

Speeds and Feeds


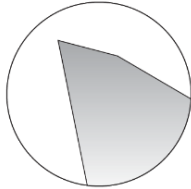

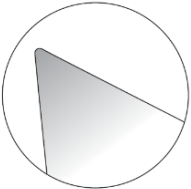

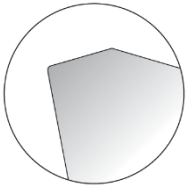

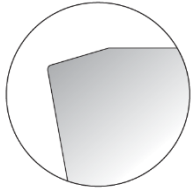


- 1) Select your material in the ISO colored chart.
- 2) Start with the recommended cutting speed, v_c (m/min) and feed rate, v_f (mm/min). Adjust the cutting speed and/or feed rate based on your cutting conditions. Calculated RPM may exceed the maximum RPM of the cutter body. **WARNING: Never exceed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

	Workpiece	Hardness	Grades	Cutting conditions				
				v_c (m/min)	f_z (mm/t)	a_p (mm)	a_e (mm)	
P	Low carbon steel	HB80~180	HU40	100~250	0.12~0.70	0.3~6.0	0.7D~0.1D	
	High carbon steel	HB180~280	HU40	100~220	0.12~0.70	0.3~6.0	0.7D~0.1D	
	Low alloy steel	Under HRC27	HP25	180~290	0.20~0.60	0.3~6.0	0.7D~0.1D	
			HU30 / HU40	100~200	0.20~0.60	0.3~6.0	0.7D~0.1D	
	Low pre-hardened steel	HRC20~50	HP25	130~250	0.30~0.50	~0.5	0.7D~0.1D	
			HH10 / HU30	50~150	0.30~0.50	~0.5	0.7D~0.1D	
	High alloy steel	Under HRC27	HP25	130~250	0.30~0.50	~0.5	0.7D~0.1D	
HU30			100~220	0.30~0.50	~0.5	0.7D~0.1D		
High pre-hardened steel	HRC20~48	HH10 / HU30	50~150	0.30~0.50	~0.5	0.7D~0.1D		
M	Stainless steel	Under HB270	HU30 / HU40	100~150	0.20~0.60	0.3~6.0	0.7D~0.1D	
K	Gray cast iron, Ductile cast iron	Under 350MPa	HU30	120~210	0.20~0.60	0.3~6.0	0.7D~0.1D	
N	Aluminum	-	HN25A	300~800	0.30~0.60	0.3~6.0	0.7D~0.1D	
S	Heat resistant alloys	Fe	HRC30~40	HU30 / HU40	35~60	0.30~0.50	~0.5	0.7D~0.1D
		Ni or Co	HRC40~45	HU30 / HU40	30~50	0.30~0.50	~0.5	0.7D~0.1D
		Titanium	HRC35~45	HU30 / HU40	40~70	0.30~0.50	~1.5	0.7D~0.1D
H	High hardened materials	Over HRC50	HU30 / HU40	30~50	0.30~0.50	~0.5	0.7D~0.1D	

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Insert	Chip Breaker	Cutting Edge Shape	Application
	HMA		Machining Aluminum
	HML		Machining Titanium & Inconel
	HMM		General Machining
	None		Machining Die Steel & Heat Resistant Alloys

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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 ³ /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 ³ /min)
a_e	Radial depth of cut	mm
a_p	Axial depth of cut	mm
Z	Number of teeth/flutes	