

# ARLON

MATERIALS FOR ELECTRONICS DIVISION



MICROWAVE & RF MATERIALS  
GUIDE



## **RF & Microwave Materials Guide**

Arlon Microwave Materials specializes in products made from fluoropolymers (i.e. PTFE), ceramic-filled fluoropolymers, ceramic-filled hydrocarbon thermosets, and other materials that deliver the electrical performance needed in frequency-dependent circuit applications. These products are supplied as copper-clad laminates with bonding plies, or prepregs, for production of multilayer printed circuits. Arlon has over 55+ years of experience in microwave materials, today providing products that are used to make combiner boards and feed networks for microwave applications as well as basestation antennas and power amplifier boards for the wireless telecommunications infrastructure market.

Our facilities in California, Delaware and China employ state-of-the-art production equipment, engineered to provide cost-effective, flexible manufacturing capacity to permit quick response to customer requirements while meeting the most stringent quality and tolerance demands. Both of our manufacturing sites are ISO 9001: 2008 registered, and through rigorous quality control practices and commitment to continuous improvement, we are dedicated to meeting and exceeding our customer's requirements.

To better service our global customer base, Arlon created the venture, Arlon Material Technologies Co, Ltd. in Suzhou, Jiangsu Province, China. This venture includes both a Finishing Center and a manufacturing facility. The finishing center is located in Suzhou and has been operational since mid-2004. The Manufacturing Facility opened in October 2006. This facility contains a new, State-Of-The-Art Vacuum Press that has capability to laminate both High Temperature PTFE Microwave Laminates as well as High Performance Polyimide and Low-loss Thermoset Based Electronic Substrates. This facility is equipped with the highest degree of process control in the industry.

A lower cost, higher performance, lower loss series of products have been launched in the 2.50 to 3.50 range. These AD "A" Series include AD255A, AD260A, AD300A and others. These microwave Laminates utilize ceramic technologies to reduce loss and tighten tolerances. They are well suited for Base Station Antennas, Satellite Radio Antennas and Power Amplifiers where low loss is critical. These products are a significant improvement in cost/performance over traditional PTFE/Glass based laminates. As further cost/performance improvement over AD "A" products, AD "C" series are the third generation, commercial laminate materials designed with enhanced mechanical and electrical performances for today's telecommunication infrastructure.

One of our most exciting products is a lower loss version of CLTE, called CLTE-XT. CLTE-XT has the lowest loss, lowest thermal expansion, highest phase stability, and lowest moisture absorption of any product in its class. It is truly "Best-in-Class." Further innovations in new low loss materials are also targeted in the near future and Arlon remains committed to the development of advanced materials targeted for high performance circuit boards and electronics.

Arlon maintains a significant commitment to research & development. Exciting recent products include the Thermally Conductive PTFE-based laminates, TC600 and TC350. These materials provide "Best-in-Class" Thermal Conductivity (W/m°C) for applications where temperature extremes are normal and Heat Rejection is a Primary Consideration. These materials Lower Junction Temperatures for Improved Power Amplifier Reliability and pull heat away from critical solder joints that can fatigue through cycling. TC600 and TC350 also offer greater Thermal Phase Stability for applications that are cycled and still need to maintain tight dielectric constant tolerances for phase sensitive circuitry.

## RF & Microwave Materials Guide

This guide covers typical properties for a wide variety of Arlon’s microwave material products, ranging from our high performance PTFE laminates to our cost-optimized PTFE and non-PTFE based RF laminates and composites. Although a complete summary of Arlon’s capabilities and full product-line is not feasible, this guide provides a good overview of the core microwave material products that Arlon produces and covers typical properties as well as the wide variety of standard product options as far as laminate thicknesses and nominal dielectric constants. To reduce complexity and confusion, the following information represents the standard and common items.

Please contact Customer Service if you do not see your desired thickness or dielectric constant or require additional assistance. For more detail on a specific product, please refer to the product specific datasheet available on-line at [www.arlon-med.com](http://www.arlon-med.com).

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*Typical properties are listed in this guide are for reference purposes only; they are not to be used as specification limits. This information creates no expressed or implied warranties. The properties of Arlon laminates may vary depending on the design and application.*

| Product | Composition | Dielectric Constant @ 10 GHz | Dissipation Factor @ 10 GHz | Thermal Coefficient of Expansion | Coefficient of Thermal Expansion (ppm/°C) |   |   | Typical Peel Strength (lbs) | Water Absorption (%) | Specific Gravity (unitless) or Density (g/cm <sup>3</sup> ) | Thermal Conductivity (W/mK) | NASA Outgassing     |                        | Flammability UL Rating |
|---------|-------------|------------------------------|-----------------------------|----------------------------------|---|---|---|-----------------------------|----------------------|---|-----------------------------|---------------------|------------------------|------------------------|
|         |             |                              |                             |                                  | X   | Y | Z |                             |                      |   |                             | Total Mass Loss (%) | Collected Volatile (%) |                        |

**CLTE-XT, CLTE-AT and CLTE High Performance, Excellent Dielectric Constant Control and Phase Stability with Temperature**

|         |   |        |        |     |    |    |    |     |      |      |      |      |      |         |
|---------|---|--------|--------|-----|----|----|----|-----|------|------|------|------|------|---------|
| CLTE-XT | Glass, PTFE and Micro-Dispersed Ceramic | 2.94 * | 0.0012 | -9  | 8  | 8  | 20 | 7.2 | 0.02 | 2.02 | 0.56 | 0.02 | 0.00 | UL94-V0 |
| CLTE-AT | Glass, PTFE and Micro-Dispersed Ceramic | 3.00   | 0.0013 | -10 | 8  | 8  | 20 | 6.5 | 0.03 | 2.06 | 0.64 | 0.02 | 0.00 | UL94-V0 |
| CLTE    | Glass, PTFE and Micro-Dispersed Ceramic | 2.98 * | 0.0025 | -9  | 10 | 12 | 34 | 7   | 0.04 | 2.38 | 0.50 | 0.02 | 0.00 | UL94-V0 |

**AD "C" Series - Enhanced next generation of AD "A" Series. Woven Glass, PTFE and Micro-Dispersed Ceramic**

|        |   |      |        |     |    |    |    |    |      |      |      |    |    |         |
|--------|---|------|--------|-----|----|----|----|----|------|------|------|----|----|---------|
| AD255C | Glass, PTFE and Micro-Dispersed Ceramic | 2.55 | 0.0014 | -75 | 16 | 16 | 50 | 12 | 0.04 | 2.30 | 0.30 | NT | NT | UL94-V0 |
| AD300C | Glass, PTFE and Micro-Dispersed Ceramic | 2.97 | 0.0020 | -25 | 12 | 12 | 50 | 13 | 0.05 | 2.10 | 0.45 | NT | NT | UL94-V0 |

**AD "A" Series - Lower Loss and Improved Performance over Traditional AD Series. Woven Glass, PTFE and Micro-Dispersed Ceramic**

|        |   |      |        |      |    |    |     |    |      |      |      |      |      |         |
|--------|---|------|--------|------|----|----|-----|----|------|------|------|------|------|---------|
| AD250A | Glass, PTFE and Micro-Dispersed Ceramic | 2.50 | 0.0015 | -140 | 12 | 15 | 95  | 14 | 0.04 | 2.25 | 0.28 | NT   | NT   | UL94-V0 |
| AD255A | Glass, PTFE and Micro-Dispersed Ceramic | 2.55 | 0.0015 | -138 | 16 | 16 | 80  | 12 | 0.04 | 2.30 | 0.30 | NT   | NT   | UL94-V0 |
| AD260A | Glass, PTFE and Micro-Dispersed Ceramic | 2.60 | 0.0017 | -80  | 16 | 16 | 80  | 17 | 0.04 | 2.30 | 0.32 | NT   | NT   | UL94-V0 |
| AD300A | Glass, PTFE and Micro-Dispersed Ceramic | 3.00 | 0.0020 | -110 | 12 | 12 | 125 | 13 | 0.02 | 2.10 | 0.49 | NT   | NT   | UL94-V0 |
| AD320A | Glass, PTFE and Micro-Dispersed Ceramic | 3.20 | 0.0032 | -125 | 14 | 14 | 128 | 14 | 0.02 | 2.09 | 0.45 | NT   | NT   | UL94-V0 |
| AD350A | Glass, PTFE and Micro-Dispersed Ceramic | 3.50 | 0.0030 | -55  | 5  | 9  | 35  | 17 | 0.1  | 2.10 | 0.45 | 0.02 | 0.02 | UL94-V0 |

**High Thermal Conductivity, Excellent Dielectric Constant Control and Phase Stability with Temperature**

|       |   |      |        |     |   |   |    |   |      |      |                  |      |      |         |
|-------|---|------|--------|-----|---|---|----|---|------|------|------------------|------|------|---------|
| TC350 | Glass, PTFE and Micro-Dispersed Ceramic | 3.50 | 0.0020 | -9  | 7 | 7 | 23 | 7 | 0.05 | 2.30 | 1.03             | 0.02 | 0.01 | UL94-V0 |
| TC600 | Glass, PTFE and Micro-Dispersed Ceramic | 6.15 | 0.0020 | -75 | 9 | 9 | 35 | 8 | 0.03 | 3.20 | 1.1(z), 1.4(x,y) | 0.02 | 0.00 | UL94-V0 |

**High Dielectric Constant for Circuit Militarization & Patch Antenna Applications**

|        |   |         |        |      |    |    |    |      |      |      |      |      |      |         |
|--------|---|---------|--------|------|----|----|----|------|------|------|------|------|------|---------|
| AD410  | Glass, PTFE and Micro-Dispersed Ceramic | 4.10    | 0.0030 | -55  | 9  | 9  | 40 | 17   | 0.06 | 2.10 | 0.46 | NT   | NT   | UL94-V0 |
| AD430  | Glass, PTFE and Micro-Dispersed Ceramic | 4.30    | 0.0030 | -55  | 9  | 9  | 40 | 17   | 0.06 | 2.10 | 0.46 | NT   | NT   | UL94-V0 |
| AD450  | Glass, PTFE and Micro-Dispersed Ceramic | 4.50    | 0.0035 | -233 | 8  | 11 | 42 | > 12 | 0.07 | 2.45 | 0.38 | 0.01 | 0.01 | UL94-V0 |
| AD450A | Glass, PTFE & Ceramic, 0.0125" Thick    | 4.50    | 0.0030 | -200 | 10 | 10 | 40 | 12   | 0.06 | 2.50 | 0.40 | NT   | NT   | UL94-V0 |
| AD600  | Glass, PTFE and Micro-Dispersed Ceramic | 6.15 *  | 0.0030 | -241 | 11 | 10 | 45 | 12   | 0.04 | 2.45 | 0.46 | 0.02 | 0.01 | UL94-V0 |
| AD1000 | Glass, PTFE and Micro-Dispersed Ceramic | 10.20 * | 0.0023 | -380 | 8  | 10 | 20 | > 12 | 0.03 | 3.2  | 0.81 | 0.01 | 0.00 | UL94-V0 |

\* Refer to Tables for Dielectric Constant and Thickness Options



**LEGACY AND ORIGINAL MICROWAVE MATERIALS**

**PRODUCT OVERVIEW**

| Product | Composition | Dielectric Constant @ 10 GHz | Dissipation Factor @ 10 GHz | Thermal Coefficient of Expansion of Er ppm/°C | Coefficient of Thermal Expansion (ppm/°C) |   |   | Typical Peel Strength (lbs) | Water Absorption (%) | Specific Gravity (unitless) or Density (g/cm <sup>3</sup> ) | Thermal Conductivity (W/mK) | NASA Outgassing     |                        | Flammability UL Rating |
|---------|-------------|------------------------------|-----------------------------|---|---|---|---|-----------------------------|----------------------|---|-----------------------------|---------------------|------------------------|------------------------|
|         |             |                              |                             |   | X   | Y | Z |                             |                      |   |                             | Total Mass Loss (%) | Collected Volatile (%) |                        |

**Traditional - Highest Performance, PTFE Coated Light Woven Glass Styles, Interdispersed PTFE films**

|              |  |               |        |      |    |    |     |    |      |      |       |      |      |         |
|--------------|--|---------------|--------|------|----|----|-----|----|------|------|-------|------|------|---------|
| DiClad 522   | Woven Fiberglass reinforced PTFE             | 2.40 - 2.60 * | 0.0018 | -153 | 14 | 21 | 173 | 14 | 0.03 | 2.31 | 0.254 | 0.02 | 0.00 | UL94-V0 |
| DiClad 527   | Woven Fiberglass reinforced PTFE             | 2.40 - 2.60 * | 0.0018 | -153 | 14 | 21 | 173 | 14 | 0.03 | 2.31 | 0.254 | 0.02 | 0.00 | UL94-V0 |
| DiClad 870   | Woven Fiberglass reinforced PTFE             | 2.33          | 0.0013 | -161 | 17 | 29 | 217 | 14 | 0.02 | 2.26 | 0.257 | 0.02 | 0.00 | UL94-V0 |
| DiClad 880   | Woven Fiberglass reinforced PTFE             | 2.17, 2.20    | 0.0009 | -160 | 25 | 34 | 252 | 14 | 0.02 | 2.23 | 0.261 | 0.01 | 0.01 | UL94-V0 |
| CuClad 250GT | Cross Piled Woven Fiberglass reinforced PTFE | 2.50          | 0.0018 | -170 | 18 | 19 | 177 | 14 | 0.03 | 2.31 | 0.254 | 0.01 | 0.00 | UL94-V0 |
| CuClad 250GX | Cross Piled Woven Fiberglass reinforced PTFE | 2.40 - 2.60 * | 0.0022 | -170 | 18 | 19 | 177 | 14 | 0.03 | 2.31 | 0.254 | 0.01 | 0.00 | UL94-V0 |
| CuClad 233LX | Cross Piled Woven Fiberglass reinforced PTFE | 2.33          | 0.0013 | -171 | 23 | 24 | 194 | 14 | 0.02 | 2.26 | 0.258 | 0.01 | 0.01 | UL94-V0 |
| CuClad 217LX | Cross Piled Woven Fiberglass reinforced PTFE | 2.17, 2.20    | 0.0009 | -151 | 29 | 28 | 246 | 14 | 0.02 | 2.23 | 0.261 | 0.01 | 0.01 | UL94-V0 |
| IsoClad 933  | Non-Woven Fiberglass reinforced PTFE         | 2.33          | 0.0016 | -132 | 31 | 35 | 203 | 10 | 0.05 | 2.27 | 0.263 | 0.03 | 0.00 | UL94-V0 |
| IsoClad 917  | Non-Woven Fiberglass reinforced PTFE         | 2.17          | 0.0013 | -157 | 46 | 47 | 236 | 10 | 0.04 | 2.23 | 0.263 | 0.02 | 0.00 | UL94-V0 |

**Original AD Series - Woven Glass and PTFE or Woven Glass, PTFE and Micro-Dispersed Ceramic**

|       |   |      |        |      |    |    |    |    |      |      |       |    |    |         |
|-------|---|------|--------|------|----|----|----|----|------|------|-------|----|----|---------|
| AD250 | Woven Glass and PTFE                    | 2.50 | 0.0018 | -110 | 12 | 15 | 95 | 14 | 0.07 | 2.40 | 0.235 | NT | NT | UL94-V0 |
| AD255 | Woven Glass and PTFE                    | 2.55 | 0.0018 | -110 | 12 | 15 | 95 | 14 | 0.07 | 2.40 | 0.235 | NT | NT | UL94-V0 |
| AD270 | Woven Glass and PTFE                    | 2.70 | 0.0023 | -110 | 12 | 15 | 95 | 14 | 0.07 | 2.40 | 0.235 | NT | NT | UL94-V0 |
| AD320 | Glass, PTFE and Micro-Dispersed Ceramic | 3.20 | 0.0038 | -110 | 12 | 15 | 95 | 17 | 0.06 | 2.40 | 0.235 | NT | NT | UL94-V0 |

**AR Series - Legacy Product, Reference AD1000 as a Next Generation Product**

|        |   |         |        |      |    |    |    |   |      |      |       |      |      |         |
|--------|---|---------|--------|------|----|----|----|---|------|------|-------|------|------|---------|
| AR1000 | Glass, PTFE and Micro-Dispersed Ceramic | 10.00 * | 0.0030 | -233 | 14 | 16 | 37 | 5 | 0.08 | 2.84 | 0.645 | 0.02 | 0.00 | UL94-V0 |
|--------|---|---------|--------|------|----|----|----|---|------|------|-------|------|------|---------|

**Low Loss Thermoset Resin Systems - Multilayer Capable, non-PTFE**

|      |                     |      |        |     |    |    |    |   |      |      |      |      |      |         |
|------|---------------------|------|--------|-----|----|----|----|---|------|------|------|------|------|---------|
| 25N  | Ceramic Hydrocarbon | 3.38 | 0.0025 | -87 | 15 | 15 | 52 | 5 | 0.09 | 1.70 | 0.45 | 0.17 | 0.01 | N/A     |
| 25FR | Ceramic Hydrocarbon | 3.58 | 0.0035 | 50  | 16 | 18 | 59 | 5 | 0.09 | 1.80 | 0.45 | 0.24 | 0.00 | UL94-V0 |

\* Refer to Tables for Dielectric Constant and Thickness Options

## CLTE-XT, CLTE-AT and CLTE

**CLTE-XT** is the next generation of CLTE with “Best-In-Class” Loss Tangent and Lowest Insertion loss in its class. Excellent dimensional stability, Phase Stability and CTE performance.

**CLTE-AT** is commercial priced product. It uses common technologies developed for CLTE-XT, but, with some changes to make the product more affordable, but with less stringent tolerances. To maintain its lower cost base, CLTE-AT has less options for copper style and panel sizes.

**CLTE** is Glass/PTFE/micro-dispersed ceramic laminates. Offers superior thermomechanical (CTE) stability and Dk over temperature with best-in-class processibility for a PTFE-based laminate.

| Product  | Standard Thickness |             |                    | Dielectric Constant |           |
|--|--------------------|-------------|--------------------|---------------------|-----------|
|  | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>CLTE-XT</b><br><br>Master Sheet Size** :<br>36"x48" | 0.0051             | 0.130       | ±0.0005            | 2.79                | ±0.03     |
|  | 0.0094             | 0.239       | ±0.0007            | 2.89                | ±0.03     |
|  | 0.0145             | 0.368       | ±0.001             | 2.94                | ±0.03     |
|  | 0.020              | 0.508       | ±0.001             | 2.92                | ±0.03     |
|  | 0.025              | 0.635       | ±0.001             | 2.94                | ±0.03     |
|  | 0.030              | 0.762       | ±0.001             | 2.94                | ±0.03     |
|  | 0.040              | 1.016       | ±0.002             | 2.94                | ±0.03     |
|  | 0.045              | 1.143       | ±0.002             | 2.94                | ±0.03     |
|  | 0.048              | 1.219       | ±0.0024            | 2.95                | ±0.03     |
|  | 0.059              | 1.499       | ±0.002             | 2.95                | ±0.03     |
|  | 0.060              | 1.524       | ±0.002             | 2.94                | ±0.03     |
|  | 0.070              | 1.778       | ±0.003             | 2.95                | ±0.03     |
|  | 0.090              | 2.286       | ±0.003             | 2.98                | ±0.03     |
|  | 0.100              | 2.540       | ±0.003             | 3.01                | ±0.03     |
|  | 0.120              | 3.048       | ±0.003             | 3.01                | ±0.03     |
| <b>CLTE-AT</b><br><br>Master Sheet Size** :<br>36"x48" | 0.005              | 0.127       | ±0.0005            | 3.00                | ±0.04     |
|  | 0.010              | 0.254       | ±0.0007            | 3.00                | ±0.04     |
|  | 0.015              | 0.381       | ±0.001             | 3.00                | ±0.04     |
|  | 0.020              | 0.508       | ±0.0015            | 3.00                | ±0.04     |
|  | 0.025              | 0.635       | ±0.002             | 3.00                | ±0.04     |
|  | 0.030              | 0.762       | ±0.002             | 3.00                | ±0.04     |
|  | 0.040              | 1.016       | ±0.0025            | 3.00                | ±0.04     |
|  | 0.050              | 1.270       | ±0.0025            | 3.00                | ±0.04     |
|  | 0.060              | 1.524       | ±0.003             | 3.00                | ±0.04     |
|  | 0.090              | 2.286       | ±0.005             | 3.02                | ±0.04     |
|  | 0.125              | 3.175       | ±0.006             | 3.02                | ±0.04     |
| <b>CLTE</b><br><br>Master Sheet Size** :<br>36"x48"    | 0.003              | 0.076       | ±0.0005            | 2.75                | ±0.08     |
|  | 0.0053             | 0.135       | ±0.0005            | 2.85                | ±0.06     |
|  | 0.010              | 0.254       | ±0.001             | 2.94                | ±0.06     |
|  | 0.015              | 0.381       | ±0.0015            | 2.95                | ±0.04     |
|  | 0.020              | 0.508       | ±0.002             | 2.96                | ±0.04     |
|  | 0.024              | 0.610       | ±0.002             | 2.97                | ±0.04     |
|  | 0.031              | 0.787       | ±0.002             | 2.98                | ±0.04     |
|  | 0.040              | 1.016       | ±0.003             | 2.98                | ±0.04     |
|  | 0.047              | 1.194       | ±0.003             | 2.98                | ±0.04     |
|  | 0.062              | 1.575       | ±0.004             | 2.98                | ±0.04     |
|  | 0.093              | 2.362       | ±0.005             | 2.98                | ±0.04     |

\*\*Master Sheet Sizes are not available on all products or thicknesses. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

## TC Series

TC350 and TC600 offer “Best-In-Class” Thermal Conductivity and Dielectric Constant Stability with Temperature leading to excellent impedance control. Excellent thermomechanical (CTE) stability for highly reliability plated thru holes and component attachment.

| Product   | Standard Thickness |             |                    | Dielectric Constant |           |
|---|--------------------|-------------|--------------------|---------------------|-----------|
|   | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>TC350</b><br><br>Master Sheet Size* :<br>36"x48" | 0.005              | 0.127       | ±0.0005            | 3.50                | ±0.05     |
|   | 0.010              | 0.254       | ±0.0007            | 3.50                | ±0.05     |
|   | 0.015              | 0.381       | ±0.001             | 3.50                | ±0.05     |
|   | 0.020              | 0.508       | ±0.0015            | 3.50                | ±0.05     |
|   | 0.025              | 0.610       | ±0.002             | 3.50                | ±0.05     |
|   | 0.030              | 0.762       | ±0.002             | 3.50                | ±0.05     |
|   | 0.040              | 1.016       | ±0.003             | 3.50                | ±0.05     |
|   | 0.050              | 1.270       | ±0.003             | 3.50                | ±0.05     |
|   | 0.060              | 1.524       | ±0.003             | 3.50                | ±0.05     |
|   | 0.090              | 2.286       | ±0.004             | 3.50                | ±0.05     |
|   | 0.100              | 2.540       | ±0.005             | 3.50                | ±0.05     |
|   | 0.120              | 3.048       | ±0.008             | 3.50                | ±0.05     |
|   | 0.125              | 3.175       | ±0.008             | 3.50                | ±0.05     |
| 0.250   | 6.350              | ±0.012      | 3.50               | ±0.05               |           |
| <b>TC600</b><br><br>Master Sheet Size* :<br>36"x48" | 0.010              | 0.254       | ±0.0007            | 6.15                | ±0.15     |
|   | 0.015              | 0.381       | ±0.001             | 6.15                | ±0.15     |
|   | 0.020              | 0.508       | ±0.001             | 6.15                | ±0.15     |
|   | 0.025              | 0.610       | ±0.0015            | 6.15                | ±0.15     |
|   | 0.030              | 0.762       | ±0.002             | 6.15                | ±0.15     |
|   | 0.035              | 0.889       | ±0.002             | 6.15                | ±0.15     |
|   | 0.040              | 1.016       | ±0.002             | 6.15                | ±0.15     |
|   | 0.050              | 1.270       | ±0.002             | 6.15                | ±0.15     |
|   | 0.060              | 1.524       | ±0.003             | 6.15                | ±0.15     |
|   | 0.090              | 2.286       | ±0.004             | 6.15                | ±0.15     |
|   | 0.125              | 3.175       | ±0.004             | 6.15                | ±0.15     |
| 0.250   | 6.350              | ±0.008      | 6.15               | ±0.15               |           |

\*Master Sheet Sizes are not available on all products or thicknesses. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

## AD “C” Series

Enhanced next generation products of AD “A” Series in terms of cost, mechanical and electrical performances, such as lower loss tangent, lower thermal expansion (CTE) and lower TCER (for better phase stability), and improved passive intermodulation (PIM) performance.

| Product**     | Standard Thickness |             |                    | Dielectric Constant |           |
|---------------|--------------------|-------------|--------------------|---------------------|-----------|
|               | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>AD255C</b> | 0.030              | 0.762       | ±0.002             | 2.55                | ±0.04     |
|               | 0.060              | 1.524       | ±0.003             | 2.55                | ±0.04     |
| <b>AD300C</b> | 0.030              | 0.762       | ±0.002             | 2.97                | ±0.05     |
|               | 0.060              | 1.524       | ±0.002             | 2.97                | ±0.05     |

\*\*Master Sheet Size of 48" x 54", other DK, thickness options available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

## AD “A” Series

Advancements and improvements to the original AD Series, low cost commercial laminates. Lower loss tangent, tighter dielectric and thickness tolerances, and PIM+ design offerings.

| Product**   | Standard Thickness |             |                    | Dielectric Constant |           |
|---|--------------------|-------------|--------------------|---------------------|-----------|
|   | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>AD250A</b>   | 0.030              | 0.762       | ±0.002             | 2.50                | ±0.04     |
|   | 0.060              | 1.524       | ±0.003             | 2.50                | ±0.04     |
|   | 0.080              | 2.032       | ±0.004             | 2.50                | ±0.04     |
|   | 0.250              | 6.350       | ±0.012             | 2.50                | ±0.04     |
| <b>AD255A</b><br><i>(AD255C provides lower cost and better performance)</i> | 0.030              | 0.762       | ±0.002             | 2.55                | ±0.04     |
|   | 0.031              | 0.787       | ±0.003             | 2.55                | ±0.04     |
|   | 0.040              | 1.016       | ±0.003             | 2.55                | ±0.04     |
|   | 0.060              | 1.524       | ±0.003             | 2.55                | ±0.04     |
|   | 0.062              | 1.575       | ±0.003             | 2.55                | ±0.04     |
|   | 0.080              | 2.032       | ±0.003             | 2.55                | ±0.04     |
| <b>AD260A</b>   | 0.040              | 1.016       | ±0.002             | 2.60                | ±0.04     |
|   | 0.060              | 1.524       | ±0.002             | 2.60                | ±0.04     |
|   | 0.090              | 2.286       | ±0.003             | 2.60                | ±0.04     |
|   | 0.125              | 3.175       | ±0.006             | 2.60                | ±0.04     |
| <b>AD300A</b><br><i>(AD300C provides lower cost and better performance)</i> | 0.020              | 0.508       | ±0.002             | 3.00                | ±0.04     |
|   | 0.030              | 0.762       | ±0.002             | 3.00                | ±0.04     |
|   | 0.040              | 1.016       | ±0.002             | 3.00                | ±0.04     |
|   | 0.060              | 1.524       | ±0.002             | 3.00                | ±0.04     |
|   | 0.090              | 2.286       | ±0.005             | 3.00                | ±0.04     |
|   | 0.120              | 3.048       | ±0.006             | 3.00                | ±0.04     |
|   | 0.125              | 3.175       | ±0.006             | 3.00                | ±0.04     |
| <b>AD320A</b>   | 0.030              | 0.762       | ±0.002             | 3.20                | ±0.04     |
|   | 0.040              | 1.016       | ±0.002             | 3.20                | ±0.04     |
|   | 0.045              | 1.143       | ±0.003             | 3.20                | ±0.04     |
|   | 0.062              | 1.575       | ±0.003             | 3.20                | ±0.04     |
|   | 0.125              | 3.175       | ±0.006             | 3.20                | ±0.04     |
| <b>AD350A</b>   | 0.020              | 0.508       | ±0.0015            | 3.50                | ±0.05     |
|   | 0.030              | 0.762       | ±0.002             | 3.50                | ±0.05     |
|   | 0.040              | 1.016       | ±0.003             | 3.50                | ±0.05     |
|   | 0.060              | 1.524       | ±0.003             | 3.50                | ±0.05     |
|   | 0.090              | 2.286       | ±0.004             | 3.50                | ±0.05     |
|   | 0.120              | 3.048       | ±0.008             | 3.50                | ±0.05     |
|   | 0.125              | 3.175       | ±0.008             | 3.50                | ±0.05     |
|   | 0.200              | 5.080       | ±0.012             | 3.50                | ±0.05     |

\*\* Master Sheet Size of 36" x 48" is standard. Other DK or thickness options available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

### High Dielectric Constant

For Circuit Militarization & High Gain Patch Antenna Applications. Excellent for applications requiring low loss, a higher dielectric constant, as well as mechanical robustness capable of handling stress, vibration or drop tests. Much more durable than either Alumina or Ceramic loaded Hydrocarbons.

| Product**      | Standard Thickness |             |                    | Dielectric Constant |              |
|----------------|--------------------|-------------|--------------------|---------------------|--------------|
|                | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance    |
| <b>AD410</b>   | 0.030              | 0.762       | ±0.002             | 4.10                | ±0.12        |
|                | 0.062              | 1.575       | ±0.003             | 4.10                | ±0.12        |
|                | 0.075              | 1.905       | ±0.004             | 4.10                | ±0.12        |
|                | 0.120              | 3.048       | ±0.006             | 4.10                | ±0.12        |
|                | 0.125              | 3.175       | ±0.006             | 4.06                | ±0.06        |
|                | 0.250              | 6.350       | ±0.008             | 4.10                | ±0.12        |
| <b>AD430</b>   | 0.030              | 0.762       | ±0.002             | 4.30                | ±0.06        |
|                | 0.125              | 3.175       | ±0.006             | 4.23                | ±0.06        |
| <b>AD450</b>   | 0.010              | 0.254       | ±0.001             | 4.50                | ±0.25        |
|                | 0.020              | 0.508       | ±0.0015            | 4.50                | ±0.25        |
|                | 0.030              | 0.762       | ±0.002             | 4.50                | ±0.25        |
|                | 0.040              | 1.016       | ±0.003             | 4.50                | ±0.25        |
|                | 0.050              | 1.270       | ±0.003             | 4.50                | ±0.25        |
|                | 0.060              | 1.524       | ±0.003             | 4.50                | ±0.25        |
|                | 0.070              | 1.778       | ±0.004             | 4.50                | ±0.25        |
|                | 0.090              | 2.286       | ±0.005             | 4.50                | ±0.25        |
|                | 0.180              | 4.572       | ±0.009             | 4.50                | ±0.25        |
|                | 0.200              | 5.080       | ±0.010             | 4.50                | ±0.25        |
|                | 0.230              | 5.842       | ±0.010             | 4.50                | ±0.25        |
| <b>AD450A</b>  | 0.120'             | 3.048       | ±0.006             | 4.50                | ±0.06        |
| <b>AD600</b>   | 0.010              | 0.254       | ±0.001             | 6.15                | ±0.40        |
|                | 0.020              | 0.508       | ±0.0015            | 6.15                | ±0.40        |
|                | 0.031              | 0.787       | ±0.002             | 6.15                | ±0.40, ±0.15 |
|                | 0.062              | 1.575       | ±0.003             | 6.15                | ±0.40        |
|                | 0.090              | 2.286       | ±0.005             | 6.15                | ±0.40        |
| <b>AD600A</b>  | 0.250              | 6.350       | ±0.012             | 6.15                | ±0.15        |
| <b>AD1000</b>  | 0.006              | 0.152       | ±0.0005            | 7.80                | ±0.35        |
|                | 0.0105             | 0.267       | ±0.001             | 9.10                | ±0.35, ±0.25 |
|                | 0.015              | 0.381       | ±0.0015            | 9.70                | ±0.35, ±0.25 |
|                | 0.020              | 0.508       | ±0.002             | 10.0                | ±0.35, ±0.25 |
|                | 0.030              | 0.762       | ±0.002             | 10.35               | ±0.35        |
|                | 0.050              | 1.270       | ±0.002             | 10.6                | ±0.35, ±0.25 |
|                | 0.059              | 1.499       | ±0.003             | 10.7                | ±0.35        |
|                | 0.127              | 3.226       | ±0.006             | 10.9                | ±0.35        |
| <b>AD1000X</b> | 0.050              | 1.270       | ±0.002             | 10.2                | ±0.35        |
|                | 0.098              | 2.489       | ±0.005             | 10.2                | ±0.35        |
|                | 0.125              | 3.175       | ±0.006             | 10.2                | ±0.35        |

\*\*Master Sheet Size of 36" x 48" is standard. Other thicknesses available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

### AD Series

The original AD Series is designed for commercial applications relying on a thicker laminate that are driven by low cost. PIM design offerings. Typical applications include base station antennas and BSA feed networks. Through the use of thicker building blocks and thicker glass styles, lower costs are achieved through less labor and machine time.

| Product**   | Standard Thickness |             |                    | Dielectric Constant |           |
|---|--------------------|-------------|--------------------|---------------------|-----------|
|   | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>AD250</b>  | 0.010              | 0.254       | ±0.001             | 2.50                | ±0.05     |
|   | 0.015              | 0.381       | ±0.0015            | 2.50                | ±0.05     |
|   | 0.020              | 2.032       | ±0.002             | 2.50                | ±0.05     |
|   | 0.031              | 0.787       | ±0.003             | 2.50                | ±0.05     |
|   | 0.062              | 1.575       | ±0.003             | 2.50                | ±0.05     |
|   | 0.090              | 2.286       | ±0.007             | 2.50                | ±0.05     |
|   | 0.125              | 3.175       | ±0.009             | 2.50                | ±0.05     |
| <b>AD255</b><br><i>(check options with AD255A and AD255C for lower loss tangent and tighter tolerances)</i> | 0.010              | 0.254       | ±0.001             | 2.55                | ±0.05     |
|   | 0.020              | 0.508       | ±0.002             | 2.55                | ±0.05     |
|   | 0.030              | 0.762       | ±0.003             | 2.55                | ±0.05     |
|   | 0.031              | 0.787       | ±0.003             | 2.55                | ±0.05     |
|   | 0.040              | 1.016       | ±0.003             | 2.55                | ±0.05     |
|   | 0.060              | 1.524       | ±0.003             | 2.55                | ±0.05     |
|   | 0.062              | 1.575       | ±0.003             | 2.55                | ±0.05     |
|   | 0.080              | 2.032       | ±0.004             | 2.55                | ±0.05     |
|   | 0.120              | 3.048       | ±0.009             | 2.55                | ±0.05     |
|   | 0.125              | 3.175       | ±0.009             | 2.55                | ±0.05     |
| <b>AD270</b>  | 0.015              | 0.381       | ±0.0015            | 2.70                | ±0.05     |
|   | 0.020              | 0.508       | ±0.002             | 2.70                | ±0.05     |
|   | 0.031              | 0.787       | ±0.003             | 2.70                | ±0.05     |
|   | 0.040              | 1.016       | ±0.003             | 2.70                | ±0.05     |
|   | 0.062              | 1.575       | ±0.003             | 2.70                | ±0.05     |
|   | 0.093              | 2.362       | ±0.007             | 2.70                | ±0.05     |
| <b>AD295</b>  | 0.040              | 1.016       | ±0.002             | 2.95                | ±0.04     |
| <b>AD320</b><br><i>(AD320A offers lower loss tangent and tighter tolerances)</i>                            | 0.015              | 0.381       | ±0.002             | 3.20                | ±0.10     |
|   | 0.020              | 0.508       | ±0.002             | 3.20                | ±0.10     |
|   | 0.031              | 0.787       | ±0.002             | 3.20                | ±0.10     |
|   | 0.062              | 1.575       | ±0.003             | 3.20                | ±0.10     |
|   | 0.093              | 2.362       | ±0.007             | 3.20                | ±0.10     |

\*\*Master Sheet Size of 36" x 48" is standard. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.



## DiClad® Series

Unidirectional woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.60) and low dielectric loss values (0.0009 to 0.0022). These products use finer glass styles for precision and have a very high degree of low loss PTFE.

| Product   | Standard Thickness |             |                    | Dielectric Constant          |           |
|---|--------------------|-------------|--------------------|------------------------------|-----------|
|   | Inches             | Millimeters | Tolerance (Inches) | Nominal                      | Tolerance |
| <b>DiClad 522</b><br>(Thicknesses represent overall laminate thickness, including copper foil)<br><br><b>Master Sheet Size** :</b><br>36"x72", 36"x48", 36"x36" | 0.015              | 0.381       | ±0.0015            | 2.50, 2.55                   | ±0.05     |
|   | 0.020              | 0.508       | ±0.002             | 2.50                         | ±0.05     |
|   | 0.024              | 0.610       | ±0.002             | 2.50, 2.60                   | ±0.05     |
|   | 0.031              | 0.787       | ±0.002             | 2.45, 2.50, 2.55, 2.60       | ±0.05     |
|   | 0.047              | 1.194       | ±0.002             | 2.50, 2.55, 2.60             | ±0.05     |
|   | 0.062              | 1.575       | ±0.003             | 2.45, 2.50, 2.55, 2.60       | ±0.05     |
|   | 0.093              | 2.363       | ±0.004             | 2.55                         | ±0.05     |
|   | 0.125              | 3.175       | ±0.004, ±0.005     | 2.50, 2.55, 2.60             | ±0.05     |
|   | 0.187              | 4.750       | ±0.006             | 2.50                         | ±0.05     |
| 0.250   | 6.350              | ±0.006      | 2.50, 2.55, 2.60   | ±0.05                        |           |
| <b>DiClad 527</b><br><br><b>Master Sheet Size** :</b><br>36"x72", 36"x48", 36"x36"  | 0.005              | 0.127       | ±0.0005            | 2.50, 2.55                   | ±0.04     |
|   | 0.010              | 0.254       | ±0.001             | 2.45, 2.50, 2.55, 2.60       | ±0.04     |
|   | 0.015              | 0.381       | ±0.0015            | 2.45, 2.50, 2.55             | ±0.04     |
|   | 0.020              | 0.508       | ±0.002             | 2.40, 2.45, 2.50, 2.55       | ±0.04     |
|   | 0.031              | 0.787       | ±0.002             | 2.40, 2.45, 2.50, 2.55, 2.60 | ±0.04     |
|   | 0.040              | 1.016       | ±0.002             | 2.40, 2.45, 2.50, 2.55, 2.60 | ±0.04     |
|   | 0.047              | 1.194       | ±0.002             | 2.50, 2.55                   | ±0.04     |
|   | 0.060              | 1.524       | ±0.003             | 2.45, 2.50, 2.55             | ±0.04     |
|   | 0.062              | 1.575       | ±0.003             | 2.40, 2.45, 2.50, 2.55, 2.60 | ±0.04     |
|   | 0.093              | 2.363       | ±0.004             | 2.45, 2.55                   | ±0.04     |
| 0.125   | 3.175              | ±0.005      | 2.45, 2.50, 2.55   | ±0.04                        |           |
| <b>DiClad 870</b><br><br><b>Master Sheet Size** :</b><br>36"x72", 36"x48", 36"x36"  | 0.005              | 0.127       | ±0.0005            | 2.33                         | ±0.02     |
|   | 0.010              | 0.254       | ±0.001             | 2.33                         | ±0.02     |
|   | 0.015              | 0.381       | ±0.001             | 2.33                         | ±0.02     |
|   | 0.020              | 0.508       | ±0.0015            | 2.33                         | ±0.02     |
|   | 0.030              | 0.762       | ±0.002             | 2.33                         | ±0.02     |
|   | 0.040              | 1.016       | ±0.002             | 2.33                         | ±0.02     |
|   | 0.060              | 1.524       | ±0.002             | 2.33                         | ±0.02     |
|   | 0.125              | 3.175       | ±0.004             | 2.33                         | ±0.02     |
| <b>DiClad 880</b><br><br><b>Master Sheet Size** :</b><br>36"x72", 36"x48", 36"x36"  | 0.005              | 0.127       | ±0.0005            | 2.17, 2.20                   | ±0.02     |
|   | 0.010              | 0.254       | ±0.001             | 2.17, 2.20                   | ±0.02     |
|   | 0.015              | 0.381       | ±0.001             | 2.17, 2.20                   | ±0.02     |
|   | 0.020              | 0.508       | ±0.0015            | 2.17, 2.20                   | ±0.02     |
|   | 0.030              | 0.762       | ±0.002             | 2.17, 2.20                   | ±0.02     |
|   | 0.050              | 1.270       | ±0.002             | 2.17, 2.20                   | ±0.02     |
|   | 0.060              | 1.524       | ±0.002             | 2.17, 2.20                   | ±0.02     |
|   | 0.125              | 3.175       | ±0.004             | 2.17, 2.20                   | ±0.02     |

\*\*Master Sheet Sizes are not available on all products or thicknesses. Other thickness options available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.



**MICROWAVE MATERIALS**

**CuClad® Series**

Cross-plyed woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.60) and loss (0.0009 to 0.0022). The sequential layers of fabric are cross-plyed to insure in-plane isotropy for applications requiring matched electrical properties in the X-Y plane.

| Product   | Standard Thickness |             |                    | Dielectric Constant    |             |
|---|--------------------|-------------|--------------------|------------------------|-------------|
|   | Inches             | Millimeters | Tolerance (Inches) | Inches                 | Millimeters |
| <b>CuClad 250GX</b><br><br>Master Sheet Size** :<br>36"x48" (non-cross-plyed),<br>36"x36" (cross-plyed)   | 0.004              | 0.102       | ±0.0005            | 2.40                   | ±0.10       |
|   | 0.010              | 0.254       | ±0.0009            | 2.48, 2.55             | ±0.04       |
|   | 0.015              | 0.381       | ±0.0015            | 2.44, 2.48, 2.55       | ±0.04       |
|   | 0.020              | 0.508       | ±0.002             | 2.45, 2.48, 2.50, 2.55 | ±0.04       |
|   | 0.030              | 0.762       | ±0.002             | 2.40, 2.45, 2.50, 2.55 | ±0.04       |
|   | 0.031              | 0.787       | ±0.002             | 2.45, 2.50, 2.55       | ±0.04       |
|   | 0.047              | 1.194       | ±0.002             | 2.50                   | ±0.04       |
|   | 0.060              | 1.524       | ±0.002             | 2.40, 2.45, 2.50, 2.55 | ±0.04       |
|   | 0.062              | 1.575       | ±0.002             | 2.45, 2.50, 2.55       | ±0.04       |
|   | 0.093              | 2.362       | ±0.002             | 2.48                   | ±0.04       |
|   | 0.120              | 3.048       | ±0.004             | 2.45, 2.50, 2.55       | ±0.04       |
| 0.125   | 3.175              | ±0.004      | 2.45, 2.50, 2.55   | ±0.04                  |             |
| <b>CuClad 250GT</b><br>(Thicknesses represent overall laminate thickness, including copper foil)<br><br>Master Sheet Size** :<br>36"x48" (non-cross-plyed),<br>36"x36" (cross-plyed)  | 0.010              | 0.254       | ±0.001             | 2.50                   | ±0.05       |
|   | 0.015              | 0.381       | ±0.0015, ±0.002    | 2.50                   | ±0.05       |
|   | 0.020              | 0.508       | ±0.002             | 2.50                   | ±0.05       |
|   | 0.031              | 0.787       | ±0.002             | 2.50                   | ±0.05       |
|   | 0.047              | 1.194       | ±0.002             | 2.50                   | ±0.05       |
|   | 0.062              | 1.575       | ±0.003             | 2.50                   | ±0.05       |
|   | 0.094              | 2.388       | ±0.004             | 2.50                   | ±0.05       |
|   | 0.125              | 3.175       | ±0.005             | 2.50                   | ±0.05       |
|   | 0.187              | 4.750       | ±0.006             | 2.50                   | ±0.05       |
|   | 0.250              | 6.350       | ±0.006             | 2.50                   | ±0.05       |
| <b>CuClad 233GY &amp; 233LX</b><br><br>Master Sheet Size** :<br>GY - 36"x48"(non-cross plyed),<br>36"x36" (cross-plyed)<br>LX - 34"x48"(non-cross plyed),<br>34"x36" (cross-plyed)<br><br>(LX represents a premium grade with additional testing)                             | 0.005              | 0.127       | ±0.0005            | 2.33                   | ±0.04       |
|   | 0.010              | 0.254       | ±0.001             | 2.33                   | ±0.04       |
|   | 0.015              | 0.381       | ±0.0015            | 2.33                   | ±0.02       |
|   | 0.020              | 0.508       | ±0.0015            | 2.33                   | ±0.02       |
|   | 0.031              | 0.787       | ±0.002             | 2.33                   | ±0.02       |
|   | 0.045              | 1.143       | ±0.002             | 2.33                   | ±0.02       |
|   | 0.062              | 1.575       | ±0.002             | 2.33                   | ±0.02       |
|   | 0.125              | 3.175       | ±0.004             | 2.33                   | ±0.02       |
| <b>CuClad 217GY &amp; 217LX</b><br><br>Master Sheet Size** :<br>GY - 36"x48"(non-cross plyed),<br>36"x36" (cross-plyed)<br>LX - 34"x48"(non-cross plyed),<br>34"x36" (cross-plyed)<br><br>(LX represents a premium grade with additional testing and certificate of analysis) | 0.005              | 0.127       | ±0.0005            | 2.17                   | ±0.04       |
|   | 0.010              | 0.254       | ±0.001             | 2.17, 2.20             | ±0.04       |
|   | 0.015              | 0.381       | ±0.0015            | 2.17                   | ±0.02       |
|   | 0.020              | 0.508       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.025              | 0.635       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.031              | 0.787       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.040              | 1.016       | ±0.002             | 2.17, 2.20             | ±0.02       |
|   | 0.045              | 1.143       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.060              | 1.524       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.062              | 1.575       | ±0.002             | 2.17                   | ±0.02       |
|   | 0.125              | 3.175       | ±0.004             | 2.17                   | ±0.02       |

\*\*Master Sheet Sizes are not available on all products or thicknesses. Other thickness options available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

## CuClad® Series

Cross-plyed woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.60) and loss (0.0009 to 0.0022). The sequential layers of fabric are cross-plyed to insure in-plane isotropy for applications requiring matched electrical properties in the X-Y plane.

| Product  | Standard Thickness |             |                    | Dielectric Constant                |           |
|--|--------------------|-------------|--------------------|------------------------------------|-----------|
|  | Inches             | Millimeters | Tolerance (Inches) | Nominal                            | Tolerance |
| <b>CuClad 250LX</b><br><br>Master Sheet Size** :<br>34"x48" (non-cross-plyed),<br>34"x36" (cross-plyed)<br><br>(LX represents a premium<br>grade with additional testing<br>and certificate of analysis) | 0.0053             | 0.135       | ±0.0005            | 2.53                               | ±0.10     |
|  | 0.0101             | 0.257       | ±0.0009            | 2.48, 2.55                         | ±0.04     |
|  | 0.0147             | 0.373       | ±0.0015            | 2.44, 2.55                         | ±0.04     |
|  | 0.0193             | 0.490       | ±0.002             | 2.43                               | ±0.04     |
|  | 0.030              | 0.762       | ±0.002             | 2.45, 2.50, 2.55                   | ±0.04     |
|  | 0.031              | 0.787       | ±0.002             | 2.45                               | ±0.04     |
|  | 0.060              | 1.524       | ±0.002             | 2.41, 2.42, 2.43, 2.45, 2.50, 2.55 | ±0.04     |
|  | 0.0625             | 1.588       | ±0.002             | 2.50, 2.55                         | ±0.04     |
|  | 0.090              | 2.286       | ±0.003             | 2.50                               | ±0.04     |
| 0.125  | 3.175              | ±0.004      | 2.45, 2.50, 2.55   | ±0.04                              |           |

## IsoClad® Series

Non-woven fiberglass / PTFE laminates available in a of Dk's of either 2.17 or 2.33 with a loss tangent of 0.0013 or 0.0016 respectively. These materials offer lower modulus permitting a more flexible thin laminate than is typical with a woven glass reinforced product.

| Product  | Standard Thickness |             |                    | Dielectric Constant |           |
|--|--------------------|-------------|--------------------|---------------------|-----------|
|  | Inches             | Millimeters | Tolerance (Inches) | Nominal             | Tolerance |
| <b>IsoClad 933</b><br>Master Sheet Size** :<br>36"x48" & 36"x72" | 0.005              | 0.127       | ±0.0007            | 2.33                | ±0.04     |
|  | 0.010              | 0.254       | ±0.001             | 2.33                | ±0.04     |
|  | 0.015              | 0.381       | ±0.0015            | 2.33                | ±0.04     |
|  | 0.020              | 0.508       | ±0.002             | 2.33                | ±0.04     |
|  | 0.031              | 0.787       | ±0.002             | 2.33                | ±0.04     |
|  | 0.045              | 1.143       | ±0.003             | 2.33                | ±0.04     |
|  | 0.060              | 1.524       | ±0.004             | 2.33                | ±0.04     |
| <b>IsoClad 917</b><br>Master Sheet Size :<br>36"x48" & 36"x72"   | 0.005              | 0.127       | ±0.0005            | 2.17                | ±0.02     |
|  | 0.010              | 0.254       | ±0.001             | 2.17                | ±0.02     |
|  | 0.015              | 0.381       | ±0.0015            | 2.17                | ±0.02     |
|  | 0.020              | 0.508       | ±0.002             | 2.17                | ±0.02     |
|  | 0.031              | 0.787       | ±0.002             | 2.17                | ±0.02     |
|  | 0.045              | 1.143       | ±0.003             | 2.17                | ±0.02     |
|  | 0.062              | 1.575       | ±0.003             | 2.17                | ±0.02     |

\*\*Master Sheet Sizes are not available on all products or thicknesses. Other thickness options available. Tolerances are subject to change and custom tolerances may be available. Please contact Arlon Customer Service with questions about material availability.

## AR Series (Legacy Material)

Glass / PTFE laminates with or without micro-dispersed ceramic fillers. These Legacy products continue to be manufactured to support legacy customer designs. Arlon encourages new designs and inquiries towards AD320A (for AR320) and AD1000 (for AR1000). The newer designs offer both lower price as well as higher performance to provide more Customer Value.

| Product  | Standard Thickness |             | Nominal Dielectric Constant |        |
|--|--------------------|-------------|-----------------------------|--------|
|  | Inches             | Millimeters | AR320                       | AR1000 |
| <b>AR SERIES</b><br><br>Master Sheet Size** :<br>36"x48" for AR1000<br>36"x72" & 36"x48" for AR320 | 0.015"             | 0.381       | --                          | 9.6    |
|  | 0.020"             | 0.508       | --                          | 9.6    |
|  | 0.024"             | 0.610       | 3.20                        | 9.7    |
|  | 0.031"             | 0.787       | 3.20                        | 9.7    |
|  | 0.047"             | 1.194       | 3.20                        | 9.7    |
|  | 0.050"             | 1.270       | --                          | 9.8    |
|  | 0.062"             | 1.575       | 3.20                        | 9.8    |
|  | 0.093"             | 2.362       | 3.20                        | 9.8    |
|  | 0.100"             | 2.540       | --                          | 9.8    |
|  | 0.125"             | 3.175       | 3.20                        | --     |

## 25 Series, Non-PTFE, Low Loss Thermoset Resin Systems

The 25 Series Products are Ceramic Hydrocarbon, Low Loss Thermoset material family with matching Pre-pregs. Excellent for multi-layer applications. 25FR contains a Flame Retardant and UL94 V0.

| Standard Laminate Thickness (inches) |       |           |
|--------------------------------------|-------|-----------|
| 25N                                  | 25FR  | Tolerance |
| 0.006                                | 0.006 | ±0.0007   |
| 0.008                                | 0.008 | ±0.0010   |
| 0.010                                | 0.010 | ±0.0010   |
| 0.012                                | 0.012 | ±0.0015   |
| 0.018                                | 0.018 | ±0.0020   |
| 0.020                                | 0.020 | ±0.0020   |
| 0.024                                | 0.024 | ±0.0020   |
| 0.030                                | 0.030 | ±0.0030   |
| 0.060                                | 0.058 | ±0.0040   |

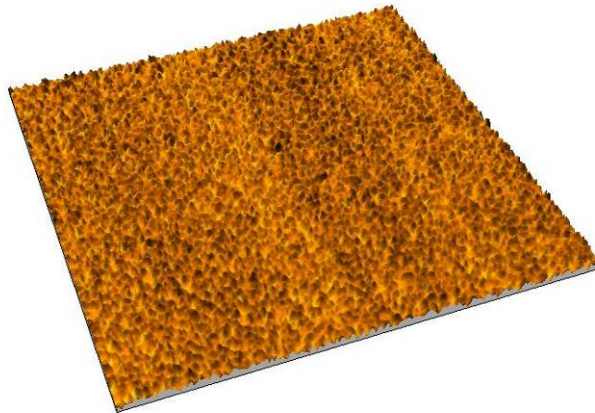
| Prepreg Thickness (inches) |        |        |
|----------------------------|--------|--------|
| Glass Style                | 25N    | 25FR   |
| 1080                       | 0.0039 | 0.0039 |
| 2112                       | 0.0058 | 0.0058 |
| 2113                       | 0.0067 | 0.0067 |

## Copper Cladding

Arlon offers a variety of copper foil cladding for high performance laminates to insure the optimal balance of low insertion loss, excellent mechanical properties and cost. Below is a list of typical copper foil options.

| Copper Foil                                | Typical Surface Roughness                        |  | Thickness<br>mil (mm) |
|--|--|--|-----------------------|
|  | Treated Side<br>$\mu\text{in}$ ( $\mu\text{m}$ ) | Untreated Side<br>$\mu\text{in}$ ( $\mu\text{m}$ ) |                       |
| 1/2 oz Electrodeposited (ED) Copper        | 31 (0.78)  | 10-15 (0.3-0.4)                                    | 0.7 (0.018)           |
| 1 oz Electrodeposited (ED) Copper          | 46 (1.2)   | 10-15 (0.3-0.4)                                    | 1.4 (0.036)           |
| 2 oz Electrodeposited (ED) Copper          | 82 (2.1)   | 10-15 (0.3-0.4)                                    | 2.8 (0.072)           |
| 1/2 oz Reverse Treat Electrodeposited (RT) | 13 (0.3)   | 20-40 (0.5-1.1)                                    | 0.7 (0.018)           |
| 1 oz Reverse Treat Electrodeposited (RT)   | 17 (0.43)  | 20-40 (0.5-1.1)                                    | 1.4 (0.036)           |
| 1/2 oz Rolled Copper (RA)                  | 30 (0.78)  | 5-12 (0.13-0.3)                                    | 0.7 (0.018)           |
| 1 oz Rolled Copper (RA)                    | 30 (0.78)  | 5-12 (0.13-0.3)                                    | 1.4 (0.036)           |

*PIM Grade Copper available on certain products. Additional copper foils, heavy metal plate or specialty foils such as Ohmega Technologies Ohmega-Ply® or TICER TCR® Resist foils are available upon request. Not all copper foil options are available on all products or thicknesses. Please contact Arlon Customer Service with questions about material availability.*

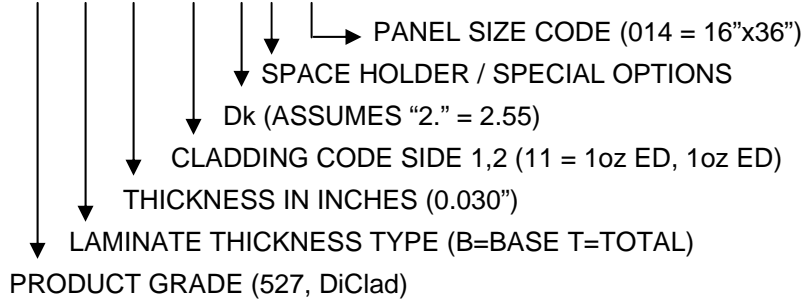


Surface Roughness Profile of Arlon 0.5 Ounce, Electrodeposited (ED) Copper via Non-Contact Optical Aberration Technique

## Arlon Part Numbers

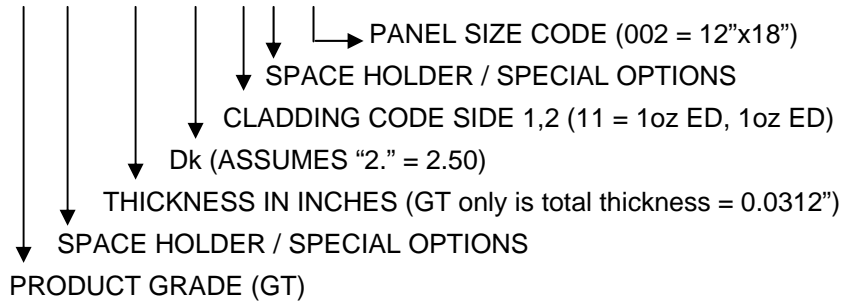
### DiClad & IsoClad Series: 522, 527, 870, 880, 917 & 933

**527B0301155.014**



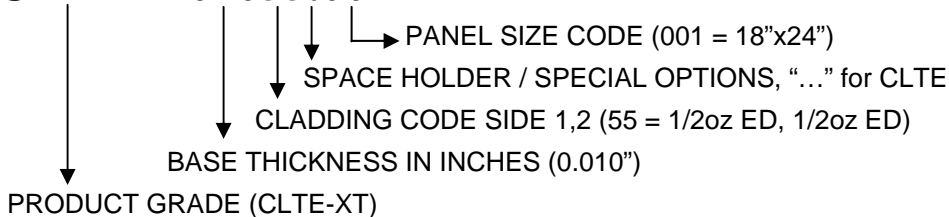
### CuClad Series: 250, 233 & 217 (GX, LX, GY, GT)

**GT-03125011.002**



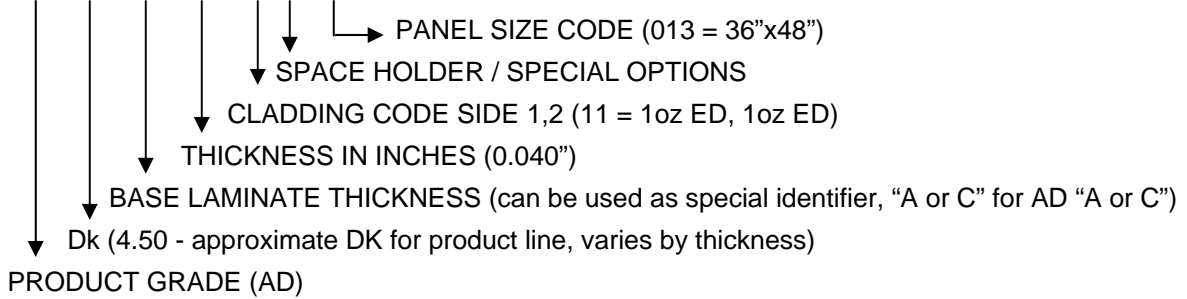
### CLTE-Xt, CLTE-AT & CLTE Series:

**CLTEXT01055.001**



**AD, AR & TC Series: (including AD “A” & “C”)**

**AD450L04011.013**



**Codes for Typical Copper Cladding and Panel Size**

| Metal Cladding Codes* |                        | Panel Size Codes*      |                             |      |
|-----------------------|------------------------|------------------------|-----------------------------|------|
| Code                  | Copper Type/<br>Weight | Panel Size<br>(Inches) | Panel Size<br>(Millimeters) | Code |
| 1                     | 1oz ED                 | 18 x 24                | 457 x 610                   | 001  |
| 2                     | 2oz ED                 | 12 x 18                | 305 x 457                   | 002  |
| 3                     | 1/2oz Rolled           | 18 x 36                | 457 x 915                   | 004  |
| 4                     | 1oz Rolled             | 36 x 48                | 915 x 1220                  | 013  |
| 5                     | 1/2oz ED               | 16 x 36                | 407 x 915                   | 014  |
| 6                     | 1/4oz ED               | 24 x 36                | 610 x 915                   | 057  |
| 7                     | 1/2oz Reverse Treat ED | 18 x 48                | 457 x 1220                  | 072  |
| 9                     | 1oz Reverse Treat ED   | 48 x 54                | 1220 x 1372                 | 615  |
| 0                     | Unclad                 | 24 x 54                | 610 x 1372                  | 825  |

\* Other metal cladding types and thicknesses, and panel size options are available for various products. Please contact Arlon Customer Service with questions about material availability.





**TECHNOLOGY ENABLING INNOVATION**

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**CONTACT INFORMATION:**

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

**North America:**

9433 Hyssop Drive, Rancho Cucamonga, California 91730

Tel: (909) 987-9533 • Fax: (909) 987-8541

1100 Governor Lea Road, Bear, Delaware, 19701

Tel: (302) 834-2100 • (800) 635-9333 • Fax: (302) 834-2574

**Northern Europe:**

44 Wilby Avenue, Little Lever, Bolton, Lancaster, BL31QE, UK

Tel/Fax: (44) 120-457-6068

**Southern Europe:**

1 Bis Rue de la Remarde, 91530 Saint Cheron, France

Tel: (33) 871-096-082 • Fax: (33) 164-566-489

**Arlon Material Technologies**

No. 20 Datong Road, Export Processing Zone,

Suzhou New & High District, Jiangsu, China

Tel (86) 512-6269-6966 • Fax: (86) 512-6269-6038

**Arlon Electronic Materials (Suzhou) Co., Ltd.**

Building 7, Da Xing Industrial Park of Suzhou New & High District

Jinangsu, China 21500

Tel: (86) 512-6672-1698 • Fax: (86) 512-6672-1697

