



Nelco® N4000-2

Multifunctional Epoxy Laminate & Prepreg

The Nelco® N4000-2 is the most established material of Nelco's product line. This multifunctional epoxy laminate and prepreg system has a long history of use and one of the broadest operating and processing windows.

Key Features

Designed for use in high-density multilayer boards, N4000-2 is suitable for surface-mount multilayers, MCM-Ls, direct chip attach, automotive and wireless communications. The characteristics of N4000-2 also make it particularly beneficial in high-volume, fine-line multilayers and PCMCIA applications.

The predictability and consistency of this material provides for tremendous ease of processing at the circuit board fabrication site, and its electrical and mechanical characteristics make it user friendly for both designers and fabricators of critical circuits.

N4000-2 is a reliable combination of managed cost, superior quality and consistent performance for a multitude of high volume applications.

As with all Nelco® materials, the N4000-2 is vacuum laminated and is available in a wide variety of constructions, copper weights and glass styles. It is also available in standard copper, double-treat copper and our RTFOIL® Laminate.

N4000-2 meets UL 94V-0 and IPC-4101/21 specifications. All Nelco® materials are RoHS compliant.

Applications

- Fine-Line Multilayers
- Surface-Mount Multilayers
- CSP Attachment
- MCM-Ls
- PCMCIA Cards
- Wireless Communications
- Bluetooth Modules
- Automotive

Global Availability

Nelco, California	+1.714.879.4293
Nelco, New York	+1.845.567.6200
Neltec, Arizona	+1.480.967.5600
Nelco, Asia Pacific	+65.6861.7117
Neltec Europe SAS	+33.380.10.10.00
Neltec, SA	+33.562.98.52.90
www.parkelectro.com	info@parkelectro.com

Park's UL file number: E36295

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Multifunctional Epoxy Laminate & Prepreg

Property / Condition	Value (U.S. Units)		Value (Metric Units)		Test Method
Mechanical Properties					
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	9.0	lb/inch	1.58	N/mm	IPC-TM-650.2.4.8
At Elevated Temperature	7.0	lb/inch	1.23	N/mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	9.0	lb/inch	1.58	N/mm	IPC-TM-650.2.4.8
X/Y CTE [-40°C to +125°C]	12 - 16	ppm/°C	12 - 16	ppm/°C	IPC-TM-650.2.4.41
Z Axis Expansion [50°C to 260°C]	4.5	%	4.5	%	IPC-TM-650.2.4.41
Young's Modulus (X/Y)	4.1/3.5	psi x 10 ⁶	24.8/23.4	GN/m ²	ASTM D3039
Poisson's Ratios (X/Y)	0.16/0.14		0.16/0.14		ASTM D3039
Thermal Conductivity	0.3 - 0.4	W/mK	0.3 - 0.4	W/mK	ASTM E1461-92
Specific Heat	1.20 - 1.40	J/gK	1.20 - 1.40	J/gK	ASTM E1461-92
Electrical Properties					
Dielectric Constant (50% resin content)					
@ 1 MHz (TFC/LCR Meter)	4.3		4.3		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)	0.023		0.023		IPC-TM-650.2.5.5.3
Volume Resistivity					
C - 96/35/90	10 ⁸	Mμ - cm	10 ⁸	Mμ - cm	IPC-TM-650.2.5.17.1
E - 24/125	10 ⁷	Mμ - cm	10 ⁷	Mμ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96/35/90	10 ⁷	Mμ	10 ⁶	Mμ	IPC-TM-650.2.5.17.1
E - 24/125	10 ⁶	Mμ	10 ⁶	Mμ	IPC-TM-650.2.5.17.1
Electric Strength	1250	V/mil	4.9x10 ⁴	V/mm	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>50	kV	>50	kV	IPC-TM-650.2.5.6
Arc Resistance	65	seconds	65	seconds	IPC-TM-650.2.5.1
Thermal Properties					
Glass Transition Temperature (T _g)					
DSC (°C)	140	°C	140	°C	IPC-TM-650.2.4.25c
TMA (°C)	130	°C	130	°C	IPC-TM-650.2.4.24c
Degradation Temp (TGA) (5% wt. loss)	300	°C	300	°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	8 - 12	minutes	8 - 12	minutes	IPC-TM-650.2.4.24.1
Chemical/Physical Properties					
Moisture Absorption	0.1	wt. %	0.1	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]	1.92	g/cm ³	1.92	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. 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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