ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inches per Tooth) 1/4	3/8	1/2	5/8	3/4	1
N	Aluminum Alloys 2024, 6061, 7075	Slotting	1 x D	1 x D	3	800	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	≤ 2 x D	.5 x D	3	1000	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	1000	.0038	.0056	.0075	.0094	.0113	.0150
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	900	.0033	.0049	.0065	.0081	.0098	.0130
		*Helical Ramp Angle	3.0 deg.	1 x D	3	800	.0024	.0036	.0048	.0060	.0072	.0096
	High Silicon Aluminum A380, A390	Slotting	.75 x D	1 x D	3	500	.0023	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	≤ 2 x D	.4 x D	3	700	.0029	.0043	.0057	.0071	.0086	.0114
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	700	.0028	.0041	.0055	.0069	.0083	.0110
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	600	.0024	.0036	.0048	.0060	.0072	.0096
		*Helical Ramp Angle	2.5 deg.	1 x D	3	500	.0018	.0027	.0036	.0045	.0054	.0072
	Magnesium Alloys	Slotting	1 x D	1 x D	3	800	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	≤ 2 x D	.5 x D	3	1000	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Rough	> 2 - 3 x D	.5 x D	3	1000	.0038	.0056	.0075	.0094	.0113	.0150
		Peripheral - Rough	> 3 - 4 x D	.45 x D	3	900	.0033	.0049	.0065	.0081	.0098	.0130
		*Helical Ramp Angle	3.0 deg.	1 x D	3	800	.0024	.0036	.0048	.0060	.0072	.0096
	Copper Alloys, Brass	Slotting	.75 x D	1 x D	3	500	.0019	.0028	.0037	.0046	.0056	.0074
		Peripheral - Rough	≤ 2 x D	.4 x D	3	600	.0023	.0035	.0046	.0058	.0069	.0092
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	600	.0023	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	500	.0020	.0029	.0039	.0049	.0059	.0078
		*Helical Ramp Angle	2.5 deg.	1 x D	3	500	.0015	.0022	.0030	.0037	.0044	.0059
	Bronze	Slotting	.75 x D	1 x D	3	500	.0018	.0026	.0035	.0044	.0053	.0070
		Peripheral - Rough	≤ 2 x D	.4 x D	3	600	.0022	.0033	.0044	.0055	.0066	.0088
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	600	.0021	.0032	.0042	.0053	.0063	.0084
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	500	.0018	.0026	.0035	.0044	.0053	.0070
		*Helical Ramp Angle	2.0 deg.	1 x D	3	500	.0014	.0021	.0028	.0035	.0042	.0056
	Composites, Plastics, Fiberglass	Slotting	.75 x D	1 x D	3	500	.0023	.0034	.0045	.0056	.0068	.0090
		Peripheral - Rough	≤ 2 x D	.4 x D	3	700	.0029	.0043	.0057	.0071	.0086	.0114
		Peripheral - Rough	> 2 - 3 x D	.4 x D	3	700	.0028	.0041	.0055	.0069	.0083	.0110
		Peripheral - Rough	> 3 - 4 x D	.375 x D	3	600	.0024	.0036	.0048	.0060	.0072	.0096
		*Helical Ramp Angle	3.0 deg.	1 x D	3	500	.0018	.0027	.0036	.0045	.0054	.0072

*Straight-Line Ramp Angle = Helical ramp angle x 5 for entry up to 1 x D.

≈ Approximately Equals
≤ Less Than or Equal To
≥ Greater Than or Equal To
× Multiply
< Less Than
> Greater Than
= Equals

Tool Tip: M233 Rougher end mills show up to 20% power reduction from M223 in the same cut.

Common Machining Formulas

$$RPM = \frac{SFM \times 3.82}{D}$$

$$SFM = RPM \times D \times .262$$

$$IPM = RPM \times IPT \times Z$$

$$MRR = RDOC \times ADOC \times IPM$$

$$RPM = \frac{M/min \times 318.3}{D}$$

$$M/min = RPM \times D \times .00314$$

$$MMPM = RPM \times MMPT \times Z$$

$$MRR = RDOC \times ADOC \times MMPM$$