

# M503 enDURO Application Guide (inch) • Speed & Feed

ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)	Feed (Inches per Tooth)						
							3/8	1/2	5/8	3/4	1		
<b>M</b>	Easy to Machine Stainless Steels 416, 410, 302, 303	Slot	.5 x D	1 x D	3	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Rough	1 x D	.5 x D	3	350	.0006	.0013	.0019	.0025	.0032	.0038	.0050
	Moderately Difficult Stainless Steels 304, 316, Invar, Kovar	Slot	.5 x D	1 x D	3	250	.0003	.0007	.0011	.0015	.0019	.0023	.0030
		Rough	1 x D	.5 x D	3	300	.0006	.0011	.0017	.0022	.0028	.0035	.0045
	Difficult to Machine Stainless Steels 316L, 17-4 PH, 15-5 PH, 13-8 PH	Slot	.5 x D	1 x D	3	225	.0003	.0006	.0009	.0012	.0015	.0018	.0024
		Rough	1 x D	.5 x D	3	275	.0003	.0007	.0011	.0015	.0019	.0023	.0030
<b>P</b>	Low Carbon Steels ≤ 32 HRc 1018, 12L14, 8620	Slot	.5 x D	1 x D	3	325	.0006	.0013	.0021	.0027	.0035	.0042	.0054
		Rough	1 x D	.5 x D	3	375	.0007	.0015	.0023	.0030	.0037	.0045	.0060
	Carbon & Tool Steels 33 HRc to 38 HRc	Slot	.5 x D	1 x D	3	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Rough	1 x D	.5 x D	3	325	.0006	.0012	.0018	.0023	.0029	.0035	.0046
<b>N</b>	Copper, Brass, & Bronze	Slot	.5 x D	1 x D	3	450	.0007	.0015	.0022	.0030	.0037	.0045	.0060
		Rough	1 x D	.5 x D	3	550	.0008	.0018	.0026	.0035	.0044	.0053	.0070
	Aluminum, Bronze & Beryllium Copper	Slot	.5 x D	1 x D	3	275	.0005	.0010	.0015	.0020	.0025	.0030	.0040
		Rough	1 x D	.5 x D	3	350	.0006	.0013	.0020	.0025	.0032	.0039	.0050

D = Tool diameter

## Common Machining Formulas

**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

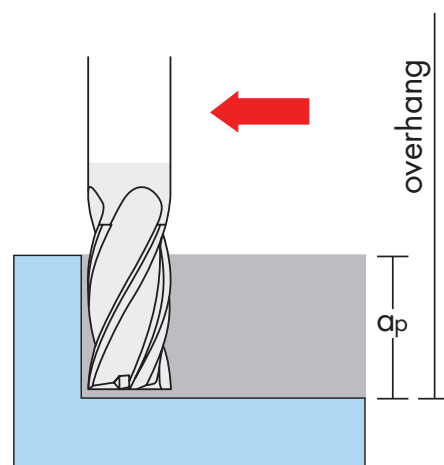
$$RPM = \frac{SFM \times 3.82}{D}$$

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

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

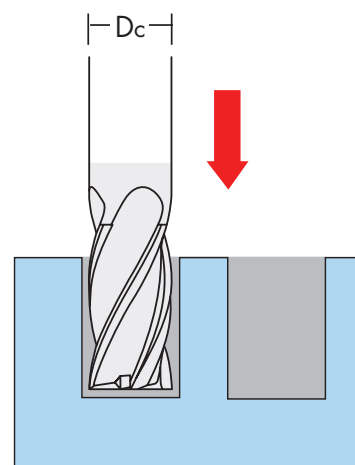
$$MRR = RDOC \times ADOC \times IPM$$

**Adjustments** – Apply these adjustments when programming the following applications.



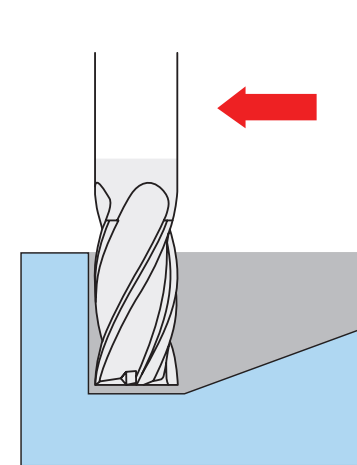
### 1. Long reach mills with large overhang

- 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