

AR1000™ and AR600™

Microwave Materials

PTFE/Woven Fiberglass/Ceramic Filled High E_r Laminates

Arlon's AR1000 and AR600 are woven fiberglass, reinforced ceramic filled PTFE based composite materials for use as printed circuit board substrates.

The higher dielectric constants of AR1000 and AR600 permit various degrees of circuit miniaturization, especially for power amplifiers, filters, couplers and other components that use low impedance lines.

AR1000 and AR600 are "soft substrates" and are relatively insensitive to vibrational stress. This allows miniaturized circuitry without requiring the complicated processing or fragile handling associated with brittle pure ceramic materials.

AR1000 and AR600 are compatible with the processing used for standard PTFE based printed circuit board substrates. In addition, the low Z-axis thermal expansion provided by the ceramic loading will improve plated through hole reliability compared to typical PTFE based laminates.

Features

- Ceramic Filled High E_r
- High Thermal Conductivity
- Large Panel Size vs. Ceramic

Benefits

- Circuit Miniaturization
- Heat Dissipation and Management
- Cost Effective Volume Manufacture of Components

Availability:

AR1000 and AR600 laminates are available in a range of thicknesses from 0.005" to 0.125" and are supplied with 1/2, 1 or 2 ounce electrodeposited copper on both sides. Other copper weights and rolled copper foil are available. AR1000 and AR600 are available bonded to heavy metal ground planes. Aluminum, brass or copper plates also provide an integral heat sink and mechanical support to the substrate. Other combinations of thickness and cladding may be available. Contact Arlon with any requests for non-standard materials.

When ordering AR1000 or AR600 products, please specify thickness, cladding, panel size, and any other special considerations. Available master sheet sizes include 36" x 48" and 36" x 72".

The logo for Arlon, consisting of the word "ARLON" in a bold, red, sans-serif font.

MATERIALS FOR ELECTRONICS

Typical Properties: AR1000™ and AR600™ PTFE/Woven Fiberglass/Ceramic Filled Laminates

Properties	Test Method	Condition	Typical Values AR1000	Typical Values AR600
Dielectric Constant @10GHz	IPC TM-650 2.5.5.6	C23/50	10.0*	6.0*
Dissipation Factor @10GHz	IPC TM-650 2.5.5.6	C23/50	0.003	0.0035
Thermal Coefficient of E_r (ppm/°C)	IPC TM-650 2.5.5.5 Adapted	-10°C to +140°C	-233	-325
Peel Strength (lbs per inch)	IPC TM-650 2.4.8	After Thermal Stress	5	6
Volume Resistivity (M Ω -cm)	IPC TM-650 2.5.17.1	C96/35/90	1.4 x 10 ⁹	1.5 x 10 ¹²
Surface Resistivity (M Ω)	IPC TM-650 2.5.17.1	C96/35/90	1.8 x 10 ⁹	3.8 x 10 ⁹
Arc Resistance (seconds)	ASTM D-495	D48/50	> 180	> 180
Tensile Modulus (kpsi) (x,y)	ASTM D-638	A, 23°C	830, 680	700, 500
Tensile Strength (kpsi) (x,y)	ASTM D-882	A, 23°C	5.1, 4.3	8.3, 7.0
Compressive Modulus (kpsi)	ASTM D-695	A, 23°C	450	225
Flexural Modulus (kpsi)	ASTM D-790	A, 23°C	615	375
Dielectric Breakdown (kv)	ASTM D-149	D48/50	> 45	> 45
Specific Gravity (g/cm ³)	ASTM D-792 Method A	A, 23°C	2.84	2.45
Water Absorption (%)	MIL-S-13949H 3.7.7 IPC TM-650 2.6.2.2	E1/105 + D24/23	0.08	0.08
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis	IPC TM-650 2.4.24 TMA	0°C to 100°C	14 16 37	12 14 62
Thermal Conductivity (W/mK)	ASTM E-1225	100°C	0.645	0.431
Outgassing Total Mass Loss (%) Collected Volatile Condensable Material (%) Water Vapor Regain (%) Visible Condensate (\pm)	NASA SP-R-0022A Maximum 1.00% Maximum 0.10%	125°C, $\leq 10^{-6}$ torr	0.02 0.00 0.00 NO	- - - -
Flammability	UL 94 Vertical Burn IPC TM-650 2.3.10	C48/23/50, E24/125	Meets requirements of UL94V-0	Meets requirements of UL94V-0

Data based on 0.062" dielectric thickness, exclusive of metal cladding except where indicated by test method. 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 AR600 and AR1000 laminates may vary depending on the application.

* Dielectric constants of AR1000 and AR600 vary with thickness. Check with Arlon for the E_r of the particular thickness you are using.

The information and data contained herein are believed reliable, but all recommendations or suggestions are made without guarantee. You should thoroughly and independently test materials for any planned applications and determine satisfactory performance before commercialization. Furthermore, no suggestion for use, or material supplied shall be construed as a recommendation or inducement to violate any law or infringe any patent.



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