



Speeds & Feeds

Product Table: Miniature End Mills - Tapered - Square
Characteristics: 3°-4° Angle per Side, 5x Length of Cut
Series: 9904xx

Product Notes:

Use the end diameter of the tool to select the correct Chip Load (IPT)

General Notes:

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10%-20% if coated. For ferrous materials with hardness ≤ 28 Rc, chip loads can be increased 10%-20%.

If you require additional information, Harvey Tool has a team of technical experts available to assist you through even the most challenging applications. Please contact us at **800-645-5609** or **Harveytech@harveyperformance.com**.

WARNING: Cutting tools may shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment in the vicinity of use.

MATERIAL	SFM	Hardness: ≤ 28 Rc (≤ 271 HBn)													
		Chip Load (IPT) By Cutter Dia			Depth of Cut		Chip Load (IPT) By Cutter Dia					Depth of Cut			
		.015	.031	.047	Radial	Axial	.062	.078	.093	.125	.187	.250	Radial	Axial	
ALUMINUM ALLOYS															
Castina (2xx, 5xx, 7xx, 8xx)	750	Slotting	.00015	.00031	.00047	1 x Dia	.08 x Dia	.00054	.00068	.00081	.00109	.00163	.00217	1 x Dia	20 x Dia
		Roughing	.00009	.00019	.00029	.13 x Dia	5 x Dia	.00034	.00042	.00051	.00068	.00102	.00136	.25 x Dia	5 x Dia
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	Finishing	.00018	.00037	.00056	.05 x Dia	5 x Dia	.00064	.00080	.00096	.00129	.00193	.00258	.10 x Dia	5 x Dia
Castings - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Slotting	.00013	.00028	.00042	1 x Dia	.08 x Dia	.00049	.00061	.00073	.00098	.00146	.00196	1 x Dia	20 x Dia
Castings - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700														
Castings - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Roughing	.00008	.00017	.00026	.13 x Dia	5 x Dia	.00030	.00038	.00045	.00061	.00091	.00122	.25 x Dia	5 x Dia
Castings - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475														
Wrought - 5%-8% Si (4xxx)	1000	Finishing	.00016	.00033	.00050	.05 x Dia	5 x Dia	.00057	.00072	.00086	.00116	.00173	.00232	.10 x Dia	5 x Dia
Wrought - 8%-12% Si (4xxx)	800														
MAGNESIUM ALLOYS	1500	Slotting	.00015	.00031	.00047	1 x Dia	.08 x Dia	.00054	.00068	.00081	.00109	.00163	.00217	1 x Dia	20 x Dia
		Roughing	.00009	.00019	.00029	.13 x Dia	5 x Dia	.00034	.00042	.00051	.00068	.00102	.00136	.25 x Dia	5 x Dia
ZINC ALLOYS	800	Finishing	.00018	.00037	.00056	.05 x Dia	5 x Dia	.00064	.00080	.00096	.00129	.00193	.00258	.10 x Dia	5 x Dia
COPPER ALLOYS															
High Coppers - 90%+ (C1xxx)	225	Slotting	.00012	.00025	.00038	1 x Dia	.08 x Dia	.00043	.00054	.00065	.00087	.00130	.00174	1 x Dia	20 x Dia
Brass (Copper Zinc alloys, C2xxx, C3xxx, C4xxx, C6400-C69800)	500														
Phosphor Bronzes (Copper in alloys, C5xxx)	225														
Aluminum Bronzes (Copper Aluminum alloys, C6060-C64200)	500	Roughing	.00007	.00015	.00023	.13 x Dia	5 x Dia	.00027	.00034	.00040	.00054	.00081	.00109	.25 x Dia	5 x Dia
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500														
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxx)	225														
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95900, C97300-C97800, C99400-C99700)	550	Finishing	.00014	.00029	.00045	.05 x Dia	5 x Dia	.00051	.00064	.00077	.00103	.00154	.00206	.10 x Dia	5 x Dia

MATERIAL	SFM	Hardness: 29-37 Rc (279-344 HBn)													
		Chip Load (IPT) By Cutter Dia			Depth of Cut		Chip Load (IPT) By Cutter Dia					Depth of Cut			
		.015	.031	.047	Radial	Axial	.062	.078	.093	.125	.187	.250	Radial	Axial	
CARBON STEELS															
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	Slotting	.00005	.00011	.00016	1 x Dia	.08 x Dia	.00019	.00023	.00028	.00037	.00056	.00075	1 x Dia	20 x Dia
		Roughing	.00003	.00006	.00009	.13 x Dia	5 x Dia	.00010	.00013	.00016	.00021	.00031	.00042	.25 x Dia	5 x Dia
		Finishing	.00006	.00011	.00017	.05 x Dia	5 x Dia	.00020	.00025	.00030	.00040	.00060	.00081	.10 x Dia	5 x Dia
1030 - 1095, 1140 - 1151, 13xx, 15xx, 2xx, 3xx, 4xxx & 4xLxx, 5xxx & 5xLxx, 50xxx & 50Lxx, 51xxx & 51Lxx, 52xxx & 52Lxx, 6xx, 8xx, 9xxx	200	Slotting	.00005	.00010	.00015	1 x Dia	.08 x Dia	.00017	.00021	.00025	.00034	.00051	.00068	1 x Dia	20 x Dia
		Roughing	.00003	.00005	.00008	.13 x Dia	5 x Dia	.00010	.00012	.00014	.00019	.00029	.00038	.25 x Dia	5 x Dia
		Finishing	.00005	.00010	.00016	.05 x Dia	5 x Dia	.00018	.00023	.00027	.00037	.00055	.00074	.10 x Dia	5 x Dia
STAINLESS STEELS															
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	Slotting	.00005	.00011	.00016	1 x Dia	.08 x Dia	.00019	.00023	.00028	.00037	.00056	.00075	1 x Dia	20 x Dia
		Roughing	.00003	.00006	.00009	.13 x Dia	5 x Dia	.00010	.00013	.00016	.00021	.00031	.00042	.25 x Dia	5 x Dia
		Finishing	.00006	.00011	.00017	.05 x Dia	5 x Dia	.00020	.00025	.00030	.00040	.00060	.00081	.10 x Dia	5 x Dia
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	200	Slotting	.00005	.00010	.00015	1 x Dia	.08 x Dia	.00017	.00021	.00025	.00034	.00051	.00068	1 x Dia	20 x Dia
		Roughing	.00003	.00005	.00008	.13 x Dia	5 x Dia	.00010	.00012	.00014	.00019	.00029	.00038	.25 x Dia	5 x Dia
		Finishing	.00005	.00010	.00016	.05 x Dia	5 x Dia	.00018	.00023	.00027	.00037	.00055	.00074	.10 x Dia	5 x Dia
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Slotting	.00003	.00006	.00009	1 x Dia	.08 x Dia	.00011	.00013	.00016	.00021	.00032	.00043	1 x Dia	20 x Dia
		Roughing	.00002	.00003	.00005	.13 x Dia	5 x Dia	.00006	.00007	.00009	.00012	.00018	.00024	.25 x Dia	5 x Dia
		Finishing	.00003	.00007	.00010	.05 x Dia	5 x Dia	.00011	.00014	.00017	.00023	.00034	.00046	.10 x Dia	5 x Dia
TOOL STEELS															
A, L, O, P, W series	200	Slotting	.00005	.00010	.00015	1 x Dia	.08 x Dia	.00017	.00021	.00025	.00034	.00051	.00068	1 x Dia	20 x Dia
		Roughing	.00003	.00005	.00008	.13 x Dia	5 x Dia	.00010	.00012	.00014	.00019	.00029	.00038	.25 x Dia	5 x Dia
		Finishing	.00005	.00010	.00016	.05 x Dia	5 x Dia	.00018	.00023	.00027	.00037	.00055	.00074	.10 x Dia	5 x Dia
D, H, M, T, S series	150	Slotting	.00003	.00006	.00009	1 x Dia	.08 x Dia	.00011	.00013	.00016	.00021	.00032	.00043	1 x Dia	20 x Dia
		Roughing	.00002	.00003	.00005	.13 x Dia	5 x Dia	.00006	.00007	.00009	.00012	.00018	.00024	.25 x Dia	5 x Dia
		Finishing	.00003	.00007	.00010	.05 x Dia	5 x Dia	.00011	.00014	.00017	.00023	.00034	.00046	.10 x Dia	5 x Dia
TITANIUM ALLOYS	150	Slotting	.00003	.00006	.00009	1 x Dia	.08 x Dia	.00011	.00013	.00016	.00021	.00032	.00043	1 x Dia	20 x Dia
		Roughing	.00002	.00003	.00005	.13 x Dia	5 x Dia	.00006	.00007	.00009	.00012	.00018	.00024	.25 x Dia	5 x Dia
		Finishing	.00003	.00007	.00010	.05 x Dia	5 x Dia	.00011	.00014	.00017	.00023	.00034	.00046	.10 x Dia	5 x Dia
HIGH TEMP ALLOYS															
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discology, Incoloy	70	Slotting	.00003	.00006	.00009	1 x Dia	.08 x Dia	.00011	.00013	.00016	.00021	.00032	.00043	1 x Dia	20 x Dia
		Roughing	.00002	.00003	.00005	.13 x Dia	5 x Dia	.00006	.00007	.00009	.00012	.00018	.00024	.25 x Dia	5 x Dia
		Finishing	.00003	.00007	.00010	.05 x Dia	5 x Dia	.00011	.00014	.00017	.00023	.00034	.00046	.10 x Dia	5 x Dia

MATERIAL	SFM	Hardness: 38-45 Rc (353-421 HBn)													
		Chip Load (IPT) By Cutter Dia			Depth of Cut		Chip Load (IPT) By Cutter Dia					Depth of Cut			
		.015	.031	.047	Radial	Axial	.062	.078	.093	.125	.187	.250	Radial	Axial	
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	-	-	-	-	-	-	-	-	-	-	-	-	-
		Finishing	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-
		Roughing	-	-	-	-	-	-	-	-	-	-	-	-	-
		Finishing	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	.00002	.00005	.00007	1 x Dia	.08 x Dia	.00008	.00011	.00013	.00017	.00026	.00034	1 x Dia	20 x Dia
		Roughing	.00001	.00003	.00004	.13 x Dia	5 x Dia	.00005	.00006	.00007	.00010	.00014	.00019	.25 x Dia	5 x Dia
		Finishing	.00003	.00005	.00008	.05 x Dia	5 x Dia	.00009	.00012	.00014	.00019	.00028	.00037	.10 x Dia	5 x Dia
		Slotting	.00001	.00003	.00005	1 x Dia	.08 x Dia	.00005	.00007	.00008	.00011	.00016	.00021	1 x Dia	20 x Dia
		Roughing	.00001	.00002	.00003	.13 x Dia	5 x Dia	.00003	.00004	.00004	.00006	.00009	.00012	.25 x Dia	5 x Dia
		Finishing	.00002	.00003	.00005	.05 x Dia	5 x Dia	.00006	.00007	.00009	.00012	.00017	.00023	.10 x Dia	5 x Dia
		Slotting	.00002	.00005	.00007	1 x Dia	.08 x Dia	.00008	.00011	.00013	.00017	.00026	.00034	1 x Dia	20 x Dia
		Roughing	.00001	.00003	.00004	.13 x Dia	5 x Dia	.00005	.00006	.00007	.00010	.00014	.00019	.25 x Dia	5 x Dia
		Finishing	.00003	.00005	.00008	.05 x Dia	5 x Dia	.00009	.00012	.00014	.00019	.00028	.00037	.10 x Dia	5 x Dia
		Slotting	.00001	.00003	.00005	1 x Dia	.08 x Dia	.00005	.00007	.00008	.00011	.00016	.00021	1 x Dia	20 x Dia
		Roughing	.00001	.00002	.00003	.13 x Dia	5 x Dia	.00003	.00004	.					