



Speeds & Feeds

Product Table: End Mills for Plastics - Ball Upcut - Long Reach - 2 Flute

Characteristics: 8x Reach Multiple

Series: 9762xx, 9763xx

| 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 | Slot - Rough | .0003 | .0005 | .0008 | .0010 | .0013 | .0016 | .0021 | .0032 | .0042 | .0045 | .0054 | .0072 | .0090 | .0107 | .0143 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0003 | .0006 | .0009 | .0012 | .0015 | .0018 | .0024 | .0036 | .0048 | .0051 | .0062 | .0082 | .0103 | .0124 | .0165 | .35 x Dia | 1 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 | Slot - Rough | .0003 | .0006 | .0010 | .0013 | .0016 | .0019 | .0026 | .0039 | .0051 | .0055 | .0066 | .0088 | .0109 | .0131 | .0175 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0004 | .0007 | .0011 | .0015 | .0018 | .0022 | .0030 | .0044 | .0059 | .0063 | .0075 | .0101 | .0126 | .0151 | .0201 | .35 x Dia | 1 x Dia |
| FILLED PLASTICS Vespel SP-3 | Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE) | 50 < 100 Rr, 55 < 85 Shore D | 1200 - 1600 | Slot - Rough | .0003 | .0005 | .0008 | .0010 | .0013 | .0016 | .0021 | .0032 | .0042 | .0045 | .0054 | .0072 | .0090 | .0107 | .0143 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0003 | .0006 | .0009 | .0012 | .0015 | .0018 | .0024 | .0036 | .0048 | .0051 | .0062 | .0082 | .0103 | .0124 | .0165 | .35 x Dia | 1 x Dia |
| Nyoil, Nylatron, Plavis MS, Torlon 4301 | Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE) | 100 > 150 Rr | 800 - 1200 | Slot - Rough | .0003 | .0006 | .0010 | .0013 | .0016 | .0019 | .0026 | .0039 | .0051 | .0055 | .0066 | .0088 | .0109 | .0131 | .0175 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0004 | .0007 | .0011 | .0015 | .0018 | .0022 | .0030 | .0044 | .0059 | .0063 | .0075 | .0101 | .0126 | .0151 | .0201 | .35 x Dia | 1 x Dia |
| | Carbon/Glass Filled 5% < 20% | 100 > 150 Rr | 600 - 800 | Slot - Rough | .0003 | .0006 | .0010 | .0013 | .0016 | .0019 | .0026 | .0039 | .0051 | .0055 | .0066 | .0088 | .0109 | .0131 | .0175 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0004 | .0007 | .0011 | .0015 | .0018 | .0022 | .0030 | .0044 | .0059 | .0063 | .0075 | .0101 | .0126 | .0151 | .0201 | .35 x Dia | 1 x Dia |
| | Carbon/Glass Filled 21% < 40% | 100 > 150 Rr | 500 - 700 | Slot - Rough | .0003 | .0005 | .0008 | .0010 | .0013 | .0016 | .0021 | .0032 | .0042 | .0045 | .0054 | .0072 | .0090 | .0107 | .0143 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0003 | .0006 | .0009 | .0012 | .0015 | .0018 | .0024 | .0036 | .0048 | .0051 | .0062 | .0082 | .0103 | .0124 | .0165 | .35 x Dia | 1 x Dia |
| FIBER REINFORCED PLASTICS FR4, G10, G11 | Carbon/Glass Fiber 5% < 20% | 100 > 150 Rr | 500 - 700 | Slot - Rough | .0003 | .0006 | .0010 | .0013 | .0016 | .0019 | .0026 | .0039 | .0051 | .0055 | .0066 | .0088 | .0109 | .0131 | .0175 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0004 | .0007 | .0011 | .0015 | .0018 | .0022 | .0030 | .0044 | .0059 | .0063 | .0075 | .0101 | .0126 | .0151 | .0201 | .35 x Dia | 1 x Dia |
| G30 | Carbon/Glass Fiber 21% < 40% | 100 > 150 Rr | 300 - 400 | Slot - Rough | .0003 | .0005 | .0008 | .0010 | .0013 | .0016 | .0021 | .0032 | .0042 | .0045 | .0054 | .0072 | .0090 | .0107 | .0143 | 1 x Dia | 1 x Dia |
| | | | | Profile | .0003 | .0006 | .0009 | .0012 | .0015 | .0018 | .0024 | .0036 | .0048 | .0051 | .0062 | .0082 | .0103 | .0124 | .0165 | .35 x Dia | 1 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**.

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.