tec-speed 3.0 VT-464L PROCESS GUIDE

UL Approval: E214381 Version: 06/03/2026

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)

- The pre-preg exceeding shelf time should be retested.
- Take care in handling thin core laminates as they are easily damaged.
- If the pre-preg is not consumed within 48hrs after opening the vacuum package, it is recommended that the bags be resealed.
- Material is available in both long and short grain. The grain direction is indicated on the label with an arrow.

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

E-Glass styles: 2116, 2113, 1080, 1067,106, 1037, 1027, etc.

Dk values are for impedance design

Delivered Thickness (inches)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0016	1027	72%	3.45	3.25	3.21	3.18	3.12	0.0066	0.0069	0.0074	0.0084	0.0091
0.0018	1027	74%	3.40	3.34	3.30	3.22	3.16	0.0067	0.0070	0.0075	0.0085	0.0092
0.002	1027	76%	3.35	3.18	3.15	3.10	3.04	0.0068	0.0071	0.0076	0.0086	0.0093
0.002	1037	72%	3.45	3.25	3.21	3.18	3.12	0.0066	0.0069	0.0074	0.0084	0.0091
0.0022	1037	74%	3.40	3.34	3.30	3.22	3.16	0.0067	0.0070	0.0075	0.0085	0.0092
0.0018	106	70%	3.47	3.27	3.24	3.20	3.14	0.0065	0.0068	0.0073	0.0083	0.0090
0.002	106	72%	3.45	3.25	3.21	3.18	3.12	0.0066	0.0069	0.0074	0.0084	0.0091
0.0024	106	76%	3.35	3.18	3.15	3.10	3.04	0.0068	0.0071	0.0076	0.0086	0.0093
0.0023	1067	69%	3.48	3.45	3.39	3.30	3.24	0.0065	0.0068	0.0073	0.0083	0.0090
0.0025	1067	71%	3.46	3.43	3.37	3.28	3.22	0.0065	0.0068	0.0073	0.0083	0.0090
0.0027	1067	73%	3.40	3.34	3.30	3.22	3.16	0.0067	0.0070	0.0075	0.0085	0.0092
0.0030	1078	64%	3.63	3.60	3.53	3.42	3.36	0.0062	0.0065	0.0070	0.0080	0.0087
0.0030	1080	64%	3.63	3.60	3.53	3.42	3.36	0.0062	0.0065	0.0070	0.0080	0.0087
0.0031	1080	66%	3.55	3.50	3.44	3.37	3.31	0.0063	0.0066	0.0071	0.0081	0.0088
0.0033	1080	68%	3.48	3.45	3.39	3.30	3.24	0.0064	0.0067	0.0072	0.0082	0.0089
0.0038	2113	56%	3.86	3.81	3.74	3.67	3.61	0.0059	0.0062	0.0068	0.0078	0.0085
0.0048	2116	54%	3.87	3.82	3.75	3.68	3.62	0.0058	0.0061	0.0067	0.0077	0.0084
0.0051	2116	56%	3.86	3.81	3.74	3.67	3.61	0.0059	0.0062	0.0068	0.0078	0.0085

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

Laminate Thickness (Inches)	Glass Style	Piles	Resin Content	Dk					Df				
				@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.002	1067	1	66%	3.55	3.50	3.44	3.37	3.31	0.0063	0.0066	0.0071	0.0081	0.0088
0.0025	1078	1	57%	3.82	3.76	3.72	3.62	3.56	0.0059	0.0062	0.0068	0.0078	0.0085
0.003	1080	1	64%	3.63	3.60	3.53	3.42	3.36	0.0062	0.0065	0.0070	0.0080	0.0087
0.003	2112	1	53%	3.87	3.82	3.75	3.68	3.62	0.0057	0.0060	0.0066	0.0076	0.0083
0.0035	2113	1	52%	3.88	3.83	3.76	3.69	3.63	0.0057	0.0060	0.0066	0.0076	0.0083
0.004	2113	1	56%	3.86	3.81	3.74	3.67	3.61	0.0059	0.0062	0.0068	0.0078	0.0085
0.005	2116	1	55%	3.88	3.83	3.76	3.69	3.63	0.0058	0.0061	0.0067	0.0077	0.0084
0.006	2112	2	53%	3.87	3.82	3.75	3.68	3.62	0.0057	0.0060	0.0066	0.0076	0.0083
0.007	2113	2	52%	3.88	3.83	3.76	3.69	3.63	0.0057	0.0060	0.0066	0.0076	0.0083
0.008	2113	2	56%	3.86	3.81	3.74	3.67	3.61	0.0059	0.0062	0.0068	0.0078	0.0085
0.01	2116	2	55%	3.87	3.82	3.75	3.68	3.62	0.0058	0.0061	0.0067	0.0077	0.0084
0.012	1506	2	44%	4.13	4.09	4.03	3.94	3.88	0.0053	0.0056	0.0061	0.0071	0.0078
0.014	7628	2	41%	4.22	4.18	4.12	4.03	3.97	0.0051	0.0054	0.0059	0.0069	0.0076
0.015	7628	2	44%	4.13	4.09	4.03	3.94	3.88	0.0053	0.0056	0.0061	0.0071	0.0078
0.016	7628	2	46%	4.07	4.03	3.97	3.88	3.82	0.0054	0.0057	0.0062	0.0072	0.0079
0.021	7628	3	41%	4.22	4.18	4.12	4.03	3.97	0.0051	0.0054	0.0059	0.0069	0.0076
0.022	7628	3	44%	4.13	4.09	4.03	3.94	3.88	0.0053	0.0056	0.0061	0.0071	0.0078
0.024	7628	3	46%	4.07	4.03	3.97	3.88	3.82	0.0054	0.0057	0.0062	0.0072	0.0079

More types could be available upon request.

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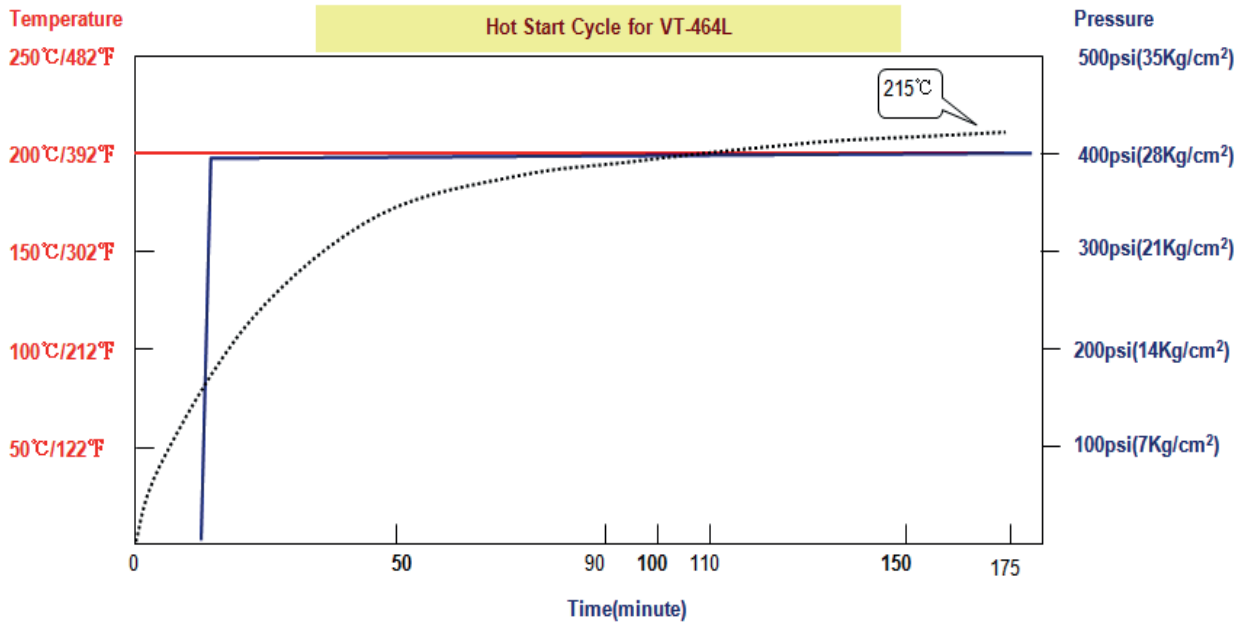
Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]: Programmable Press: ≥2.8°C/min
2. Curing Temperature & Time: >100min 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.
- Suggest Drilling parameter as below:

Diameter (mm)	Spindle Speed (krpm)	Feed Rate (mm/sec)	Chip Load (μm/rev)	Hit Counts
0.25	125	25	10~15	500
1.0	53	31	30~45	1000

Desmear Process

- Please test desmear rate and check whether the smear is cleaned clearly by SEM , Ventec could provide the specimens.
- 1 cycle Plasma and 1 cycle desmearis 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.