

High Performance Solid Carbide Milling Guide

Metric

Type	Rc Hardness	MILLING M/Min. (Vc)				CHIPLOAD PER FLUTE (Fz)		
		Aluminum Series		All Other High Performance Series		3.0 - 6.0	6.0 - 12.0	12.0 - 25.0
		Uncoated	Coated	Uncoated	X.Ceed Coated			
COBALT BASE ALLOYS								
Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-4, L-605	< 35	-	-	60 - 80	80 - 120	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	40 - 50	50 - 75	.010 - .035	.025 - .050	.025 - .075
NICKEL BASE ALLOYS								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	45 - 60	60 - 90	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	25 - 40	40 - 60	.010 - .035	.025 - .050	.025 - .075
IRON BASE ALLOYS								
Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 35	-	-	60 - 90	75 - 105	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	45 - 60	60 - 75	.010 - .035	.025 - .050	.025 - .075
MONEL								
Monel - 65% Nickel		-	-	60 - 90	80 - 120	.025 - .065	.035 - .100	.075 - .125
TITANIUM ALLOYS								
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		40 - 90	75 - 120	45 - 90	75 - 120	.010 - .025	.025 - .065	.035 - .100
5553 / Beta Titanium		-	-	30 - 60	45 - 75	.008 - .020	.020 - .050	.025 - .075
STAINLESS STEELS								
13/8, 15/5, 17-4, pH Types	< 35	-	-	60 - 105	75 - 90	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	45 - 75	60 - 75	.010 - .035	.025 - .050	.025 - .075
Inox, 200 Series, 300 Series	< 35	-	-	75 - 105	90 - 120	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	50 - 80	65 - 90	.010 - .035	.025 - .050	.025 - .075
304L, 316L, Nitronic 50, Inox	< 35	-	-	40 - 60	75 - 90	.020 - .035	.025 - .050	.035 - .075
	> 35	-	-	25 - 40	60 - 75	.010 - .025	.025 - .035	.025 - .050
400 Series	< 35	-	-	60 - 105	75 - 90	.020 - .050	.025 - .075	.050 - .100
	> 35	-	-	45 - 75	60 - 75	.010 - .035	.025 - .050	.025 - .075
HIGH STRENGTH TOOL STEELS								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	65 - 90	75 - 105	.020 - .050	.025 - .075	.050 - .100
	30 - 38	-	-	40 - 60	45 - 75	.010 - .035	.025 - .050	.025 - .075
	> 38	<i>(SEE HIGH ROCKWELL CHART - PAGES 238-239)</i>						
MEDIUM ALLOY TOOL STEELS								
200, 250, 300, 8620	< 35	-	-	75 - 105	75 - 120	.025 - .065	.035 - .100	.075 - .125
	> 35	-	-	45 - 60	45 - 90	.020 - .050	.025 - .075	.050 - .100
CARBON STEELS								
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	75 - 105	90 - 150	.025 - .065	.035 - .100	.075 - .125
	> 35	-	-	45 - 60	75 - 120	.020 - .050	.025 - .075	.050 - .100
CAST MATERIAL								
Steel		-	-	50 - 75	75 - 120	.035 - .100	.050 - .150	.075 - .250
Ductile Iron		-	-	60 - 90	90 - 125	.035 - .100	.050 - .150	.075 - .250
Gray Iron		-	-	50 - 75	75 - 125	.035 - .100	.050 - .150	.075 - .250
Aluminum		90 - 120	90 - 150	90 - 120	-	.035 - .100	.050 - .150	.075 - .250
ALUMINUM								
Aircraft Grade (6061, 7075)	Standard Speed	90 - 120	90 - 180	60 - 120	90 - 150	.035 - .100	.050 - .150	.075 - .250
	High Speed	<i>(SEE HIGH SPEED ALUMINUM CHART - PAGE 232)</i>						
MAGNESIUM								
		60 - 90	60 - 150	60 - 90	90 - 150	.035 - .100	.050 - .150	.075 - .250
COPPER								
Copper Alloys		60 - 90	90 - 150	60 - 90	90 - 150	.025 - .065	.040 - .090	.050 - .200
BRASS, BRONZE								
Brass, Aluminum/Bronze, Low Silicon Bronze		60 - 90	90 - 150	60 - 90	60 - 120	.025 - .065	.040 - .090	.050 - .200

Beryllium added to any material adds hardness and some nickel content. If tool displays chatter, increase feed (M/Min.) up to 30% and reduce speed (RPM) by 10%. More detailed information is available on succeeding pages regarding the following materials: Aluminum, High Rockwell Steels, Graphite, and VRX end mills

NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.