



# FEEDS & SPEEDS - MILLING CUTTERS OR SAWS CARBIDE TIPPED

**RPM FORMULA:**  $\frac{\text{SFM} \times 3.82}{\text{Diameter}}$

**IPM FORMULA:**  $\text{IPT} \times \text{RPM} \times \text{Number of teeth}$



Feeds & speeds are starting recommendations only. Factors including fixturing, available horsepower, depth of cut, and coolant capabilities may significantly affect performance. Use this chart for half and full side mill & face mill cutters.

CHIP CLASS	MATERIAL BEING MACHINED	MATERIAL EXAMPLES	BRINELL HARDNESS	CHIP DESCRIPTION	SLITTING SAWS AND SIDE MILLING CUTTERS	
					SURFACE FEET PER MINUTE	INCHES PER TOOTH
					SFPM	IPT
20	ALUMINUM ALLOY CAST AND WROUGHT	308.0, 356.0, 360.0, 380.0, 383.0, 390.0, 2024, 3003, 4032, 5052, 6061, 7075	30 - 150 (500 kg)	DISCONTINUOUS FLAKY OR LONG STRINGY	1000 - 2000	.004-.008
	COPPER ALLOY TOUGH	101, 110, 115, 120, 130, 142, 155, 170, 172, 175, 195, 425, 610, 630, 655, 725, 805, 826, 910	40 - 200 (500 kg)	LONG CONTINUOUS	200 - 500	.004-.008
	LEAD ALLOY	Alloys 7, 8, 13, 15 15b, 45b, 65b, 85b, 95b	10 - 20 (500 kg)	DISCONTINUOUS TIGHTLY CURLED	300 - 1000	.004-.008
	PLASTIC	ABS, Acrylic, Allyl, Bakelite, Epoxy, Furan, Nylon, Polyethylene, Polystyrene, PVC	-	CONTINUOUS	1500 - 3000	.004-.008
	ZINC ALLOY	AC41 A, AG40A, AMS4803, 11 7RO 12, ZDC NO. 7 GRADES 903, 925	80 - 100	LONG TIGHTLY CURLED	750 - 1500	.005-.010
40	ALUMINUM BRONZE	614, 952-958	40 - 175	SHORT LOOSELY CURLED	200 - 600	.003-.006
	COPPER ALLOY/BRASS/BRONZE FREE MACHINING	268, 270, 314, 332, 335, 340, 342, 353, 356, 360, 370, 464-467, 485, 838, 945	10 - 100Rb	FLAT SMALL	400 - 800	.004-.008
	MAGNESIUM ALLOY	AM60A, AZ21A, AZ91B-C, HM31A, K1A, ZE41A, ZK40A	50 - 90 (500 kg)	FLAT SMALL	750 - 1500	.004-.008
	NICKEL SILVER	745, 752, 754, 757, 770, 973-978	10 - 100Rb	LOOSELY CURLED	200 - 400	.003-.006
60	CAST IRON - DUCTILE AUSTENITIC (NI-RESIST)	TYPES D-2, D-2B, D-2C, D-2M, D-3, D-3A, D-4, D-5, D-5B	120 - 275	DISCONTINUOUS TIGHTLY CURLED	75 - 150	.002-.004
	CAST IRON - DUCTILE FERRITIC & FERRITIC - PEARLITIC	GRADES 60-40-18, 65-45-12, 80-55-06, D4018, D4512, D5506	140 - 270	DISCONTINUOUS TIGHTLY CURLED	250 - 400	.003-.006
	CAST IRON - DUCTILE MARTENSITIC & PEARLITIC - MARTENSITIC	GRADES 100-70-03, 120-90-02, D7003, DQ&T	270 - 400	DISCONTINUOUS TIGHTLY CURLED	200 - 300	.003-.006
	CAST IRON - GRAY FERRITIC & FERRITIC - PEARLITIC	CLASSES 20, 25, 30, 35, 40 GRADES G1800, G2500, G3000	120 - 220	DISCONTINUOUS	250 - 425	.003-.006
	CAST IRON - GRAY PEARLITIC	CLASSES 45, 50, 55, 60 GRADES G3500, G4000	220 - 320	DISCONTINUOUS	120 - 300	.002-.004
	CAST IRON - MALLEABLE FERRITIC & PEARLITIC	GRADES 32510, 35018, 40010, 45008 GRADES M3210, M4504, M5003	110 - 240	DISCONTINUOUS	200 - 400	.003-.006
	CAST IRON - MALLEABLE TEMPERED MARTENSITE	GRADES 60004, 70003, 80002 GRADES M5003, M8501	200 - 320	DISCONTINUOUS	130 - 225	.002-.004
80	STEEL - LOW & MEDIUM STRENGTH FREE MACHINING	1108-1119, 1132-1151, 10L17, 10L18, 10L50, 11L44, 12L13, 12L14, 12L15	100 - 250	DISCONTINUOUS LOOSELY CURLED	250 - 500	.003-.006
	STEEL - LOW & MEDIUM STRENGTH WROUGHT	1005-1029, 1030-1050, 1513, 1518, 1524, 1552	100 - 375	CONTINUOUS STRINGY	200 - 400	.002-.004
100	ALLOY STEEL - LOW & MEDIUM STRENGTH FREE MACHINING	41L30, 41L40, 41L50, 86L20, 4142Se, 4145Te	100 - 275	DISCONTINUOUS TIGHTLY CURLED	200 - 400	.002-.004
	ALLOY STEEL - LOW & MEDIUM STRENGTH	1330, 1345, 1515, 4012, 4130, 4140, 4150, 4320, 4340, 4620, 5130, 8620, 8630, 8645, 9310	85 - 375	LOOSELY CURLED	150 - 300	.002-.005
	STAINLESS STEEL 400 SERIES	409, 410, 414, 420, 430, 436, 442, 446	135 - 325	DISCONTINUOUS TIGHTLY CURLED	200 - 400	.003-.006
	STAINLESS STEEL FREE MACHINING	203 EZ, 303, 303MA, 303Pb, 303 PLUS X, 303Se, 416, 416Se, 420F, 430F, 440F	135 - 275	SHORT TIGHTLY CURLED	250 - 500	.003-.006
120	ALLOY STEEL - HIGH STRENGTH, MARAGING STEEL, NITRIDING STEEL, TOOL STEEL	50100, 51100, 52100, GRADES 200-350, Nitrallloy, SERIES A2, D2, H13, M50, P20, S7, W1	175 - 400	CONTINUOUS WIRY	75 - 150	.002-.004
140	HIGH TEMP ALLOY NICKEL & IRON	A-286; Hastelloy C; Inconel 600, 625, 718, 825; Monel 400; Nimonic 75, 80; Rene 41; Waspaloy	140 - 300	CONTINUOUS WIRY	50 - 150	.002-.004
	STAINLESS STEEL 300 SERIES	301, 302, 304, 309, 314, 316, 321, 330, 347, 385, Nitronic 32, 33, 40, 50, 60	135 - 375	WIRY LOOSELY CURLED	75 - 150	.002-.004
	STAINLESS STEEL PH SERIES	13-8 Mo, 15-5PH, 16-6PH, 17-4PH, 17-7PH, AM-350, AM-335	150 - 440	WIRY LOOSELY CURLED	75 - 150	.002-.004
	TITANIUM ALLOY	98.9, 99.0, 99.2, 99.5, Ti-6Al-4V, Ti-6Al-6V2Sn, Ti-8Mn, Ti-10v-2Fe-3Al	110 - 380	CONTINUOUS WIRY	100 - 200	.002-.004

CUTTERS