

TECHNICAL INFO

A large, bold, blue letter 'E' is centered within a white circle. The circle is partially cut off by the top edge of the page. The 'E' has a modern, sans-serif font.

E1 - E4

DIAMETER CHART

E2

CARBIDE STUDY

E3

DIAMETER CHART

DRILL SIZE	DECIMAL INCH	DRILL SIZE	DECIMAL INCH	DRILL SIZE	DECIMAL INCH	DRILL SIZE	DECIMAL INCH
0.05mm	0.0020"	58	0.0420"	2.80mm	0.1102"	13	0.1850"
0.10mm	0.0040"	57	0.0430"	34	0.1110"	4.70mm	0.1850"
0.13mm	0.0050"	1.10mm	0.0433"	2.85mm	0.1122"	4.75mm	0.1870"
0.15mm	0.0059"	1.15mm	0.0453"	33	0.1130"	3/16"	0.1875"
97	0.0059"	56	0.0465"	2.90mm	0.1142"	4.80mm	0.1890"
96	0.0063"	3/64"	0.0469"	32	0.1160"	12	0.1890"
95	0.0067"	1.20mm	0.0472"	2.95mm	0.1161"	4.85mm	0.1909"
94	0.0071"	1.25mm	0.0492"	3.00mm	0.1181"	11	0.1910"
93	0.0075"	1.30mm	0.0512"	31	0.1200"	4.90mm	0.1929"
92	0.0079"	55	0.0520"	3.05mm	0.1201"	10	0.1935"
0.20mm	0.0079"	1.35mm	0.0531"	3.10mm	0.1220"	4.95mm	0.1949"
91	0.0083"	54	0.0550"	3.15mm	0.1240"	9	0.1960"
90	0.0087"	1.40mm	0.0551"	1/8"	0.1250"	5.00mm	0.1968"
89	0.0091"	1.45mm	0.0571"	3.20mm	0.1260"	5.05mm	0.1988"
88	0.0095"	1.50mm	0.0591"	3.25mm	0.1280"	8	0.1990"
0.25mm	0.0098"	53	0.0595"	30	0.1285"	5.10mm	0.2008"
87	0.0100"	1.55mm	0.0610"	3.30mm	0.1299"	7	0.2010"
86	0.0105"	1/16"	0.0625"	3.35mm	0.1319"	5.15mm	0.2028"
85	0.0110"	1.60mm	0.0630"	3.40mm	0.1339"	13/64"	0.2031"
84	0.0115"	52	0.0635"	3.45mm	0.1358"	6	0.2040"
0.30mm	0.0118"	1.65mm	0.0650"	29	0.1360"	5.20mm	0.2047"
83	0.0120"	1.70mm	0.0669"	3.50mm	0.1378"	5	0.2055"
82	0.0125"	51	0.0670"	3.55mm	0.1398"	5.25mm	0.2067"
81	0.0130"	1.75mm	0.0689"	28	0.1405"	5.30mm	0.2087"
80	0.0135"	50	0.0700"	9/64"	0.1406"	4	0.2090"
0.35mm	0.0138"	1.80mm	0.0709"	3.60mm	0.1417"	5.35mm	0.2106"
79	0.0145"	1.85mm	0.0728"	3.65mm	0.1437"	5.40mm	0.2126"
1/64"	0.0156"	49	0.0730"	27	0.1440"	3	0.2130"
0.40mm	0.0157"	1.90mm	0.0748"	3.70mm	0.1457"	5.45mm	0.2146"
78	0.0160"	48	0.0760"	26	0.1470"	5.50mm	0.2165"
0.45mm	0.0177"	1.95mm	0.0768"	3.75mm	0.1476"	5.55mm	0.2185"
77	0.0180"	5/64"	0.0781"	25	0.1495"	7/32"	0.2188"
0.50mm	0.0197"	47	0.0785"	3.80mm	0.1496"	5.60mm	0.2205"
76	0.0200"	2.00mm	0.0787"	3.85mm	0.1516"	2	0.2210"
75	0.0210"	2.05mm	0.0807"	24	0.1520"	5.65mm	0.2224"
0.55mm	0.0217"	46	0.0810"	3.90mm	0.1535"	5.70mm	0.2244"
74	0.0225"	45	0.0820"	23	0.1540"	5.75mm	0.2264"
0.60mm	0.0236"	2.10mm	0.0827"	3.95mm	0.1555"	1	0.2280"
73	0.0240"	2.15mm	0.0846"	5/32"	0.1562"	5.80mm	0.2283"
72	0.0250"	44	0.0860"	22	0.1570"	5.85mm	0.2302"
0.65mm	0.0256"	2.20mm	0.0866"	4.00mm	0.1575"	5.90mm	0.2323"
71	0.0260"	2.25mm	0.0886"	21	0.1590"	A	0.2340"
0.70mm	0.0276"	43	0.0890"	4.05mm	0.1594"	5.95mm	0.2343"
70	0.0280"	2.30mm	0.0906"	20	0.1610"	15/64"	0.2344"
69	0.0292"	2.35mm	0.0925"	4.10mm	0.1614"	6.00mm	0.2362"
0.75mm	0.0295"	42	0.0935"	4.15mm	0.1634"	B	0.2380"
68	0.0310"	3/32"	0.0938"	4.20mm	0.1654"	6.05mm	0.2382"
1/32"	0.0312"	2.40mm	0.0945"	19	0.1660"	6.10mm	0.2402"
0.80mm	0.0315"	41	0.0960"	4.25mm	0.1673"	C	0.2420"
67	0.0320"	2.45mm	0.0965"	4.30mm	0.1693"	6.15mm	0.2421"
66	0.0330"	40	0.0980"	18	0.1695"	6.20mm	0.2441"
0.85mm	0.0335"	2.50mm	0.0984"	4.35mm	0.1713"	D	0.2460"
65	0.0350"	39	0.0995"	11/64"	0.1719"	6.25mm	0.2461"
0.90mm	0.0354"	2.55mm	0.1004"	17	0.1730"	6.30mm	0.2480"
64	0.0360"	38	0.1015"	4.40mm	0.1732"	6.35mm	0.2500"
63	0.0370"	2.60mm	0.1024"	4.45mm	0.1752"	E	0.2500"
0.95mm	0.0374"	37	0.1040"	16	0.1770"	1/4"	0.2500"
62	0.0380"	2.65mm	0.1043"	4.50mm	0.1772"	6.40mm	0.2520"
61	0.0390"	2.70mm	0.1063"	4.55mm	0.1791"	6.50mm	0.2559"
1.00mm	0.0394"	36	0.1065"	15	0.1800"	F	0.2570"
60	0.0400"	2.75mm	0.1083"	4.60mm	0.1811"	6.60mm	0.2598"
59	0.0410"	7/64"	0.1094"	14	0.1820"	G	0.2610"
1.05mm	0.0413"	35	0.1100"	4.65mm	0.1831"	6.70mm	0.2638"

• Colors indicate standard ring (collar) colors

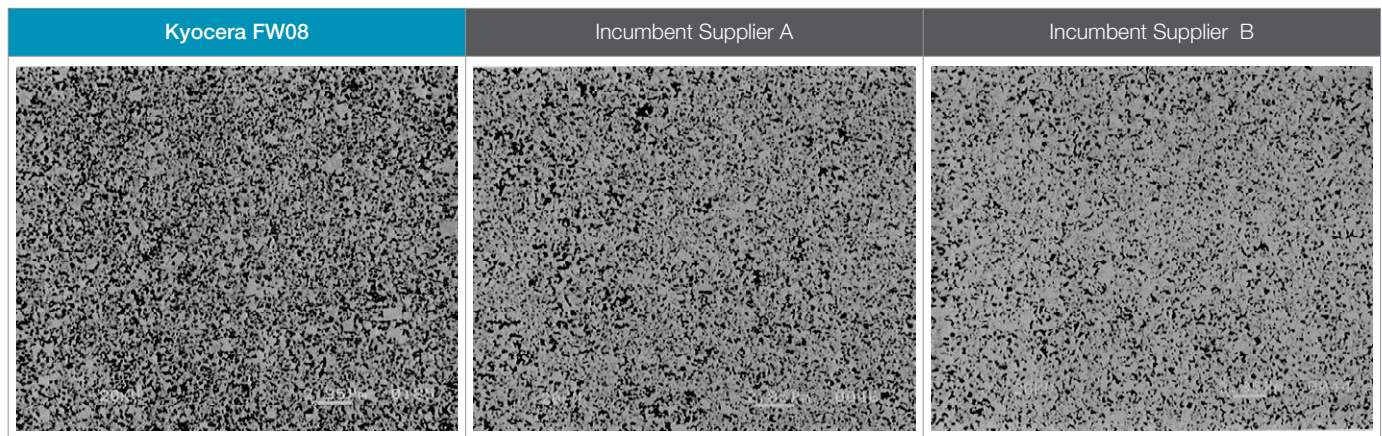
Kyocera Carbide Study – PCB Drills

After three years of development and qualification, Kyocera Corporation Carbide is now qualified on the Kyocera Precision Tool's (KPT) small to micro drill range for PCB Drills. Kyocera, one of the world's leading suppliers of carbide blanks developed carbide specifically for PCB applications and after several iterations of 8% and 6% formulations, became the preferred supplier for KPT PCB Drills. When evaluating suppliers, KPT strictly enforces the requirement that qualification means out-performing incumbent suppliers, especially in this case.

Kyocera carbide is the primary raw material supplier for KPT drill diameter range 0.0079" – 0.0453". KPT qualification consisted of several carbide grades and performance tests, below is the highest volume, micro drill results lengths:

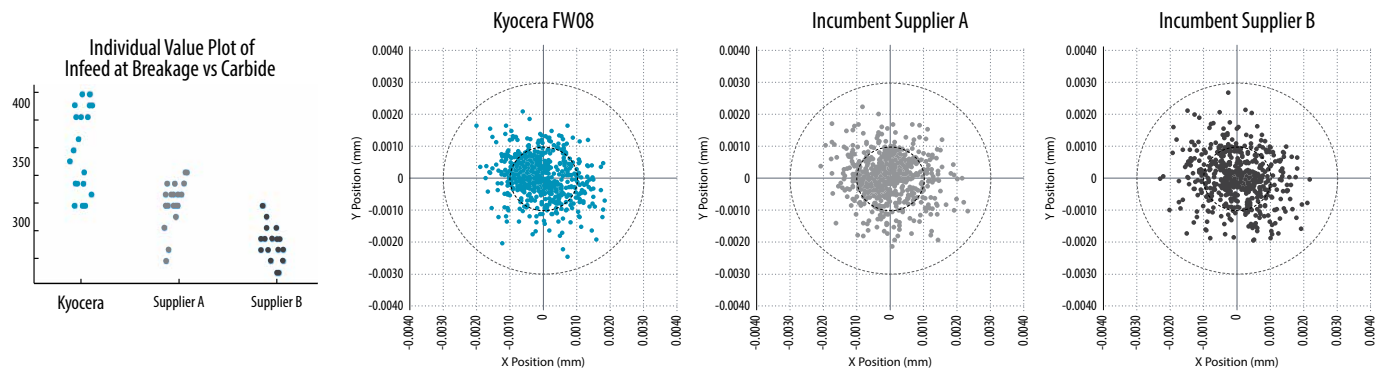
Carbide Performance Comparison

Grain Structure and Homogeneity



Performance Testing

Robustness and Positional Accuracy were the two primary performance metrics in the study. Kyocera FW08 met or exceeded the incumbent suppliers' performance in both cases.



One-way ANOVA: Infeed at Breakage versus Carbide					
Source	DF	SS	MS	F	P
Carbide	2	301720	150860	52.06	0.000
Error	57	165180	2898		
Total	59	466900			

True Position Deviation			
	Mean	Std Dev	Median
Kyocera	0.0009807	0.0005157	0.0009493
Supplier A	0.0010761	0.0005583	0.000982
Supplier B	0.0011299	0.0005847	0.0010445

S = 53.83 | R-Sq = 64.62% | R-Sq(adj) = 63.38%

Level	N	Mean	StDev
Kyocera	20	306.00	75.70
Supplier A	20	206.00	41.09
Supplier B	20	133.00	35.70

DRILLS	A
END MILLS	B
ROUTERS	C
SCORING / ENGRAVING COUNTERSINKS	D
TECHNICAL	E
INDEX	F