



## Synthane-Taylor Laminates

### FB-650K High Performance Copper Clad FR-4 Laminates Multifunctional High Tg Epoxy

A high reliability laminate, FB-650K is designed for use in multilayer and rigid boards. Performance characteristics include:

- Glass transition temperature (Tg) 170°C
- Fluorescent response for Automatic Optical Inspection (AOI)
- UV blocking for liquid photoimageable applications (LPI)
- Exceptional cross-link density
- Outstanding chemical and moisture resistance
- Superior thermal shock resistance
- Average thermal expansion less than standard FR-4
- Process using standard FR-4 parameters
- Provides for excellent drill characteristics with minimal smear, which allows for consistent etchback (Desmear)

FB-650K is UL rated 94-VO and meets and/or exceeds all requirements of IPC-4101. Our material is manufactured to Class "A" surface quality and Class B/L thickness tolerance as standard. Special requirements are available upon request.

Properties Tested	Values Obtained	
	Under 0.030"	Over 0.030"
Peel Strength, lbs/inch width 1 oz/ft <sup>2</sup> copper		
As received	8.0	8.5
After thermal stress	8.0	8.0
Volume Resistivity		
Minimum in megohm-centimeter		
After moisture resistance	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
At elevated temperature	1 x 10 <sup>3</sup>	1 x 10 <sup>3</sup>
Surface Resistivity		
Minimum in megohm-centimeter		
After moisture resistance	1 x 10 <sup>4</sup>	1 x 10 <sup>4</sup>
At elevated temperature	1 x 10 <sup>3</sup>	1 x 10 <sup>3</sup>
Permittivity at 1 MHz max (Dielectric Constant)	4.6	4.8
Loss Tangent at 1 MHz max (Dissipation Factor)	0.018	0.020
Dimensional Stability, max. chg. in/in	+/- 0.0005	-
Glass Transition Temperature (Tg), D.S.C. Method	170°C	170°C

### FB-650M Copper Clad FR-4 Laminates Multifunctional Epoxy

A high reliability laminate, FB-650M is designed for use in multilayer and rigid boards. Performance characteristics include:

- Glass transition temperature (Tg) 145°C
- Fluorescent response for Automatic Optical Inspection (AOI)
- UV blocking for liquid photoimageable applications (LPI)
- High cross-link density
- Improved chemical and moisture resistance
- Improved thermal shock resistance
- Average thermal expansion less than standard FR-4
- Provides for excellent drill characteristics with minimal smear, which allows for consistent etchback (Desmear)

FB-650M is UL rated 94-VO and meets and/or exceeds all requirements of IPC-4101. Our material is manufactured to Class "A" surface quality and Class B/L thickness tolerance as standard. Special requirements are available upon request.

Properties Tested	Values Obtained	
	Under 0.030"	Over 0.030"
Peel Strength, lbs/inch width 1 oz/ft <sup>2</sup> copper		
As received	8.0	8.5
After thermal stress	8.0	8.0
Volume Resistivity		
Minimum in megohm-centimeter		
After moisture resistance	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
At elevated temperature	1 x 10 <sup>3</sup>	1 x 10 <sup>3</sup>
Surface Resistivity		
Minimum in megohm-centimeter		
After moisture resistance	1 x 10 <sup>4</sup>	1 x 10 <sup>4</sup>
At elevated temperature	1 x 10 <sup>3</sup>	1 x 10 <sup>3</sup>
Permittivity at 1 MHz max (Dielectric Constant)	4.6	4.8
Loss Tangent at 1 MHz max (Dissipation Factor)	0.018	0.020
Dimensional Stability, max. chg. in/in	+/- 0.0005	-
Glass Transition Temperature (Tg), D.S.C. Method	145°C	145°C

## EF-650K High Performance Prepregs Multifunctional High Tg Epoxy

EF-650K prepregs are UL rated 94-VO and meet and/or exceed all requirements of IPC-4101. EF-650K is available in a full range of industry standard glass styles and roll widths. Extreme care is taken during the treating process to ensure precise control of resin content, resin flow, and reactivity. This translates to predictable viscosity curves during multilayer lamination. Special requirements are available upon request.

EF-650K (FR-4) Prepreg (170°C tg)						
Glass Style	Part Number	Resin Content % Range	Resin Flow % Range	Gel Time (Seconds*)	Scaled Flow Pressed Thickness (Mils)	Estimated Pressed Thickness**
106	EF650K 106	65-71	40-50	150-180	1.4 +/- 0.2	1.5-1.8
1080	EF650K 1080	62-68	38-46	150-180	2.4 +/- 0.3	3.1-3.4
1080	EF650K 1080L	54-60	32-38	150-180	2.2 +/- 0.3	2.5-2.8
2113	EF650K 2113	54-60	34-40	150-180	3.5 +/- 0.3	4.0-4.4
2113	EF650K 2113L	50-56	29-33	150-180	3.2 +/- 0.3	3.8-4.2
2116	EF650K 2116	51-57	29-35	150-180	4.1 +/- 0.4	4.7-5.1
7628	EF650K 7628	40-43	18-26	150-180	6.4 +/- 0.3	7.0-7.4
7628	EF650K 7628HR	45-51	27-33	150-180	7.9 +/- 0.5	7.8-8.8

## EF-650M Prepregs Multifunctional Epoxy

EF-650M prepregs are UL rated 94-VO and meet and/or exceed all requirements of IPC-4101. EF-650M is available in a full range of industry standard glass styles and roll widths. Extreme care is taken during the treating process to ensure precise control of resin content, resin flow, and reactivity. This translates to predictable viscosity curves during multilayer lamination. Special requirements are available upon request.

EF-650M (FR-4) Prepreg (140°C tg)						
Glass Style	Part Number	Resin Content % Range	Resin Flow % Range	Gel Time (Seconds*)	Scaled Flow Pressed Thickness (Mils)	Estimated Pressed Thickness**
106	EF650M 106	65-71	40-50	150-180	1.4 +/- 0.2	1.5-1.8
1080	EF650M 1080	62-68	38-46	150-180	2.4 +/- 0.3	3.1-3.4
1080	EF650M 1080L	54-60	32-38	150-180	2.2 +/- 0.3	2.5-2.8
2113	EF650M 2113	54-60	34-40	150-180	3.5 +/- 0.3	4.0-4.4
2113	EF650M 2113L	50-56	29-33	150-180	3.2 +/- 0.3	3.8-4.2
2116	EF650M 2116	51-57	29-35	150-180	4.1 +/- 0.4	4.7-5.1
7628	EF650M 7628	40-43	18-26	150-180	6.4 +/- 0.3	7.0-7.4
7628	EF650M 7628HR	45-51	27-33	150-180	7.9 +/- 0.5	7.8-8.8

\*Gel Time tested using a 25mg sample at 171°C.

\*\*Values for reference only, actual prepreg thickness yield depends on inner layer copper weight and image density as well as customer press cycle parameters.

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