HARVEY TOOL

Speeds & Feeds

Product Table: End Mills for Plastics - Finishers - Ball Upcut - 3 Flute - Slow Helix
Characteristics: 3x Length of Cut
Series: 8087xx, 8088xx

Material	Type	Hardness	SFM	Chip Load (IPT) By Cutter Diameter															Depth of Cut	
					.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	.625	.750	1.000	Radial	Axial
UNFILLED PLASTICS ETFE, FEP, HDPE, LDPE, PFA, Polyurethane, PTFE, Rulon, Teflon, UHMW	Unfilled	50 < 100 Rr, 55 < 85 Shore D	1200 - 1600	Semi-Roughing	.00040	.00083	.00126	.00167	.00210	.00250	.00336	.00503	.00673	.00714	.00858	.01144	.01430	.01716	.02287	.35 x Dia	1 x Dia
				Finishing	.00022	.00046	.00069	.00091	.00115	.00137	.00184	.00276	.00369	.00391	.00470	.00627	.00783	.00940	.01253	.10 x Dia	3 x Dia
Acrylic, Acetal, Delrin, Lucite, Nylon 6, Nylon 6/6, PAI, PI, PEEK, Plexiglas, PS, PSU, Torlon 4203, Ultem 1000	Unfilled	100 > 150 Rr	800 - 1200	Semi-Roughing	.00038	.00078	.00118	.00156	.00196	.00234	.00315	.00471	.00629	.00667	.00802	.01069	.01337	.01604	.02139	.35 x Dia	1 x Dia
				Finishing	.00021	.00043	.00065	.00085	.00108	.00128	.00172	.00258	.00345	.00366	.00439	.00586	.00732	.00879	.01172	.10 x Dia	3 x Dia
FILLED PLASTICS Vespel SP-3	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	50 < 100 Rr, 55 < 85 Shore D	1200 - 1600	Semi-Roughing	.00040	.00083	.00126	.00167	.00210	.00250	.00336	.00503	.00673	.00714	.00858	.01144	.01430	.01716	.02287	.35 x Dia	1 x Dia
				Finishing	.00022	.00046	.00069	.00091	.00115	.00137	.00184	.00276	.00369	.00391	.00470	.00627	.00783	.00940	.01253	.10 x Dia	3 x Dia
Nyoil, Nylatron, Plavis MS, Torlon 4301	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	100 > 150 Rr	800 - 1200	Semi-Roughing	.00038	.00078	.00118	.00156	.00196	.00234	.00315	.00471	.00629	.00667	.00802	.01069	.01337	.01604	.02139	.35 x Dia	1 x Dia
				Finishing	.00021	.00043	.00065	.00085	.00108	.00128	.00172	.00258	.00345	.00366	.00439	.00586	.00732	.00879	.01172	.10 x Dia	3 x Dia
	Carbon/Glass Filled 5% < 20%	100 > 150 Rr	600 - 800	Semi-Roughing	.00038	.00078	.00118	.00156	.00196	.00234	.00315	.00471	.00629	.00667	.00802	.01069	.01337	.01604	.02139	.35 x Dia	1 x Dia
				Finishing	.00021	.00043	.00065	.00085	.00108	.00128	.00172	.00258	.00345	.00366	.00439	.00586	.00732	.00879	.01172	.10 x Dia	3 x Dia
	Carbon/Glass Filled 21% < 40%	100 > 150 Rr	500 - 700	Semi-Roughing	.00031	.00064	.00097	.00128	.00161	.00191	.00257	.00385	.00515	.00546	.00656	.00875	.01094	.01312	.01750	.35 x Dia	1 x Dia
				Finishing	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00211	.00282	.00299	.00359	.00479	.00599	.00719	.00959	.10 x Dia	3 x Dia
FIBER REINFORCED PLASTICS FR4, G10, G11	Carbon/Glass Fiber 5% < 20%	100 > 150 Rr	500 - 700	Semi-Roughing	.00038	.00078	.00118	.00156	.00196	.00234	.00315	.00471	.00629	.00667	.00802	.01069	.01337	.01604	.02139	.35 x Dia	1 x Dia
				Finishing	.00021	.00043	.00065	.00085	.00108	.00128	.00172	.00258	.00345	.00366	.00439	.00586	.00732	.00879	.01172	.10 x Dia	3 x Dia
G30	Carbon/Glass Fiber 21% < 40%	100 > 150 Rr	300 - 400	Semi-Roughing	.00031	.00064	.00097	.00128	.00161	.00191	.00257	.00385	.00515	.00546	.00656	.00875	.01094	.01312	.01750	.35 x Dia	1 x Dia
				Finishing	.00017	.00035	.00053	.00070	.00088	.00105	.00141	.00211	.00282	.00299	.00359	.00479	.00599	.00719	.00959	.10 x Dia	3 x Dia

Product Notes:

Plastics are typically discussed in 3 basic ways:

Unfilled - virgin plastic with no additives, fillers or reinforcement
Filled - virgin plastic with lubricating additives or strengthening particle fill
Fiber Reinforced - virgin plastic with reinforcing strands of fiber laid in either a random or engineered way

Since the melting point varies greatly from plastic to plastic, the speed (RPM) used should be closely supervised

Fiber Reinforced Plastics can be challenging as they encompass multiple variations. Please consider the following:

- An additional reduction in RPM may be necessary to avoid excessive fraying, splitting and tear out of fibers
- There may be high density areas or "hard spots" (especially in random/whisker reinforcement) in which speeds & feeds should be reduced
- Aramid fibers are more ductile and less abrasive than glass and carbon fibers allowing increased chip loads (IPT) in these materials
- When machining woven/cloth layered materials, use an oscillating program to help avoid heavy, localized wear on the cutter

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, remain unchanged or even decreased if coated.

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**.