



**Speeds & Feeds**

**Product Table:** Miniature High Performance Drills - Composites - Double Angle

**Characteristics:** 8x Length of Flute

**Series:** AWS-C4

Material	Type	Hardness	SFM	Chip Load (IPR) By Drill Diameter								
				.015	.031	.047	.062	.078	.093	.125	.187	.250
<b>UNFILLED PLASTICS</b>												
ETFE, FEP, HDPE, LDPE, PFA, Polyurethane, PTFE, Rulon, Teflon, UHMW	Unfilled	50 < 100 Rr, 55 < 85 Shore D	800-1200	.0005	.0011	.0017	.0022	.0028	.0033	.0045	.0067	.0090
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	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099
<b>FILLED PLASTICS</b>												
Vespel SP-3	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	50 < 100 Rr, 55 < 85 Shore D	800-1200	.0005	.0011	.0017	.0022	.0028	.0033	.0045	.0067	.0090
Nycoil, Nylatron, Plavis MS, Torlon 4301	Lubricant Filled (Oil, Moly, Graphite, Teflon, PTFE)	100 > 150 Rr	500-800	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099
	Carbon/Glass Filled 5% < 20%	100 > 150 Rr	400-600	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099
	Carbon/Glass Filled 21% < 40%	100 > 150 Rr	350-500	.0005	.0010	.0015	.0020	.0025	.0030	.0041	.0061	.0081
<b>FIBER REINFORCED PLASTICS</b>												
FR4, G10, G11	Carbon/Glass Fiber 5% < 20%	100 > 150 Rr	350-500	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099
G30	Carbon/Glass Fiber 21% < 40%	100 > 150 Rr	200-300	.0005	.0010	.0015	.0020	.0025	.0030	.0041	.0061	.0081
<b>METAL MATRIX COMPOSITES</b>												
	Aluminum/Composite Layered		150-250	.0006	.0012	.0019	.0025	.0031	.0037	.0050	.0074	.0099
	Titanium/Composite Layered		80-120	.0004	.0009	.0014	.0018	.0022	.0027	.0036	.0054	.0072

**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

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. For Composite materials, the initial peck depth should be 3-5x Diameter with each subsequent peck at 2-3x Diameter.

**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.