

# ARLON

MATERIALS FOR ELECTRONICS DIVISION



MICROWAVE & RF MATERIALS  
GUIDE



**MICROWAVE MATERIALS**

---

## **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 "50 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 and Delaware 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: 2000 registered, and through rigorous quality control practices and commitment to continual improvement, we are dedicated to meeting and exceeding our customer's requirements.

To better service our global customer base, Arlon has created the Arlon Material Technologies Co, Ltd. in Suzhou, Jiangsu Province, China. This effort includes a finishing center that is located in Suzhou and has been operational since mid-2004. A Manufacturing Facility is scheduled to open during the Third Quarter of 2006. This facility will contain a new, State-Of-The-Art Vacuum Press that has capability to laminate both High Temperature PTFE Microwave Laminates as well as Lower Temperature Epoxy and Resin Based Electronic Substrates. This plant will be equipped with the highest degree of process control in the industry.

Arlon maintains a significant commitment to research & development. In the past few years, we have introduced several product innovations for high performance, cost-effective circuit board applications, including 55ST & 65GT - respectively, high peel strength and halogen-free flame retardant non-woven aramid laminate and prepreg systems, and the first high Dk, 10.2, ultra-thin, 0.0024", ceramic-filled PTFE substrate on woven glass - AD10. Interesting products include FoamClad<sup>®/F</sup> 100, a patented laminate construction using foam as the dielectric that offers a cost effective solution for high performance antennas. This was followed with the launch of our mechanically robust AD1000, with a 10.2 Dk. The AD1000 has a "Best-in-Class" loss tangent and lowest insertion loss, lowest CTE and moisture absorption values in its class and highest Thermal Conductivity available. AD300A was recently introduced to provide much lower loss than AD300.

Three exciting new products are planned to be launched in the second half of 2006. 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. You can expect to see additional product innovations from our development pipeline in the months and years to come.

## 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 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).

### Table of Contents

Product Overview.....	4
DiClad.....	5
CuClad.....	6-7
IsoClad.....	7
CLTE .....	8
AR Series.....	8
AD Series.....	9-10
FoamClad.....	10
25N/FR.....	10
Copper Cladding.....	11
Customer Service/Sales Contact Information.....	Back

*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.*



## MICROWAVE MATERIALS

## PRODUCT OVERVIEW

Product	Composition	Dielectric Constant @ 10 GHz	Dissipation Factor @ 10 GHz	Thermal Coefficient of Expansion ppm/°C	Coefficient of Thermal Expansion (ppm/°C)			Typical Peel Strength (lbs)	Water Absorption (%)	Specific Gravity (unitless) or Density (g/cm³)	Thermal Conductivity (W/mK)	NASA Outgassing		Flammability UL Rating
					X	Y	Z					Total Mass Loss (%)	Collected Volatile (%)	
<b>Traditional - Highest Performance, PTFE Coated Light Woven Glass Styles, Interdispersed PTFE films</b>														
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 Plied Woven Fiberglass reinforced PTFE	2.50	0.001	-170	18	19	177	14	0.03	2.31	0.254	0.01	0.00	UL94-V0
CuClad 250GX	Cross Plied 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 Plied 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 Plied 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
<b>CLT-XT, CLTE &amp; CLTE-LC High Performance PTFE/Woven Glass / Microfine Ceramic</b>														
CLTE	Glass, PTFE and Micro-Dispersed Ceramic	2.98 *	0.0025	-9	10	12	35	7	0.04	2.38	0.50	0.02	0.00	UL94-V0
CLTE-LC	Glass, PTFE and Micro-Dispersed Ceramic	2.98 *	0.0025	-10	10	12	35	7	0.04	2.38	0.50	0.02	0.00	UL94-V0
<b>AR Series</b>														
AR1000	Glass, PTFE and Micro-Dispersed Ceramic	10.00 *	0.003	-233	14	16	37	5	0.08	2.84	0.645	0.02	0.00	UL94-V0
<b>AD Series - Woven Glass and PTFE or Woven Glass, PTFE and Micro-Dispersed Ceramic</b>														
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
AD260A	Glass, PTFE and Micro-Dispersed Ceramic	2.60	0.0017	-78	12	15	65	14	0.1	2.30	0.300	NT	NT	UL94-V0
AD270	Woven Glass and PTFE	2.70	0.003	-110	12	15	95	14	0.07	2.40	0.235	NT	NT	UL94-V0
AD300A	Glass, PTFE and Micro-Dispersed Ceramic	3.00	0.002	-110	12	12	125	13	0.02	2.10	0.49	NT	NT	UL94-V0
AD320	Woven Glass and PTFE	3.20	0.003	-110	12	15	95	14	0.07	2.40	0.235	NT	NT	UL94-V0
AD350	Glass, PTFE and Micro-Dispersed Ceramic	3.50	0.003	-110	12	15	95	17	0.06	2.40	0.235	NT	NT	UL94-V0
AD350A	Glass, PTFE and Micro-Dispersed Ceramic	3.50	0.003	-55	5	9	35	17	0.1	2.10	0.45	0.02	0.02	UL94-V0
AD410	Glass, PTFE and Micro-Dispersed Ceramic	4.10	0.003	-55	9	9	40	17	0.06	2.10	0.46	NT	NT	UL94-V0
AD430	Glass, PTFE and Micro-Dispersed Ceramic	4.30	0.003	-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
AD5	Glass, PTFE and Micro-Dispersed Ceramic	5.10 *	0.003	-300	15	15	45	5	0.05	2.45	0.46	NT	NT	UL94-V0
AD600	Glass, PTFE and Micro-Dispersed Ceramic	6.15 *	0.003	-241	11	10	64	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
AD10	Glass, PTFE and Micro-Dispersed Ceramic	10.20 *	0.005	-423	6	6	8	4	0.03	2.80	0.55	NT	NT	UL94-V0
<b>Non PTFE Low Loss Thermoset Resin Systems</b>														
25N	Ceramic Hydrocarbon	3.38	0.0025	-87	15	15	52	5	0.09	1.70	0.45	0.17	0.24	N/A
25FR	Ceramic Hydrocarbon	3.58	0.0035	50	16	18	59	5	0.09	1.80	0.45	0.01	0.00	UL94-V0
<b>Microporous, Closed Cell Foam Laminate</b>														
Foamed	Foamed Composite	1.10 - 1.30 *	0.002 - 0.004	-88	25	25	N/A	7	0.5	0.35	0.1	N/A	N/A	N/A

\* Refer to Tables for Dielectric Constant and Thickness Options



## DiClad® Series

Unidirectional woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.6) and low dielectric loss values (0.0009 to 0.0022).

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



**MICROWAVE MATERIALS**

**CuClad® Series**

Cross-plyed woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.6) 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.

	Standard Thickness		Available Nominal
	Inches	Millimeters	
<b>CuClad 250GX</b>  Master Sheet Size** : 36"x48" (non-cross-plyed), 36"x36" (cross-plyed)	0.004"	0.102	2.4
	0.010"	0.254	2.48, 2.55
	0.015"	0.381	2.44, 2.48, 2.55
	0.020"	0.508	2.45, 2.48, 2.50, 2.55
	0.030"	0.762	2.40, 2.45, 2.50, 2.55
	0.031"	0.787	2.45, 2.50, 2.55
	0.047"	1.194	2.50
	0.060"	1.524	2.40, 2.45, 2.50, 2.55
	0.062"	1.575	2.45, 2.50, 2.55
	0.093"	2.362	2.48
	0.120"	3.048	2.45, 2.50, 2.55
	0.125"	3.175	2.45, 2.50, 2.55
<b>CuClad 250GT</b> (Thicknesses represent overall laminate thickness, including copper foil)  Master Sheet Size** : 36"x48" (non-cross-plyed), 36"x36" (cross-plyed)	0.010"	0.254	2.50
	0.015"	0.381	2.50
	0.020"	0.508	2.50
	0.031"	0.787	2.50
	0.047"	1.194	2.50
	0.062"	1.575	2.50
	0.094"	2.388	2.50
	0.125"	3.175	2.50
	0.187"	4.750	2.50
0.250"	6.350	2.50	
<b>CuClad 233GY &amp; 233LX</b> Master Sheet Size** : GY - 36"x48"(non-cross plyed), 36"x36" (cross-plyed) LX - 34"x48"(non-cross plyed), 34"x36" (cross-plyed)  (LX represents a premium grade with additional testing)	0.005"	0.127	2.33
	0.010"	0.254	2.33
	0.015"	0.381	2.33
	0.020"	0.508	2.33
	0.031"	0.787	2.33
	0.045"	1.143	2.33
	0.062"	1.575	2.33
	0.125"	3.175	2.33
<b>CuClad 217GY &amp; 217LX</b>  Master Sheet Size** : GY - 36"x48"(non-cross plyed), 36"x36" (cross-plyed) LX - 34"x48"(non-cross plyed), 34"x36" (cross-plyed)  (LX represents a premium grade with additional testing and certificate of analysis)	0.005"	0.127	2.17
	0.010"	0.254	2.17
	0.015"	0.381	2.17
	0.020"	0.508	2.17
	0.025"	0.635	2.17
	0.031"	0.787	2.17
	0.040"	1.016	2.17, 2.20
	0.045"	1.143	2.17
	0.060"	1.524	2.17
	0.062"	1.575	2.17
0.125"	3.175	2.17	



### CuClad® Series

Cross-plyed woven fiberglass / PTFE laminates available in a range of Dk's (2.17 to 2.6) 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		Available Nominal Dielectric Constant Options
	Inches	Millimeters	
<b>CuClad 250LX</b>  Master Sheet Size** : 34"x48" (non-cross-plyed), 34"x36" (cross-plyed)  (LX represents a premium grade with additional testing and certificate of analysis)	0.0053"	0.135	2.53
	0.0101"	0.257	2.48, 2.55
	0.0147"	0.373	2.44, 2.55
	0.0193"	0.490	2.43
	0.030"	0.762	2.45, 2.50, 2.55
	0.031"	0.787	2.45
	0.060"	1.524	2.41, 2.42, 2.43, 2.45, 2.50, 2.55
	0.0625"	1.588	2.50, 2.55
	0.090"	2.286	2.50
	0.125"	3.175	2.45, 2.50, 2.55

### 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		Available Nominal Dielectric Constant Options
	Inches	Millimeters	
<b>IsoClad 933</b> Master Sheet Size** : 36"x48" & 36"x72"	0.005"	0.127	2.33
	0.010"	0.254	2.33
	0.015"	0.381	2.33
	0.020"	0.508	2.33
	0.031"	0.787	2.33
	0.045"	1.143	2.33
	0.060"	1.524	2.33
<b>IsoClad 917</b> Master Sheet Size : 36"x48" & 36"x72"	0.005"	0.127	2.17
	0.010"	0.254	2.17
	0.015"	0.381	2.17
	0.020"	0.508	2.17
	0.031"	0.787	2.17
	0.045"	1.143	2.17
	0.062"	1.575	2.17

\*\*Master Sheet Sizes are not available on all products or thicknesses. Please contact Arlon Customer Service with questions about material availability.

## CLTE and CLTE-LC

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.

	Standard Thickness		Available Nominal
	Inches	Millimeters	
<b>CLTE</b> Master Sheet Size** : 36"x48"	0.003"	0.076	2.75
	0.0053"	0.135	2.85
	0.010"	0.254	2.94
	0.015"	0.381	2.95
	0.020"	0.508	2.96
	0.024"	0.610	2.97
	0.031"	0.787	2.98
	0.040"	1.016	2.98
	0.047"	1.194	2.98
	0.062"	1.575	2.98
	0.093"	2.362	2.98
	0.125"	3.175	2.98
	0.150"	3.810	2.98
<b>CLTE-LC</b> Master Sheet Size** : 36"x48"	0.010"	0.254	2.94
	0.020"	0.508	2.96
	0.030"	0.762	2.98
	0.047"	1.194	2.98
	0.062"	1.575	2.98
	0.093"	2.362	2.98

## AR Series

Glass / PTFE laminates with or without micro-dispersed ceramic fillers.

	Standard Thickness		Nominal Dielectric Constant		
	Inches	Millimeters	AR300	AR320	AR1000
<b>AR SERIES</b> Master Sheet Size** : 36"x48" for AR1000 36"x72" & 36"x48" for AR300 and AR320	0.015"	0.381	--	--	9.6
	0.020"	0.508	3.00	--	9.6
	0.024"	0.610	--	3.20	9.7
	0.031"	0.787	3.00	3.20	9.7
	0.047"	1.194	--	3.20	9.7
	0.050"	1.270	--	--	9.8
	0.062"	1.575	3.00	3.20	9.8
	0.093"	2.362	--	3.20	9.8
	0.100"	2.540	--	--	9.8
	0.125"	3.175	--	3.20	--





**MICROWAVE MATERIALS**

**AD Series**

Cost-optimized Woven Glass and PTFE laminates or Woven Glass, PTFE and micro-dispersed ceramic laminates.

Standard Thickness		Nominal Dielectric Constant														
Inches	Millimeters	AD250	AD255	AD260A	AD270	AD295	AD300A	AD320	AD350	AD350A	AD360	AD410	AD430	AD450	AD600	AD1000
0.006"	0.152	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.80
0.010"	0.254	--	--	--	--	--	--	--	--	--	--	--	--	4.50	6.00	--
0.0105"	0.267	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.10
0.015"	0.381	--	--	--	2.70	--	--	--	--	--	--	--	--	--	--	9.70
0.020"	0.508	2.50	2.55	--	2.70	--	3.00	3.20	3.50	3.50	--	--	--	4.50	--	10.00
0.024"	0.610	--	--	--	--	--	--	--	--	--	--	--	--	--	6.15	--
0.025"	0.635	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.20
0.030"	0.762	--	--	--	--	--	3.00	--	3.50	3.50	--	4.10	--	4.50	--	10.35
0.031"	0.787	2.50	2.55	--	2.70	--	--	3.20	--	--	--	--	--	--	6.15	--
0.050"	1.270	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.20, 10.60
0.059"	1.499	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.70
0.060"	1.524	--	--	2.60	--	--	3.00	--	3.50	3.50	--	--	--	4.50	--	--
0.062"	1.575	2.50	2.55	--	2.70	2.95	--	3.20	--	--	3.60	4.10	--	--	6.15	--
0.090"	2.286	--	--	--	--	--	--	--	--	--	--	--	--	4.50	--	--
0.093"	2.362	--	--	--	2.70	--	--	--	--	--	--	--	--	--	--	--
0.100"	2.540	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.20
0.120"	3.048	--	--	--	--	--	--	--	--	--	--	--	--	4.50	--	--
0.125"	3.175	--	--	--	--	--	--	--	--	--	--	4.10	4.30	--	--	10.20
0.127"	3.226	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.90
0.200"	5.080	--	--	--	--	--	--	--	--	--	--	--	--	4.50	--	--

Master Sheet Size\*\* : 36"X48"

\*\*Master Sheet Sizes are not available on all products or thicknesses. Please contact Arlon Customer Service with questions about material availability.

### AD5 & AD10

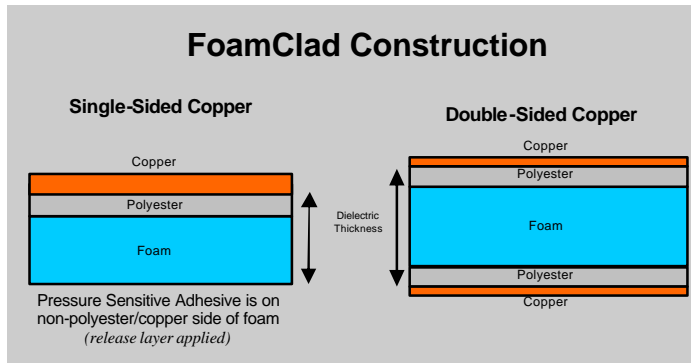
Ultra-thin, high dielectric, glass / PTFE / micro-dispersed ceramic laminates, ideal for miniaturization of microwave components.

	Standard Thickness		Available Nominal
	Inches	Millimeters	
<b>AD5</b> (18"x24" panels only)	0.003"	0.076	5.1
<b>AD10</b> (18"x24" panels only)	0.0024"	0.061	10.2

### FoamClad

Low-cost, light weight, foam-based laminate for antenna applications.

	Standard Thickness		Available Nominal
	Inches	Millimeters	
<b>FoamClad<sup>R/F</sup> 100</b> <b>Double-sided</b> Master Sheet Size : up to 24"x78" standard (*118" length with conditions)	0.043"	1.092	1.35
	0.074"	1.880	1.25
	0.106"	2.692	1.20
<b>FoamClad<sup>R/F</sup> 100</b> <b>Single-sided</b> Master Sheet Size : up to 24"x78" standard (*118" length with conditions)	0.039"	0.991	1.30
	0.070"	1.778	1.20
	0.102"	2.591	1.18



### Non-PTFE Low Loss Thermoset Resin Systems

The 25 Series Products are Ceramic Hydrocarbon, Low Loss Thermoset material family with matching Pre-pregs. 25FR contains a Flame Retardant.

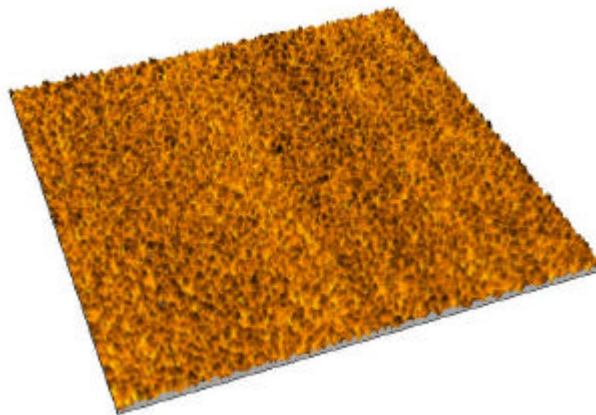
Product	Thickness Options	Dielectric Constant
<b>25N</b>	Various	3.38
<b>25FR</b>	Various	3.58

## 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 ( $R_{rms}$ )		Thickness mil (mm)
	Treated Side $\mu\text{in}$ ( $\mu\text{m}$ )	Untreated Side $\mu\text{in}$ ( $\mu\text{m}$ )	
$\frac{1}{2}$ 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)
$\frac{1}{2}$ 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)
$\frac{1}{2}$ 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 Gould 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



*Technology Enabling Innovation*

**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

**NORTHERN EUROPE:**

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

**SOUTHERN EUROPE:**

Arlon, Inc.  
1 Bis Rue de la Remarde  
91530 Saint Cheron, France  
Tel: (33) 871-096-082  
Fax: (33) 164-566-489

**SOUTHERN CHINA:**

Arlon, Inc.  
Room 601, Unit 1, Bldg 6  
Liyuan, Xincun Holiday Road  
Hua qiaocheng, Nanshan District  
Shenzhen 518053  
China  
Tel: (86) 755-269-066-12  
Fax: (86) 755-269-213-57

**NORTHERN CHINA:**

Arlon, Inc.  
Room 11/401, No. 8  
Hong Gu Road  
Shanghai, China 200336  
Tel/Fax: (86) 21-620-902-02

