

# Park's Advanced Circuitry Materials

## Nelco® N7000-2 HT Laminate Nelco® N7000-3 Prepreg and Laminate Toughened Polyimide Prepreg & Laminate



*The Nelco N7000-2 HT laminate and N7000-3 prepreg are a series of toughened polyimide material for use in high-reliability multilayers. This combined resin system provides excellent thermal performance, improved processing characteristics and is exceptional for use in a wide variety of applications that include fine geometry multilayer constructions and extreme reliability requirements.*

### Key Features

#### Polyimide Resin Chemistry

- Robust thermal stability and reliability
- Toughened resin system
- High temperature tolerance and chemical resistance

#### Lead-free Assembly Compatibility

- Withstands multiple thermal excursions
- T<sub>g</sub> 260°C by DSC
- T260 >120 minutes
- Low Z-Axis CTE
- Designed for use in severe conditions

#### Supports Current and Previous Military and Industrial Standards

- N7000-2 HT and N7000-3 meet IPC-4101/40 and /41
- Complies with the old GIJ and GIL military specifications

#### Reliable Plated-through Holes

- Low Z-Axis CTE and toughened polyimide chemistry providing good dimensional stability

#### Reliable Processing

- Improved fracture resistance compared with traditional polyimide systems
- Reduced cure time compared to other traditional polyimide systems

#### And Much More

- Vacuum laminated
- Available in a wide variety of constructions, copper weights and glass styles
- All Nelco materials are RoHS compliant

### Applications

- Fine-Line Multilayers
- Backplanes
- Surface-Mount Multilayers
- BGA Multilayers
- Direct Chip Attach
- Underhood Automotive
- Burn-in Boards

### Global Availability

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



# Nelco<sup>®</sup> N7000-2 HT / N7000-3

## Toughened Polyimide Laminate & Prepreg

Mechanical Properties	U.S. Units		Metric Units		Test Method
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	7.5	lb / inch	1.31	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	7.0	lb / inch	1.22	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	7.0	lb / inch	1.22	N / mm	IPC-TM-650.2.4.8
X / Y CTE [-40°C to +125°C]	9 - 12	ppm / °C	9 - 12	ppm / °C	IPC-TM-650.2.4.41
Z Axis Expansion [50°C to 260°C]	<2.5	%	<2.5	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)	3.1 / 3.3	psi x 106	21.1 / 22.2	GN / m2	ASTM D3039
Poisson's Ratios (X / Y)	0.146 / 0.153		0.146 / 0.153		ASTM D3039
Thermal Conductivity	0.45	W / mK	0.45	W / mK	ASTM E1461
Specific Heat	1.06	J / gK	1.06	J / gK	ASTM E1461
<b>Electrical Properties</b>					
Dielectric Constant (50% resin content)					
@ 1 GHz (RF Impedance)	3.8		3.8		IPC-TM-650.2.5.5.9
@ 2.5 GHz (Stripline)	3.5		3.5		IPC-TM-650.2.5.5.5
@ 10 GHz (Stripline)	3.5		3.5		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	3.5		3.5		
Dissipation Factor (50% resin content)					
@ 2.5 GHz (Stripline)	0.015		0.015		IPC-TM-650.2.5.5.5
@ 10 GHz (Stripline)	0.015		0.015		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	0.009		0.009		
Volume Resistivity					
C - 96 / 35 / 90	10 <sup>7</sup>	MΩ - cm	10 <sup>7</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125	10 <sup>7</sup>	MΩ - cm	10 <sup>7</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96 / 35 / 90	10 <sup>7</sup>	MΩ	10 <sup>7</sup>	MΩ	IPC-TM-650.2.5.17.1
E - 24 / 125	10 <sup>7</sup>	MΩ	10 <sup>7</sup>	MΩ	IPC-TM-650.2.5.17.1
Electric Strength	1200	V / mil	4.7x10 <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	100	seconds	100	seconds	IPC-TM-650.2.5.1
<b>Thermal Properties</b>					
Glass Transition Temperature (Tg)					
DSC (°C)	260	°C	260	°C	IPC-TM-650.2.4.25c
TMA (°C)	250	°C	250	°C	IPC-TM-650.2.4.24c
Degradation Temp (TGA) (5% wt. loss)	376	°C	376	°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	120+	minutes	120+	minutes	IPC-TM-650.2.4.24.1
<b>Chemical / Physical Properties</b>					
Moisture Absorption	0.35	wt. %	0.35	wt. %	IPC-TM-650.2.6.2.1
Methylene Chloride Resistance	<0.50	% wt. chg.	<0.50	% wt. chg.	IPC-TM-650.2.3.4.3
Density [50% resin content]	1.70	g / cm <sup>3</sup>	1.70	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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