

R-1755V and R-1650V

Multifunctional “Filled” Epoxy Resin System

R-1755”V” is a multilayer laminate system designed for high reliability. It has superior THERMAL and CAF performance characteristics and exceeds LEAD-FREE assembly requirements. The following guidelines are provided as general recommendations and some process optimization may be necessary. Please contact our Customer Service or Technical Service Departments.

Material Storage

R-1755”V” laminate and R-1650”V” prepreg should be stored in the same conditions as other FR-4 materials. Laminate should be stored in a cool dry environment. Avoid bending or scratching the surface. When possible, store the laminate in its original packaging. Prepreg should be stored flat in a temperature controlled environment (cool and dry) : 68°F (21°C) and less and 50% RH. For prolonged storage, keep prepreg at a reduced temperature of 40°F (4.5°C). Open bags should be resealed when not in use.

Laminate Surface Preparation

Regular shiny copper can be cleaned using industry standard chemical clean or mechanical clean. Reverse treat copper should be cleaned using industry standard chemical clean.

Inner Layer Bond Treatment

Black or Brown Oxide with reduction (DMAB) or equivalent can be used. Alternative Oxide Treatment using Peroxide / Sulfuric Etch technology can also be used. Note that black and brown (especially brown) oxide treatments often have lower thermal resistance.

Drying

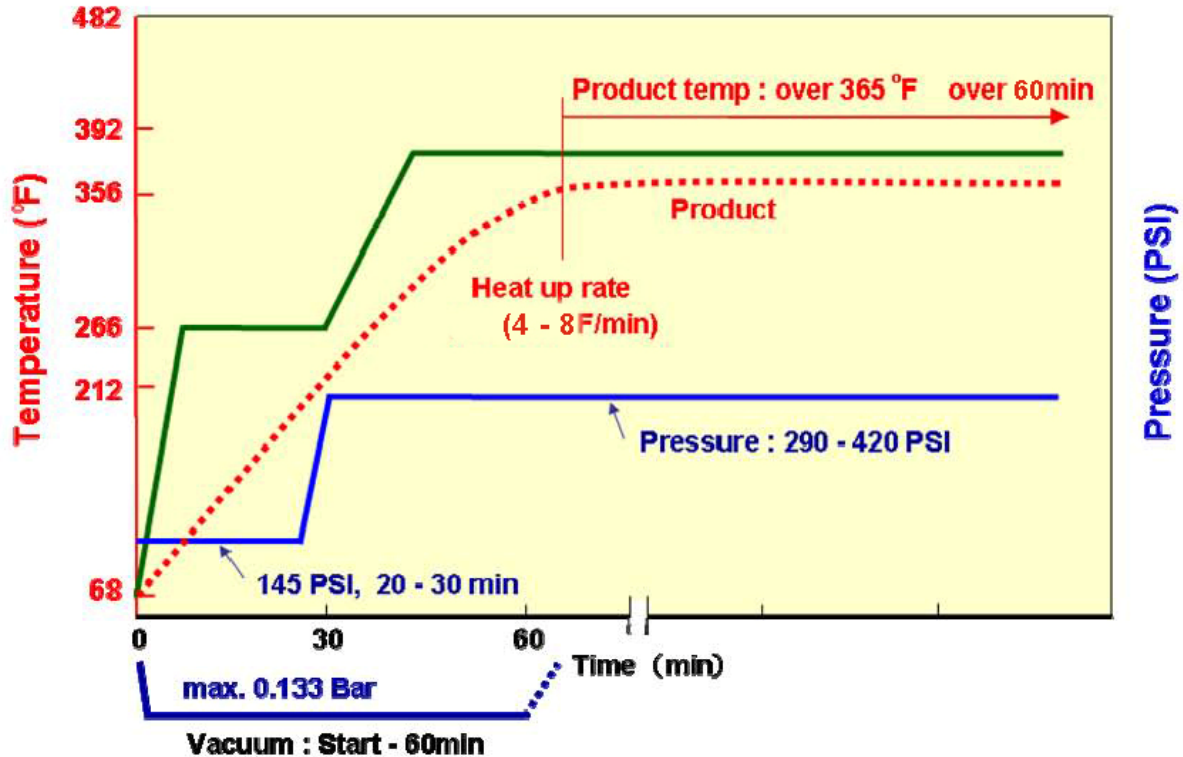
Dry finished inner layers completely to remove any absorbed moisture or surface moisture. A racked back at 225°F (105°C) for 20-30 minutes is preferred for black and brown oxide. For conveyORIZED alternative oxide processing, some equipment have sufficient drying capability, however, a similar rack bake is suggested.

Lamination Cycle

	US	Metric
Pre-Vacuum	10 – 15 minutes prior to application of heat or pressure 28.5 inches Hg minimum Run for 60 minutes.	724 mm Hg minimum
Heat Rise Rate	4 – 7°F per minute	1.8 – 3.5°C per minute
Range for Heat Rise	180 – 280°F	80 – 140°C
Pressure	250 – 300 psi	18 – 21 Kg/cm ²
Cure Time and Temperature	60 – 80 minutes @ 365°F	60 – 80 minutes @ 185°C
Cool Down Rate	Less than 7°F per minute until parts reach 250°F	Less than 3.5°C per minute until parts reach 120°C

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Hole Preparation and Smear Removal

Standard mild Permanganate desmear is adequate in most cases. Plasma may be used as a more aggressive etchback. However, a standard Permanganate process should follow the plasma process. The weight loss of R-1755V is almost the same as standard FR-4.

Process	Reagent	Temperature	Time
Swelling	Alkaline	65-85°C	5-10 mins
Etching	Permanganate	70-85°C	10-15 mins
Swelling	Organic Solvent	35-40°C	6-10 mins

Part Number	Weight Loss Ratio
R-1755"V"	0.8 – 1.2
R-1650"V"	1.0

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Drilling Parameters

Drill Size	US		Metric	
	0.010" – 0.018"	0.020" – 0.055"	0.25 – 0.46 mm	0.5 – 1.4 mm
Surface speed	280 – 460 SFM	500 – 650 SFM	85 – 140 m/min	150 – 200 m/min
Chip Load	0.6 – 1.0 mils/rev	1.0 – 2.5 mils/rev	15 – 25 μ /rev	25 – 65 μ /rev
Hit Count (Max)	1000 - 1500	1500 - 1750	1000 - 1500	1500 - 1750

diameter	spindle	velocity	min		max		bit life
			infeed	chipload	infeed	chipload	
mm	rpm	m/min	m/min	μ /rev	m/min	μ /rev	hits
0.20	160,000	100	1.6	10	2.4	15	750-2,000
0.25	160,000	126	1.8	11	2.8	18	750-2,000
0.30	160,000	151	1.9	12	3.2	20	1,500-3,000
0.35	137,000	151	1.8	13	3.0	22	1,500-3,000
0.40	120,000	151	1.8	15	2.9	24	1,500-3,000
0.45	107,000	151	1.8	17	2.7	25	1,500-3,000
0.50	96,000	151	1.8	19	2.7	28	1,500-3,000
0.55	87,000	150	1.8	21	2.6	30	1,500-3,000
0.60	80,000	151	1.7	21	2.6	33	1,500-3,000
0.65	74,000	151	1.7	23	2.6	35	1,500-3,000
0.70	68,000	149	1.7	25	2.6	38	1,500-3,000
0.75	64,000	151	1.6	25	2.6	41	1,500-3,000
0.80	60,000	151	1.6	27	2.5	42	1,500-3,000
0.85	56,000	149	1.6	29	2.4	43	1,500-3,000
0.90	53,000	150	1.6	30	2.4	45	1,500-3,000

CAF Resistance

