



## PTFE + woven fiberglass cloth substrate

RP220 laminates are woven fiberglass/PTFE composite materials. Using precise control of the fiberglass/PTFE ratio, RP220 laminates offer a range of choices from the lowest dielectric constant and dissipation factor to a more highly reinforced laminate with better dimensional stability.

The woven fiberglass reinforcement in RP220 products provides greater dimensional stability than nonwoven fiberglass reinforced PTFE based laminates of similar dielectric constants. The consistency and precise control of the PTFE coated fiberglass cloth allows Relong to offer stable dielectric constants.

RP220 laminates are frequently used in filter, coupler and low noise amplifier (LNA) applications, where dielectric constant uniformity is critical. They are also used in power dividers and combiners, where low loss ( $D_f$  0.0009) is important.

### Features:

- Extremely Low Loss Tangent (0.0009 @ 10GHz)
- Excellent Dimensional Stability
- Excellent Product Performance Uniformity

### Benefits:

- Electrical Properties Are Highly Uniform Across Frequency
- Consistent Mechanical Performance
- Excellent Chemical Resistance

### Typical Applications:

- Defense Microwave/RF Applications
- Phased Array Radar Antenna Network
- Low Loss Base Station Antenna
- Military Radar Feed Networks
- Missile Guidance Systems
- Digital Radio Antennas
- Filters, Couplers, LNAs

## Typical Properties:

Property	Units	Value	Test Method
<b>1. Electrical Properties</b>			
Dielectric Constant			
@ 10 GHz	-	2.20	IPC TM-650 2.5.5.5
Dissipation Factor			
@ 10 GHz	-	0.0009	IPC TM-650 2.5.5.5
Temperature Coefficient of Dielectric			
TC $\epsilon_r$ @ 10 GHz (-10-140° C)	ppm/°C	-160	IPC TM-650 2.5.5.5
Volume Resistivity			
C96/35/90	M $\Omega$ -cm	1.4 x 10 <sup>9</sup>	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	M $\Omega$	2.9 x 10 <sup>6</sup>	IPC TM-650 2.5.17.1
Dielectric Breakdown	kV	>45	IPC TM-650 2.5.6
Arc Resistance	sec	>180	IPC TM-650 2.5.1
<b>2. Thermal Properties</b>			
Thermal Expansion			
CTE (X)	ppm/°C	25	IPC TM-650 2.4.41
CTE (Y)	ppm/°C	34	IPC TM-650 2.4.41
CTE (Z)	ppm/°C	252	IPC TM-650 2.4.24
<b>3. Physical Properties</b>			
Water Absorption	%	0.02	IPC TM-650 2.6.2.1
Density	g/cm <sup>3</sup>	2.23	ASTM D792 Method A
Thermal Conductivity	W/mK	0.261	ASTM D5470
Flammability	Class	V0	UL-94
<b>4. Mechanical Properties</b>			
Peel Strength	lb/in	20	IPC TM-650 2.4.8
Tensile Modulus (Machine/Cross)	kpsi	267, 202	ASTM D-638
Tensile Strength (Machine/Cross)	kpsi	8.1, 7.5	ASTM D-882
Compressive Modulus	kpsi	237	ASTM D-695
Flexural Modulus	kpsi	357	ASTM D-790

Results listed above are typical properties, they are not to be used as specification limits. The above information creates no expressed or implied warranties. The properties of Relong laminates may vary depending on the design and application.

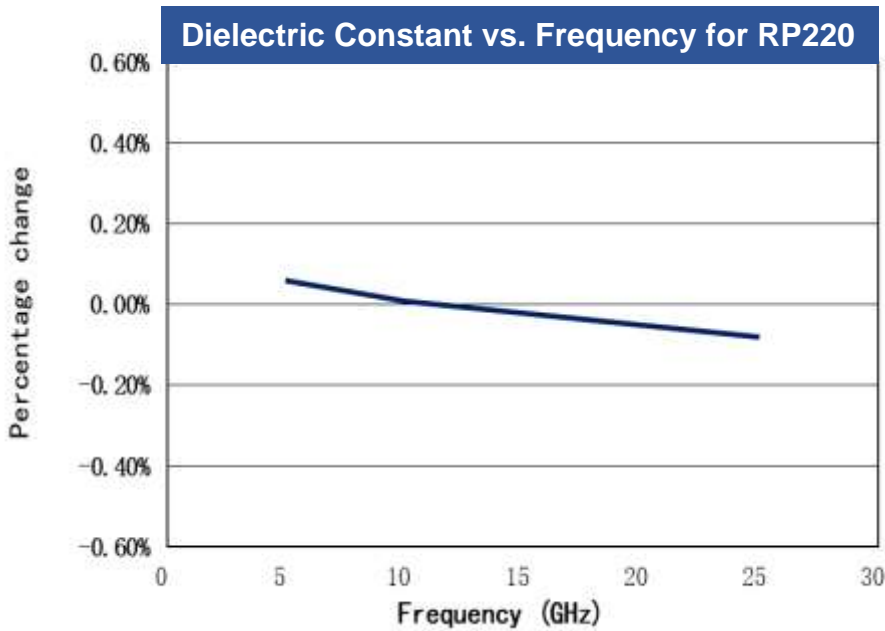


Figure 1

Demonstrates the Stability of Dielectric Constant across Frequency. This characteristic demonstrates the inherent robustness of Relong Laminates across Frequency, thus simplifying the final design process when working across EM spectrum. The stability of the Dielectric Constant of RP220 over frequency ensures easy design transition and scalability of design.

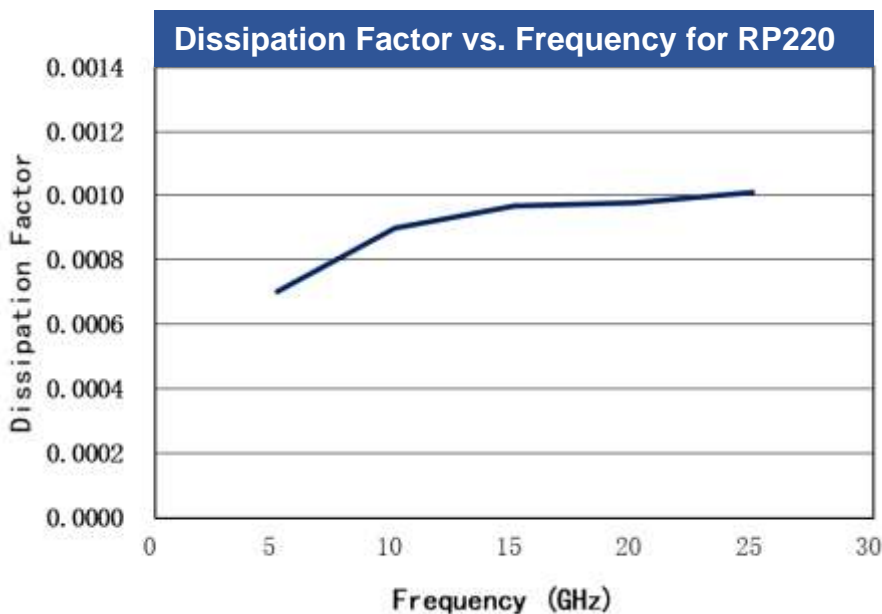


Figure 2

Demonstrates the Stability of Dissipation Factor across Frequency. This characteristic demonstrates the inherent robustness of Relong Laminates across Frequency, providing a stable platform for high frequency applications where signal integrity is critical to the overall performance of the application.

## Material Availability:

RP220 laminate offers 1/2oz, 1OZ and 2OZ electrolytic copper or reverse treat copper on both side, if necessary, we also can offer other copper or rolled copper. RP220 can also be combined with metal plate, such as aluminum plate, brass plate, copper plate, etc. The advantage is that it can provide heat dissipation and mechanical support of composite medium.

RP220 Standard Master Sheets are 54" x 48". Common panel sizes include (not limited) :18"x 12" and 18" x 24 ".when place order, please specify dielectric thickness, cladding type, panel size and any other special considerations.