

E520B 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)			
							1/8	1/4	3/8	1/2
P	Carbon and tool steels < 48 HRC	Rough	.2 x D	.2 x D	2	400	.0013	.0025	.0038	.0050
		Finish	.02 x D	.02 x D	2	275	.0015	.0030	.0045	.0060
H	Hardened materials 49 to 57 HRC	Rough	.2 X D	.2 X D	2	375	.0008	.0017	.0025	.0033
		Finish	.02 x D	.02 x D	2	250	.0010	.0020	.0030	.0040
	Hardened materials 58 to 62 HRC	Rough	1 X D	1 X D	2	250	.0007	.0014	.0021	.0028
		Finish	.01 x D	.01 x D	2	150	.0005	.0011	.0016	.0021

D = Tool diameter

Common Machining Formulas

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

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

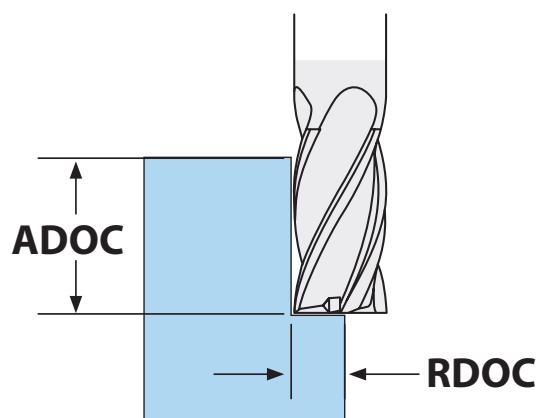
$$IPM = RPM \times IPT \times Z$$

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

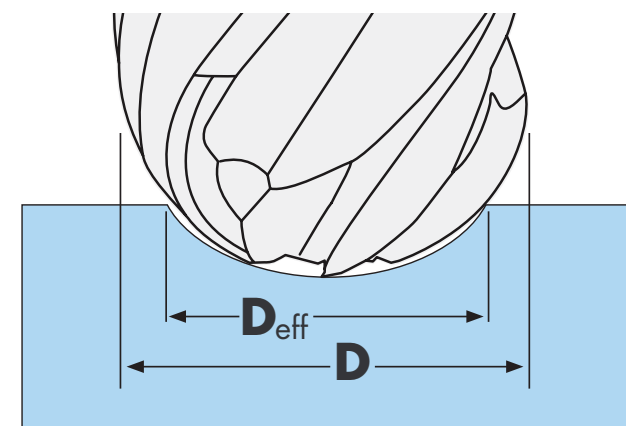
Radial Chip Thinning Adjustment
$$IPT_{adj} = \frac{IPT \times (D/2)}{\sqrt{(D \times RDOC) - RDOC^2}}$$

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

- 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

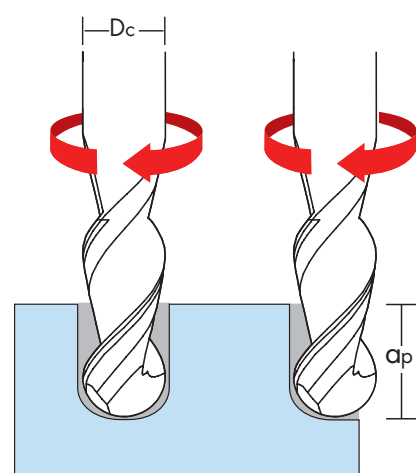


Apply chip thinning adjustment when $RDOC < D$



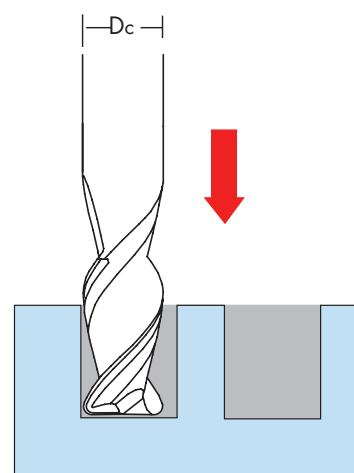
Use D_{eff} when making shallow cuts with full radius

Adjustments - Apply these adjustments when programming the following applications.



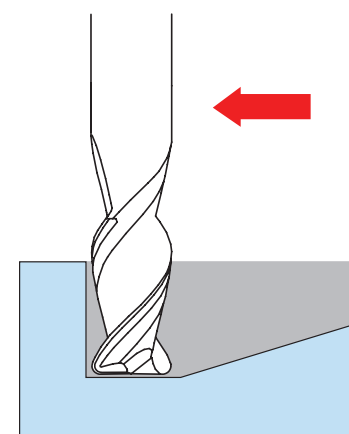
1. Ball-nose end mills

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



2. Plunge entry into work piece

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



3. Ramp entry into work piece

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