

## PTFE/Woven Fiberglass/Ceramic Filled Laminate for Microwave Printed Circuit Boards

### Features:

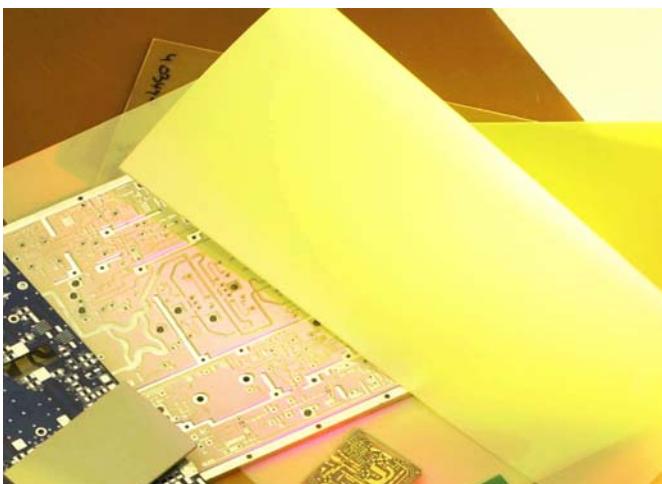
- Ceramic Filled High Dielectric Constant
- Mechanically Robust; replaces brittle laminates that cannot withstand processing, impact or High G forces
- Large Panel Sizes
- High Peel Strength for Narrow Lines

### Benefits:

- Circuit Miniaturization
- Replace Ceramic in Some Applications
- Improved Processing and Reliability
- Large Panel Sizes for Multiple Circuit Layout and lower cost Processing
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### Typical Applications:

- Microwave Combiner and Power Divider Boards
- Power Amplifiers, Filters and Couplers
- Smaller Footprint Antennas
- Digital Audio Broadcasting (DAB) Antennas (Satellite Radio)
- GPS & Hand-held RFID Reader Antennas
- Antennas in Hand-held RFID Readers



AD600 is a legacy product. This data sheet is provided for legacy users. Arlon encourages you to consider the higher performing, lower loss, tighter tolerance, higher thermal conductivity TC600. Lower cost, thicker options (assume greater than 0.100") with tighter DK tolerance, may also be available as an improved AD600A.

Arlon's AD600 is a woven fiberglass reinforced, ceramic filled, PTFE-based composite material for use as a printed circuit board substrate. AD600 was designed to provide low dielectric loss, low insertion loss and mechanical robustness to the 6.15 dielectric constant market.

Higher dielectric constant permits various degrees of circuit miniaturization, especially for microwave power dividers, power combiners, amplifiers, filters, couplers and other components that use low impedance lines. The 6.15 dielectric constant provides the miniaturization that is needed for small footprint antennas (GPS, DAB-Satellite Radio, Hand-held RFID Readers, etc.).

AD600 is a "soft substrate" and is relatively insensitive to stress from vibration. The robust AD600 overcomes the brittleness of ceramics (such as alumina or LTCC) through the suspension of micro-dispersed ceramics in a relatively soft PTFE based substrate that is reinforced with woven fiberglass. This gives RF designers the advantages of low loss without sacrificing the mechanical robustness required to fulfill the needs of today's shock, drop and impact testing requirements of today's electronics. It is also preferred by board manufacturers as it can be easily cut and routed without being overly sensitive.

## Typical Properties: AD600

Property	Test Method	Condition	Result
Dielectric Constant (1 MHz and 200 MHz)	IPC TM-650 2.5.5.3 2.5.5.6	C23/50	6.15 (see below)
Dissipation Factor (1 MHz)	IPC TM-650 2.5.5.3	C23/50	0.003
Arc Resistance (seconds)	ASTM D-495	D48/50	>180
Density (g/cm <sup>3</sup> )	ASTM D-792 Method A	A, 23°C	2.45
Water Absorption (%)	IPC TM-650 2.6.2.1	E1/105 + D24/23	0.04
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis	IPC TM-650 2.4.24 TMA	0°C to 100°C	11 10 45
Thermal Conductivity (W/mK)	ASTM E-1225	100°C	0.46
Peel Strength (lbs per inch)	IPC TM-650 2.4.8	After thermal stress	12
Outgassing Total Mass Loss (%) Collected Volatile Condensable Material (%) Water Vapor Recovered Visible Condensate (±)	NASA SP-R-0022A Maximum 1.00% Maximum 0.10%	125°C, $\leq 10^{-6}$ torr	0.02 0.01 0.00 NO
Flammability	UL 94 Vertical Burn IPC TM-650 2.3.10	C48/23/50, E24/125	Meets requirements of UL94-V0

<b>Thickness</b>	0.0055"	0.015"	0.046"	0.075"	0.090"	0.100"	0.150"	0.250"
<b>Dielectric Constant</b>	5.50	6.15	6.15	6.15	6.15	6.25	6.30	6.30

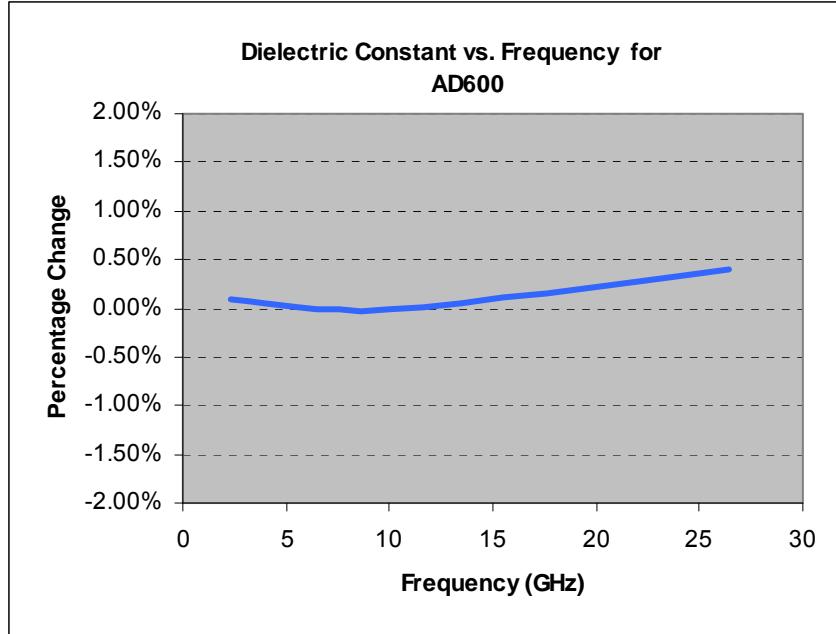
*Other thicknesses are available. AD600 is a legacy product. Arlon encourages you to consider the higher performing, lower loss, tighter tolerance, higher thermal conductivity TC600. Lower cost, thicker options (assume greater than 0.100") with tighter DK tolerance, may also be available as an improved AD600A.*

### Material Availability:

AD600 laminate is supplied with 1/2, 1 or 2 ounce electrodeposited copper on both sides. Other copper weights and rolled copper foil are available. AD601 is available bonded to heavy metal ground planes. Aluminum, brass or copper plates also provide an integral heat sink and mechanical support to the substrate.

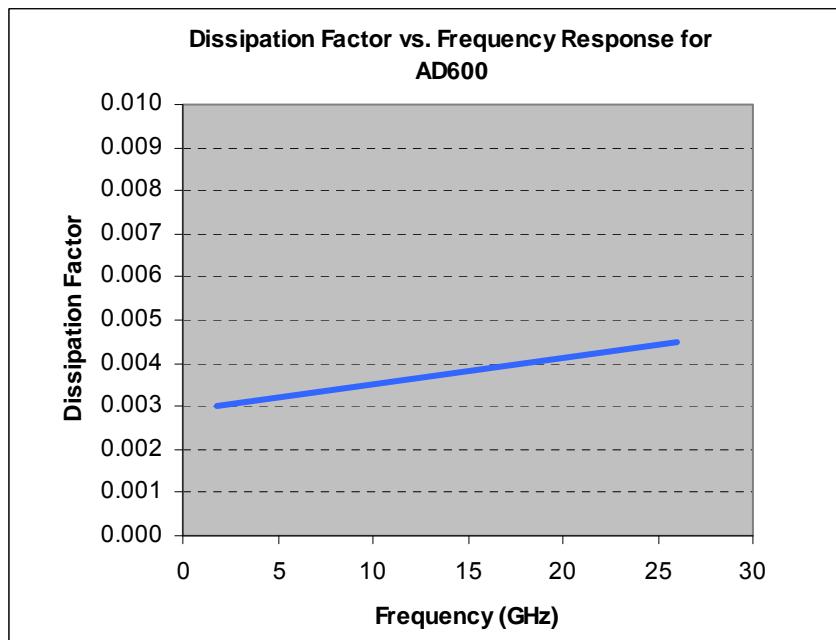
When ordering AD600 product, please specify thickness, cladding, panel size, and any other special considerations. The most common sheet size is 36" x 48". Available in standard panel sizes up to 24" x 36", with larger dimensions available upon request. Most popular panel sizes include 12" x 18", 16" x 18" and 18" x 24".

## AD600 Laminate



**Figure 1**

Demonstrates the Stability of Dielectric Constant across Frequency. This information was correlated from data generated by using a free space and circular resonator cavity. This characteristic demonstrates the inherent robustness of Arlon Laminates across Frequency, thus simplifying the final design process when working across EM spectrum. The stability of the Dielectric Constant of AD601 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 Arlon Laminates across Frequency, providing a stable platform for high frequency applications where signal integrity is critical to the overall performance of the application.