

tec-speed 7.0H VT-463H

PROCESS GUIDE

UL Approval: E214381 Version: 03/02/2025

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

E-Glass styles: 2116, 3313, 1078, 106, etc.

Delivered Thickness (Inches)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
0.0025	1067	72%	3.24	3.23	3.23	3.21	3.19	0.0014	0.0015	0.0017	0.0019	0.0021
0.0028	1067	75%	3.18	3.17	3.17	3.15	3.13	0.0012	0.0013	0.0015	0.0017	0.0019
0.003	1067	77%	3.16	3.16	3.16	3.12	3.11	0.0012	0.0013	0.0015	0.0017	0.0019
0.0032	1078	67%	3.36	3.35	3.35	3.33	3.32	0.0017	0.0018	0.0023	0.0027	0.0029
0.0035	1078	69%	3.32	3.32	3.31	3.3	3.28	0.0017	0.0018	0.0023	0.0027	0.0029
0.0041	1078	73%	3.24	3.23	3.23	3.21	3.19	0.0014	0.0015	0.0017	0.0019	0.0021
0.0039	3313	56%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.0042	3313	59%	3.58	3.58	3.57	3.56	3.55	0.0019	0.002	0.0026	0.0029	0.0031
0.0052	2116	56%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003

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	69%	3.32	3.32	3.31	3.3	3.28	0.0017	0.0018	0.0023	0.0027	0.0029
0.003	1078	1	65%	3.39	3.38	3.38	3.36	3.34	0.0017	0.0018	0.0023	0.0027	0.0029
0.004	3313	1	57%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.004	1067	2	69%	3.32	3.32	3.31	3.3	3.28	0.0017	0.0018	0.0023	0.0027	0.0029
0.005	2116	1	55%	3.66	3.66	3.65	3.64	3.63	0.002	0.0021	0.0024	0.0027	0.0029
0.005	1067	2	72%	3.24	3.23	3.23	3.21	3.19	0.0014	0.0015	0.0017	0.0019	0.0021
0.006	1078	2	65%	3.39	3.38	3.38	3.36	3.34	0.0017	0.0018	0.0023	0.0027	0.0029
0.008	3313	2	57%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.01	2116	2	55%	3.66	3.66	3.65	3.64	3.63	0.002	0.0021	0.0024	0.0027	0.0029
0.012	3313	3	57%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.016	3313	4	57%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.018	3313x2+ 2116x2	4	56%	3.63	3.63	3.62	3.61	3.59	0.0018	0.0019	0.0025	0.0028	0.003
0.02	2116	4	55%	3.66	3.66	3.65	3.64	3.63	0.002	0.0021	0.0024	0.0027	0.0029
0.025	2116	5	55%	3.66	3.66	3.65	3.64	3.63	0.002	0.0021	0.0024	0.0027	0.0029
0.03	2116	6	55%	3.66	3.66	3.65	3.64	3.63	0.002	0.0021	0.0024	0.0027	0.0029
0.059	1067	1	69%	3.32	3.32	3.31	3.3	3.28	0.0017	0.0018	0.0023	0.0027	0.0029

More types could be available upon request.

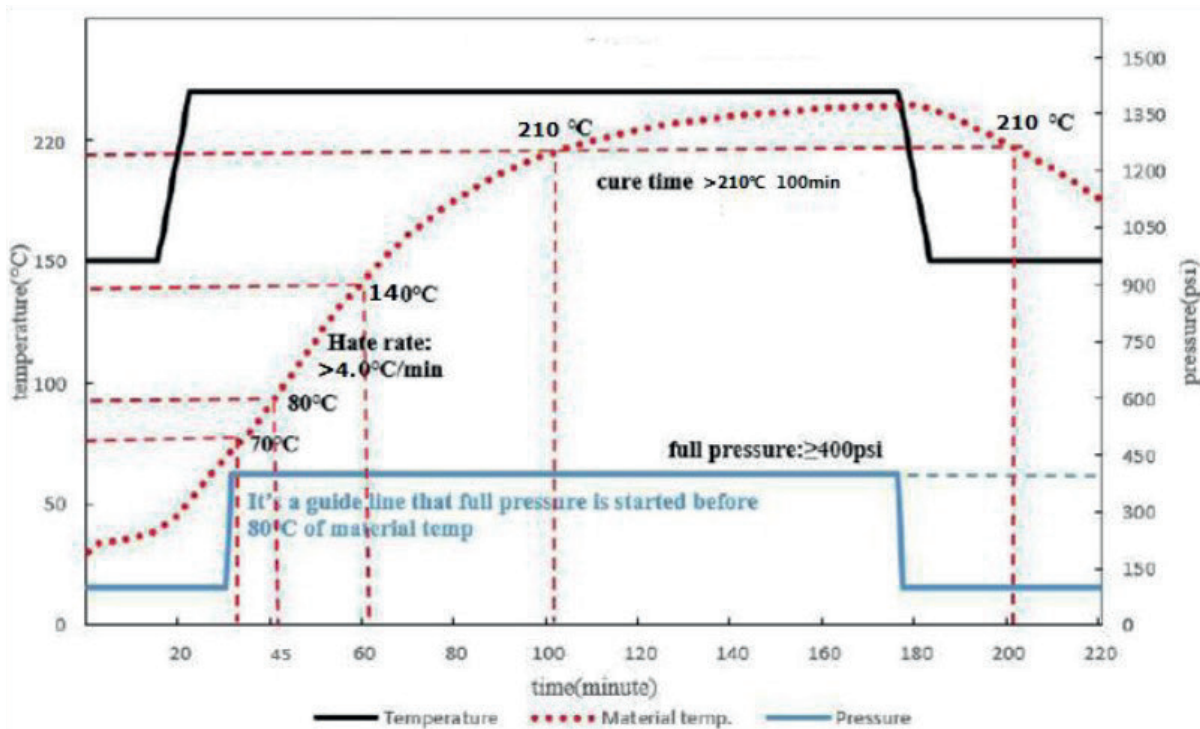
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Press Condition

1. Heating rate [Rate of Rise] of material [Material Temperature]: Programmable Press: $\geq 4^{\circ}\text{C}/\text{min}$
2. Curing Temperature & Time: $>100\text{min}$ at more than 210°C and peak temperature $>215^{\circ}\text{C}$
3. Full Pressure: $\geq 400\text{psi}$ ($28\text{Kg}/\text{cm}^2$) should be applied full pressure before 80°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
0.2	160	1.6~2.4	10~15	700~1000
0.25	160	1.8~2.8	11~18	700~1000
0.3	160	1.9~3.2	12~20	700~1000
0.35	137	1.8~3.0	13~22	700~1000
0.4	120	1.8~2.9	15~24	700~1000
0.45	107	1.8~2.7	17~25	700~1000
0.5	96	1.8~2.7	19~28	1400~2000
0.55	87	1.8~2.6	21~30	1400~2000
0.6	80	1.7~2.6	21~33	1400~2000
0.65	74	1.7~2.6	23~35	1400~2000
0.7	68	1.7~2.6	25~38	1400~2000
0.75	64	1.6~2.6	25~41	1400~2000
0.8	60	1.6~2.5	27~42	1400~2000
0.85	56	1.6~2.4	29~43	1400~2000
0.9	53	1.6~2.4	30~45	1400~2000

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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%CF ₄ , 80% O ₂ , 10% N ₂	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.