



Product Table: Miniature End Mills - Square - Long Reach, Standard Flute
Characteristics: 5x Reach Multiple, 2 Flutes
Series: 9445xx, 9446xx

MATERIAL		Hardness: ≤ 28 Rc (≤ 271 HBn)																
		SFM	Chip Load (IPT) by Dia			Depth of Cut		Chip Load (IPT) by Cutter Dia						Depth of Cut				
			0.015	0.031	0.047	Radial	Axial	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	Radial	Axial	
ALUMINUM ALLOYS	750	Slotting	.00017	.00035	.00054	1 x Dia	.08 x Dia	.00061	.00077	.00092	.00124	.00185	.00248	.00371	.00495	1 x Dia	.20 x Dia	
		Roughing	.00021	.00044	.00067	.30 x Dia	.35 x Dia	.00077	.00097	.00115	.00155	.00231	.00309	.00464	.00619	.60 x Dia	.35 x Dia	
		Finishing	.00032	.00067	.00101	.06 x Dia	3 x Dia	.00116	.00146	.00175	.00235	.00351	.00469	.00704	.00939	.12 x Dia	3 x Dia	
	700	Slotting	.00015	.00032	.00048	1 x Dia	.08 x Dia	.00055	.00069	.00083	.00111	.00167	.00223	.00334	.00446	1 x Dia	.20 x Dia	
		Roughing	.00019	.00040	.00060	.30 x Dia	.35 x Dia	.00069	.00087	.00104	.00139	.00208	.00278	.00418	.00557	.60 x Dia	.35 x Dia	
		Finishing	.00029	.00060	.00091	.06 x Dia	3 x Dia	.00105	.00132	.00157	.00211	.00316	.00422	.00634	.00845	.12 x Dia	3 x Dia	
800	Slotting	.00017	.00035	.00054	1 x Dia	.08 x Dia	.00061	.00077	.00092	.00124	.00185	.00248	.00371	.00495	1 x Dia	.20 x Dia		
	Roughing	.00021	.00044	.00067	.30 x Dia	.35 x Dia	.00077	.00097	.00115	.00155	.00231	.00309	.00464	.00619	.60 x Dia	.35 x Dia		
	Finishing	.00032	.00067	.00101	.06 x Dia	3 x Dia	.00116	.00146	.00175	.00235	.00351	.00469	.00704	.00939	.12 x Dia	3 x Dia		
MAGNESIUM ALLOYS		1500	Slotting	.00017	.00035	.00054	1 x Dia	.08 x Dia	.00061	.00077	.00092	.00124	.00185	.00248	.00371	.00495	1 x Dia	.20 x Dia
ZINC ALLOYS		800	Slotting	.00017	.00035	.00054	1 x Dia	.08 x Dia	.00061	.00077	.00092	.00124	.00185	.00248	.00371	.00495	1 x Dia	.20 x Dia
COPPER ALLOYS		225	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
High Coppers - 90%+ (C1xxxx)		500	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C66400-C69800)		225	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Phosphor Bronzes (Copper Tin alloys, C5xxxx)		500	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)		500	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)		500	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)		225	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)		550	Slotting	.00014	.00028	.00043	1 x Dia	.08 x Dia	.00049	.00062	.00074	.00099	.00148	.00198	.00297	.00396	1 x Dia	.20 x Dia

Please note:

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		Hardness: 29-37 Rc (279-344 HBn)																
		SFM	Chip Load (IPT) by Dia			Depth of Cut		Chip Load (IPT) by Cutter Dia						Depth of Cut				
			0.015	0.031	0.047	Radial	Axial	0.062	0.078	0.093	0.125	0.187	0.250	0.375	0.500	Radial	Axial	
CARBON STEELS	600	Slotting	.00006	.00012	.00018	1 x Dia	.08 x Dia	.00021	.00027	.00032	.00043	.00064	.00085	.00128	.00170	1 x Dia	.20 x Dia	
		Roughing	.00007	.00014	.00021	.30 x Dia	.35 x Dia	.00024	.00030	.00036	.00048	.00072	.00096	.00144	.00191	.60 x Dia	.35 x Dia	
		Finishing	.00010	.00021	.00032	.06 x Dia	3 x Dia	.00036	.00046	.00055	.00073	.00110	.00147	.00220	.00293	.12 x Dia	3 x Dia	
	200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia	
		Roughing	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia	
		Finishing	.00009	.00019	.00029	.06 x Dia	3 x Dia	.00033	.00042	.00050	.00067	.00100	.00134	.00201	.00268	.12 x Dia	3 x Dia	
STAINLESS STEELS		450	Slotting	.00006	.00012	.00018	1 x Dia	.08 x Dia	.00021	.00027	.00032	.00043	.00064	.00085	.00128	.00170	1 x Dia	.20 x Dia
203 EZ, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe		450	Slotting	.00007	.00014	.00021	.30 x Dia	.35 x Dia	.00024	.00030	.00036	.00048	.00072	.00096	.00144	.00191	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia
		200	Slotting	.00006	.00012	.00019	.30 x Dia	.35 x Dia	.00022	.00027	.00033	.00044	.00065	.00087	.00131	.00175	.60 x Dia	.35 x Dia
		200	Slotting	.00005	.00011	.00017	1 x Dia	.08 x Dia	.00019	.00024	.00029	.00039	.00058	.00078	.00117	.00156	1 x Dia	.20 x Dia