

# Park Advanced Circuitry Materials



## Nelco® N9000-13 RF

### PTFE Performance Blended Laminate

The Nelco® N9000-13 RF is a next generation PTFE Performance Blended product which combines the RF electrical properties of PTFE with the competitive performance features of Nelco's proprietary N4000-13 epoxy.

### Key Features

**Blended material offers the mechanical performance of a thermoset epoxy with the electrical performance of PTFE**

- Lead-free assembly compatibility.
- Excellent for cost-sensitive applications such as LNB's, In-building antennas and automotive telematics.
- Does not use expensive and abrasive ceramic fillers
- Provides a UL 94V-0 flammability rating.

#### CAF\* Resistant

- Providing long term reliability in end products.

#### Standard constructions for a wide range of applications

Dielectric Constant**	Dissipation Factor**	Laminate Core Thickness
3.00	0.0040	0.020", 0.030", 0.060
3.20	0.0045	0.020", 0.030", 0.060
3.38	0.0046	0.020", 0.030", 0.060
3.50	0.0055	0.020", 0.030", 0.060

#### Optimized N9000 PTFE processing

- Conventional PTFE processing
- Most epoxy prepregs will adhere for hybrid multilayer applications

#### Global Availability

- Vacuum laminated
- Available worldwide
- Meets UL 94V-0 specifications
- All materials are RoHS compliant

\*\*All Dk and loss testing performed according to IPC TM 650 testing methods at 10 GHz.

### Applications

- Antennas
- Automotive
- LNBs
- Hybrid RF Multilayers
- Avionics
- Military
- Commercial RF Applications
- Lead-Free Assembly Substrates

### Global Availability

Nelco Products, Inc. (California) - Americas  
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**Park's UL file number: E36295**



# Nelco® N9000-13 RF

## PTFE Performance Blended Laminate

Property / Condition	Value (U.S. Units)		Value (Metric Units)		Test Method
<b>Mechanical Properties</b>					
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	9.12	lb / inch	1.60	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	8.54	lb / inch	1.50	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	N/A	lb / inch	N/A	N / mm	IPC-TM-650.2.4.8
X / Y CTE [-40°C to +125°C]			13 - 20	ppm / °C	IPC-TM-650.2.4.41
Z Axis Expansion [-40°C to +125°C]			67	ppm / °C	Internal Method
<b>Electrical Properties</b>					
Dielectric Constant @ 10 GHz (Stripline)					IPC-TM-650.2.5.5.5
N9300-13 RF	3.00		3.00		
N9320-13 RF	3.20		3.20		
N9338-13 RF	3.38		3.38		
N9350-13 RF	3.48		3.48		
Dissipation Factor @ 10 GHz (Stripline)					IPC-TM-650.2.5.5
N9300-13 RF	0.0040		0.0040		
N9320-13 RF	0.0045		0.0045		
N9338-13 RF	0.0046		0.0046		
N9350-13 RF	0.0055		0.0055		
Volume Resistivity					
C - 96 / 35 / 90			10 <sup>8</sup>	Mμ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125			10 <sup>9</sup>	Mμ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96 / 35 / 90	10 <sup>6</sup>	Mμ	10 <sup>6</sup>	Mμ	IPC-TM-650.2.5.17.1
E - 24 / 125	10 <sup>7</sup>	Mμ	10 <sup>7</sup>	Mμ	IPC-TM-650.2.5.17.1
Electric Strength	1300	V / mil	4.8x10 <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	77	seconds	77	seconds	IPC-TM-650.2.5.1
<b>Thermal Properties</b>					
Glass Transition Temperature (T <sub>g</sub> )					
DSC (°C)	428	°F	220	°C	IPC-TM-650.2.4.25c
TMA (°C)	410	°F	210	°C	IPC-TM-650.2.4.24c
DMA (°C)	473	°F	245	°C	IPC-TM-650.2.4.24.3
Degradation Temp (TGA) (5% wt. loss)	662	°F	350	°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.)	600+	seconds	600+	seconds	(modified)
T <sub>260</sub>	30+	minutes	30+	minutes	IPC-TM-650.2.4.24.1
T <sub>300</sub>	8.7	minutes	8.7	minutes	IPC-TM-650.2.4.24.1
<b>Chemical / Physical Properties</b>					
Moisture Absorption	0.07	wt. %	0.07	wt. %	IPC-TM-650.2.6.2.1

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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.parkellectro.com](http://www.parkellectro.com).

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