

Miniature Solid Carbide End Mill Speed and Feed Recommendations

Workpiece		Type and Depth of Cut	Surface Speed (SFM)	FEED PER TOOTH BY END MILL DIAMETER								
Material	Examples			.005 - .015	.015 - .030	.030 - .045	.045 - .060	.060 - .075	.075 - .090	.090 - .105	.105 - .125	
Steel (ISO P)	Low Alloy Steels - Maraging	10XX, 11XX, 13XX	Slotting ≤ 15% of D	150	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 6% of D Axial & ≤ 35% of D Radial	300	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
	Medium Alloy Steels	200, 250, 300	Slotting ≤ 15% of D	125	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
	High Alloy Steels - Mold and Die	A-2, P20, O1, D2, H-13	Slotting ≤ 10% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
High Strength Steels	4140, 4340, 52100	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	
		Profiling 6% of D Axial & ≤ 30% of D Radial	180	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	
Stainless Steel (ISO M)	Martensitic	403, 410, 416	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Austenitic	302, 303, 304L, 316L	Slotting ≤ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Precipitation Hardened	13-8, 15-5 PH, 17-4 PH, A-236, AM-350	Slotting ≤ 10% of D	90	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Cast Iron (ISO K)	Cast Iron	Grey Cast Iron	Slotting ≤ 25% of D	125	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & ≤ 35% of D Radial	400	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
	Ductile Iron	Ductile Cast Iron	Slotting ≤ 15% of D	100	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 10% of D Axial & ≤ 25% of D Radial	250	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
High Temperature Alloys (ISO S)	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting ≤ 7% of D	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	100	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermoNikel 300, Incoloy 600	Slotting ≤ 7% of D	40	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	60	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting ≤ 7% of D	50	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & ≤ 20% of D Radial	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-25 (Decrease SFM & IPM 25% for 5553)	Slotting ≤ 15% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & ≤ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Al (ISO N)	Aluminum Alloys	6061-T6, 7075	Slotting ≤ 15% of D	650	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & ≤ 35% of D Radial	775	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

In general, use lower speeds and feeds for hard and difficult-to-machine materials. Use higher speeds and feeds for easy-to-machine materials. Use higher surface speed for lighter cuts, smaller tools, and better finishes. Higher feed rates can improve tool life and performance in softer materials and more abrasive materials.

For longer length tools, reduce feed rates by 50%.

For coated tools, speeds may be increased by up to 20% with the feed rate unchanged.

NOTE: Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.