VT-441C

PROCESS GUIDE

Laminate/Prepreg

UL Approval: E214381 Version: 05/08/2025

Precautions in Handling

- Please be careful when single ply of 1080 prepreg is designed to the dielectric layer.
- **VT-441C** has weaker thermal resistance than regular **VT-441**. Please be very careful when 8L and higher layer count is designed or dielectric with single ply of 1080.
- **VT-441C** Dk is a little higher than **VT-441**. Please take it into consideration whenever impendence control is required.
- CTI 600 only can be guaranteed when the full stack-up is from VT-441C material.
- Please be noticed that the surface roughness and clearness affect CTI rating.

Storage Condition & Shelf Life

		Prepreg		Laminate
Storage Condition	Temperature	Below 23°C (73°F)	Below 5°C (41°F)	Room
	Relative Humidity	Below 55% RH	/	/
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.

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Prepreg Availability

PP Type	Resin Content	Press Thickness (mil)	Dk				Df			
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz
7628	50%	8.0	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
7628	46%	7.5	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1506	54%	7.0	4.5	4.5	4.4	4.4	0.012	0.012	0.013	0.013
2116	58%	5.0	4.5	4.5	4.4	4.4	0.012	0.012	0.013	0.013
1080	68%	3.1	4.3	4.3	4.2	4.2	0.012	0.012	0.013	0.013
106	76%	2.3	4.1	4.1	4.0	4.0	0.013	0.013	0.014	0.014

Remark: More types could be available upon request.
When 2116PP or/and 1080PP is used as the outmost layer, 2-ply minimum is required to ensure CTI 600.
2-Ply 106 prepreg can only withstand CTI 400V.

Laminate Availability

Dk values are for impedance design

Core Thickness (inches)	Stack-up	Resin Content	Dk				Df			
			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz
0.008	1-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.012	2-1506	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.015	2-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.016	2-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.018	2-7628+ 1-1080	48%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.020	2-7628+ 1-2116	47%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.024	3-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.028	4-7628	42%	4.7	4.7	4.6	4.6	0.011	0.011	0.012	0.012
0.030	4-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.036	5-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.042	6-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.054	7-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.057	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.058	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.060	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012

Remark: More types could be available upon request.
In order to satisfy CTI ≥600V, please don't design 0.10mm in outer layer.

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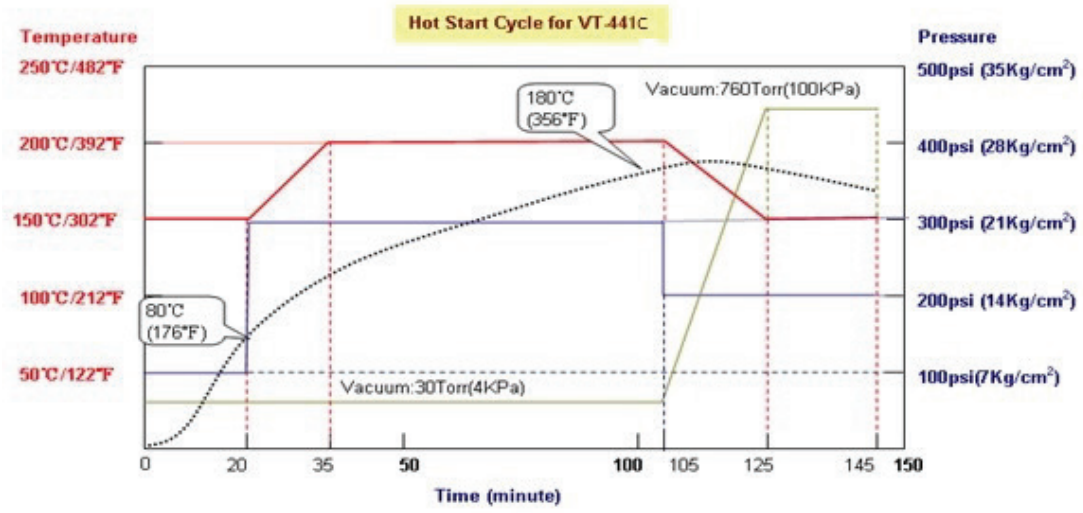
Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]: Programmable Press: ≥2.0°C/min
2. Curing Temperature & Time: >60min at more than 180°C (356°F) [Material temperature]
3. Full Pressure: ≥300psi and temperature to apply full pressure ≤80 °C
4. Vacuuming should be continued until over 140°C (284°F) [Material Temperature]
5. Cold Press condition: Keep Plate @ Room Temperature by water; Pressure:100psi; Keep Time: 60minutes



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Typical Drilling Conditions

Diameter	Stack Height	Spindle (KRPM)	Infeed (mm/s)	Retract (mm/s)	Hit Count
0.25mm	1 PNL/Stack	130	38	300	800
0.30mm	1 PNL/Stack	130	38	300	800
0.60mm	1 PNL/Stack	80	43	300	800

1. Excessive wear of carbide drill bits. Diamond coated drill bits preferred;
2. LE Aluminum sheet and white phenolic entry board are preferred;

Desmear Process

The de-smearing rate of **VT-441C** is less than regular **VT-441**. 1 time vertical de-smearing is preferred.

Please examine hole wall to check de-smearing effect.

Typical de-smearing rate for reference only:

1x De-smearing	Supplier	Chemical
0.27mg/cm^2	Atotech	Alkaline Permanganate

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.