

Recommended Cutting Speeds and Feeds for Carbide Tools

Solid Carbide Drills

Material	Cutting Speed (SFM)
Aluminium / Aluminium Alloys	250-450
Aluminium-High Silicon	100-250
Brass	250-450
Bronze	150-250
Copper / Copper Alloys	150-350
Cast Iron (soft)	130-200
Cast Iron (medium)	100-150
Cast Iron (hard)	50-130
Magnesium	300-600
Monel	60-180
Steel (cast & forged)	60-120
Steel Heat Treated (35-40 RC)	60-80
Steel Heat Treated (40-45 RC)	40-60
Steel Heat Treated (45 + RC)	20-40
Steel (medium carbon)	100-180
Mould Steel	60-130
Tool Steel	40-110
Stainless Steel (300 series)	30-90
Stainless Steel (400 series)	40-130
Inconel	30-70
Rene	30-60
Titanium	40-100
Waspaloy	30-60
Epoxy Fibre	200-350
Plastic	200-600
Resin (fibreglass)	200-400
Masonite	80-200
Phenolic	70-120

Diameter Range	Feed (I.P.M.)
Under 1/16"	.0005-.001
Over 1/16" to 1/8"	.001-.002
Over 1/8" to 1/4"	.002-.003
Over 1/4" to 3/8"	.003-.005
Over 3/8" to 1/2"	.005-.008

Solid Carbide End Mills

Material	Cutting Speed SFM	End Feed per tooth		
		<1/4"	<1/2"	<1"
Aluminium / Aluminium Alloys	600-1200	.0002-.0020	.0020-.0040	.0040-.0080
Brass / Bronze	200-350	.0005-.0020	.0020-.0030	.0030-.0050
Copper / Copper Alloys	350-900	.0005-.0020	0.002	.0020-.0060
Iron-Cast (soft)	200-500	.0005-.0020	.0020-.0030	.0030-.0080
Iron-Cast (hard)	80-350	.0003-.0008	.0008-.0020	.0020-.0040
Iron-Ductile	80-400	.0002-.0010	.0010-.0020	.0020-.0060
Iron-Malleable	200-600	.0002-.0010	.0010-.0030	.0030-.0070
Magnesium / Magnesium Alloys	800-1400	.0005-.0020	.0020-.0040	.0040-.0100
Monel / High Nickel Steel	150-300	.0002-.0010	.0010-.0020	.0020-.0040
Nickel Base High Temp. Alloys	20-130	.0003-.0008	.0008-.0010	.0010-.0020
Plastics	600-1200	.0006-.0030	.0030-.0060	.0060-.0150
Plastics-Glass Filled	300-800	.0006-.0030	.0030-.0040	.0040-.0120
Refractory Alloys	80-400	.0002-.0010	0.001	.0010-.0020
Steel-Low Carbon	200-500	.0002-.0010	.0010-.0030	.0030-.0070
Steel-Medium Carbon	100-250	.0004-.0015	.0015-.0020	.0020-.0050
Steel-Hardened	25-120	.0002-.0005	.0005-.0010	.0010-.0030
Mould Steel	200-350	.0002-.0010	.0010-.0020	.0020-.0060
Tool Steel	100-300	.0002-.0010	.0010-.0020	.0020-.0060
Stainless Steel-Soft	150-350	.0002-.0010	.0010-.0020	.0020-.0060
Stainless Steel-Hard	50-200	.0002-.0005	.0005-.0010	.0010-.0050
Titanium-Soft	120-350	.0002-.0010	.0010-.0020	.0020-.0060
Titanium-Hard	30-150	.0002-.0005	.0005-.0010	.0010-.0040

S.F.M. = Surface Feet Per Minute
 I.P.M. = Inches Per Minute
 I.P.R. = Inches Per Revolution

Solid Carbide Reamers

Material	Cutting Speed SFM	Feed I.P.R
Aluminium / Aluminium Alloys	100-250	.005-.015
Aluminium-High Silicon	80-200	.003-.012
Brass	100-250	.005-.015
Bronze	90-175	.003-.012
Copper / Copper Alloys	90-220	.005-.015
Cast Iron (soft)	80-200	.006-.015
Cast Iron (medium)	60-150	.006-.012
Cast Iron (hard)	40-90	.004-.010
Magnesium	100-250	.005-.015
Monel	40-120	.004-.012
Steel (cast & forged)	40-100	.003-.010
Steel Heat Treated (35-40 RC)	40-70	.004-.008
Steel Heat Treated (40-45 RC)	30-50	.002-.006
Steel Heat Treated (45 + RC)	15-40	.001-.004
Steel (medium carbon)	50-100	.005-.010
Mould Steel	40-120	.004-.006
Tool Steel	30-90	.004-.006
Stainless Steel (300 series)	20-80	.004-.008
Stainless Steel (400 series)	30-120	.005-.010
Inconel	20-60	.001-.005
Rene	20-60	.002-.006
Titanium	30-90	.002-.008
Waspaloy	20-60	.002-.006
Epoxy Fibre	100-250	.005-.015
Plastic	100-300	.005-.015
Resin (fibreglass)	100-300	.005-.015
Masonite	60-150	.005-.015
Phenolic	60-100	.005-.015

To calculate the spindle speed in rpm use these formulae:

For imperial cutting tools, Spindle speed (rpm) = $\frac{S.F.M \times 12}{D \times 3.142}$ (where D is the cutter diameter in inches)

For metric cutting tools, Spindle speed (rpm) = $\frac{S.F.M \times 304.8}{D \times 3.142}$ (where D is the cutter diameter in mm)



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