General Solid Carbide Milling Guide

Metric

Type	Rc Hardness	MILLING M/Min. (Vc)					CHIPLOAD PER FLUTE (Fz)				
		2 flute stub / std.	2 flute extra length	3 & 4 flute stub / std.	3 & 4 flute extra length	DIAMOND COATED	1.0 - 3.0	3.0 - 6.0	6.0 - 12.0	12.0 - 25.0	25.0 - 32.0
COBALT BASE ALLOYS											
Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 35	-	-	50 - 70	45 - 60	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	35 - 50	30 - 45	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
NICKEL BASE ALLOYS											
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	35 - 50	30 - 45	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	20 - 35	15 - 25	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
IRON BASE ALLOYS											
Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 35	-	-	50 - 70	45 - 60	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	35 - 50	30 - 45	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
MONEL											
Monel - 65% Nickel		50 - 90	35 - 50	50 - 90	35 - 50	-	.015 - .035	.025 - .065	.035 - .100	.075 - .125	.100 - .150
TITANIUM ALLOYS											
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		60 - 90	35 - 75	60 - 90	35 - 75	-	.015 - .035	.025 - .065	.035 - .100	.075 - .125	.100 - .150
5553 / Beta Titanium		-	-	35 - 65	30 - 60	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
STAINLESS STEELS											
13/8, 15/5, 17-4, pH Types	< 35	-	-	45 - 75	30 - 45	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	35 - 50	25 - 45	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
Inox, 200 Series, 300 Series	< 35	-	-	60 - 80	40 - 55	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	45 - 60	30 - 45	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
304L, 316L, Nitronic 50, Inox	< 35	-	-	25 - 40	25 - 35	-	.010 - .020	.020 - .035	.025 - .050	.035 - .075	.050 - .100
	> 35	-	-	20 - 35	15 - 25	-	.005 - .015	.010 - .025	.025 - .035	.025 - .050	.035 - .075
400 Series	< 35	-	-	45 - 75	30 - 45	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	> 35	-	-	35 - 50	25 - 40	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
HIGH STRENGTH TOOL STEELS											
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	45 - 60	35 - 50	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
	30 - 38	-	-	30 - 45	25 - 35	-	.005 - .015	.010 - .035	.025 - .050	.025 - .075	.050 - .100
	> 38	-	-	15 - 30	10 - 25	-	.003 - .008	.005 - .020	.015 - .040	.020 - .065	.035 - .090
MEDIUM ALLOY TOOL STEELS											
200, 250, 300, 8620	< 35	-	-	55 - 75	45 - 60	-	.015 - .035	.025 - .065	.035 - .100	.075 - .125	.100 - .150
	> 35	-	-	35 - 55	30 - 45	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
CARBON STEELS											
A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	55 - 75	45 - 60	-	.015 - .035	.025 - .065	.035 - .100	.075 - .125	.100 - .150
	> 35	-	-	35 - 55	30 - 45	-	.010 - .025	.020 - .050	.025 - .075	.050 - .100	.075 - .125
CAST MATERIAL											
Steel		70 - 100	50 - 75	75 - 105	50 - 75	-	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250
Ductile Iron		60 - 90	35 - 60	60 - 90	35 - 60	-	.015 - .035	.025 - .075	.035 - .100	.050 - .150	.075 - .200
Gray Iron		70 - 100	50 - 75	75 - 105	50 - 75	-	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250
Aluminum		75 - 105	75 - 105	75 - 105	75 - 105	-	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250
ALUMINUM											
Aircraft Grade (6061, 7075)	Standard Speed	90 - 150	90 - 150	90 - 150	90 - 150	-	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .300
	High Speed	*(SEE HIGH SPEED ALUMINUM CHART - PAGE 232)*									
MAGNESIUM											
		90 - 150	90 - 150	90 - 150	90 - 150	-	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250
COPPER											
Copper Alloys		120 - 150	75 - 105	90 - 135	75 - 105	-	.020 - .040	.025 - .065	.040 - .090	.050 - .200	.075 - .250
BRASS, BRONZE											
Brass, Aluminum/Bronze, Low Silicon Bronze		90 - 120	60 - 90	75 - 115	60 - 90	-	.020 - .040	.025 - .065	.040 - .090	.050 - .200	.075 - .250
COMPOSITE MATERIAL											
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	60 - 120	60 - 120	60 - 150	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250
Graphite, G10		*(SEE GRAPHITE CHART - PAGE 242)*				90 - 300	.025 - .050	.035 - .100	.050 - .150	.075 - .250	.125 - .250

When plunging into a solid, drop feed by approximately 50%.

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