M2 Series Application Guide (Inch) • Speed & Feed

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inch per Tooth) 1/8	1/4	3/8	1/2	5/8	3/4	1
N	Aluminum Alloys 2024, 6061, 7075	Slotting	1 x D	1 x D	2	800	.0018	.0036	.0054	.0072	.0090	.0108	.0144
			.75 x D	1 x D	3	800	.0015	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	1 x D	.75 x D	2	1000	.0025	.0050	.0075	.0100	.0125	.0150	.0200
					3	1000	.0020	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Finish	1.5 x D	.01 x D	2	1200	.0030	.0060	.0090	.0120	.0150	.0210	.0240
					3	1200	.0025	.0050	.0075	.0100	.0125	.0150	.0200
	High Silicon-Aluminum A380, A390	Slotting	.75 x D	1 x D	2	500	.0013	.0026	.0039	.0052	.0065	.0078	.0104
			.5 x D	1 x D	3	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088
		Peripheral - Rough	1 x D	.5 x D	2	700	.0016	.0033	.0049	.0065	.0081	.0098	.0130
					3	700	.0014	.0028	.0041	.0055	.0069	.0083	.0110
		Peripheral - Finish	1.5 x D	.01 x D	2	900	.0020	.0041	.0061	.0082	.0102	.0122	.0163
					3	900	.0017	.0035	.0052	.0069	.0086	.0104	.0138
	Magnesium Alloys	Slotting	1 x D	1 x D	2	800	.0018	.0036	.0054	.0072	.0090	.0108	.0144
			.75 x D	1 x D	3	800	.0015	.0030	.0045	.0060	.0075	.0090	.0120
		Peripheral - Rough	1 x D	.75 x D	2	1000	.0025	.0050	.0075	.0100	.0125	.0150	.0200
					3	1000	.0020	.0040	.0060	.0080	.0100	.0120	.0160
		Peripheral - Finish	1.5 x D	.01 x D	2	1200	.0030	.0060	.0090	.0120	.0150	.0210	.0240
					3	1200	.0025	.0050	.0075	.0100	.0125	.0150	.0200
	Copper Alloys, Brass, Bronze	Slotting	.75 x D	1 x D	2	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088
					3	500	.0009	.0018	.0027	.0036	.0045	.0054	.0072
		Peripheral - Rough	1 x D	.75 x D	2	575	.0011	.0022	.0033	.0044	.0055	.0066	.0088
					3	575	.0013	.0026	.0039	.0052	.0065	.0078	.0104
		Peripheral - Finish	1.5 x D	.01 x D	2	650	.0018	.0036	.0054	.0072	.0090	.0108	.0144
					3	650	.0015	.0030	.0045	.0060	.0075	.0090	.0120
	Composites, Plastics, Fiberglass	Slotting	1 x D	1 x D	2	500	.0013	.0026	.0039	.0052	.0065	.0078	.0104
					3	500	.0011	.0022	.0033	.0044	.0055	.0066	.0088
		Peripheral - Rough	1 x D	.75 x D	2	700	.0016	.0033	.0049	.0065	.0081	.0098	.0130
					3	700	.0014	.0028	.0041	.0055	.0069	.0083	.0110
		Peripheral - Finish	1.5 x D	.01 x D	2	900	.0020	.0041	.0061	.0082	.0102	.0122	.0163
					3	900	.0017	.0035	.0052	.0069	.0086	.0104	.0138

D = Tool diameter

Common Machining Formulas

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

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

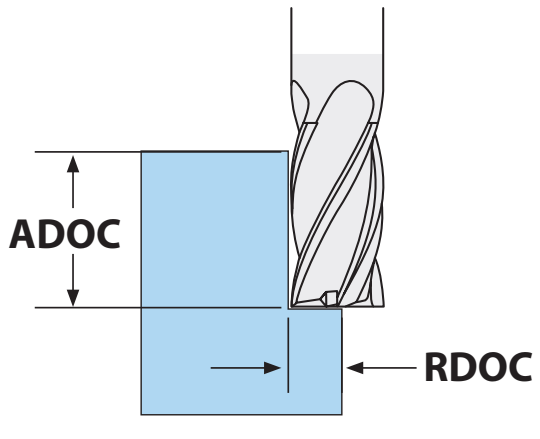
$$IPM = RPM \times IPT \times Z$$

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

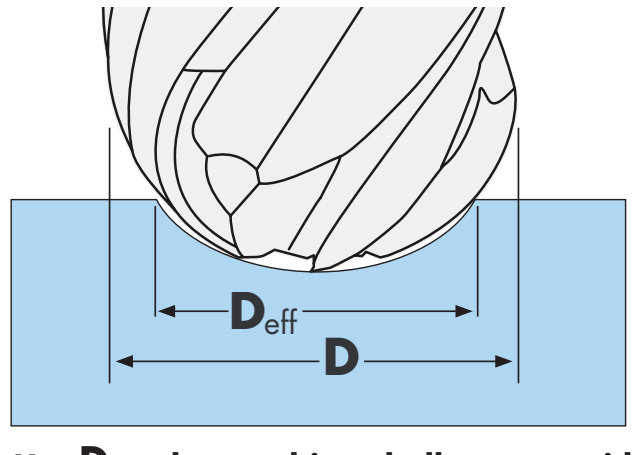
Radial Chip Thinning Adjustment $$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

Ball Nose "Effective Diameter" $$D_{eff} = 2x \sqrt{R^2 - (R - ADOC)^2}$$

D	Tool Cutting Diameter
R	Tool Radius
Z	Number of Flutes
RPM	Revolutions per Minute
SFM	Surface Feet per Minute
IPM	Inches per Minute
MRR	Metal Removal Rate
RDOC	Radial Depth of Cut
ADOC	Axial Depth of Cut

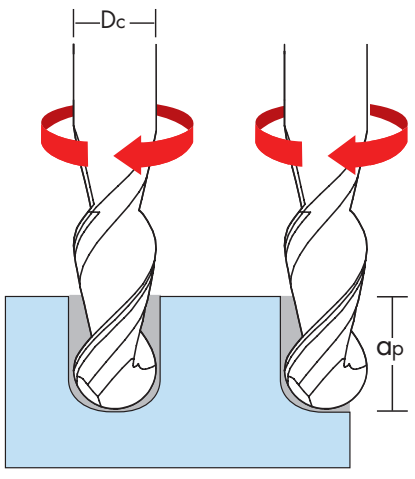


Apply chip thinning adjustment when RDOC < D



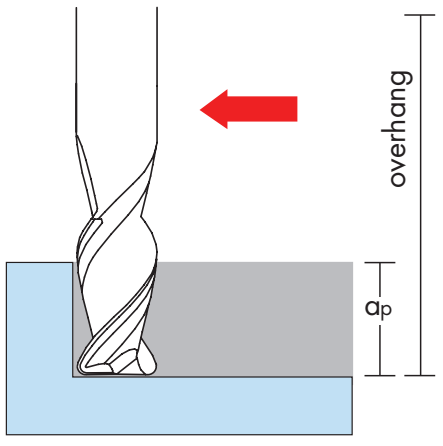
Use D_{eff} when making shallow cuts with full radius

Adjustments – Apply these adjustments when programming the following applications.



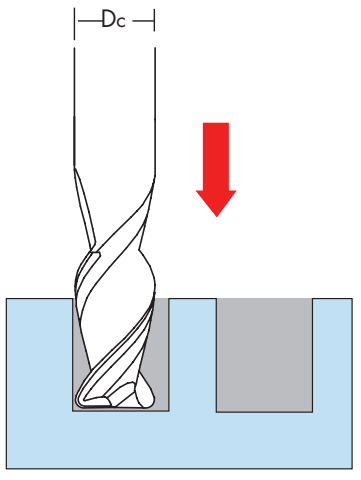
1. Ball-nose end mills

- Reduce chip load by 25% from roughing/slotting recommendation when axial DOC (ap) exceeds 75% of Dc



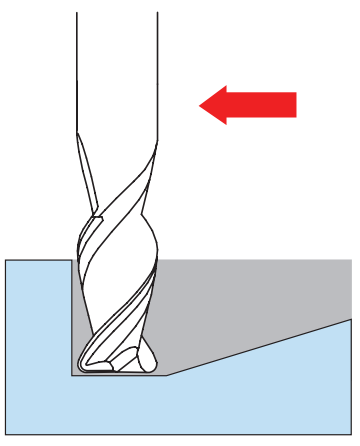
2. Long reach mills with large overhang

- Reduce speed rate and chip load by 10%



3. Plunge entry into work piece

- Reduce chip load by 80% of recommended slotting rate
- Peck mill if axial DOC (ap) exceeds 50% of Dc



4. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chip load by 20% of recommended slotting rate