



Speeds & Feeds

Product Table: Miniature High Performance Drills - PCD Diamond - Double Angle
Characteristics: 5x Length of Flute
Series: BCF

Material	Type	Hardness	SFM	Chip Load (IPR) By Drill Diameter				
				.078	.093	.125	.187	.250
ALUMINUM ALLOYS								
0% - 5% Silicon (2xxx, 3xxx, 4xxx, 5xxx, 7xx, 8xx, A3xxx, A4xxx, B4xx, C3xx, 1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)		≤ 28 Rc (≤ 271 HBn)	600 - 1000	.0037	.0045	.0060	.0090	.0120
5%-8% Silicon (3xx, A3xx, C3xx, 4xx, A4xx, B4xx, 4xxx)		≤ 28 Rc (≤ 271 HBn)	500 - 1000	.0034	.0040	.0054	.0081	.0108
8%-12% Silicon (3xx, A3xx, C3xx, 4xx, A4xx, B4xx, 4xxx)		≤ 28 Rc (≤ 271 HBn)	400 - 800	.0028	.0033	.0045	.0067	.0090
12%-16% Silicon (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)		≤ 28 Rc (≤ 271 HBn)	300 - 600	.0022	.0027	.0036	.0054	.0072
MAGNESIUM ALLOYS		≤ 28 Rc (≤ 271 HBn)	600 - 1000	.0037	.0045	.0060	.0090	.0120
ZINC ALLOYS		≤ 28 Rc (≤ 271 HBn)	600 - 1000	.0037	.0045	.0060	.0090	.0120
COPPER ALLOYS								
High Coppers - 90%+ (C1xxxx) Phosphor Bronzes (Copper Tin alloys, C5xxxx) Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxxx)		≤ 28 Rc (≤ 271 HBn)	200 - 500					
Brass (Copper Zinc alloys, C2xxxx, C3xxxx, C4xxxx, C6400-C69800) Aluminum Bronzese (Copper Aluminum alloys, C60600-C64200) Silicon Bronzese (Copper Silicon alloys, C64700-C66100) Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)		≤ 28 Rc (≤ 271 HBn)	400 - 800	.0030	.0036	.0048	.0072	.0096
UNFILLED PLASTICS								
ETFE, FEP, HDPE, LDPE, PFA, Polyurethane, PTFE, Rulon, Teflon, UHMW	Unfilled	50 < 100 Rr, (55 < 85 Shore D)	800 - 1200	.0037	.0045	.0060	.0090	.0120
Acrylic, Acetal, Delrin, Lucite, Nylon 6, Nylon 6/6, PAI, PI, PEEK, Plexiglas, PS, PSU, Torlon 4203, Ultem 1000	Unfilled	100 > 150 Rr	500 - 800	.0041	.0049	.0066	.0099	.0132
FILLED PLASTICS								
Vespel SP-3	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	50 < 100 Rr, (55 < 85 Shore D)	800 - 1200	.0037	.0045	.0060	.0090	.0120
Nycol, Nylatron, Plavis MS, Torlon 4301	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	100 > 150 Rr	500 - 800	.0041	.0049	.0066	.0099	.0132
	Carbon/Glass Filled 5% < 20%	100 > 150 Rr	400 - 600	.0041	.0049	.0066	.0099	.0132
	Carbon/Glass Filled 21% < 40%	100 > 150 Rr	350 - 500	.0034	.0040	.0054	.0081	.0108
FIBER REINFORCED PLASTICS								
FR4, G10, G11	Carbon/Glass Fiber 5% < 20%	100 > 150 Rr	350 - 500	.0041	.0049	.0066	.0099	.0132
G30	Carbon/Glass Fiber 21% < 40%	100 > 150 Rr	200 - 300	.0034	.0040	.0054	.0081	.0108
METAL MATRIX COMPOSITES								
	Aluminum/Composite Layered		320 - 500	.0041	.0049	.0066	.0099	.0132
	Titanium/Composite Layered		160 - 260	.0030	.0036	.0048	.0072	.0096
GRAPHITE								
PGCO 3			400 - 600	.0043	.0051	.0069	.0103	.0138
GREEN CERAMIC & GREEN CARBIDE								
			100 - 300	.0039	.0047	.0063	.0094	.0126

Product Notes:

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 drilling Metal Matrix Composites a further feed rate reduction is needed when entering different material layers.

- For Aluminum sections, reduce feed by 30%
- For Titanium sections, reduce feed by 50%

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

Pecking cycles are recommended to avoid chip packing and breakage. The initial peck depth should be 3-5x Diameter with each subsequent peck at 2-3x Diameter. For Metal Matrix Composites with Aluminum, pecking should begin when part thickness is more than 1x Diameter. For Titanium, pecking should begin when part thickness is more than .5x Diameter. Each subsequent peck should be .5-1x Diameter for Titanium.

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.