

# Anteo™ Laminates

Anteo™ laminates, designed with a dielectric constant (Dk) to match that of FR-4, offer a more cost-effective solution without compromising on performance. Despite their lower cost, these laminates retain the tight Dk and thickness tolerances required to cater to the burgeoning needs of the wireless market, typically addressed by more expensive FR-4 materials.

As the demand for wireless data skyrockets, mobile network capacity and performance need to keep pace. Traditional FR-4 materials, while suitable for less demanding RF applications, have occasionally fallen short due to evolving wireless infrastructure and escalating performance demands, particularly in small cells and carrier-grade Wi-Fi. This has can lead to RF performance inconsistencies and inadequacies.

With Anteo laminates, wireless circuit designers are poised for a breakthrough. These materials match the performance of mid-tier circuit materials, extending past the constraints of FR-4 and providing an optimal balance of cost, performance, and reliability. Moreover, Anteo laminates are designed to be fabricated using standard epoxy/glass (FR-4) processes, aligning with conventional bondplies.

In terms of compliance, Anteo laminates leverage RoHS-compliant flame-retardant technology to achieve a UL 94 V-0 flame retardant rating. Additionally, they are compatible with lead-free solder processes. Adhering to the requirements of IPC-4103B, slash sheet /250, these materials promise robust compliance with industry standards while offering a more affordable alternative.



## ||| Features and Benefits:

Glass Reinforced Hydrocarbon Thermoset Platform

- Ease of PCB manufacturing and assembly in line with FR-4

Dk Tailored to FR-4 Industry Standard Norms

- Anteo L43 laminate has a Dk of 4.38 for ease of transition when upgraded electrical performance is needed over FR-4

Tighter Dk and Thickness Tolerance than FR-4

- Consistent circuit performance

Low Z Axis CTE and High Tg

- Improved design flexibility, PTH reliability
- Automated assembly compatible

Flame Retardant Laminate

- UL 94 V-0

## ||| Typical Applications:

- GPS Antennas
- Wifi Antennas
- Vehicle to Vehicle/Vehicle to Infrastructure Communications (V2X)
- Internet of Things (IoT) Segments: Smart Home and Wireless Meters

### Standard Properties Table

Properties	Typical Value <sup>1</sup> L43 Laminate	Units	Test Conditions		Test Method
<b>Electrical Properties</b>					
Dielectric Constant (design) <sup>3</sup>	4.38 <sup>2</sup>	-	C-24/23/50	10 GHz	Microstrip Differential Phase Length
Dissipation Factor	0.005	-	23°C @ 50% RH	10 GHz	IPC TM-650 2.5.5.5
Thermal Coefficient of Dielectric Constant	-21	ppm/°C	-50 to 150°C	10 GHz	IPC TM-650 2.5.5.5
Volume Resistivity	2.9 x 10 <sup>9</sup>	MΩ-cm	C96/35/90		IPC TM-650 2.5.17.1
Surface Resistivity	6.2 x 10 <sup>7</sup>	MΩ	C96/35/90		IPC TM-650 2.5.17.1
Electrical Strength (dielectric strength)	675	V/mil	-		IPC TM-650 2.5.6.2
<b>Thermal Properties</b>					
Decomposition Temperature (Td)	414	°C	2hrs @ 105°C	5% Weight Loss	IPC TM-650 2.3.40
Coefficient of Thermal Expansion - x	13	ppm/°C	-55°C to 288°C		IPC TM-650 2.4.41
Coefficient of Thermal Expansion - y	16	ppm/°C			
Coefficient of Thermal Expansion - z	42	ppm/°C			
Thermal Conductivity	0.64	W/(mK)	80°C		ASTM D5470
Time to Delamination	>60	minutes	as-received	288°C	IPC TM-650 2.4.24.1
<b>Mechanical Properties</b>					
Copper Peel Strength	5.3	N/mm (lbs/in)	35 μm foil		IPC TM-650 2.4.8
Tensile Strength (MD/CMD)	16, 12	kpsi	-		ASTM D3039/D3039-14
Flexural Strength (MD, CMD)	25, 19	kpsi	-		IPC-TM-650 2.4.4
Dimensional Stability (MD, CMD)	-0.48, -0.59	mm/m	-		IPC-TM-650 2.4.39a
<b>Physical Properties</b>					
Flammability	V-0		-		UL 94
Moisture Absorption	0.07	%	D24/23		IPC TM-650 2.6.2.1
Lead-free Process Compatible	Yes		-		

NOTES:

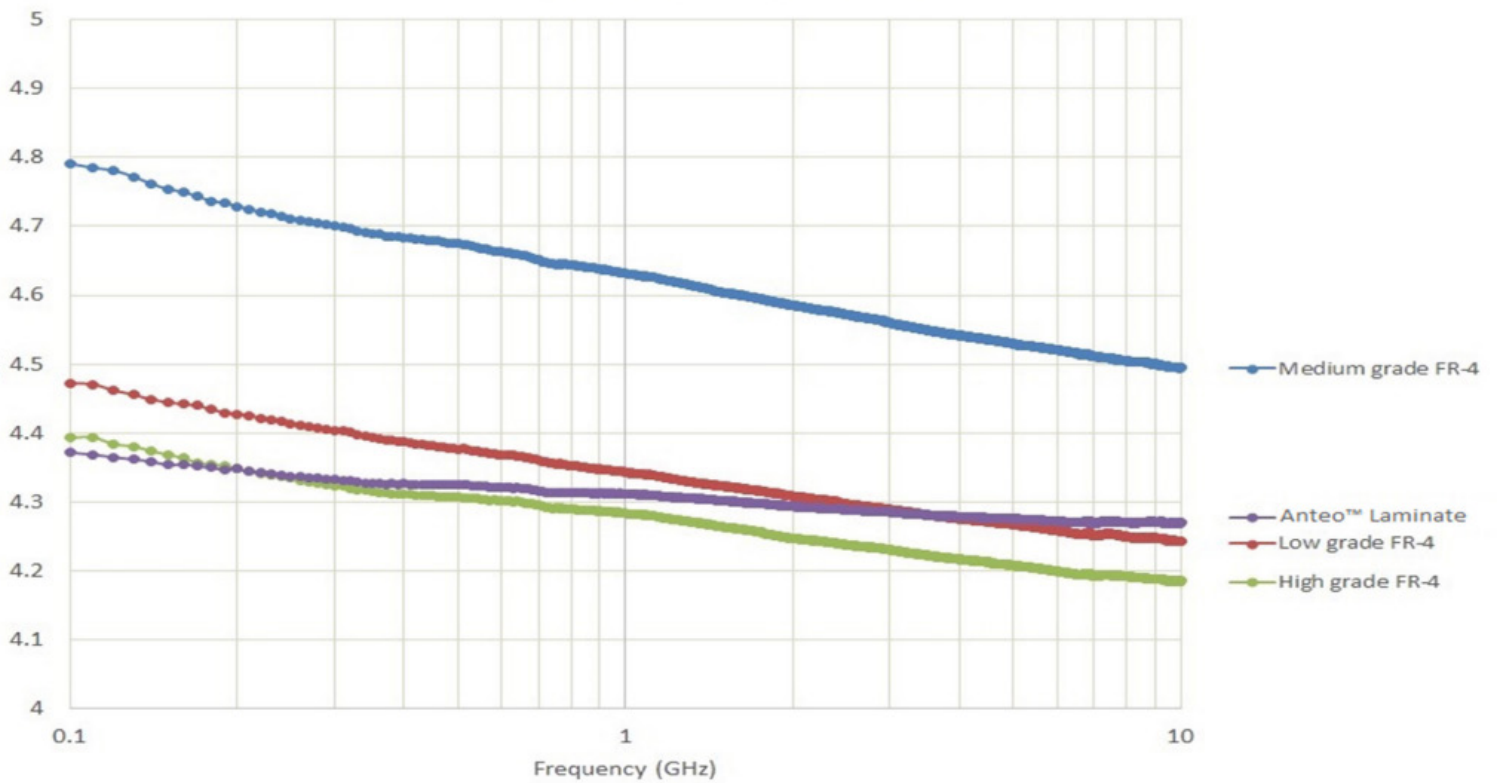
[1] Typical values are a representation of an average value for the population of the property. For specification values contact Rogers Corporation.

[2] Dielectric Constant using stripline method IPC TM-650 2.5.5.5 at 10 GHz is 4.07 +/- 0.08 for Rogers' internal Q.A. testing

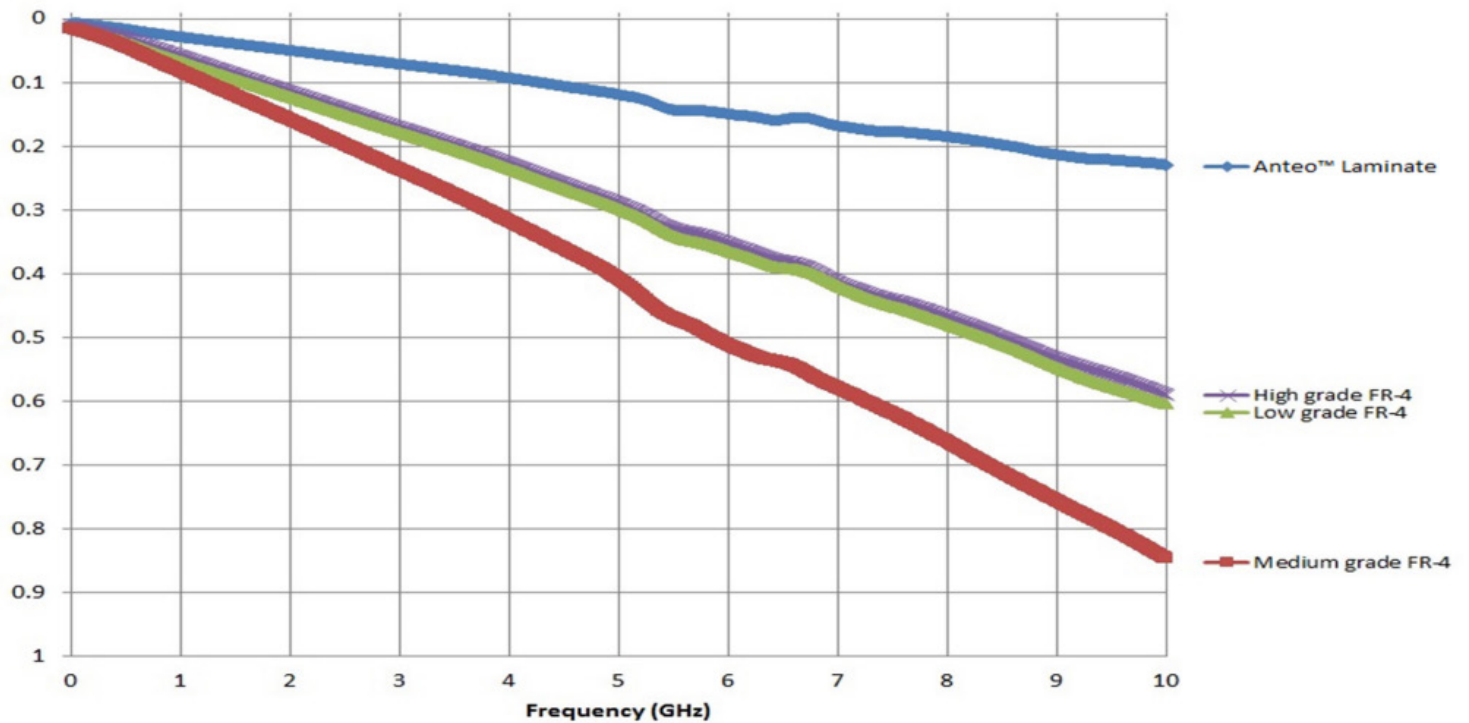
[3] The design Dk is an average number from several different tested lots of material and on the most common thickness/s. If more detailed information is required please contact Rogers Corporation.

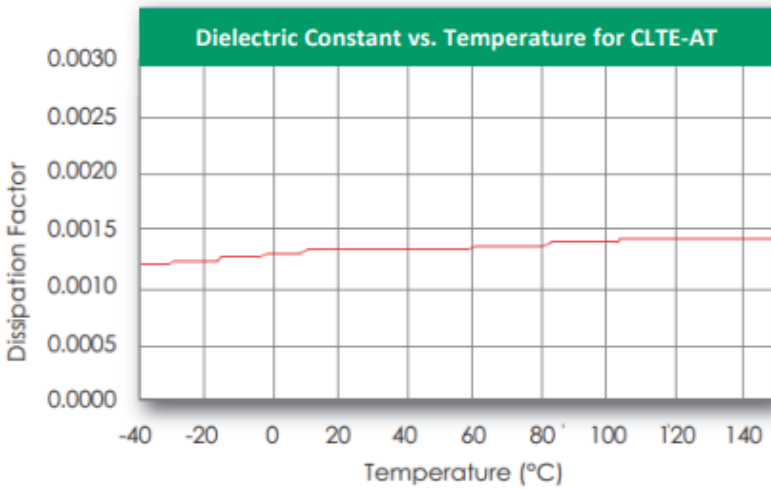
### Property Charts

Microstrip differential phase length method, Dk vs. Frequency using 30mil thick circuit materials



Microstrip Insertion Loss, Differential Length Method Using 30mil thick circuit materials





**Figure 4**

This *Df/Temperature* curve shows the unique thermal stability properties of CLTE-AT materials when thermocycled over temperature.

### Standard Offerings

Standard Thicknesses	Standard Panel Sizes	Standard Claddings
0.005" (0.13 mm) ± 0.0005" 0.010" (0.254 mm) ± 0.0010" 0.020" (0.508 mm) ± 0.0015" 0.030" (0.762 mm) ± 0.0020" 0.060" (1.52 mm) ± 0.0030"	18" X 12" (475 X 305mm) 18" X 24" (475 X 610mm)	<u>Electrodeposited Copper Foil</u> 1/2 oz. (18µm) 1 oz. (35µm)  <u>Reverse Treated Electrodeposited Copper Foil</u> 1/2 oz. (18µm) 1 oz. (35µm)

\*Contact Customer Service or Sales Engineering to inquire about other available product configurations including additional thicknesses, panel sizes and claddings.

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 IPC Slash Sheet # 4103B/250 || UL File #

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Revised 1674 120723 Publication #92-216