

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

### Features:

- Cost-Effective Construction using PTFE and microdispersed ceramic
- High Volume Manufacturing Design
- Excellent PIM Performance
- Reduced Thermal Coefficient of Dielectric Constant (TC $\epsilon$ r)
- High Thermal Conductivity ideal for Higher Power Designs

### Benefits:

- Low Dielectric Loss (Loss Tangent)
- Low Insertion Loss (S21)
- Excellent Copper Bond Strength
- Low Moisture Absorption

### Typical Applications:

- Base Station Antennas
- Power Amplifiers (PA), Tower Mounted Amplifiers (TMA) and Tower Mounted Booster Amplifiers (TMB)
- Multimedia Transmission Systems



AD320A is a woven fiberglass reinforced PTFE/Microfine Ceramic composite material and is a significant improvement in cost/performance over traditional fluoropolymer-glass laminates that do not use ceramics. This combination offers designers an advantage for improving electrical performance through the use of advanced material without the additional cost traditionally associated with higher performance.

AD320A was specifically developed for Base Station Antennas and Base Station Power Amplifiers where low loss and low PIM is critical. Other key performance attributes include low moisture absorption, low thermal coefficient of the dielectric (CT $\epsilon$ r), high copper peel strength and good dimensional and thermal stability. The 3.20 Dielectric Constant also provides a small degree of miniaturization that is critical to the size constraints of some antenna designs.

AD320A is 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.

## Typical Properties: AD320A

Property	Test Method	Condition	Result
Dielectric Constant (10GHz)	IPC TM-650 2.5.5.5	C23/50	3.20 ± 0.04
Dielectric Constant (1MHz)	IPC TM-650 2.5.5.3	C23/50	3.20
Dissipation Factor (10GHz)	IPC TM-650 2.5.5.5	C23/50	0.0032
Thermal Coefficient of Dielectric constant	IPC TM-650 2.5.5.5 Adapted	0°C to +100°C	-125
Peel Strength (lbs.per inch) 1 Ounce ED Copper	IPC TM-650 2.4.8	After Thermal Stress	14
Volume Resistivity (MΩ-cm)	IPC TM-650 2.5.17.1	C96/35/90	8.2x 10 <sup>7</sup> megohm-cm
Surface Resistivity (MΩ)	IPC TM-650 2.5.17.1	C96/35/90	4.3 x 10 <sup>7</sup> megohm
Arc Resistance (seconds)	ASTM D-495	D48/50	>185 seconds
Tensile Modulus (x,y)	ASTM D-638	A, 23°C	700, 500 kpsi
Tensile Strength (x,y)	ASTM D-882	A, 23°C	20, 17 kpsi
Compressive Modulus	ASTM D-695	A, 23°C	1600 kpsi
Flexural Modulus	ASTM D-790	A, 23°C	1500 kpsi
Breakdown kV	ASTM D-149	D48/50	> 40 kV
Specific Gravity (unitless) / Mass (g/cm <sup>3</sup> )	ASTM D-792 Method A	A, 23°C	2.09
Water Absorption	IPC TM-650 2.6.2.2	E1/105 + D24/23	< 0.02%
Coefficient of Thermal Expansion (ppm/°C) X Axis Y Axis Z Axis		0°C to 100°C	14 14 128
Thermal Conductivity (W/mK)	ASTM E-1225	100°C	0.45
Flammability	UL 94	C48/23/50, E24/125	Meets UL94-V0

### **Material Availability:**

AD320A is currently built 0.030" and 0.045" Thicknesses. Other thicknesses may be available. Inquire with Arlon Customer Service for other options. AD320A is supplied with 1/2 ounce, 1 ounce or 2 ounce electrodeposited copper foil on both sides. These materials are also available to a heavy metal ground plane. Aluminum, brass and copper plate may be specified, providing an integral heat sink and mechanical support to the substrate. AD320A is built in 36" x 48" or 36" x 72" Sheets. Common panel sizes include: 12" x 18", 16" x 18" and 18" x 24". Other panel sizes available.



**MATERIALS FOR ELECTRONICS**

---

**CONTACT INFORMATION:**

---

For samples, technical assistance, customer service or for more information, please contact Arlon Materials for Electronics Division at the following locations:

**NORTH AMERICA:**

Arlon, Inc.  
Electronic Substrates  
9433 Hyssop Drive  
Rancho Cucamonga, CA 91730  
Tel: (909) 987-9533  
Fax: (909) 987-8541

Arlon, Inc.  
Microwave Materials  
1100 Governor Lea Road  
Bear, DE 19701  
Tel: (800) 635-9333  
Outside U.S. & Canada: (302) 834-2100  
Fax: (302) 834-2574

**EUROPE:**

Arlon, Inc.  
44 Wilby Avenue  
Little Lever  
Bolton, Lancaster BL31QE  
United Kingdom  
Tel: (44) 120-457-6068  
Fax: (44) 120-479-6463

**SOUTHERN CHINA:**

Arlon, Inc.  
Room 805, Unit 3, Bldg 4  
Liyuan, Xincun Holiday Road  
Huaqiao Cheng, Shenzhen 518053  
China  
Tel/Fax: (86) 755-269-066-12

**NORTHERN CHINA:**

Arlon, Inc.  
Room 11/401, No. 8  
Hong Gu Road  
Shanghai, China 200336  
Tel/Fax: (86) 21-6209-0202

© 2008, 2009 Arlon Incorporated

2008 Rev D

Or visit us on the web at:  
[www.arlon-med.com](http://www.arlon-med.com)

Certified to  
ISO 9001:2008