

## PTFE/Woven Fiberglass/Micro-Ceramic Filled Laminate for RF & Microwave Printed Circuit Boards

### Features:

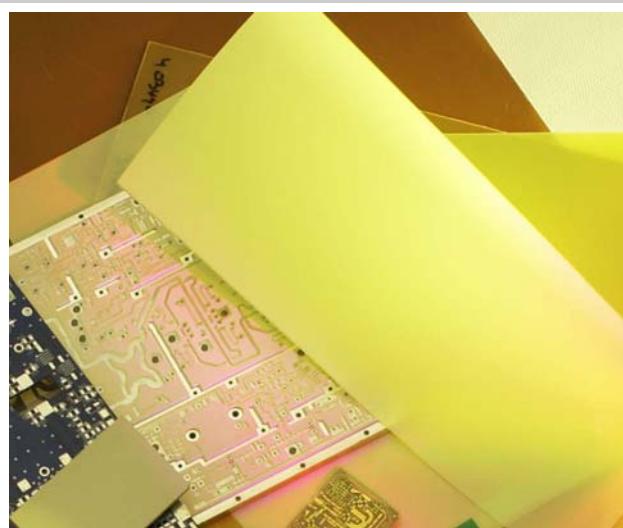
- Low Loss Ceramic Filled PTFE
- Dielectric Constant (4.10)
- High Thermal Conductivity
- Very Low Z-Direction CTE
- Large Panel Sizes Available
- Low Thermal Coefficient of Er

### Benefits:

- Superior PTH adhesion
- Excellent Heat Dissipation and Heat Management
- Multiple boards/panel (reduced edge trim waste)
- Large antenna formats

### Typical Applications:

- Applications Requiring Low Loss and Some Degree of Miniaturization
- Replacement for lossier (*and frequency limited*) FR-4, ceramic/epoxy thermoset and ceramic filled hydrocarbons
- Satellite Radio Antennas (DAB)
- GPS Antennas
- RFID Reader Antennas
- Electronic Surveillance, SIGINT and other RF Applications
- Multimedia Transmission Systems



Arlon's Next Generation AD410 is a woven fiberglass reinforced, ceramic filled, PTFE-based composite material for use as a printed circuit board substrate. It has been developed to provide high thermal conductivity, low thermal expansion and strong interlaminar and copper bond integrity.

The electrical properties of AD410 are highly desired in applications where higher frequency and expectations for increased fidelity with broadband signals are beyond the performance capabilities offered by FR-4, ceramic/epoxy thermosets and ceramic filled hydrocarbons.

Its higher thermal conductivity and low CTE promote its use in higher power designs, where temperature extremes are normal and heat rejection is a primary consideration. Its lower CTE offers better component attachment reliability as well.

AD410 is compatible with the processing used for standard PTFE based printed circuit board substrates. Its low Z-axis thermal expansion improves plated through hole reliability compared to typical PTFE based laminates. Low X-Y expansion improves BGA solder-joint reliability.

AD410's Low Thermal Coefficient of Er is also ideal for applications that experience diverse temperature changes (Aviation, Space, etc.) and are also sensitive to Phase Stability (Phase Fed Apertures).

## Typical Properties: AD410

Property	Test Method	Condition	Result
Dielectric Constant @10GHz	IPC TM-650 2.5.5.5	C23/50	4.10
Loss Tangent @10 GHz	IPC TM-650 2.5.5.5	C23/50	0.003
Thermal Coefficient of $\epsilon_r$	IPC TM-650 2.5.5.5	-10°C to +140°C	- 55
Copper peel Strength (1oz) lbs (lbs. per linear inch)	IPC TM-650 2.4.8	A, TS	17
Volume Resistivity (MΩ-cm)	IPC TM-650 2.5.17.1	C96/35/90	$1.2 \times 10^9$
Surface Resistivity (MΩ)	IPC TM-650 2.5.17.1	C96/35/90	$4.5 \times 10^7$
Arc Resistance (seconds)	ASTM D-495	D48/50	>180
Tensile Modulus (kpsi)	ASTM D-638	A, 23°C	> 700
Tensile Strength (kpsi)	IPC TM-650 2.4.18	A, 23°C	> 20
Compressive Modulus (kpsi)	ASTM D-695	A, 23°C	> 350
Flexural Modulus (kpsi)	ASTM D-790	A, 23°C	> 540
Dielectric Breakdown (kV)	ASTM D-149	D48/50	> 45
Specific Gravity (g/cm <sup>3</sup> )	ASTM D-792 Method A	A, 23°C	2.10
Water Absorption (%)	IPC TM-650 2.6.2.2	E1/105 + D24/23	0.06
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis	IPC TM-650 2.4.24 TMA	0°C to 100°C	9 9 40
Thermal Conductivity (W/mK)	ASTM E-1225	100°C	0.46
Flammability	UL 94 Vertical Burn	C48/23/50, E24/125	UL94-V0

### **Material Availability:**

Current Standard Production is based on 0.062" and 0.125" thickness designs. Other thicknesses may be available. Please contact Arlon Customer Service to discuss your application.

AD410 is supplied with 1/2, 1 or 2 ounce electrodeposited copper on both sides. Other copper weights and rolled copper foil are available. AD410 is also available bonded to heavy metal ground planes. Aluminum, brass or copper plate can provide an integral heat sink and mechanical support to the substrate.

When ordering AD410, specify dielectric thickness, cladding, panel size and any other special considerations. Typical Panels are cut from a Master Sheet. The master sheet is limited to 36" x 48" and 36" x 72". Typical panel sizes cut from a master sheet include: 12" x 18", 18" X 24", 16" X 18". Custom sizes are available.