車載用基板 / 両面 - 8 層 (ϕ0.05mm - ϕ1.6mm)

Automotive PWB / Double sided to 8-layer

UNION TOOL CO.

穴明け機主軸回転数（Max 値）125 krpm *Maximum spindle speed 125 krpm*

直径 Diameter		回転数 Spindle speed	（周速）*2 (Velocity) *2	送り速度 Infeed rate		（チップロード）*2 (Chipload) *2	上昇速度 Retract rate		捨て板切り込み深さ Depth into back-up board		ヒット数 *3 Hits *3	再研磨回数 *3 Number of repoints *3	基板重ね枚数 Stack height *3, *4 基板厚 Board thickness [mm]		
[mm]	[inch]	[rpm]	[m/min]	[m/min]	[IPM]	[μm/rev]	[m/min]	[IPM]	[mm]	[inch]	-	-	t 0.8	t 1.0 - 1.2	t 1.6
0.05	0.0020	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0.075	0.0030	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0.09	0.0035	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0.1	0.0039	125,000	(39)	0.63	25	(5)	10	394	0.1	0.0039	1,000 - 2,000	1	1	1	1
0.12	0.0047	125,000	(47)	0.63	25	(5)	10	394	0.15	0.0059	1,000 - 2,000	1	1	1	1
0.15	0.0059	125,000	(59)	0.94	37	(8)	15	591	0.15	0.0059	1,000 - 2,000	2	1	1	1
0.2	0.0079	125,000	(79)	1.50	59	(12)	25.4	1000	0.2	0.0079	1,000 - 2,000	2	1 - 2	1	1
0.25	0.0098	125,000	(98)	1.88	74	(15)	25.4	1000	0.25	0.0098	1,000 - 2,000	2	1 - 2	1 - 2	1
0.275	0.0108	125,000	(108)	1.88	74	(15)	25.4	1000	0.3	0.0118	1,000 - 2,000	2	2 - 3	1 - 2	1
0.3	0.0118	125,000	(118)	1.88	74	(15)	25.4	1000	0.3	0.0118	2,000 - 3,000	2	3 - 4	2 - 3	1 - 2
0.35	0.0138	118,000	(130)	2.01	79	(17)	25.4	1000	0.35	0.0138	2,000 - 3,000	2	3 - 4	2 - 3	1 - 2
0.4	0.0157	104,000	(131)	2.08	82	(20)	25.4	1000	0.4	0.0157	2,000 - 3,000	3	3 - 4	2 - 3	2 - 3
0.45	0.0177	92,000	(130)	2.12	83	(23)	25.4	1000	0.45	0.0177	2,000 - 3,000	3	3 - 4	2 - 3	2 - 3
0.5	0.0197	83,000	(130)	2.08	82	(25)	25.4	1000	0.5	0.0197	2,000 - 3,000	3	3 - 4	2 - 3	2 - 3
0.55	0.0217	75,000	(130)	1.88	74	(25)	25.4	1000	0.55	0.0217	2,000 - 3,000	3	3 - 4	2 - 3	2 - 3
0.6	0.0236	69,000	(130)	1.73	68	(25)	25.4	1000	0.6	0.0236	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.65	0.0256	64,000	(131)	1.60	63	(25)	25.4	1000	0.65	0.0256	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.7	0.0276	59,000	(130)	1.77	70	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.75	0.0295	55,000	(130)	1.65	65	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.8	0.0315	52,000	(131)	1.56	61	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.85	0.0335	49,000	(131)	1.47	58	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.9	0.0354	46,000	(130)	1.38	54	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
0.95	0.0374	44,000	(131)	1.32	52	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1	0.0394	41,000	(129)	1.23	48	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.05	0.0413	39,000	(129)	1.17	46	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.1	0.0433	38,000	(131)	1.14	45	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.15	0.0453	36,000	(130)	1.08	43	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.2	0.0472	35,000	(132)	1.05	41	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.25	0.0492	33,000	(130)	0.99	39	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.3	0.0512	32,000	(131)	0.96	38	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.35	0.0531	31,000	(131)	0.93	37	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.4	0.0551	30,000	(132)	0.90	35	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.45	0.0571	29,000	(132)	0.87	34	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.5	0.0591	28,000	(132)	0.84	33	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.55	0.0610	27,000	(131)	0.81	32	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4
1.6	0.0630	26,000	(131)	0.78	31	(30)	25.4	1000	0.7	0.0276	2,000 - 3,000	3	4 - 5	3 - 4	3 - 4

*1 赤字のドリル径は125krpm以上の高速回転加工で穴品質ならびにドリル折損率が改善されます。
*2 周速ならびにチップロードはメートル表記です。
*3 ヒット数、再研磨回数、重ね枚数は目安です。穴品質をご確認の上設定願います。
*4 t0.8mm未満の基板に関しては、半導体パッケージ用基板の加工条件をご参考下さい。
*5 上記表に適合しない基板厚や重ね枚数で加工される場合については、別途お問い合わせ願います。
*6 穴明加工機のスピンドル性能等によっては条件設定を改善する必要があります。
*7 穴明加工機のプレッシャーフット、及びバキューム性能は、穴品質に影響を及ぼすことがありますので定期的な点検をお奨めします。
*8 当板、捨板の材料、厚さは穴品質に影響を及ぼすことがありますので、選定にあたっては十分ご注意ください。
*9 基材メーカーならびに基材型番によって加工特性が大きく異なります。目標品質をクリアできるヒット数ならびに基板重ね枚数をご検討願います。
*10 本加工条件は穴内壁荒れ、ならびに穴周囲バリ低減を考慮して作成されています。

*1 Diameters written in RED will gain improved hole quality when drilling with over 125krpm spindle speed.
*2 Velocity and chipload are shown in metric units.
*3 Hits, number of repoints and stack heights are for general information. They should be determined by hole quality.
*4 For panels below t0.8mm, please refer to our “Package Substrate” parameters.
*5 Where the board thickness and/or stack height are not shown in the table, please contact Union Tool’s Technical support team.
*6 These parameters can be affected by the condition and performance of both the spindle and drilling machine.
*7 The pressure foot and vacuum performance of the drilling machine can affect hole quality. Periodic inspection, maintenance and measurement is strongly recommended.
*8 The thickness of the entry and back-up board, together with the material type can affect the drilling conditions and care should be taken to choose an appropriate product for the application being drilled.
*9 Drilling performance changes differently depending on PWB makers and model types. Hit counts and PWB stack height should be determined by hole quality target.
*10 This drilling parameter is considered the improvement of hole wall roughness and burr around hole.

車載用基板 / 両面 - 8 層 (ϕ1.65mm - ϕ6.5mm)

Automotive PWB / Double sided to 8-layer

UNION TOOL CO.

穴明け機主軸回転数（Max 値）125 krpm *Maximum spindle speed 125 krpm*

直径 Diameter		回転数 Spindle speed	（周速）*2 (Velocity) *2	送り速度 Infeed rate		（チップロード）*2 (Chipload) *2	上昇速度 Retract rate		捨て板切り込み深さ Depth into back-up board		ヒット数 *3 Hits *3	再研磨回数 *3 Number of repoints *3	基板重ね枚数 Stack height *3, *4 基板厚 Board thickness [mm]		
[mm]	[inch]	[rpm]	[m/min]	[m/min]	[IPM]	[μm/rev]	[m/min]	[IPM]	[mm]	[inch]	-	-	t 0.8	t 1.0 - 1.2	t 1.6
1.65	0.0650	26,000	(135)	0.78	31	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.7	0.0669	25,000	(134)	0.75	30	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.75	0.0689	24,000	(132)	0.72	28	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.8	0.0709	24,000	(136)	0.72	28	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.85	0.0728	23,000	(134)	0.69	27	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.9	0.0748	23,000	(137)	0.69	27	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
1.95	0.0768	22,000	(135)	0.66	26	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2	0.0787	22,000	(138)	0.66	26	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.05	0.0807	21,000	(135)	0.63	25	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.1	0.0827	20,000	(132)	0.60	24	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.15	0.0846	20,000	(135)	0.60	24	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.2	0.0866	19,000	(131)	0.57	22	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.25	0.0886	19,000	(134)	0.57	22	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.3	0.0906	18,000	(130)	0.54	21	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.35	0.0925	18,000	(133)	0.54	21	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.4	0.0945	17,000	(128)	0.51	20	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.45	0.0965	17,000	(131)	0.51	20	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.5	0.0984	17,000	(134)	0.51	20	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.55	0.1004	17,000	(136)	0.51	20	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.6	0.1024	17,000	(139)	0.51	20	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.65	0.1043	16,000	(133)	0.48	19	(30)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.7	0.1063	16,000	(136)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.75	0.1083	16,000	(138)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.8	0.1102	16,000	(141)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.85	0.1122	15,000	(134)	0.30	12	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.9	0.1142	16,000	(146)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
2.95	0.1161	16,000	(148)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3	0.1181	16,000	(151)	0.32	13	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3.05	0.1201	15,000	(144)	0.30	12	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3.1	0.1220	15,000	(146)	0.30	12	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3.15	0.1240	15,000	(148)	0.30	12	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3.175	0.1250	15,000	(150)	0.30	12	(20)	25.4	1000	0.7	0.0276	1,500 - 2,500	4	4 - 5	3 - 4	3 - 4
3.2 - 3.95	0.126 - 0.156	15,000	-	0.30	12	(20)	25.4	1000	0.7	0.0276	500-1000	4	4 - 5	3 - 4	3 - 4
4.0 - 4.95	0.157 - 0.195	15,000	-	0.15	6	(10)	25.4	1000	0.7	0.0276	500-1000	4	4 - 5	3 - 4	3 - 4
5.0 - 5.95	0.197 - 0.234	15,000	-	0.15	6	(10)	25.4	1000	0.7	0.0276	500-1000	4	4 - 5	3 - 4	3 - 4
6.0 - 6.5	0.236 - 0.256	15,000	-	0.15	6	(10)	25.4	1000	0.7	0.0276	500-1000	4	4 - 5	3 - 4	3 - 4

*1 穴周囲バリならびに内壁荒れが見られる場合はチップロードを下げて下さい。
*2 周速ならびにチップロードはメートル表記です。
*3 ヒット数、再研磨回数、重ね枚数は目安です。穴品質をご確認の上設定願います。
*4 t0.8mm未満の基板に関しては、半導体パッケージ用基板の加工条件をご参考下さい。
*5 上記表に適合しない基板厚や重ね枚数で加工される場合については、別途お問い合わせ願います。
*6 穴明加工機のスピンドル性能等によっては条件設定を改善する必要があります。
*7 穴明加工機のプレッシャーフット、及びバキューム性能は、穴品質に影響を及ぼすことがありますので定期的な点検をお奨めします。
*8 当板、捨板の材料、厚さは穴品質に影響を及ぼすことがありますので、選定にあたっては十分ご注意ください。
*9 基材メーカーならびに基材型番によって加工特性が大きく異なります。目標品質をクリアできるヒット数ならびに基板重ね枚数をご検討願います。
*10 本加工条件は穴内壁荒れ、ならびに穴周囲バリ低減を考慮して作成されています。

*1 In the case of burring and hole wall roughness problems, please decrease the chipload.
*2 Velocity and chipload are shown in metric units.
*3 Hits, number of repoints and stack heights are for general information. They should be determined by hole quality.
*4 For panels below t0.8mm, please refer to our “Package Substrate” parameters.
*5 Where the board thickness and/or stack height are not shown in the table, please contact Union Tool’s Technical support team.
*6 These parameters can be affected by the condition and performance of both the spindle and drilling machine.
*7 The pressure foot and vacuum performance of the drilling machine can affect hole quality. Periodic inspection, maintenance and measurement is strongly recommended.
*8 The thickness of the entry and back-up board, together with the material type can affect the drilling conditions and care should be taken to choose an appropriate product for the application being drilled.
*9 Drilling performance changes differently depending on PWB makers and model types. Hit counts and PWB stack height should be determined by hole quality target.
*10 This drilling parameter is considered the improvement of hole wall roughness and burr around hole.