FR-4 Multilayer High Tg PCB Material

Recommended Drill Series: 100, 150, 430, 460, 480, 560, 580

Drill Size	Diameter *(inch)*	Feed *(inch/min)*	Speed *(k-rpm)*	Retract *(inch/min)*	Z-Axis Offset *(inches)*	Max Hits	Chipload *(mm/rev)*	SFM
0.10mm	0.0040	43	200	200	-0.011	500	0.22	209
0.13mm	0.0050	50	200	300	-0.011	600	0.25	262
0.15mm	0.0059	60	200	300	-0.011	600	0.30	309
#96	0.0063	65	200	400	-0.011	600	0.33	330
#95	0.0067	73	200	400	-0.012	600	0.37	351
#94	0.0071	78	200	500	-0.012	600	0.39	372
#93	0.0075	85	200	500	-0.012	600	0.43	393
#92	0.0079	94	200	500	-0.012	800	0.47	413
#91	0.0083	100	200	600	-0.012	800	0.50	434
#90	0.0087	104	198	600	-0.012	800	0.53	451
#89	0.0091	104	189	700	-0.012	800	0.55	450
#88	0.0095	104	181	700	-0.012	800	0.57	450
0.25mm	0.0098	104	175	800	-0.012	1000	0.59	449
#87	0.0100	104	172	800	-0.012	1000	0.60	450
#86	0.0105	104	164	800	-0.012	1000	0.63	451
#85	0.0110	104	156	900	-0.013	1000	0.67	450
#84	0.0115	104	150	900	-0.013	1000	0.69	450
0.30mm	0.0118	106	146	1000	-0.013	1200	0.73	450
#83	0.0120	108	143	1000	-0.013	1200	0.76	450
#82	0.0125	112	138	1000	-0.013	1200	0.81	450
#81	0.0130	115	132	1000	-0.013	1200	0.87	450
#80	0.0135	118	127	1000	-0.013	1500	0.93	450
0.35mm	0.0138	118	125	1000	-0.013	1500	0.94	450
#79	0.0145	119	119	1000	-0.013	1500	1.00	450
1/64	0.0156	120	110	1000	-0.014	1500	1.09	450
0.40mm	0.0158	120	109	1000	-0.014	1500	1.10	450
#78	0.0160	122	107	1000	-0.014	1500	1.14	450
0.45mm	0.0177	123	97	1000	-0.014	1500	1.27	450
#77	0.0180	124	96	1000	-0.014	1500	1.29	450
0.50mm	0.0197	125	87	1000	-0.015	1500	1.44	450
#76	0.0200	126	86	1000	-0.015	1500	1.47	450
#75	0.0210	126	82	1000	-0.015	1500	1.54	450
0.55mm	0.0217	126	79	1000	-0.015	1500	1.59	450
#74	0.0225	125	76	1000	-0.015	1500	1.64	450
0.60mm	0.0236	124	73	1000	-0.016	1500	1.70	450
#73	0.0240	124	72	1000	-0.016	1500	1.72	450
#72	0.0250	123	69	1000	-0.016	1500	1.78	450
0.65mm	0.0256	122	67	1000	-0.016	1500	1.82	450
#71	0.0260	122	66	1000	-0.016	1500	1.85	450
0.70mm	0.0276	120	62	1000	-0.016	1500	1.94	450
#70	0.0280	120	61	1000	-0.017	1500	1.97	450
#69	0.0292	119	59	1000	-0.017	1500	2.02	450
0.75mm	0.0295	119	58	1000	-0.017	1500	2.05	450
#68	0.0310	116	55	1000	-0.017	1500	2.11	450
1/32	0.0312	116	55	1000	-0.017	1500	2.11	450
0.80mm	0.0315	115	55	1000	-0.017	1500	2.09	450
#67	0.0320	114	54	1000	-0.017	1500	2.11	450
#66	0.0330	113	52	1000	-0.018	1500	2.17	450
0.85mm	0.0335	113	51	1000	-0.018	1500	2.22	450
#65	0.0350	112	49	1000	-0.018	1500	2.29	450
0.90mm	0.0354	112	49	1000	-0.018	1500	2.29	450
#64	0.0360	112	48	1000	-0.018	1500	2.33	450
#63	0.0370	111	46	1000	-0.019	1500	2.41	450
0.95mm	0.0374	111	46	1000	-0.019	1500	2.41	450
#62	0.0380	110	45	1000	-0.019	1500	2.44	450
#61	0.0390	109	44	1000	-0.019	1500	2.48	450
1.00mm	0.0394	109	44	1000	-0.019	1500	2.48	450
#60	0.0400	107	43	1000	-0.019	1500	2.49	450
#59	0.0410	105	42	1000	-0.020	1500	2.50	450
1.05mm	0.0413	105	42	1000	-0.020	1500	2.50	450
#58	0.0420	103	41	1000	-0.020	1500	2.50	450
#57	0.0430	100	40	1000	-0.020	1500	2.50	450
1.10mm	0.0433	100	40	1000	-0.020	1500	2.50	450
1.15mm	0.0453	95	38	1000	-0.021	1500	2.50	450

Note: This information is based on **200K RPM** Spindle Capability. Please use maximum spindle speed if listed RPM is unattainable

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Drill Size	Diameter *(inch)*	Feed *(inch/min)*	Speed *(k-rpm)*	Retract *(inch/min)*	Z-Axis Offset *(inches)*	Max Hits	Chipload *(mm/rev)*	SFM
#56	0.0465	93	37	1000	-0.021	1500	2.50	450
3/64	0.0469	93	37	1000	-0.021	1500	2.50	450
1.20mm	0.0472	90	36	1000	-0.021	1500	2.50	450
1.25mm	0.0492	88	35	1000	-0.021	1500	2.50	450
1.30mm	0.0512	85	34	1000	-0.022	1500	2.50	450
#55	0.0520	83	33	1000	-0.022	1500	2.50	450
1.35mm	0.0531	80	32	1000	-0.022	1500	2.50	450
#54	0.0550	78	31	1000	-0.023	1500	2.50	450
1.40mm	0.0551	78	31	1000	-0.023	1500	2.50	450
1.45mm	0.0571	75	30	1000	-0.023	1500	2.50	450
1.50mm	0.0591	73	29	1000	-0.024	1500	2.50	450
#53	0.0595	73	29	1000	-0.024	1500	2.50	450
1.55mm	0.0610	70	28	1000	-0.024	1500	2.50	450
1/16	0.0625	70	28	1000	-0.025	1500	2.50	450
1.60mm	0.0630	68	27	1000	-0.025	1500	2.50	450
#52	0.0635	68	27	1000	-0.025	1500	2.50	450
1.65mm	0.0650	65	26	1000	-0.025	1500	2.50	450
1.70mm	0.0669	65	26	1000	-0.026	1500	2.50	450
#51	0.0670	65	26	1000	-0.026	1500	2.50	450
1.75mm	0.0689	63	25	1000	-0.026	1500	2.50	450
#50	0.0700	63	25	1000	-0.026	1500	2.50	450
1.80mm	0.0709	63	25	1000	-0.027	1500	2.50	464
1.85mm	0.0728	63	25	1000	-0.027	1500	2.50	476
#49	0.0730	63	25	1000	-0.027	1500	2.50	478
1.90mm	0.0748	63	25	1000	-0.027	1500	2.50	489
#48	0.0760	63	25	1000	-0.028	1500	2.50	497
1.95mm	0.0768	63	25	1000	-0.028	1500	2.50	502
5/64	0.0781	63	25	1000	-0.028	1500	2.50	511
#47	0.0785	63	25	1000	-0.028	1500	2.50	514
2.00mm	0.0787	63	25	1000	-0.028	1500	2.50	515
2.05mm	0.0807	63	25	1000	-0.029	1500	2.50	528
#46	0.0810	63	25	1000	-0.029	1500	2.50	530
#45	0.0820	63	25	1000	-0.029	1500	2.50	536
2.10mm	0.0827	63	25	1000	-0.029	1500	2.50	541
2.15mm	0.0846	63	25	1000	-0.030	1500	2.50	553
#44	0.0860	63	25	1000	-0.030	1500	2.50	563
2.20mm	0.0866	63	25	1000	-0.030	1500	2.50	567
2.25mm	0.0886	63	25	1000	-0.031	1500	2.50	580
#43	0.0890	63	25	1000	-0.031	1500	2.50	582
2.30mm	0.0906	63	25	1000	-0.031	1500	2.50	593
2.35mm	0.0925	63	25	1000	-0.032	1500	2.50	605
#42	0.0935	63	25	1000	-0.032	1500	2.50	612
3/32	0.0938	63	25	1000	-0.032	1500	2.50	614
2.40mm	0.0945	63	25	1000	-0.032	1500	2.50	618
#41	0.0960	63	25	1000	-0.032	1500	2.50	628
2.45mm	0.0965	63	25	1000	-0.033	1500	2.50	631
#40	0.0980	63	25	1000	-0.033	1500	2.50	641
2.50mm	0.0984	63	25	1000	-0.033	1500	2.50	644
#39	0.0995	63	25	1000	-0.033	1500	2.50	651
2.55mm	0.1004	63	25	1000	-0.033	1500	2.50	657
#38	0.1015	63	25	1000	-0.034	1500	2.50	664
2.60mm	0.1024	63	25	1000	-0.034	1500	2.50	670
#37	0.1040	63	25	1000	-0.034	1200	2.50	680
2.65mm	0.1043	63	25	1000	-0.034	1200	2.50	682
2.70mm	0.1063	63	25	1000	-0.035	1200	2.50	695
#36	0.1065	63	25	1000	-0.035	1200	2.50	697
2.75mm	0.1083	63	25	1000	-0.035	1200	2.50	708
7/64	0.1094	63	25	1000	-0.036	1200	2.50	716
#35	0.1100	63	25	1000	-0.036	1200	2.50	720
2.80mm	0.1102	63	25	1000	-0.036	1200	2.50	721
#34	0.1110	63	25	1000	-0.036	1200	2.50	726
2.85mm	0.1122	63	25	1000	-0.036	1200	2.50	734
#33	0.1130	63	25	1000	-0.036	1200	2.50	739
2.90mm	0.1142	63	25	1000	-0.037	1200	2.50	747
#32	0.1160	63	25	1000	-0.037	1200	2.50	759
2.95mm	0.1161	63	25	1000	-0.037	1200	2.50	759
3.00mm	0.1181	63	25	1000	-0.038	1200	2.50	773
#31	0.1200	63	25	1000	-0.038	1200	2.50	785
3.05mm	0.1201	63	25	1000	-0.038	1200	2.50	786
3.10mm	0.1220	63	25	1000	-0.038	1200	2.50	798
3.15mm	0.1240	63	25	1000	-0.039	1200	2.50	811
1/8	0.1250	63	25	1000	-0.039	1200	2.50	818

Note: This information is based on **200K RPM** Spindle Capability. Please use maximum spindle speed if listed RPM is unattainable

Drill Size	Diameter *(inch)*	Feed *(inch/min)*	Speed *(k-rpm)*	Retract *(inch/min)*	Z-Axis Offset *(inches)*	Max Hits	Chipload *(mm/rev)*	SFM
3.20mm	0.1260	50	25	1000	-0.018	1000	2.00	824
3.25mm	0.1280	50	25	1000	-0.018	1000	2.00	837
#30	0.1285	50	25	1000	-0.019	1000	2.00	841
3.30mm	0.1299	50	25	1000	-0.019	1000	2.00	850
3.35mm	0.1319	50	25	1000	-0.019	1000	2.00	863
3.40mm	0.1339	50	25	1000	-0.019	1000	2.00	876
3.45mm	0.1358	50	25	1000	-0.019	1000	2.00	888
#29	0.1360	50	25	1000	-0.019	1000	2.00	890
3.50mm	0.1378	44	25	1000	-0.019	1000	1.76	901
3.55mm	0.1398	44	25	1000	-0.019	1000	1.76	915
#28	0.1405	44	25	1000	-0.019	1000	1.76	919
9/64	0.1406	44	25	1000	-0.019	800	1.76	920
3.60mm	0.1417	44	25	1000	-0.019	800	1.76	927
3.65mm	0.1437	44	25	1000	-0.020	800	1.76	940
#27	0.1440	44	25	1000	-0.020	800	1.76	942
3.70mm	0.1457	44	25	1000	-0.020	800	1.76	953
#26	0.1470	44	25	1000	-0.020	800	1.76	962
3.75mm	0.1476	44	25	1000	-0.020	800	1.76	966
#25	0.1495	44	25	1000	-0.020	800	1.76	978
3.80mm	0.1496	44	25	1000	-0.020	800	1.76	979
3.85mm	0.1516	44	25	1000	-0.020	800	1.76	992
#24	0.1520	44	25	1000	-0.020	600	1.76	994
3.90mm	0.1535	44	25	1000	-0.020	600	1.76	1004
#23	0.1540	44	25	1000	-0.020	600	1.76	1007
3.95	0.1555	38	25	1000	-0.020	600	1.52	1017
5/32	0.1562	38	25	1000	-0.020	600	1.52	1022
#22	0.1570	38	25	1000	-0.020	600	1.52	1027
4.00mm	0.1575	38	25	1000	-0.020	600	1.52	1030
#21	0.1590	38	25	1000	-0.021	600	1.52	1040
4.05mm	0.1594	38	25	1000	-0.021	600	1.52	1043
#20	0.1610	38	25	1000	-0.021	600	1.52	1053
4.10mm	0.1614	38	25	1000	-0.021	600	1.52	1056
4.15mm	0.1634	38	25	1000	-0.021	600	1.52	1069
4.20mm	0.1654	38	25	1000	-0.021	600	1.52	1082
#19	0.1660	38	25	1000	-0.021	600	1.52	1086
4.25mm	0.1673	38	25	1000	-0.021	600	1.52	1094
4.30mm	0.1693	38	25	1000	-0.021	600	1.52	1108
#18	0.1695	38	25	1000	-0.021	600	1.52	1109
4.35mm	0.1713	38	25	1000	-0.021	600	1.52	1121
11/64	0.1719	38	25	1000	-0.021	600	1.52	1125
#17	0.1730	38	25	1000	-0.021	500	1.52	1132
4.40mm	0.1732	38	25	1000	-0.021	500	1.52	1133
4.45mm	0.1752	38	25	1000	-0.022	500	1.52	1146
#16	0.1770	38	25	1000	-0.022	500	1.52	1158
4.50mm	0.1772	38	25	1000	-0.022	500	1.52	1159
4.55mm	0.1792	38	25	1000	-0.022	500	1.52	1172
#15	0.1800	38	25	1000	-0.022	500	1.52	1178
4.60mm	0.1811	38	25	1000	-0.022	500	1.52	1185
#14	0.1820	38	25	1000	-0.022	500	1.52	1191
4.65mm	0.1831	38	25	1000	-0.022	500	1.52	1198
#13	0.1850	38	25	1000	-0.022	500	1.52	1210
4.70mm	0.1850	38	25	1000	-0.022	500	1.52	1210
4.75mm	0.1870	38	25	1000	-0.022	500	1.52	1223
3/16	0.1875	38	25	1000	-0.022	500	1.52	1227
4.80mm	0.1890	38	25	1000	-0.023	500	1.52	1236
#12	0.1890	38	25	1000	-0.023	500	1.52	1236
4.85mm	0.1909	38	25	1000	-0.023	500	1.52	1249
#11	0.1910	38	25	1000	-0.023	500	1.52	1249
4.90mm	0.1929	38	25	1000	-0.023	500	1.52	1262
#10	0.1935	38	25	1000	-0.023	500	1.52	1266
4.95mm	0.1949	38	25	1000	-0.023	500	1.52	1275
#9	0.1960	38	25	1000	-0.023	400	1.52	1282
5.00mm	0.1968	38	25	1000	-0.023	400	1.52	1287
5.05mm	0.1988	38	25	1000	-0.023	400	1.52	1300
#8	0.1990	38	25	1000	-0.023	400	1.52	1302
5.10mm	0.2008	31	25	1000	-0.023	400	1.24	1314
#7	0.2010	31	25	1000	-0.023	400	1.24	1315
5.15mm	0.2028	31	25	1000	-0.023	400	1.24	1327
13/64	0.2031	31	25	1000	-0.023	400	1.24	1329
#6	0.2040	31	25	1000	-0.024	400	1.24	1335
5.20mm	0.2047	31	25	1000	-0.024	400	1.24	1339
#5	0.2055	31	25	1000	-0.024	400	1.24	1344

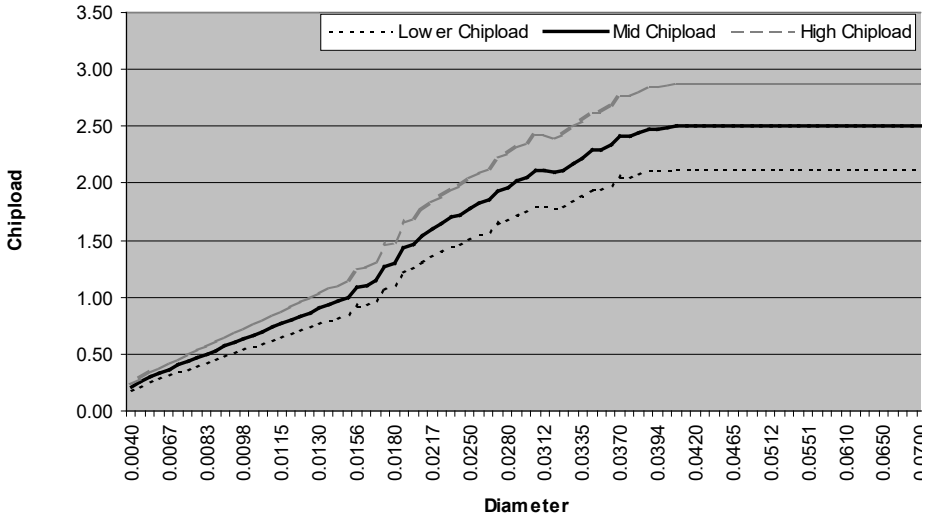
Note: This information is based on **200K RPM** Spindle Capability. Please use maximum spindle speed if listed RPM is unattainable

Drill Size	Diameter *(inch)*	Feed *(inch/min)*	Speed *(k-rpm)*	Retract *(inch/min)*	Z-Axis Offset *(inches)*	Max Hits	Chipload *(mm/rev)*	SFM
5.25mm	0.2067	31	25	1000	-0.024	400	1.24	1352
5.30mm	0.2087	31	25	1000	-0.024	400	1.24	1365
#4	0.2090	31	25	1000	-0.024	400	1.24	1367
5.35mm	0.2106	31	25	1000	-0.024	400	1.24	1378
5.40mm	0.2126	31	25	1000	-0.024	400	1.24	1391
#3	0.2130	31	25	1000	-0.024	400	1.24	1393
5.45mm	0.2146	31	25	1000	-0.024	400	1.24	1404
5.50mm	0.2165	31	25	1000	-0.024	400	1.24	1416
5.55mm	0.2185	31	25	1000	-0.024	400	1.24	1429
7/32	0.2188	31	25	1000	-0.024	400	1.24	1431
5.60mm	0.2205	31	25	1000	-0.025	400	1.24	1442
#2	0.2210	31	25	1000	-0.025	400	1.24	1446
5.65mm	0.2224	31	25	1000	-0.025	400	1.24	1455
5.70mm	0.2244	31	25	1000	-0.025	400	1.24	1468
5.75mm	0.2264	31	25	1000	-0.025	400	1.24	1481
#1	0.2280	31	25	1000	-0.025	400	1.24	1492
5.80mm	0.2283	31	25	1000	-0.025	400	1.24	1493
5.85mm	0.2302	31	25	1000	-0.025	400	1.24	1506
5.90mm	0.2323	31	25	1000	-0.025	400	1.24	1520
A	0.2340	31	25	1000	-0.025	400	1.24	1531
5.95mm	0.2343	31	25	1000	-0.026	400	1.24	1533
15/64	0.2344	31	25	1000	-0.026	400	1.24	1533
6.00mm	0.2362	31	25	1000	-0.026	400	1.24	1545
B	0.2380	31	25	1000	-0.026	400	1.24	1557
6.05mm	0.2382	31	25	1000	-0.026	400	1.24	1558
6.10mm	0.2402	31	25	1000	-0.026	400	1.24	1571
C	0.2420	31	25	1000	-0.026	400	1.24	1583
6.15mm	0.2421	31	25	1000	-0.026	400	1.24	1584
6.20mm	0.2441	31	25	1000	-0.026	400	1.24	1597
D	0.2460	31	25	1000	-0.026	400	1.24	1609
6.25mm	0.2461	31	25	1000	-0.026	400	1.24	1610
6.30mm	0.2480	31	25	1000	-0.026	400	1.24	1622
6.35mm	0.2500	31	25	1000	-0.027	400	1.24	1635
6.40mm	0.2520	31	25	1000	-0.027	400	1.24	1649
6.50mm	0.2559	31	25	1000	-0.027	400	1.24	1674
F	0.2570	31	25	1000	-0.027	400	1.24	1681
6.60mm	0.2598	31	25	1000	-0.027	400	1.24	1700

In some cases, there may be an opportunity to increase the chipload based on the application's robustness. Variables such as machine technology and condition, stack support materials, and Kyocera design selection may allow the increased throughput with higher chiploads. Multiply the recommended chipload by 1.15 to reach the higher chipload.

If the application is not as robust due to heavy glass, high copper content, tight annular ring requirements, or similar, multiply the recommended chipload by 0.85.

Chiploads for FR-4 Multilayer High Tg



Note: This information is based on **200K RPM** Spindle Capability. Please use maximum spindle speed if listed RPM is unattainable