Amana Tool®

INDUSTRIAL

Solid Carbide Multi-Helix Square & Corner Radius End Mill Router Bits with TiAlN Coating Speed and Feed Chart

Steel

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4"	3/8"	1/2"
Magnetic Soft Steel	< 120 B	12L14, 12L15	525-790	0.0015	0.0025	0.003
Structural, Case Carburising	< 200 B	1005-1025, 1214, 1215, A36	525-790	0.0015	0.0025	0.003
Plain Carbon Steel	< 250 B	1030-1060, 1144-1146	395-525	0.0015	0.0025	0.003
Alloy Steel	< 250 B	4140, 4340, 52100, 8620, H11-H41, A2, D2, O1, P20, 420	395-525	0.0015	0.0025	0.003
Alloy Steel, Hardened/Tempered Steel	350	4140, 4340, 52100, 8620, H11-H41, A2, D2, O1, P20, 420	260-525	0.001	0.002	0.0025
Alloy Steel, Hardened/Tempered Steel	> 350 B	4140, 4340, 52100, 8620, H11-H41, A2, D2, O1, P20, 420	130-260	0.001	0.002	0.0025
Alloy Steel, Hardened	49-55 C	A2, H10-H41, L1-L6, M1-M42, T1	130-260	0.001	0.002	0.0025
Alloy Steel, Hardened	55-60 C	A2, H10-H41, L1-L6, M1-M42, T1	130-260	0.001	0.002	0.0025
Alloy Steel, Hardened	> 60 C	A2, H10-H41, L1-L6, M1-M42, T1	130-260	0.001	0.002	0.0025

Stainless Steel

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4"	3/8"	1/2"
Free Machining Stainless	< 250 B	200, 303, 416, 420F, 430F, 440	260-525	0.0015	0.0025	0.003
Austenetic	< 250 B	301, 302, 304, 316, 321, 330, AM-350, Custom 455	200-330	0.001	0.002	0.0025
Ferritic + Austenetic, Martensitic	< 300 B	318-329, 400-446, 15-4PH, 17-4PH, Duplex	160-260	0.001	0.002	0.0025
Precipitation Hardened	< 300 B	15-5PH, 17-4PH, Custom 450	150-220	0.001	0.002	0.0025

Cast Iron

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4"	3/8"	1/2"
Lamellar Graphite	< 150	Grey, G10, Gg40, J431C, A48 Class20	330-500	0.002	0.003	0.0035
Lamellar Graphite	> 150 < 300	Grey, Gg25, Gg40, J158, A48 Class 40-60	260-460	0.002	0.003	0.0035
Nodular Graphite, Maileable Case Iron	< 200	A220, A436, A439, A602, Black, GGG40-GGG70	230-330	0.001	0.003	0.0035
Nodular Graphite, Maileable Case Iron	> 200 < 300	Black Gts/Gtw, J434C	160-260	0.001	0.003	0.0035

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Titanium

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4”	3/8”	1/2”
Unalloyed	< 200	Commercially Pure	400-650	0.001	0.0015	0.002
Alloyed	< 270	6A14V,6A14V-25n, Monel, Monel K	260-400	0.001	0.0015	0.002
Alloyed	> 270 < 350	6A14-V-4Mo, 7A14-V-4Mo, 4911-4967	130-200	0.001	0.0015	0.002

Nickel

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4”	3/8”	1/2”
Unalloyed	< 150	Commercially Pure	400-650	0.001	0.0015	0.002
Alloyed	< 270	Monel 400, Hastelloy C, Inconel 625, Waspaloy	200-400	0.001	0.0015	0.002
Alloyed	> 270 < 350	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	130-330	0.001	0.0015	0.002

Synthetic Materials

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4”	3/8”	1/2”
Thermoplastics	n/a	Ultramid, Polystrol		0.002	0.003	0.0035
Thermosetting Plastics	n/a	Bakelite, Pertinax		0.002	0.003	0.0035
Reinforced Plastic Materials	n/a	CFK, GFKAFK		0.002	0.003	0.0035

Hard Materials

Materials	Hardness	USA Standards, SAE/AISI/UNS	Surface Feet Per Minute	Suggested End Mill Starting Feed Per Tooth 1/4”	3/8”	1/2”
Cermets (Metal-Ceramics)	< 550	Commercially Pure	25-50	0.0015	0.025	0.003

Simple Machining Calculations:
To find **RPM:** SFM x 3.82 / diameter of tool
To find **SFM:** 0.262 x diameter of tool x RPM
To find **Feed Rate:** RPM x # of flutes x chip load
To find **Chip Load:** IPM / (RPM x # of Flutes)

Depth of Cut:
1 x D Use recommended chip load
2 x D Reduce chip load by 25%
3 x D Reduce chip load by 50%