

VT-481

UL Approval: E214381 Version: Rev. 8

PROCESS GUIDELINE & AVAILABILITY BULLETIN

VT-481 CCL/Laminate VT-481 PP/Prepreg (Middle Tg [150°C] FR-4)

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% RH	/	/
Shelf Life*		3 Months	6 Months	12 Months (airproof)

*Prepreg exceeding shelf life should be retested.

Take care in handling thin core laminates as they are easily damaged.

If the pre-preg 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 pre-preg is designed to the dielectric layer.

Dimension stability is same with Normal FR-4 material

Please make sure that VT-481 is suitable with your brown oxide processing.

We recommended control the peel strength with brown oxide copper over 3 Lb/in (0.69N/mm).

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PRE-PREG AVAILABILITY AND GUIDE TO DIELECTRIC THICKNESS

VT-481PP pre-pregs are available in many E-Glass styles, such as 7628, 7629, 1506, 1500, 2113, 2313, 3313, 2116, 1080, 1086, 1078, 106, 1067 etc.

Type	Basic Weight of G/F	Resin Content	Press Thickness (mil)	DK			DF		Remark
				@ 1GHz	@ 2GHz	@ 5GHz	@ 1GHz	@ 5GHz	
7628HR	203gsm	48%	8.2	4.20	4.10	4.08	0.018	0.020	Standard
7628	203gsm	46%	7.8	4.28	4.23	4.18	0.016	0.017	Standard
1506HR	165gsm	52%	7.1	4.16	4.11	4.06	0.018	0.020	Standard
2116	105gsm	55%	4.9	4.13	4.05	4.00	0.018	0.019	Standard
2116LR	105gsm	52%	4.5	4.18	4.08	4.05	0.018	0.019	Standard
2113	79gsm	57%	3.8	4.06	3.98	3.90	0.020	0.020	Standard
1080HR	47gsm	68%	3.3	3.93	3.82	3.78	0.021	0.022	Standard
1080	47gsm	66%	3.0	3.95	3.85	3.80	0.020	0.021	Standard
106	25gsm	76%	2.3	3.80	3.75	3.72	0.023	0.025	Standard

Remark:

- ① Press thickness test condition---Prepreg lamination size 18"*24", Copper Foil---1oz/1oz, Flow---about 5%;
- ② Make laminated pre-preg 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 AND GUIDE OF DK & DF FOR DESIGN

VT-481 Laminates are available in thickness from .002" to .200" and with the copper foil from 1/4oz to 12oz; Ventec can supply either reverse treated (RT) or double side treated copper foil. For cores $\geq .005$ ", it is recommended to use the reverse treated copper due to the low profile. The peel strength for RT foil is ≈ 1 -2lbs/in (0.35Kg/m) less than Standard foil.

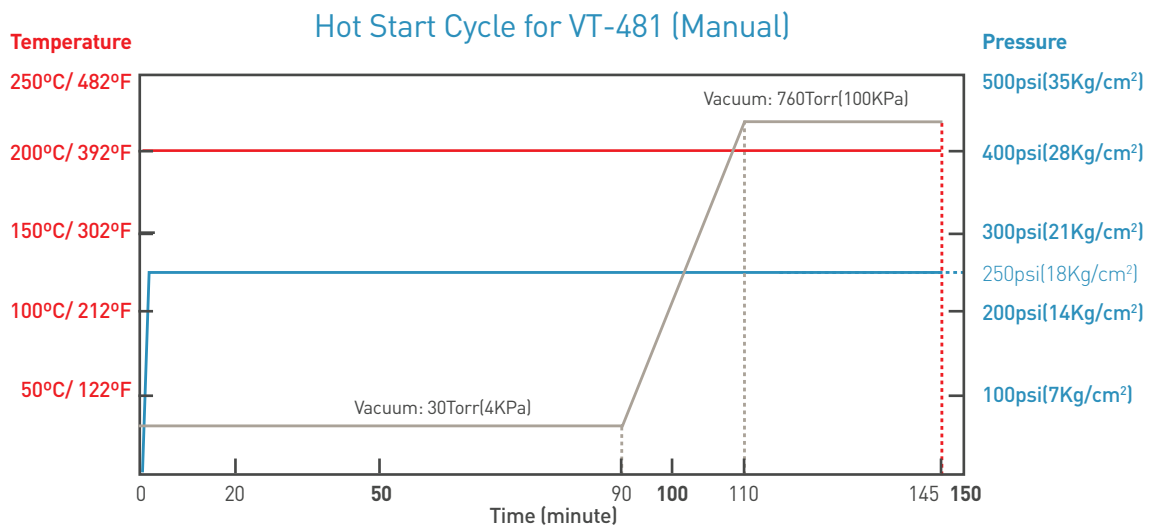
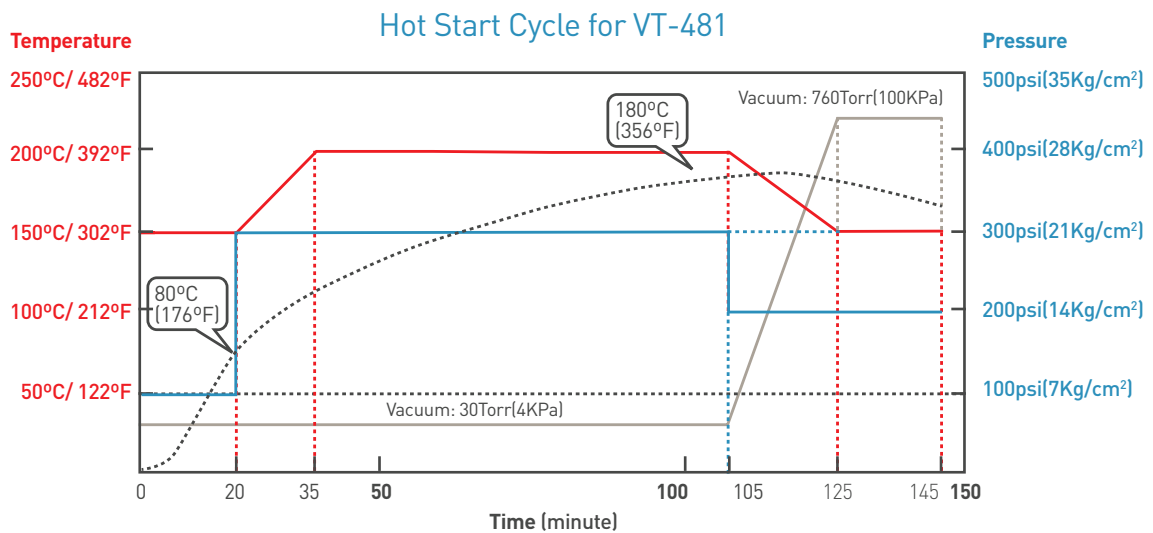
Core thk. (inches)	Ventec Standard Const.	Resin Content	DK			DF		Remark
			@ 1GHz	@ 2GHz	@ 5GHz	@ 1GHz	@ 5GHz	
0.002	1-106	72%	3.85	3.78	3.75	0.023	0.024	Standard
0.003	1-1080	66%	3.95	3.85	3.80	0.020	0.021	Standard
0.004	1-2116	46%	4.28	4.20	4.17	0.014	0.015	Standard
0.004	2-106	72%	3.85	3.80	3.75	0.023	0.025	2ply Construction
0.005	1-2116	55%	4.13	4.05	4.00	0.018	0.019	Standard
0.006	1-506	45%	4.35	4.30	4.25	0.015	0.015	Standard
0.007	1-7628	41%	4.45	4.38	4.30	0.013	0.014	Standard
0.008	1-7628	46%	4.30	4.25	4.20	0.014	0.015	Standard
0.008	2-2116	46%	4.28	4.20	4.17	0.014	0.015	2ply Construction
0.010	2-2116	55%	4.13	4.05	4.00	0.018	0.019	Standard
0.012	2-1506	45%	4.35	4.30	4.25	0.014	0.015	Standard
0.014	2-7628	41%	4.45	4.38	4.30	0.013	0.014	Standard
0.016	2-7628	46%	4.30	4.25	4.20	0.014	0.015	Standard
0.028	4-7628	41%	4.45	4.38	4.30	0.013	0.014	Standard
0.036	5-7628	43%	4.41	4.35	4.28	0.013	0.015	Standard
0.045	6-7628	46%	4.30	4.25	4.20	0.014	0.015	Standard
0.049	7-7628	41%	4.45	4.38	4.30	0.013	0.014	Standard
0.059	8-7628	44%	4.38	4.32	4.25	0.014	0.015	Standard

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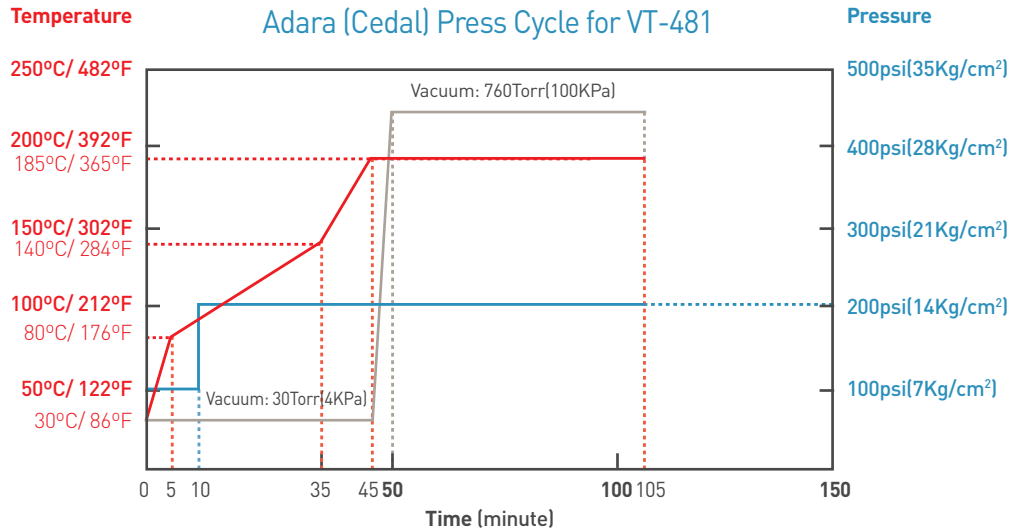
Press Condition

1. Heating rate (Rise of Rate) of material:
Programmable Press: 1.5-3.0°C/min (3-5°F/min). Manual Press: 3-6°C/min (5-10°F/min)
2. Curing Temperature & Time: >60min at more than 180°C (365°F); [Material Temperature].
3. Full Pressure: ≥250-300psi
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 Parameters (φ0.3-1.0 mm) [Recommended]

1. Spindle Speed:	120-180	KRPM
2. Feed Rate:	120-220	inch / min
3. Retract Rate:	600-1000	inch / min
4. Chip Load:	0.6~2.0	mil / Rev.
5. Entry board:	t0.15mm Al	-
6. Stacked amount (t1.6mm):	1-3 stacks	-

Typical Drilling Parameters

Hole Size (mm)	0.20 ~ 0.25	0.30 ~ 0.35	0.40 ~ 0.55	0.60 ~ 0.65	0.70 ~ 1.00	1.10 ~ 1.25	1.30 ~ 1.35	1.40 ~ 1.45	1.50 ~ 1.80	2.05 ~ 3.00
Spindle Speed [KRPM]	150	150	120	80	70	60	55	50	45	30
Feed Rate [Inch/min]	110	130	130	80	80	80	80	80	80	80
Retract Rate [IPM]	700	700	900	900	900	900	900	600	600	500
Chip Load [Mil/Rev.]	0.73	0.87	1.08	1.00	1.14	1.33	1.45	1.60	1.78	2.67

The use of undercut drill bits has yielded better quality on smaller holes. Check with your drill supplier for more information.

Desmearing Process

Desmear rate of **VT-481** is less than that of the conventional FR-4;
 Minor adjustments to the desmear process may be necessary for the higher Tg materials;
 Check with your chemical supplier for recommendations.