VT-447V

UL Approval: E214381 Version: 19/12/2024

PROCESS GUIDE

VT-447V CCL/Laminate VT-447V PP/Prepreg

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 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.
- Dimension stability is the same as Standard FR4 material.
- Please check with your oxide vendor to make sure that our material is suitable with your oxide process. We recommend to control the peel strength with brown oxide copper over 2 Lb/in.
- For unclad or single sided laminates to be used in multilayer, please brush unclad sides before use.

VT-447V
PROCESS GUIDE

Prepreg Availability

E-Glass styles: 7628, 2116, 2113, 1087, 1080, 1067, 106, 1037, 1027, etc.

PP Type	Resin Content	Press Thickness (mil)	DK				DF			
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz
7628	48%	7.9	4.46	4.36	4.31	4.31	0.012	0.013	0.013	0.014
7628	45%	7.5	4.52	4.42	4.37	4.37	0.012	0.013	0.013	0.014
2116	57%	4.9	4.20	4.10	4.05	4.05	0.013	0.014	0.014	0.015
2116	55%	4.7	4.25	4.15	4.10	4.10	0.013	0.014	0.014	0.015
2116	53%	4.4	4.30	4.20	4.15	4.15	0.013	0.014	0.014	0.015
2113	57%	3.9	4.20	4.10	4.05	4.05	0.013	0.014	0.014	0.015
1086	67%	3.5	3.95	3.85	3.80	3.80	0.014	0.015	0.015	0.016
1086	69%	3.8	3.90	3.80	3.75	3.75	0.014	0.015	0.015	0.016
1080	68%	3.2	3.93	3.83	3.78	3.78	0.014	0.015	0.015	0.016
1080	66%	3.0	3.98	3.88	3.83	3.83	0.014	0.015	0.015	0.016
1080	64%	2.7	4.03	3.93	3.88	3.88	0.014	0.015	0.015	0.016
1078	67%	3.0	3.95	3.85	3.80	3.80	0.014	0.015	0.015	0.016
1078	69%	3.2	3.90	3.80	3.75	3.75	0.014	0.015	0.015	0.016
106	73%	2.2	3.80	3.70	3.65	3.65	0.014	0.015	0.015	0.016
106	75%	2.4	3.75	3.65	3.60	3.60	0.014	0.015	0.015	0.016
1067	72%	2.0	3.83	3.73	3.68	3.68	0.014	0.015	0.015	0.016
1067	74%	2.4	3.78	3.68	3.63	3.63	0.015	0.016	0.016	0.017
1067	78%	2.8	3.69	3.59	3.54	3.54	0.015	0.016	0.016	0.017
1037	73%	1.8	3.80	3.70	3.65	3.65	0.014	0.015	0.015	0.016
1037	75%	2.0	3.75	3.65	3.60	3.60	0.015	0.016	0.016	0.017
1027	71%	1.5	3.85	3.75	3.70	3.70	0.014	0.015	0.015	0.016
1027	73%	1.6	3.80	3.70	3.65	3.65	0.014	0.015	0.015	0.016
1027	75%	1.8	3.75	3.65	3.60	3.60	0.015	0.016	0.016	0.017

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.

VT-447V
PROCESS GUIDE

Laminates Availability

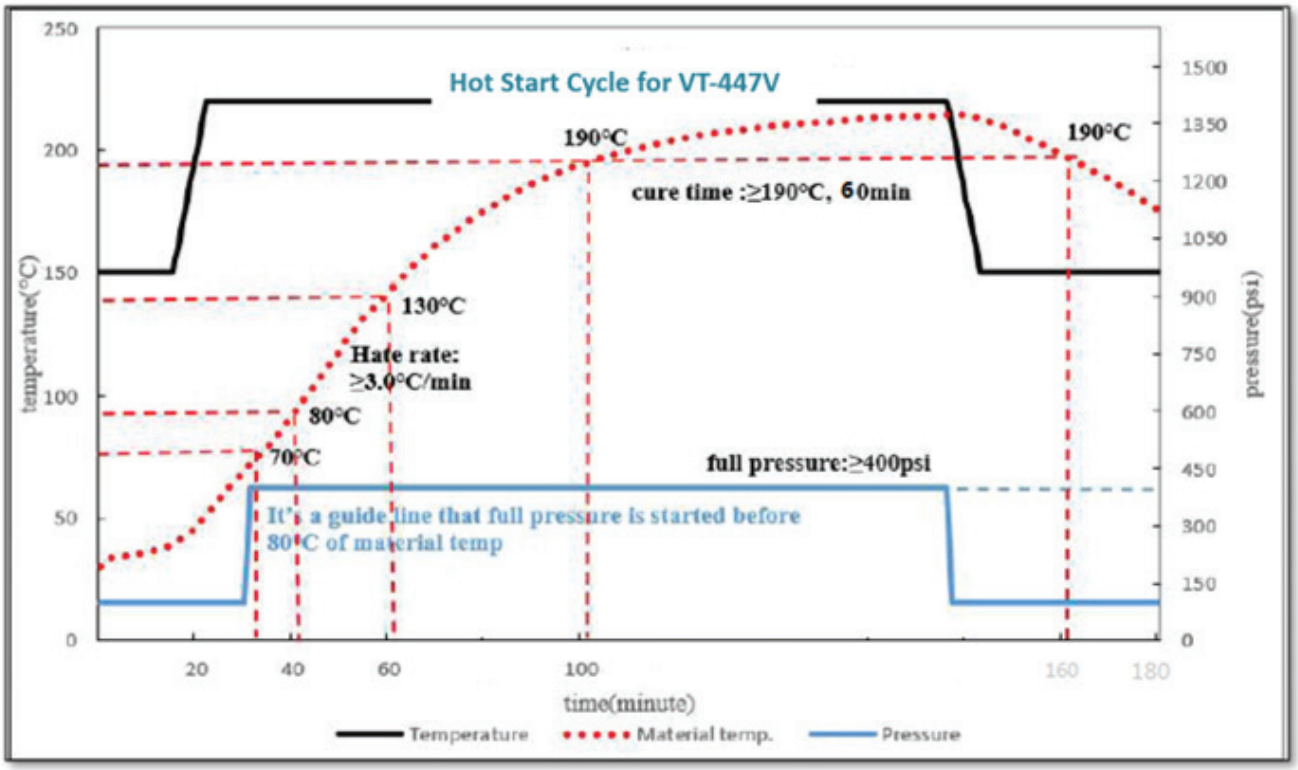
- Thickness: 0.002" (0.05mm) to 0.200" (5mm), available in sheet or panel form
- Copper Foil: 1/4 to 12oz, HTE or RTF or DST
- DK values are for impedance design.

Core thk. (inches)	Stack-up	Resin Content	DK				DF			
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz
0.002	1-1067	68%	3.93	3.83	3.78	3.78	0.014	0.015	0.015	0.016
0.003	1-2112	52%	4.33	4.13	4.08	4.08	0.013	0.014	0.014	0.015
0.004	1-2116	46%	4.50	4.13	4.08	4.08	0.012	0.013	0.013	0.014
0.004	2-1067	68%	3.93	3.83	3.78	3.78	0.014	0.015	0.015	0.016
0.005	1-2116	55%	4.25	4.15	4.10	4.10	0.013	0.014	0.014	0.015
0.006	1-1506	45%	4.52	4.42	4.37	4.37	0.012	0.013	0.013	0.014
0.007	1-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.008	1-7628	44%	4.55	4.45	4.40	4.40	0.012	0.013	0.013	0.014
0.008	2-2116	46%	4.50	4.40	4.35	4.35	0.012	0.013	0.013	0.014
0.010	2-2116	56%	4.23	4.13	4.08	4.08	0.013	0.014	0.014	0.015
0.012	2-1506	45%	4.52	4.42	4.37	4.37	0.012	0.013	0.013	0.014
0.014	2-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.015	2-7628	43%	4.58	4.48	4.43	4.43	0.011	0.012	0.012	0.013
0.021	3-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.024	3-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.028	4-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.031	4-7628	44%	4.55	4.45	4.40	4.40	0.011	0.012	0.012	0.013
0.036	5-7628	43%	4.58	4.48	4.43	4.43	0.011	0.012	0.012	0.013
0.045	6-7628	43%	4.58	4.48	4.43	4.43	0.011	0.012	0.012	0.013
0.049	7-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.056	8-7628	42%	4.61	4.51	4.46	4.46	0.011	0.012	0.012	0.013
0.059	8-7628	44%	4.55	4.45	4.40	4.40	0.011	0.012	0.012	0.013

VT-447V
PROCESS GUIDE

Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]:
   Programmable Press: ≥3.0°C/min
2. Curing Temperature & Time: >60min at more than 190°C and peak temperature >200°C
3. Full Pressure: ≥400psi (28Kg/cm²) 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.



VT-447V
PROCESS GUIDE

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 (um/rev)	Hit Counts
0.25	125	25	10~15	500
1.0	53	31	30~45	800

Desmear Process

- Please test desmear rate and check whether the smear is cleaned clearly by SEM, Ventec could provide the specimen for pilot.
- 1 cycle Plasma and 1 cycle desmear or 2 cycles desmear is recommended.
- Holding time from desmear to PTH process: < 2 hours