooth (mm)
$f_z = \frac{v_f}{n \cdot Z}$

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

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

Material Removal Rate (mm <sup>3</sup> /min)
$MMR = \frac{a_p \cdot a_e \cdot v_f}{1000}$

## Metric

Symbol	Definition	Unit
$v_f$	Feed rate	mm/min
$f_n$	Feed per revolution	mm/rev
$f_z$	Feed per tooth	mm
$v_c$	Cutting speed	m/min (SMM)
$n$	Spindle speed	rev/min (RPM)
$D_{tool}$	Tool cutting diameter	mm
$MMR$	Material removal rate	(mm <sup>3</sup> /min)
$a_e$	Radial depth of cut	mm
$a_p$	Axial depth of cut	mm
$Z$	Number of teeth/flutes	