tec-speed 9.2 & 9.3H
VT-468(LK2) & VT-468(Q)
PROCESS GUIDE

UL Approval: E214381 Version: 28/11/2025

Precautions in Handling

Storage Condition & Shelf Life

		Prepreg		Laminate
Storage Condition	Temperature	Below 23°C (73°F)	Below 5°C (41°F)	Room
	Relative Humidity	Below 55%	/	/
Shelf Life		3 Months	6 Months	24 Months (airproof)

- Laminate should be stored flat in a cool dry environment. Avoid bending or scratching the laminate surface.
- Prepreg should be stored flat in a cool dry controlled environment 23°C or less and 50% RH or less. Extended storage of prepreg should be at a reduced temperature of 5°C.
- Open bags of prepreg must be resealed. Prepreg should not be exposed to open environments for more than 8 hours total cumulatively under the above conditions or as agreed upon between user and supplier.
- A first-in-first-out inventory system and a method to track material lot numbers through PWB processing and delivery of finished circuits is recommended.

Designing and Inner layer Process

- Please be careful when single ply of 1080, 1086, 1078 or 106 prepreg is designed to the dielectric layer.
- Before feed please baking to remove any absorbed moisture or surface moisture especially for thinner core. Baking at 150°C for 120 minutes is preferred.
- Oxide Alternative is preferred & recommended over the other oxide chemistry for the advanced boards fabrications, especially for lead free and high layer count applications.
- Holding time between brown oxide and press process: best control within 6 hours.

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Prepreg Availability

Dk values are for impedance design

VT-468(LK2)

Delivered Thickness (Inches)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0025	1035	75%	3.02	3.02	3.01	3.00	2.98	0.0007	0.0007	0.0008	0.0009	0.0010
0.0030	1035	78%	2.97	2.97	2.96	2.95	2.93	0.0006	0.0006	0.0007	0.0008	0.0009
0.0030	1078	66%	3.12	3.12	3.11	3.10	3.08	0.0007	0.0007	0.0008	0.0009	0.0010
0.0035	1078	71%	3.07	3.07	3.06	3.05	3.03	0.0007	0.0007	0.0008	0.0009	0.0010
0.0040	1078	75%	3.02	3.02	3.01	3.00	2.98	0.0007	0.0007	0.0008	0.0009	0.0010

VT-468(Q)

Delivered Thickness (Inches)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0022	1035	71	2.49	2.49	2.48	2.47	2.45	0.0003	0.0003	0.0004	0.0005	0.0006
0.0025	1035	75	2.44	2.44	2.43	2.42	2.40	0.0003	0.0003	0.0004	0.0005	0.0006
0.0030	1035	78	2.39	2.39	2.38	2.37	2.37	0.0002	0.0002	0.0003	0.0004	0.0005
0.0030	1078	66	2.54	2.54	2.53	2.52	2.50	0.0003	0.0003	0.0004	0.0005	0.0006
0.0035	1078	71	2.49	2.49	2.48	2.47	2.45	0.0003	0.0003	0.0004	0.0005	0.0006
0.0040	1078	75	2.44	2.44	2.43	2.42	2.40	0.0003	0.0003	0.0004	0.0005	0.0006

Remark:

① Press thickness test condition---Prepreg lamination size 18"*24", Copper Foil---1oz/1oz, Flow---about 5%;

② Make laminated prepreg to micro-section and measure the thickness with microscope; this thickness is used for resistance design calculation.

③ The thickness measured with micrometer is 0.2~0.4 mil larger than that measured with micro-section; and mainly used for total thickness design calculation.

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Laminates Availability

Dk values are for impedance design

VT-468(LK2)

Laminate Thickness (Inches)	Glass Style	Piles	Resin Content	Dk					Df				
				@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0020	1035	1ply	68	3.10	3.10	3.09	3.08	3.06	0.0007	0.0007	0.0008	0.0009	0.0010
0.0025	1035	1ply	75	3.02	3.02	3.01	3.00	2.98	0.0007	0.0007	0.0008	0.0009	0.0010
0.0030	1078	1ply	66	3.12	3.12	3.11	3.10	3.08	0.0007	0.0007	0.0008	0.0009	0.0010
0.0035	1078	1ply	71	3.07	3.07	3.06	3.05	3.03	0.0007	0.0007	0.0008	0.0009	0.0010
0.0040	1035	2ply	68	3.10	3.10	3.09	3.08	3.06	0.0007	0.0007	0.0008	0.0009	0.0010
0.0050	1035	2ply	75	3.02	3.02	3.01	3.00	2.98	0.0007	0.0007	0.0008	0.0009	0.0010
0.0060	1078	2ply	66	3.12	3.12	3.11	3.10	3.08	0.0007	0.0007	0.0008	0.0009	0.0010
0.0070	1078	2ply	71	3.07	3.07	3.06	3.05	3.03	0.0007	0.0007	0.0008	0.0009	0.0010

VT-468(Q)

Laminate Thickness (Inches)	Glass Style	Piles	Resin Content	Dk					Df				
				@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0020	1035	1ply	68	2.52	2.52	2.51	2.50	2.48	0.0003	0.0003	0.0004	0.0005	0.0006
0.0025	1035	1ply	75	2.44	2.44	2.43	2.42	2.40	0.0003	0.0003	0.0004	0.0005	0.0006
0.0030	1078	1ply	66	2.54	2.54	2.53	2.52	2.50	0.0003	0.0003	0.0004	0.0005	0.0006
0.0035	1078	1ply	71	2.49	2.49	2.48	2.47	2.45	0.0003	0.0003	0.0004	0.0005	0.0006
0.0040	1035	2ply	68	2.52	2.52	2.51	2.50	2.48	0.0003	0.0003	0.0004	0.0005	0.0006
0.0050	1035	2ply	75	2.44	2.44	2.43	2.42	2.40	0.0003	0.0003	0.0004	0.0005	0.0006
0.0060	1078	2ply	66	2.54	2.54	2.53	2.52	2.50	0.0003	0.0003	0.0004	0.0005	0.0006
0.0070	1078	2ply	71	2.49	2.49	2.48	2.47	2.45	0.0003	0.0003	0.0004	0.0005	0.0006

More types could be available upon request.

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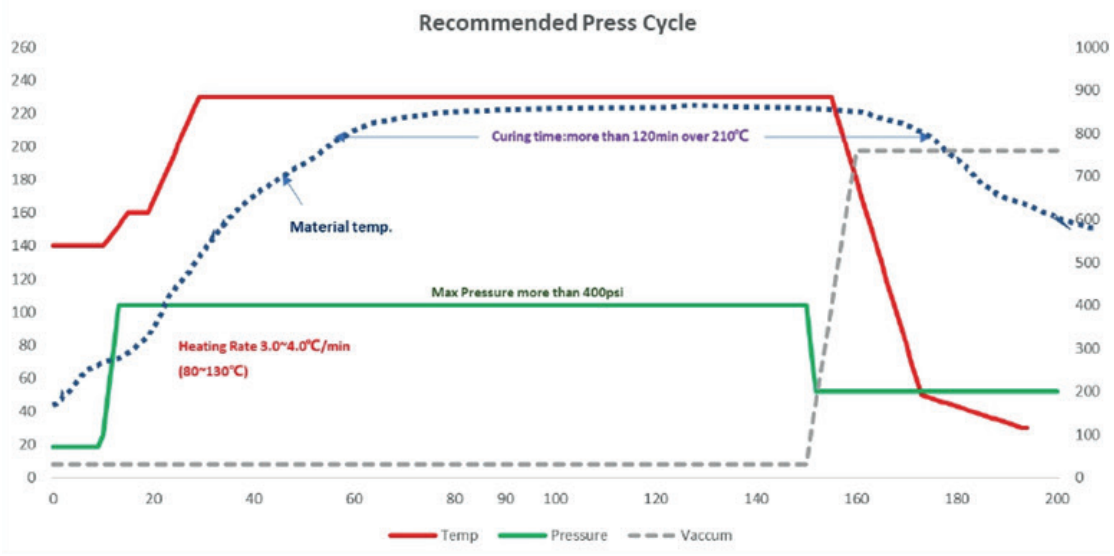
Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]: Programmable Press: ≥3°C/min
2. Curing Temperature & Time: >120min at more than 210°C and peak temperature>215 °C
3. Full Pressure: ≥400psi (28Kg/cm2) should be applied full pressure before 100 °C
4. Vacuuming should be continued until over 140°C [Material Temperature]
5. Cushion for pressure evenness is needed



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Typical Drilling Parameters

- Drilling parameters should be adjusted depending on hole size, layer count, panel thickness, stack count and stack height etc.
- Please adjust drilling parameters after checking qualities of through holes.
- Smear, resin cracking or nail heading may occur if drilling condition doesn't match material.

Drill Size (mm)	Spindle Speed (krpm)	In-Feed Rate (inches/min)	Retract Rate (inches/min)	S.F.M (ft/min)	Chip Load (mil/rev.)	Max Hit
0.25	150	98	500	386	0.65	500
0.30	126	118	500	389	0.93	500
0.35	109	125	500	392	1.15	500
0.40	96	130	500	395	1.35	500
0.45	86	132	500	397	1.53	500
0.50	78	133	500	400	1.7	1000
0.55	71	132	500	403	1.85	1000
0.60	66	131	500	405	1.99	1000
0.65	61	129	500	408	2.11	1000
0.70	57	127	500	411	2.21	1000
0.75	54	124	500	414	2.3	1000
0.80	51	120	500	416	2.37	1000
0.85	48	117	500	419	2.43	1000
0.90	46	113	500	422	2.47	1000
1.00	41	104	500	427	2.5	1000

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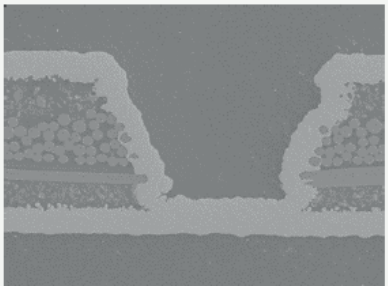
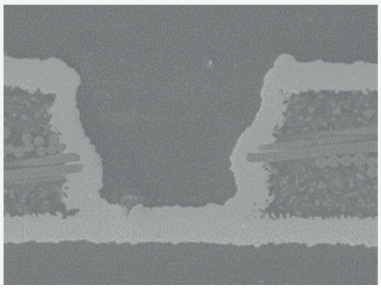
Laser Drilling

- Brown Oxidation treatment
- Diameter: 80μm
- Pulse width: 1st shot (for copper) 15us, 2nd / 3rd shot (for prepreg) 7us





Desmear Process

- Before using plasma or desmear, a post baking @150°C for 120min is preferred.
- 1 cycle Plasma and 1 cycle desmear is recommended.
- Typical plasma conditions.

Process	Temperature (°C)	Gas mixture	Power (W)	Duration (min)
Parameter	80-100	10%CF4 , 80% O2, 10% N2	4000	60-80

- Typical Chemical conditions. (Atotech chemical)

Process	Temperature (°C)	Duration (min)
Sewll	60-70	5-10
Permanganate Oxidizer	70-80	10-15

If use other chemical, please consult the chemical supplier for suggested conditions.

Packaging and baking recommendation

- It is recommended to bake the board before packaging at 125°C/4~8h to avoid moisture causing a decrease in heat resistance.
- If the PCBs needs to be stored for a long time before use, it is recommended to use aluminum foil vacuum packaging.
- If exceed 3 months after packaging , It is best to bake the PCBs at 125°C/4~6h before assembly before use.