HT 1.5

Closely Controlled Melt Point
Chemically Stable
Low Dissipation Factor
Low Dielectric Constant

TACONIC

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HT1.5

APPLICATIONS

Microwave Radios
High Speed Digital Work Stations
Satellite Antenna Systems
Passive Components
High Layer Count MLBs
High Speed Chip Test MLBs

Taconic has over 35 years of experience coating fiberglass fabric with PTFE (polytetrafluoroethylene). This enables Taconic to manufacture copper clad PTFE/woven glass laminates with exceptionally well controlled electrical and mechanical properties.

Taconic laminates are engineered to provide electrical and mechanical properties to meet the requirements of complex microwave and high speed digital applications. The low Z-axis CTE of TLE laminates provides excellent plated through hole reliability. The low thermal expansion properties in the X and Y plane ensure high reliability in surface mount applications. The dielectric constant (Dk) exhibits minimal change over temperature.
offered at 2.95, with a tolerance of ±.05.

TacBond HT 1.5 bonding film offers several unique features, which make it ideally suited as a bonding agent for producing laminated stripline and multilayer packages, using Taconic laminates.
ing fabrication processes.

TacBond HT 1.5 is generally ordered in roll form, both in 12" (304 mm) and 24" (609 mm) width @ 30' (9 m) length. Contact our Customer Service Department for any other thicknesses.

TAC BOND HT 1.5 Typical Properties

Features	Benefits
Closely controlled melt point	Predictable laminating cycle
Dielectric Constant: 2.35	Electrical properties of the package are nearly unaffected by the presence of the bonding film
Low loss properties	Same as above
Chemically stable	Process chemistries will not affect circuit integrity

TacBond HT 1.5			
Property	**Units**	**Value**	**Test Method**
Dielectric Constant @ 10 GHz	-	2.35	ASTM D-3380
Dissipation Factor @ 10 GHz	-	.0025	ASTM D-3380
Melt Point	-	397 ºF (203 ºC)	DuPont Thermal Analyzer
Thickness	Inches (mm)	.0015 (38)	
Water Absorption	%	.005	ASTM D-570
Tensile			
MD	psi	5000	ASTM D-882
TD	psi	3000	ASTM D-882
Elongation (min)			
MD	%	25	ASTM D-882
TD	%	50	ASTM D-882

Laminating Procedure

Surface Preparation and Handling

1. After copper etching to form circuit traces, it is important to minimize handling of the PTFE surfaces. Cotton gloves should be worn by operators and protective slip sheets placed over each surface for transport to the next process.
2. The PTFE surface from which ED foil has been etched has a sufficient roughness for bonding. Where rolled foil has been etched or unclad laminate is to be bonded to, it is recommended that the PTFE surface be treated to provide adequate adhesion. The same chemistries which are used for pth preparation are also recommended for surface treating. Plasma etching or the use of sodium based chemistries (such as FluroEtch® by Acton, TetraEtch® by Gore, and Bond-Prep® by APC) are recommended. The specific processing techniques are provided by the supplier.
3. Copper surfaces should be treated for optimum bond strength. A brown oxide treatment - or a treatment of so-called alternative bonders - of the copper circuitry will enhance the surface topography for mechanical bonding with the TacBond adhesive film. The first process step requires a cleaner to remove resist residues and handling oils. A copper micro-etch follows to provide a uniform roughened surface area. The brown oxide creates needle like crystals which anchor to the bond layer during lamination. As with any chemical process, adequate rinsing is essential after each process step. Salt residues will inhibit bonding. The final rinse should be monitored and maintained at a pH less than 8.5. The layers should be dried and handled without imparting surface contamination such as hand oils.

Lay-up and Lamination

Recommended bonding temperature: 425 ºF (220 ºC)

1. Bake the layers for one hour at 250 ºF (100 ºC) to remove moisture. Store the layers in a controlled environment and use within 24 hours.
2. Press pads should be used between the tooling plate and first separator plate to distribute the pressure evenly across the panel. High pressure areas which exist in the plates and circuits to be filled are absorbed by the pads. The pads also provide temperature uniformity from outside to center of the stack. This results in panel to panel thickness consistency.
3. The board should be constructed with TAC BOND film as supplied. Take care when handling the film during cutting and lay-up to prevent contamination. Depending on the circuit design and filling requirements, one to three sheets of bonding film may be required. The area to be filled and the

dielectric requirement should be used to calculate the number of .0015" (38 micron) film sheets needed. Clean, polished steel or aluminum separator plates are recommended to be used between the boards in multiple stack heights.

4. For vacuum assist lamination, pull vacuum for 20 minutes prior to heat up. Maintain vacuum throughout the cycle. The evacuation of air from the stack will aid in assuring complete encapsulation of circuits.
5. A thermocouple placed in the outside border area of the center board in the stack will allow for temperature monitoring and determination of adequate cycle time.
6. This stack may be loaded into a hot or cold press to start. The heat rise and cycle profiles will differ if not compensated for with press pad lagging. The heat input into the package is not critical, however, it should be controlled to minimize the differential between the outside and center of the stack. Typically, the heat rate is between 12 – 20 ºF/min (6 - 9 ºC/min) from ambient to 425 ºF (220 ºC).).
7. Pressure can be applied immediately upon loading into the press. The pressure will vary with panel size and should be used within the range of 100 - 200 psi (7 – 14 bar).
8. Maintain the stack at 425 ºF (220 ºC) for 15 minutes. The temperature should not exceed 450º F (230 ºC).
9. Cool down under pressure in the lamination press or transfer to a cool down press. If transferred, minimize the time that the stack does not have pressure. Maintain under pressure until the stack is below 200 ºF (100 ºC).