

tec-speed 6.0 & 6.1H-PK VT-770 / VT-770(LK) 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

- The prepreg exceeding shelf time should be retested.
- Take care in handling thin core laminates as they are easily damaged.
- If the prepreg 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.
- Baking of material is recommended for stabilization of dimension.
- In case of thin copper(ex.3µm) with carrier copper foil, the carrier foil should be removed off before baking.
Baking condition: Temp 200°C 2 hours;
- Brown Oxide can be used. In the case of using Black Oxide, please check whether peel strength is acceptable for the usage;
- Holding time between brown oxide and press process: best control within 6 hours.

tec-speed 6.0 & 6.1H-PK VT-770 / VT-770(LK)

PROCESS GUIDE

UL Approval: E214381 Version: 03/02/2025

Prepreg Availability

E-Glass styles: 2116, 3313, 1078, 1067, 1037, 1035, etc.
Dk values are for impedance design

VT-770

Delivered Thickness (mil)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
2.0	1037	74%	3.27	3.27	3.23	3.19	3.16	0.003	0.0034	0.0037	0.0039	0.0041
2.4	1067	71%	3.33	3.33	3.27	3.23	3.19	0.003	0.0035	0.0038	0.004	0.0042
2.6	1067	73%	3.28	3.28	3.22	3.18	3.15	0.003	0.0034	0.0037	0.0039	0.0041
2.9	1067	75%	3.25	3.24	3.20	3.16	3.13	0.003	0.0034	0.0037	0.0039	0.0041
3.3	1078	66%	3.40	3.40	3.35	3.31	3.27	0.0031	0.0036	0.0039	0.0041	0.0043
3.5	1078	68%	3.33	3.32	3.26	3.22	3.19	0.003	0.0035	0.0038	0.004	0.0042
4.0	3313	56%	3.48	3.48	3.43	3.39	3.34	0.0033	0.0038	0.0041	0.0043	0.0045
5.0	2116	54%	3.50	3.49	3.45	3.41	3.38	0.0033	0.0038	0.0041	0.0043	0.0045

VT-770 (LK)

Delivered Thickness (mil)	Glass Style	Resin Content	Dk					Df				
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
2.1	1035	67%	3.00	2.98	2.95	2.91	2.88	0.0018	0.0020	0.0022	0.0024	0.0026
2.3	1035	71%	2.92	2.90	2.88	2.83	2.80	0.0018	0.0020	0.0022	0.0024	0.0026
2.7	1035	75%	2.85	2.83	2.80	2.75	2.72	0.0017	0.0019	0.0021	0.0023	0.0025
3.0	1078	67%	3.00	2.98	2.95	2.91	2.88	0.0018	0.0020	0.0022	0.0024	0.0026
3.5	1078	71%	2.92	2.90	2.88	2.83	2.80	0.0018	0.0020	0.0022	0.0024	0.0026
3.9	1078	74%	2.87	2.85	2.83	2.78	2.75	0.0017	0.0019	0.0021	0.0023	0.0025
4.2	3313	63%	3.05	3.03	3.00	2.96	2.93	0.0020	0.0022	0.0024	0.0026	0.0028
5.0	2116	59%	3.12	3.10	3.07	3.03	3.00	0.0020	0.0022	0.0024	0.0026	0.0028

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.

tec-speed 6.0 & 6.1H-PK VT-770 / VT-770(LK)

PROCESS GUIDE

UL Approval: E214381 Version: 03/02/2025

Laminates Availability

Dk values are for impedance design

VT-770

Laminate Thickness (mil)	Glass Style	Piles	Resin Content	Dk					Df				
				@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
1.7	1027	1ply	73%	3.28	3.28	3.22	3.18	3.15	0.003	0.0034	0.0037	0.0039	0.0041
2.0	1067	1ply	65%	3.40	3.40	3.35	3.31	3.27	0.0031	0.0036	0.0039	0.0041	0.0043
2.4	1067	1ply	69%	3.33	3.32	3.26	3.22	3.19	0.0030	0.0035	0.0038	0.0040	0.0042
3.0	1078	1ply	64%	3.42	3.41	3.36	3.33	3.29	0.0031	0.0036	0.0039	0.0041	0.0043
3.5	1078	1ply	68%	3.35	3.35	3.29	3.25	3.21	0.0030	0.0035	0.0038	0.0040	0.0042
4.0	3313	1ply	56%	3.48	3.48	3.43	3.39	3.34	0.0033	0.0038	0.0041	0.0043	0.0045
4.0	1067	2ply	65%	3.40	3.40	3.35	3.31	3.27	0.0031	0.0036	0.0039	0.0041	0.0043
5.0	2116	1ply	54%	3.50	3.49	3.45	3.41	3.38	0.0033	0.0038	0.0041	0.0043	0.0045
5.0	1078	2ply	58%	3.47	3.47	3.42	3.38	3.34	0.0033	0.0038	0.0041	0.0043	0.0045
6.0	1078	2ply	63%	3.44	3.44	3.39	3.35	3.31	0.0031	0.0036	0.0039	0.0041	0.0043
8.0	3313	2ply	56%	3.48	3.48	3.43	3.39	3.34	0.0033	0.0038	0.0041	0.0043	0.0045
12.0	3313	3ply	56%	3.48	3.48	3.43	3.39	3.34	0.0033	0.0038	0.0041	0.0043	0.0045

More types could be available upon request.

VT-770(LK)

Laminate Thickness (mil)	Glass Style	Piles	Resin Content	Dk					Df				
				@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 20GHz
2.0	1067	1ply	69	2.95	2.93	2.90	2.85	2.82	0.0018	0.0020	0.0022	0.0024	0.0026
2.6	1078	1ply	65	3.05	3.03	3.00	2.96	2.93	0.0019	0.0021	0.0023	0.0025	0.0027
2.6	1037	2ply	65	3.05	3.03	3.00	2.96	2.93	0.0019	0.0021	0.0023	0.0025	0.0027
3.0	1078	1ply	67	3.00	2.98	2.95	2.91	2.88	0.0018	0.0020	0.0022	0.0024	0.0026
4.0	3313	1ply	60	3.10	3.08	3.05	3.01	2.98	0.0020	0.0022	0.0024	0.0026	0.0028
4.0	1067	2ply	69	2.95	2.93	2.90	2.85	2.82	0.0018	0.0020	0.0022	0.0024	0.0026
4.5	3313	1ply	63	3.05	3.03	3.00	2.96	2.93	0.0020	0.0022	0.0024	0.0026	0.0028
4.5	1067	2ply	72	2.92	2.90	2.88	2.83	2.80	0.0018	0.0020	0.0022	0.0024	0.0026
5.0	2116	1ply	58	3.12	3.10	3.07	3.03	3.00	0.0020	0.0022	0.0024	0.0026	0.0028
5.0	1067	2ply	75	2.85	2.83	2.80	2.75	2.72	0.0017	0.0019	0.0021	0.0023	0.0025
6.0	1078	2ply	67	3.00	2.98	2.95	2.91	2.88	0.0018	0.0020	0.0022	0.0024	0.0026
8.0	3313	2ply	60	3.10	3.08	3.05	3.01	2.98	0.0020	0.0022	0.0024	0.0026	0.0028
10.0	2116	2ply	58	3.12	3.10	3.07	3.03	3.00	0.0020	0.0022	0.0024	0.0026	0.0028

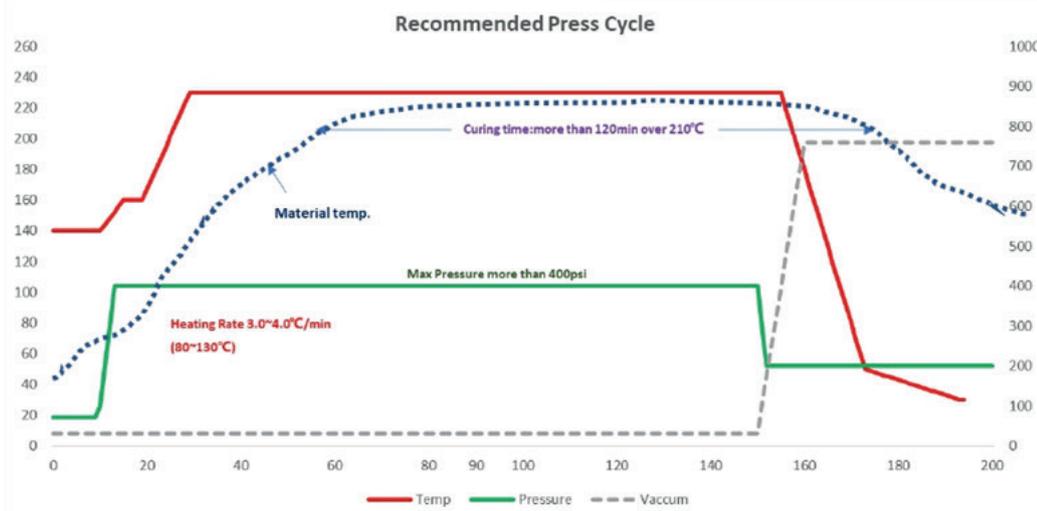
More types could be available upon request.

tec-speed 6.0 & 6.1H-PK VT-770 / VT-770(LK) PROCESS GUIDE

UL Approval: E214381 Version: 03/02/2025

Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]: Programmable Press: $\geq 3^{\circ}\text{C}/\text{min}$
2. Curing Temperature & Time: $> 120\text{min}$ 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 100°C
4. Vacuuming should be continued until over 140°C [Material Temperature]
5. Cushion for pressure evenness is needed



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 (IPM)	Retract Rate (IPM)	Hit Counts
0.10mm	200~300	25~38	800	1000
0.20mm	150~200	38~50	800	1000
0.30mm	100~150	38~60	800	1000
0.40mm	80~100	40~50	800	1000

- Smear, resin cracking or nail heading may occur if drilling condition doesn't match material.

tec-speed 6.0 & 6.1H-PK VT-770 / VT-770(LK) PROCESS GUIDE

UL Approval: E214381 Version: 03/02/2025

Desmear Process

- The weight loss of VT-770 & VT-770(LK) is less than as our conventional FR-4 material.
- We recommend a plasma cycle and a vertical permanganate cycle together to adequately prepare the hole walls for plating (If used by horizontal desmear, it should be need twice cycles).
- Plasma Desmear Parameter
One time of FR-4 conditions is recommendable.
- Permanganate Desmear Parameter
Twice of FR-4 horizontal desmear condition is recommendable, or one time of FR-4 vertical desmear condition is recommendable.
- Typical Permanganate Desmear parameter by Atotech chemical as below:

Process	Reagent Type	Temperature (°C)	Duration (min)
Sewlling	Alkaline	60-70	5-10
Etching	Permanganate	70-80	10-15

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.