

M503 enDURO Application Guide (metric) • Speed & Feed

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/Min)	Feed (MM per Tooth)						
							3,0	6,0	9,0	12,0	16,0	19,0	25,0
M	Easy to Machine Stainless Steels 416, 410, 302, 303	Slot	.5 x D	1 x D	3	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
		Rough	1 x D	.5 x D	3	107	.0152	.0330	.0483	.0635	.0813	.0965	.1270
	Moderately Difficult Stainless Steels 304, 316, Invar, Kovar	Slot	.5 x D	1 x D	3	76	.0076	.0178	.0279	.0381	.0483	.0584	.0762
		Rough	1 x D	.5 x D	3	91	.0152	.0279	.0432	.0559	.0711	.0889	.1143
	Difficult to Machine Stainless Steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slot	.5 x D	1 x D	3	69	.0076	.0152	.0229	.0305	.0381	.0457	.0610
		Rough	1 x D	.5 x D	3	84	.0076	.0178	.0279	.0381	.0483	.0584	.0762
P	Low Carbon Steels ≤ 32 HRc 1018, 12L14, 8620	Slot	.5 x D	1 x D	3	99	.0152	.0330	.0533	.0686	.0889	.1067	.1372
		Rough	1 x D	.5 x D	3	114	.0178	.0381	.0584	.0762	.0940	.1143	.1524
	Carbon & Tool Steels 33 HRc to 38 HRc	Slot	.5 x D	1 x D	3	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
		Rough	1 x D	.5 x D	3	99	.0152	.0305	.0457	.0584	.0737	.0889	.1168
N	Copper, Brass, & Bronze	Slot	.5 x D	1 x D	3	137	.0178	.0381	.0559	.0762	.0940	.1143	.1524
		Rough	1 x D	.5 x D	3	168	.0203	.0457	.0660	.0889	.1118	.1346	.1778
	Aluminum, Bronze & Beryllium Copper	Slot	.5 x D	1 x D	3	84	.0127	.0254	.0381	.0508	.0635	.0762	.1016
		Rough	1 x D	.5 x D	3	107	.0152	.0330	.0508	.0635	.0813	.0991	.1270

D = Tool diameter

Common Machining Formulas

D Tool Cutting Diameter
R Tool Radius
Z Number of Flutes
RPM Revolutions per Minute
M/MIN Meters per Minute
MM/Min Millimeters per Minute
MRR Metal Removal Rate
RDOC Radial Depth of Cut
ADOC Axial Depth of Cut

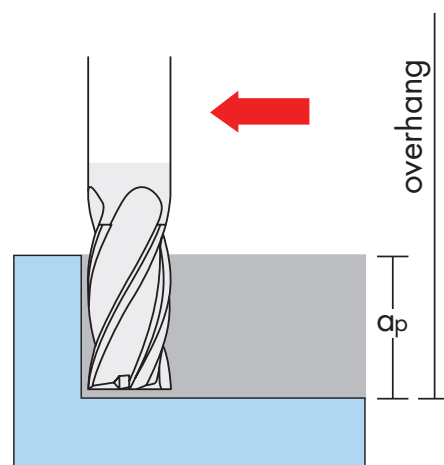
$$\text{RPM} = \frac{\text{M/MIN} \times 318.057}{D}$$

$$\text{M/MIN} = \text{RPM} \times D \times .00314$$

$$\text{MM/MIN} = \text{RPM} \times \text{MMPT} \times Z$$

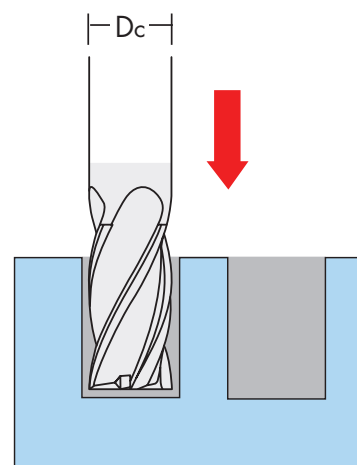
$$\text{MRR} = \text{RDOC} \times \text{ADOC} \times \text{MM/MIN}$$

Adjustments – Apply these adjustments when programming the following applications.



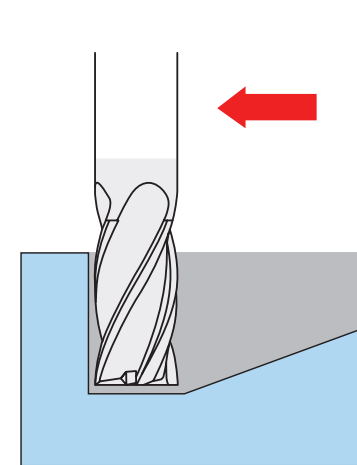
1. Long reach mills with large overhang

- Reduce speed rate and chip load by 20% each when total reach to tool diameter ratio is 5:1 or greater



2. Plunge entry into work piece

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



3. Ramp entry into work piece

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