

# Park Advanced Circuitry Materials

## Mercurywave™ 9350



### RF and Microwave Substrate and Prepreg

Mercurywave™ 9350 is a non PTFE, high frequency, low loss resin system tailored to meet the needs of the RF and Microwave market. With its low loss electrical properties and high thermal reliability, Mercurywave™ 9350 offers greater flexibility and freedom to design high performance RF and Microwave substrates.

#### Key Features

##### Excellent Electrical Properties

- Controlled Dk/Df electrical properties for both laminate and prepregs
- Stable electrical properties versus frequency when tested over environmental conditions

##### RF Substrate Technology

- Single and double sided
- Mixed hybrid designs
- Multi-layer capability
- Low insertion loss
- Low passive intermodulation

##### Lead-Free Compatibility

- Mercurywave™ 9350 will withstand multiple 260°C assembly reflow cycles

##### Thermal and Mechanical Properties

- Excellent thermal dissipation
- Low Z-axis expansion
- High peel strength
- High Tg material

##### Processing

- 120 min press at 193°C and 275-350 psi

##### Available in a variety of constructions

- Available in a wide variety of constructions, copper weights and glass styles including standard copper, double treat and RTFOIL®
- UL Rating of 50°C MOT
- Meets and exceeds:
  - IPC-4101/29
  - IPC-4103/11 electrical and mechanical requirements
  - UL 94V-0
- All Nelco® materials are RoHS compliant.
- Vacuum laminated

#### Applications

##### Base Station Equipment

- Filters, combiners and components

##### Automotive

- Radar
- Broadband communication
- Road tolling

##### Satellite Communication

- LNB's / LNA's
- GPS

##### Military

- High reliability communications
- Guidance
- Radar

##### Broadband RF Antennas

- WiFi / WiMax
- RFID's
- LAN's

##### RF Components

- Directional couplers
- TXRX
- Up/Down converters

#### Global Availability

Neltec, Inc. - Americas

+1.480.967.5600

Nelco Products Pte. Ltd. - Asia Pacific

+65.6861.7117

Neltec, S.A. - Europe

+33.562.98.52.90

www.parkedro.com

info@parkedro.com

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



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## RF and Microwave Substrate and Prepreg

Mechanical Properties	Mercurywave™ 9350	U.S. Units	Mercurywave™ 9350	Metric	Test Method
Peel Strength - 1 oz. (35 micron) Cu					
After Solder Float	7	lb / inch	1.22	N / mm	IPC-TM-650.2.4.8
At Elevated Temperature	7	lb / inch	1.22	N / mm	IPC-TM-650.2.4.8.2a
After Exposure to Process Solutions	8	lb / inch	1.4	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 CTE Alpha 1 [50°C to Tg]	48	ppm / °C	48	ppm / °C	IPC-TM-650.2.4.24
Z Axis CTE Alpha 2 [Tg to 260°C]	245	ppm / °C	245	ppm / °C	IPC-TM-650.2.4.24
Z Axis Expansion [50°C to 260°C]	2.5	%	2.5	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)	3.0 / 3.7	psi x 10 <sup>6</sup>	2.1 <sup>10</sup> / 2.5 <sup>10</sup>	GN / m <sup>2</sup>	ASTM D3039
Poisson's Ratios (X / Y)	0.14 / 0.17		0.14 / 0.17		ASTM D3039
Thermal Conductivity	.5	W / mK	.5	W / mK	ASTM E1461
Specific Heat	1.2	J / gK	1.2	J / gK	ASTM E1461
<b>Electrical Properties</b>					
Dielectric Constant (Typical)					
@ 2.5 GHz (Split Post Cavity)	3.7		3.7		
@ 10 GHz (Stripline)	3.5		3.5		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	3.7		3.7		
Dissipation Factor (Typical)					
@ 2.5 GHz (Split Post Cavity)	0.004		0.004		
@ 10 GHz (Stripline)	0.004		0.004		IPC-TM-650.2.5.5.5
@ 10 GHz (Split Post Cavity)	0.004		0.004		
Volume Resistivity					
C - 96 / 35 / 90	7.0x10 <sup>7</sup>	MΩ - cm	7.0x10 <sup>7</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
E - 24 / 125	7.4x10 <sup>6</sup>	MΩ - cm	7.4x10 <sup>6</sup>	MΩ - cm	IPC-TM-650.2.5.17.1
Surface Resistivity					
C - 96 / 35 / 90	6.6x10 <sup>5</sup>	MΩ	6.6x10 <sup>5</sup>	MΩ	IPC-TM-650.2.5.17.1
E - 24 / 125	4.7x10 <sup>6</sup>	MΩ	4.7x10 <sup>6</sup>	MΩ	IPC-TM-650.2.5.17.1
Electric Strength	1500	V / mil	5.9x10 <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	132	seconds	132	seconds	IPC-TM-650.2.5.1
<b>Thermal Properties</b>					
*Glass Transition Temperature (Tg)					
DMA (°C) (Tan d Peak)	≥200	°C	≥200	°C	IPC-TM-650.2.4.24.3
Degradation Temp (TGA) (5% wt. loss)	360	°C	360	°C	IPC-TM-650.2.4.24.6
Pressure Cooker-60 min then solder dip @288°C until failure (max 10 min.)	60	minutes	60	minutes	IPC-TM-650.2.6.16 (modified)
T260	200	minutes	200	minutes	IPC-TM-650.2.4.24.1
T288	40	minutes	40	minutes	IPC-TM-650.2.4.24.1
T300	18	minutes	18	minutes	IPC-TM-650.2.4.24.1
<b>Chemical / Physical Properties</b>					
Moisture Absorption	0.15	wt. %	0.15	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]	1.97	g / cm <sup>3</sup>	1.97	g / cm <sup>3</sup>	

\*DMA is the preferred method for measuring Tg - other methods may be less accurate.

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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