

## R-2125 and R-2120

### Low Loss / High Reliability Laminate System

**R-2125** is a super-low-loss multilayer laminate system with high heat resistance. The material exceeds LEAD-FREE assembly requirements. The following guidelines are provided as general recommendations; process optimization may be necessary.

#### Material Storage

Laminate should be stored in a cool dry environment. Avoid bending or scratching the laminate surface. When possible, store the laminate in its original packaging and protect the surface. 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

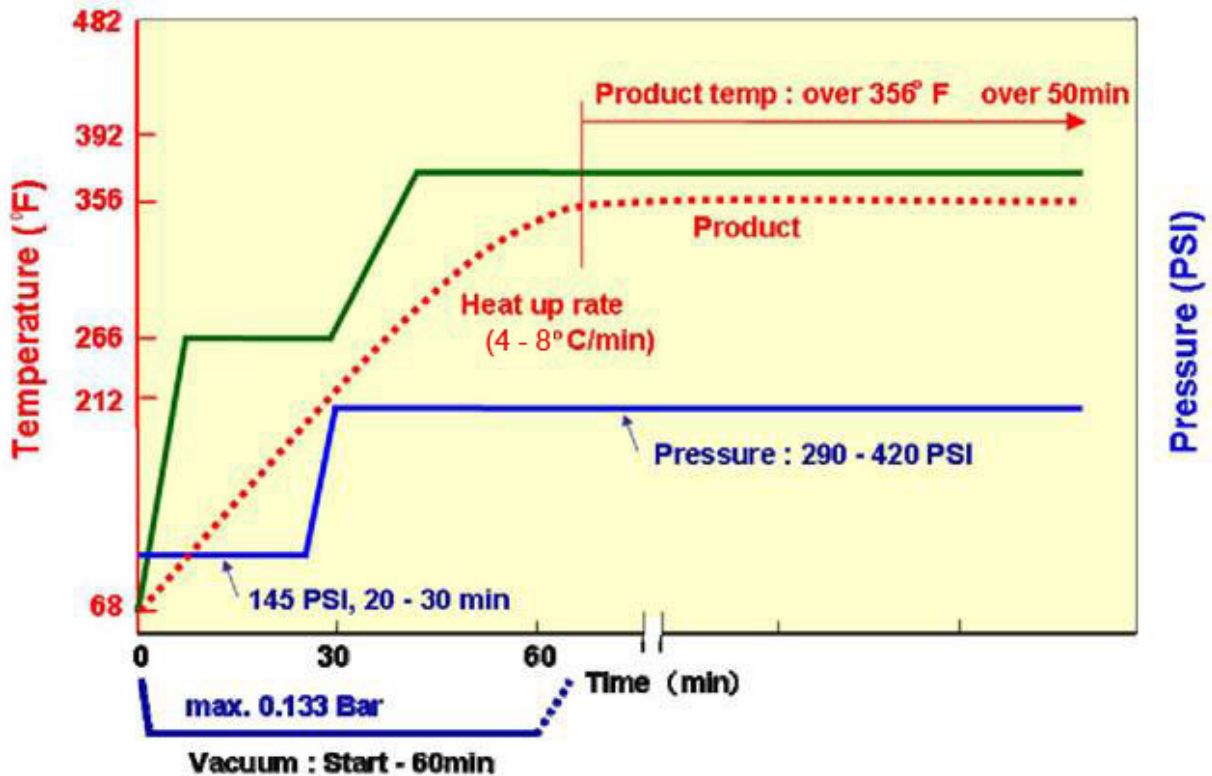
Dry finished inner layers completely to remove any absorbed moisture or surface moisture. A racked back at 225°F (105°C) for 20-30 minutes is preferred for black and brown oxide. For conveyORIZED alternative oxide processing, some equipment have sufficient drying capability, however, a similar rack bake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

#### Lamination Cycle

	US	Metric
Pre-Vacuum	10 – 15 minutes prior to application of heat and pressure 28.5 inches Hg minimum	724 mm Hg minimum
Heat Rise Rate	4 – 8°F per minute	1 – 4°C per minute
Range for Heat Rise	100 – 300°F	50 – 150°C
Pressure	290 – 420 psi	20 – 29 Kg/cm <sup>2</sup>
Cure Time and Temperature	60 minutes @ 356°F	60 – 70 minutes @ 180°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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**Multilayer Lamination Cycle (US)**

R-2125

**Hole Preparation and Smear Removal**

The weight loss of R-2125 laminate and R-2120 prepreg is less than standard FR-4 material. Desmear parameters should be adjusted depending on board thickness, stack count and stack thickness. Contact our Technical Service Group for more information.

**Drilling**

Drilling parameters should be adjusted depending on hole size, layer count, panel thickness and stack height. Below are the base-line drilling parameters. Please contact our Technical Service Department for more information. Hans Vandervelde is our Carbide Drill and Router engineer and can be reached at 1-858-342-9852.

**R-2125 and R-2120**

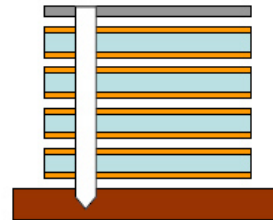
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**Drilling (con't)**

diameter	spindle	velocity	min		max		bit life
			infeed	chipload	infeed	chipload	
mm	rpm	m/min	m/min	$\mu$ /rev	m/min	$\mu$ /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

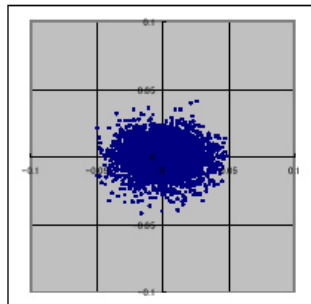
**Positioning accuracy**

Drill size	mm	0.3
Surface speed	m/min	151
Revolution	rpm	160000
Chip load	micron/rev	20
Hit count		3000
Entry board		0.15 Aluminum
Panel thickness	mm	0.8
Copper thickness	micron	35/35
Stack count		4



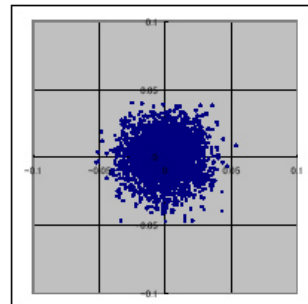
**Positioning accuracy map of R-2125 and R-1766 as conventional FR-4**

**R-2125**



positioning accuracy : 48.0 micron

**R-1766**



positioning accuracy : 47.2 micron