

# VT-441C(G1)

## PROCESS GUIDE

UL Approval: E214381    Version: 09/03/2025

Laminate/Prepreg

### Precautions in Handling

- Please be careful when single ply of 1080 prepreg is designed to the dielectric layer.
- **VT-441C(G1)** 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(G1)** Dk is a little higher than **VT-441**. Please take it into consideration whenever impedance control is required.
- CTI grade-1 only can be guaranteed when the full stack-up is from VT-441C(G1) 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%	/	/
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	4.9	4.9	4.8	4.8	0.011	0.011	0.012	0.012
7628	46%	7.5	5.0	5.0	4.9	4.9	0.010	0.010	0.011	0.011
2116	58%	5.0	4.7	4.6	4.6	4.5	0.012	0.012	0.013	0.013
1080	68%	3.1	4.3	4.3	4.2	4.2	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 GRADE-1.

## Laminate Availability

Core Thickness		Stack-up	Resin Content	Dk				Df			
mm	inches			@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz	@ 1GHz	@ 2GHz	@ 5GHz	@ 10GHz
0.20	0.008	1-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.30	0.012	2-1506	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.38	0.015	2-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.41	0.016	2-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.76	0.030	4-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
0.91	0.036	5-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1.07	0.042	6-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1.37	0.054	7-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1.45	0.057	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1.47	0.058	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012
1.52	0.060	8-7628	46%	4.6	4.6	4.5	4.5	0.011	0.011	0.012	0.012

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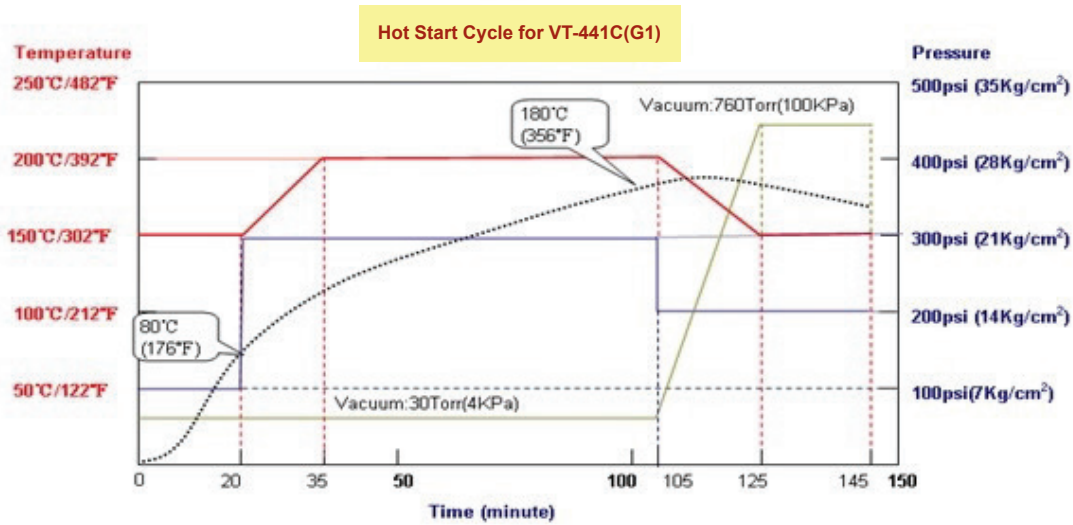
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### Press Condition

1. Heating rate (Rate of Rise) of material [Material Temperature]: Programmable Press: 1.5~3.0°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 before ≤80 °C
4. Vacuuming should be continued until over 140°C [Material Temperature]
5. Cold Press condition: Keep Plate @ Room Temperature by water; Pressure: 100psi; Keep Time: 60minutes



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### Typical Drilling Conditions

**VT-441C(G1)** is high fillers system, please adjust drill parameters according to other Middle Tg FR-4. New drill bit, single stack and less hit count is recommended for getting better hole wall quality. Besides, run FA to get optimal drill parameters are necessary.

Diameter	Stack Height	Spindle (KRPM)	Infeed (mm/s)	Retract (mm/s)	Hit Count
0.25mm	1 PNL/Stack	130	38	300	800-1000
0.30mm	1 PNL/Stack	130	38	300	800-1000
0.60mm	1 PNL/Stack	80	43	300	800-1000

1. Excessive wear of carbide drill bits. Diamond coated drill bits preferred;
2. For dense holes area or hole size, LE Aluminum sheet and white phenolic entry board are preferred;

### Desmear Process

The de-smearing rate of **VT-441C(G1)** 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 <sup>2</sup>	Atotech	Alkaline Permanganate

### Punching/Routing

- Not suitable for punching process.
- Routing process is recommended. Reduce routing speed to prevent edge cracks from outburst mechanical force

### 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.