

# EXPANDED CUTTING CONDITIONS






ISO	Material	Material Strength	CVD Coated Grades				PVD Coated Grades		
			X500	MP91M	PFZ	SC3025	SP4036	SP6564	X400
Surface Speed Feet per Minute*									
<b>P</b>	Unalloyed Steels	<180 HBN	-	1150 - 450	910 - 440	-	920 - 490	860 - 420	770 - 400
		<280 HBN	-	1010 - 390	790 - 390	-	830 - 420	760 - 370	700 - 360
	Alloyed Steels	210-280 HBN	690 - 320	890 - 340	690 - 340	-	790 - 370	730 - 320	680 - 320
		280-360 HBN	530 - 240	660 - 260	530 - 260	-	630 - 290	580 - 260	570 - 270
		360-415 HBN	330 - 160	-	330 - 160	-	-	370 - 160	350 - 160
<b>M</b>	Stainless Steels	Austenitic + Ferritic	790 - 370	660 - 390	790 - 390	-	920 - 420	870 - 370	-
		Martensitic	710 - 320	590 - 360	730 - 360	-	830 - 370	780 - 340	-
	PH Stainless	Refractory P.H.	330 - 160	-	350 - 160	-	380 - 180	370 - 160	-
<b>K</b>	Cast Irons	Grey GG-Ft	-	1200 - 470	-	1300 - 500	970 - 470	-	-
		Spheroidal-Ductile GGG-FGS	730 - 340	940 - 370	740 - 360	1100 - 400	780 - 370	-	-
		Malleable GTS-MN/MP	660 - 320	860 - 340	680 - 320	900 - 350	710 - 340	-	-
<b>N</b>	Aluminum & Alloys	< 16% Silicon	-	-	-	-	-	-	-
		> 16% Silicon	-	-	-	-	-	-	-
<b>S</b>	High Temperature Alloys	Iron Based	280 - 130	230 - 140	280 - 140	-	300 - 140	280 - 130	-
		Cobalt Based	150 - 60	140 - 80	150 - 80	-	170 - 80	150 - 80	-
		Nickel Based	170 - 80	140 - 80	150 - 80	-	190 - 80	170 - 80	-
		Titanium Based	200 - 90	170 - 90	200 - 90	-	220 - 90	200 - 90	-
<b>H</b>	Hard Steels	48 - 52 HRC	-	-	-	-	200 - 450	- 360	305 - 140
		52 - 56 HRC	-	-	-	-	170 - 320	- 270	300 - 100
		56 - 58 HRC	-	-	-	-	70 - 130	- 130	200 - 80
	Austempered Ductile Iron	46 - 50 HRC	-	220 - 130	-	-	-	-	-

\* Surface Speed Feet per Minute

$$\text{Surface speed} = \frac{3.142 \times \text{cutter dia.} \times \text{R.P.M.}}{12}$$

$$\text{R.P.M.} = \frac{\text{Surface speed} \times 12}{(\text{Cutter dia.} \times 3.142)}$$

## Star Guide Key to Recommended Tools

Material Designations							
	<b>P</b>  Unalloyed Steels	<b>M</b>  Stainless Steels	<b>K</b>  Cast Irons	<b>S</b>  High Temp. Alloys			
	<b>P</b>  Alloyed Steels	<b>M</b>  PH Stainless	<b>N</b>  Aluminum & Alloys	<b>H</b>  Hard Materials			

# EXPANDED CUTTING CONDITIONS








ISO	Material	Material Strength	PVD Coated Grades			Uncoated Grades			Micrograin	
			SFZ	SP1064	SP5464	SF30	SU5400	X44	GH1	GH2
Surface Speed Feet per Minute*										
<b>P</b>	Unalloyed Steels	<180 HBN	790 - 440	-	795 - 340	680 - 410	605 - 370	-	-	-
		<280 HBN	710 - 390	-	700 - 300	600 - 360	545 - 320	-	-	-
	Alloyed Steels	210-280 HBN	630 - 340	970 - 570	615 - 265	530 - 320	480 - 290	450 - 260	-	-
		280-360 HBN	460 - 260	740 - 440	465 - 200	400 - 240	350 - 225	330 - 190	-	-
		360-415 HBN	-	480 - 270	300 - 130	-	225 - 145	220 - 130	-	-
<b>M</b>	Stainless Steels	Austenitic + Ferritic	710 - 390	-	-	600 - 360	-	-	-	-
		Martensitic	640 - 360	-	-	550 - 320	-	-	-	-
	PH Stainless	Refractory P.H.	300 - 160	-	-	-	-	-	-	-
<b>K</b>	Cast Irons	Grey GG-Ft	840 - 470	1320 - 780	840 - 360	-	-	-	910 - 700	875 - 625
		Spheroidal-Ductile GGG-FGS	-	1040 - 600	655 - 280	-	-	-	-	-
		Malleable GTS-MN/MP	- 550	940 - 550	595 - 255	-	-	-	-	-
<b>N</b>	Aluminum & Alloys	< 16% Silicon	2810 - 1310	3290 - 1310	-	-	-	-	3290 - 1310	3280 - 1300
		> 16% Silicon	1420 - 900	1560 - 900	-	-	-	-	1560 - 900	1400 - 800
<b>S</b>	High Temperature Alloys	Iron Based	250 - 130	-	-	-	-	-	-	-
		Cobalt Based	140 - 80	-	-	-	-	-	-	-
		Nickel Based	150 - 80	-	-	-	-	-	-	-
		Titanium Based	170 - 90	-	-	-	-	-	220 - 160	175 - 100
<b>H</b>	Hard Steels	48 - 52 HRC	200 - 360	200 - 450	300 - 130	-	-	-	-	-
		52 - 56 HRC	170 - 270	170 - 320	280 - 120	-	-	-	-	-
		56 - 58 HRC	70 - 130	70 - 130	265 - 115	-	-	-	-	-
	Austempered Ductile Iron	46 - 50 HRC	-	-	235 - 100	-	-	-	-	-

\* Surface Speed Feet per Minute

$$\text{Surface speed} = \frac{3.142 \times \text{cutter dia.} \times \text{R.P.M.}}{12}$$

$$\text{R.P.M.} = \frac{\text{Surface speed} \times 12}{(\text{Cutter dia.} \times 3.142)}$$

## Star Guide Key to Recommended Tools

Material Designations	
 P Unalloyed Steels	 M Stainless Steels
 K Cast Irons	 S High Temp. Alloys
 P Alloyed Steels	 M PH Stainless
 N Aluminum & Alloys	 H Hard Materials