

Nelco® N5000 BT Epoxy Laminate and Prepreg

The Nelco® N5000 BT epoxy laminate and prepreg system provides superior electrical properties. The N5000 resin system was originally developed for application specific use in high density military and commercial boards requiring not only close thickness tolerance, but also the ability to withstand the stress of multiple soldering excursions and repeated chemical exposure.

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 185°C by DSC
- Low Dk and Df
- Reduced X/Y and Z-Axis expansion

CAF* Resistant

- Low Z-CTE and proven CAF resistance provide long-term reliability

Wide Processing Latitude

- Unique BT / epoxy blend results in a wide processing latitude
- 90 min press at 190°C and 200-350 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

- Fine-Line Multilayers
- Backplanes
- Surface-Mount Multilayers
- BGA Multilayers
- MCM-Ls
- Direct Chip Attach
- Wireless Communications
- High Density Interconnects

Global Availability

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Park's UL file number: E36295



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Nelco N5000

BT Epoxy Laminate and Prepreg

Mechanical Properties	U.S. Units		Metric Units		Test Method
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	8.9	lb / inch	1.56	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	8.3	lb / inch	1.45	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	9.4	lb / inch	1.65	N / mm	IPC-TM-650.2.4.8
X / Y CTE [-40°C to +125°C]	10 - 14	ppm / °C	10 - 14	ppm / °C	IPC-TM-650.2.4.41
Z Axis Expansion [50°C to 260°C]	3.8	%	3.8	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)	4.7 / 4.1	psi x 10 ⁶	31.9 / 27.8	GN / m ²	ASTM D3039
Poisson's Ratios (X / Y)	0.16 / 0.14		0.16 / 0.14		ASTM D3039
Thermal Conductivity	TBD	W / mK	TBD	W / mK	ASTM E1461
Specific Heat	TBD	J / gK	TBD	J / gK	ASTM E1461
Electrical Properties					
Dielectric Constant (50% resin content)					
@ 1 GHz (RF Impedance)	3.8		3.8		IPC-TM-650.2.5.5.9
@ 2.5 GHz (Stripline)	3.6		3.6		IPC-TM-650.2.5.5.5
@ 10 GHz (Stripline)	3.6		3.6		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	3.6		3.6		
Dissipation Factor (50% resin content)					
@ 2.5 GHz (Stripline)	0.014		0.014		IPC-TM-650.2.5.5.5
@ 10 GHz (Stripline)	0.014		0.014		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	0.010		0.010		
Volume Resistivity					
C - 96 / 35 / 90	10 ⁷	MΩ - cm	10 ⁷	MΩ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125	10 ⁷	MΩ - cm	10 ⁷	MΩ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96 / 35 / 90	10 ⁶	MΩ	10 ⁶	MΩ	IPC-TM-650.2.5.17.1
E - 24 / 125	10 ⁷	MΩ	10 ⁷	MΩ	IPC-TM-650.2.5.17.1
Electric Strength	1200	V / mil	4.7x10 ⁴	V / mm	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>50	kV	>50	kV	IPC-TM-650.2.5.6
Arc Resistance	118	seconds	118	seconds	IPC-TM-650.2.5.1
Thermal Properties					
Glass Transition Temperature (T _g)					
DSC (°C)	185	°C	185	°C	IPC-TM-650.2.4.25c
TMA (°C)	175	°C	175	°C	IPC-TM-650.2.4.24c
DMA (°C) (Tan δ Peak)	220	°C	220	°C	IPC-TM-650.2.4.24.3
Degradation Temp (TGA) (5% wt. loss)	334	°C	334	°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)
T ₂₆₀	12+	minutes	12+	minutes	IPC-TM-650.2.4.24.1
Chemical / Physical Properties					
Moisture Absorption	<0.05	wt. %	<0.05	wt. %	IPC-TM-650.2.6.2.1
Methylene Chloride Resistance	0.7	% wt. chg.	0.7	% wt. chg.	IPC-TM-650.2.3.4.3
Density [50% resin content]	1.77	g / cm ³	1.77	g / cm ³	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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*CAF resistance has been established to greater than 500 hours using a specific OEM coupon design and test procedure. For details on this or other CAF tests, please visit www.parkelectro.com.

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