

# Park Advanced Circuitry Materials

## Nelco® N5000-30 Prepreg Nelco® N5000-32 Laminate

### High-Performance, Chip-Packaging, BT Epoxy Laminate



*The Nelco® N5000-30 prepreg and N5000-32 laminate BT epoxy materials are designed specifically to meet or exceed new and emerging chip-packaging requirements. The primary applications of these materials include high performance interconnects that form the circuitry inside plastic BGAs, PBGAs and LGAs.*

#### Key Features

##### BT Resin Chemistry

- BT (bismaleimide triazine) provides low Dk and Df values and overall superior electrical properties

##### Excellent Reliability and Performance

- Suitable for lead-free assembly applications and designs
- Tg 205°C by DSC
- Low Dk and Df
- Reduced X/Y and Z-Axis expansion
- Provides excellent wire bondability

##### Chip Packaging Options

- N5000-30 is offered as a prepreg to be used as a build-up for multilayer applications and is a natural color, high performance, dimensionally stable BT material
- N5000-32 is a black laminate suitable for double-sided PBGA applications and multilayer packages in conjunction with N5000-30 prepreg
- A reduced flow version is also available

##### Meets JEDEC Standards

- Excellent electromigration and insulation resistance
- High thermal resistance

##### Wide Processing Latitude

- Robust drilling properties
- 60 min press at 182°C and 200-300 psi

##### And Much More

- Vacuum laminated
- Available in a wide variety of constructions, copper weights and glass styles
- Meets UL 94V-0 and IPC-4101/30 specifications
- All Nelco® materials are RoHS compliant

#### Applications

- BGA Multilayers
- PBGA
- LG
- PCMCIA
- MCM-Ls
- Direct Chip Attach
- JEDEC Conforming Packages

#### Global Availability

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**Park's UL file number: E36295**

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# Nelco N5000-30 Prepreg / N5000-32 Laminate

## High-Performance, Chip-Packaging, BT Epoxy Package

Mechanical Properties	U.S. Units		Metric Units		Test Method
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	9.2	lb / inch	1.61	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	8.7	lb / inch	1.52	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	TBD	lb / inch	TBD	N / mm	IPC-TM-650.2.4.8
X / Y CTE [-40°C to +125°C]	14	ppm / °C	14	ppm / °C	IPC-TM-650.2.4.41
Z Axis Expansion [50°C to 260°C]	3.6	%	3.6	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)	3.4 / 3.3	psi x 10 <sup>6</sup>	23.1 / 22.4	GN / m <sup>2</sup>	ASTM D3039
Poisson's Ratios (X / Y)	0.21 / 0.21		0.21 / 0.21		ASTM D3039
Thermal Conductivity	TBD	W / mK	TBD	W / mK	ASTM E1461
Specific Heat	TBD	J / gK	TBD	J / gK	ASTM E1461
<b>Electrical Properties</b>					
Dielectric Constant (50% resin content)					
@ 1 MHz (TFC/LCR Meter)	4.4		4.4		IPC-TM-650.2.5.5.3
@ 1 GHz (RF Impedance)	4.1		4.1		IPC-TM-650.2.5.5.9
Dissipation Factor (50% resin content)					
@ 1 MHz (TFC/LCR Meter)	0.009		0.009		IPC-TM-650.2.5.5.3
@ 1 GHz (RF Impedance)	TBD		TBD		IPC-TM-650.2.5.5.9
Volume Resistivity					
C - 96 / 35 / 90	10 <sup>9</sup>	MΩ - cm	10 <sup>9</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125	TBD	MΩ - cm	TBD	MΩ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96 / 35 / 90	10 <sup>8</sup>	MΩ	10 <sup>8</sup>	MΩ	IPC-TM-650.2.5.17.1
E - 24 / 125	TBD	MΩ	TBD	MΩ	IPC-TM-650.2.5.17.1
Electric Strength	1750	V / mil	6.9x10 <sup>4</sup>	V / mm	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>50	kV	>50	kV	IPC-TM-650.2.5.6
Arc Resistance	145	seconds	145	seconds	IPC-TM-650.2.5.1
<b>Thermal Properties</b>					
Glass Transition Temperature (Tg)					
DMA (°C) (Tan δ Peak)	205	°C	205	°C	IPC-TM-650.2.4.24.3
Degradation Temp (TGA) (5% wt. loss)	344	°C	344	°C	IPC-TM-650.2.4.24.6
Pressure Cooker-60 min then solder dip					IPC-TM-650.2.6.16
@288°C until failure (max 10 min.)	Pass		Pass		(modified)
T260	12+	minutes	12+	minutes	IPC-TM-650.2.4.24.1
<b>Chemical / Physical Properties</b>					
Moisture Absorption	<0.05	wt. %	<0.05	wt. %	IPC-TM-650.2.6.2.1
Methylene Chloride Resistance	TBD	% wt. chg.	TBD	% wt. chg.	IPC-TM-650.2.3.4.3
Density [50% resin content]	TBD	g / cm <sup>3</sup>	TBD	g / cm <sup>3</sup>	Internal Method

Park Electrochemical Corp. is a global advanced materials company which develops and manufactures high-technology digital and RF/microwave printed circuit materials and advanced composite materials, parts and assemblies. The company operates under the Nelco®, Nelcote® and Nova™ names.

All test data provided are typical values and not intended to be specification values. For review of critical specification tolerances, please contact a Nelco representative directly. Nelco reserves the right to change these typical values as a natural process of refining our testing equipment and techniques.

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