Nelco® N4000-6 FC

Fast-Cure, High-Tg Multifunctional Epoxy Laminate & Prepreg

The Nelco® N4000-6 FC is a high-Tg epoxy laminate and prepreg system that provides a wide range of performance versatility and ease of processing for demanding high-layer count applications.

Key Features

A Proven High-Tg Substrate
- Years of field use with consistent results
- Consistent dielectric thickness
- Global availability

Robust Thermal Properties
- Tg of 175ºC
- Suitable for high-layer count, sophisticated PWB designs

Superior electrical properties
- Excellent electrical properties for a standard loss material
- Supporting advanced technology PWB designs

Enhanced Standard FR-4 processing
- Key processing parameters of drilling, desmear and lamination use standard low Tg FR-4 methods
- Cure time reduced when compared to many other high Tg materials
- Excellent drilling characteristics, especially in high layer-count designs
- 60 min press at 182ºC and 200-300 psi.

And Much More
- Vacuum laminated
- Available in a wide variety of constructions, copper weights and glass styles including standard copper, double treat and RTFOIL® laminate
- Meets UL 94V-0 and IPC-4101/24 and /26 specifications
- All Nelco® materials are RoHS compliant

Applications

- Fine-Line Multilayers
- Backplanes
- Surface-Mount Multilayers
- BGA Multilayers
- CSP Attachment
- Automotive
- Underhood Automotive
- Wireless Communications
- Infrastructure
- Network Storage
- High-End Servers

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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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 - 15	ppm/°C	12 - 15	ppm/°C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 1 [50°C to Tg]	70	ppm/°C	70	ppm/°C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 2 [Tg to 260°C]	320	ppm/°C	320	ppm/°C	IPC-TM-650.2.4.41
Z Axis Expansion [50°C to 260°C]	4.1	%	4.1	%	IPC-TM-650.2.4.41
Young's Modulus (X/Y)	4.4/3.7	psi x 10^6	29.9/25.1	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
@ 2.5 GHz (Stripline)	4.0		4.0		IPC-TM-650.2.5.5.5
Dissipation Factor (50% resin content)					
@ 1 MHz (TFC/LCR Meter)	0.023		0.023		IPC-TM-650.2.5.5.3
@ 2.5 GHz (Stripline)	0.022		0.022		IPC-TM-650.2.5.5.5
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	10^7	Mμ	IPC-TM-650.2.5.17.1
E - 24/125	10^7	Mμ	10^7	Mμ	IPC-TM-650.2.5.17.1
Electric Strength	1300	V/mil	$5.1x10^4$	V/mm	IPC-TM-650.2.5.6.2
Dielectric Breakdown	>50	kV	>50	kV	IPC-TM-650.2.5.6
Arc Resistance	70	seconds	70	seconds	IPC-TM-650.2.5.1
Thermal Properties					
Glass Transition Temperature (T_g)					
DSC (°C)	175 *	°C	175 *	°C	IPC-TM-650.2.4.25c
TMA (°C)	170 *	°C	170 *	°C	IPC-TM-650.2.4.24c
Degradation Temp (TGA) (5% wt. loss)	325	°C	325	°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}	4 - 8	minutes	4 - 8	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.

*Tg nominal on laminates. Finished board value may be lower due to printed circuit processes.

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