



# High Tech News

Engineered Solutions for Advanced PWB Technology

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## Arlon's 65GT and The Environmentally Friendly Microvia



With the introduction of Arlon's 65GT "Green" aramid reinforced laminate and prepreg product line at IPC in March, 2002, the last barrier has fallen on the way to building fully environmentally and process friendly HDI boards for a variety of applications, including cellular phones and telecom infrastructure requiring PWB's with microvia layers. Remember, you saw it first at Arlon -- the Environmentally Friendly Microvia!

The 65GT product line is based on Dupont's Thermount®RT nonwoven aramid reinforcement with third generation halogen and antimony-free resin technology to provide non-toxic flame retardance in a product which has high copper peels and somewhat reduced water absorption as compared to earlier generations of nonwoven aramid products based on more conventional brominated FR resin systems.

### **ARLON'S MULTIFUNCTIONAL EPOXY THERMOUNT®-BASED PRODUCTS**

	<b>55RT</b>	<b>55ST</b>	<b>65GT</b>
Tg (°C)	175	175	150
Dielectric Constant	3.63	3.53	3.45
Peel, 1 oz Cu (lb/in)	5-6	10	8
CTE (X,Y,Z) ppm/°C	10/10/110	11/11/120	11/11/120
Resin % Options	53/63	53/63	53/61
UL-94	V0	V0	V0
Flame Retardant	TBBA	TBBA	No Br/Sb
CAF Resistance	Excellent	Excellent	Excellent
Water Absorption %	0.35	0.32	0.28

Laminate and Prepreg based on Thermount® nonwoven aramid are the material of choice for HDI applications whether you want to use a single microvia layer as a foil lam on top of a

<b>10 Great Reasons to Use Arlon's Thermount®-Based Products</b>
* <b>Excellent CAF Resistance</b>
* <b>Smooth Surface</b>
* <b>Unparalleled Registration Stability</b>
* <b>Ease of Laser Microvia Formation</b>
* <b>Resists Cracking</b>
* <b>High Peel with 55ST Interpenetrating Polymer Network Resin Technology</b>
* <b>Improved Moisture Regain Over 1st Generation Thermount Products</b>
* <b>Flat, Parallel for Foil Lamination</b>
* <b>Low XY CTE for SMT Applications</b>
* <b>Improved PTH Reliability</b>
* <b>Environmentally Friendly 65GT Version UL-94 V0 with no Halogen or Antimony</b>
* <b>Available High Resin for Via Fill</b>

4-6 layer FR-4 board, or a full-build board with multiple layers of blind and buried vias in addition to the surface

microvia structure which may extend between layers 1, 2 and 3, as required. Issues reported with RCC (Resin Coated Copper) including resin cracking, registration issues and poor coplanarity, may be significantly improved by using an Arlon nonwoven aramid product in a foil lamination.

If you are faced with the need to move your "Green" products into the HDI arena and provide microvia structure, this product line will give you the ideal tool to do just that. Arlon's 65GT is compatible with other "Green" epoxy products, and processes identically to our standard 55RT and 55ST epoxy aramid products. Given the excellent CAF resistance delivered by a nonwoven, random fiber structure, 65GT is worth a look today.

For additional information contact [sales@Arlon-med.com](mailto:sales@Arlon-med.com) or check our website at [www.Arlon-med.com](http://www.Arlon-med.com).

### **Arlon's 25N and 25FR -- Solving RF Problems with Laminate Material**

Everybody has heard the old GM advertising slogan, "This is not your Father's Buick!" In a few words it tells us that this generation has and should have different expectations concerning the overall appearance and performance of their automobiles. Much the same thing might well be said about today's microwave and RF printed circuit boards -- the demands on materials have changed, and materials have had to change to meet the requirements of electronics that are smaller, faster, and more complex while at the same time needing to be lower in cost than ever before.

Arlon's 25N and 25FR (flame retardant) laminate and prepreg products are uniquely designed for the 21<sup>st</sup> century RF and microwave designer whose boards are going to be high density multilayer structures with requirements for lower loss and dielectric constant attributes not found in FR-4 or modified FR-4 products.

The broad applicability of 25N and 25FR can be appreciated in their use in such diverse programs as: antennas, LNA's and filters for cellular infrastructure; transceivers, RF

power amplifiers and cable amplifiers for TV and broadband internet; marine band radar; and roadway toll systems. Four and six layer PWB's permit much higher density interconnection than is traditionally allowed with PTFE materials, while FR-4 type lamination and post lamination processing are compatible with equipment and process expertise in a broad range of PWB fabrication and assembly houses.

There are four key benefits to 25N and 25FR that make it unique among the product offerings targeted at the low cost RF and microwave marketplace:

- Does not require complex PTFE processing
- More stable Er over temperature than most PTFE laminates
- Homogeneous prepreg (same Er as the laminate)
- Higher thermal conductivity than conventional laminates

Key Properties of 25N and 25FR are as follows:

	25N	25FR
<b>Dielectric Constant (10 GHz)</b>	3.38	3.58
<b>Loss Tangent (10 GHz)</b>	0.0025	0.0035
<b>Thermal Conductivity (W/m-K)</b>	0.45	0.45
<b>UL-94 Rating</b>	n/a	V0
<b>Water Absorption (%)</b>	0.09	0.09

We believe that the availability of electrically and mechanically identical prepreg and laminate is the critical difference between 25N and 25FR and competitive products that have similar properties. The same prepreg that we use to make the laminate product is offered to the board fabricator to produce multilayer PWB's, thus ensuring total electrical, mechanical and chemical compatibility. This is important because of the potential problems associated with transmitting RF and microwave signals between layers of material with different dielectric constants. Signal reflections and other sources of loss may erode signal strength or signal integrity, and different harmonics may travel at different speeds.

To learn more about Arlon's 25N and 25FR and all our high tech products for microwave and RF applications, we invite you to visit our website at [www.Arlon-med.com](http://www.Arlon-med.com).

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## **Arlon People -- Changing of the Guard**

Please join us in welcoming Brad Foster to Arlon as our incoming Vice President of Sales. Brad has been active in the PWB and laminate industry since graduating from college, having most recently been



Western Regional Sales Manager for Polyclad, prior to which he held a variety of technical and sales management positions with Shipley. Brad cut his teeth in the industry as a Process Engineer at Sigma Circuits. He received his BA and BS degrees in Geology and Oceanography from Humboldt State University, Arcata, in 1986, and an MBA from the University of the Pacific, Stockton, in 1998. Brad currently lives in Newport Beach, CA

and is in the process of relocating to Alta Loma, near Arlon's Rancho Cucamonga facility where he has his office.

Many of you have worked with our long-time Arlon Vice President of Sales, Don Watt,



(seen here greeting customers at a recent IPC Expo) who retired from "active duty" at the beginning of March, 2002 and will now have the time to indulge himself in some of his many hobbies and interests (camping, hiking, digital photography and swearing at his motor-home, to name just a few) -- not to mention just being able to relax with a good book whenever he wants to. If Don retires with the same enthusiasm and energy that he has put into his work all these years, "relax" may be the wrong word. And Don will do some consulting work for Arlon, primarily to

lead our efforts in the Asia-Pacific marketplace, so we won't completely lose touch with him -- however we all extend Don our best wishes for good health, happiness and long life in his retirement.

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## **Final Notes from Chet Guiles**

The recent IPC Expo and Conference in Long Beach gets mixed reviews. On the one hand, customer traffic at the show was slower than it has been for some time, a reflection

we believe, of the downturn in the economy that we hope will have turned around by IPC time next year. On the other hand, there was a lively technical conference with some good papers and interesting discussion. Of particular interest this year was CAF (conductive anodic filament) growth in PWB's where PTH's are getting closer and closer together and even materials traditionally known to be "CAF-resistant" are starting to reach their limits under these conditions. Arlon's booth featured some of our new non-woven aramid products (55ST -- featuring high peel strength; 65GT -- a "green" halogen and antimony-free product, and 85RT -- a polyimide product) that allow optimum laser microvia formation and inherently resist CAF formation by limiting the available pathway for filament growth and providing resin systems with polymers optimized to intimately interpenetrate the aramid fiber reinforcement.

As we work on putting together our Technical Roadmap for 2002, we see much progress made with the introduction this past year of: the PIM family of products exhibiting Passive Intermodulation Distortion resistant materials in our DiClad 880 and AD-Series microwave/RF laminates; a low cost version of our CLTE product, CLTE-LC, with the same stable dielectric constant over temperature; 55ST nonwoven epoxy-aramid based material with high peel and improved internal cohesive strength; and the introduction at the Spring 2002 IPC Expo of our environmentally friendly 65GT, Green Thermount® based epoxy product. Yet much remains to be done, and we are still actively at work on a variety of additional products and enhancements that we will be announcing as the year goes forward, as well as a number of concepts on which we will be asking you for input and guidance as we develop them into future new products.

In our next newsletter we will look at the subject of clearance hole filling and the various products Arlon has developed (including the long awaited "Howefill 2") to permit hole filling, while resisting resin cracking and other issues associated with large resin filled clearance areas. Meanwhile, I remain confident that some of the early indicators will prove to be truly prophetic, and that we will all start to see the benefits of the much-anticipated heating up of the economy.