TACONIC
Finding a better way

TacBond HT 1.5 Bonding Film

TacBond HT1.5 bonding film offers several unique features that make it ideal as a bonding agent for producing laminated stripline and multilayer packages using Taconic laminates. The closely controlled melt point provides a predictable laminating cycle. In addition, the electrical properties of the package are nearly unaffected by the presence of the bonding film. Process chemistries will not affect circuit integrity due to the chemical stability of this bonding film.

TacBond HT 1.5 is generally ordered in roll form in 12" (304 mm) and 24" (609 mm) width x 30' (9 m) length.

Taconic is a world leader in RF laminates and high speed digital materials, offering a wide range of high frequency laminates and prepregs. These advanced materials are used in the fabrication of antennas, multilayer RF and high speed digital boards, interconnections and devices.

Benefits & Applications:

- **Low Dk**
- **Low Df**
- **Chemically Stable**
- **Closely Controlled Melt Point**

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

TacBond HT 1.5 Typical Properties			
Property	Units	Value	Test Method
Thickness	mils, mm	1.5, 38	
Dk @ 10 GHz		2.35	ASTM D 3380
Df @ 10 GHz		.0025	ASTM D 3380
Dielectric Strength	v/mil	3,000	ASTM D 149
Volume Resistivity	Mohm/cm	10^{12}	ASTM D 257
Surface Resistivity	Mohm	10^{10}	ASTM D 257
Melt Point		397° F/203° C	DuPont Thermal Analyzer
Water Absorption	%	.005	ASTM D 570
Thermal Conductivity	W/m/k	.22	
Tensile Strength MD, CD	psi	5000, 3000	ASTM D 882
Elongation (min.) MD, CD	%	25, 50	ASTM D 882

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North & South America
Taconic - Headquarters
Petersburgh, NY 12138
Tel: 518-658-3202 / 1-800-833-1805
addinfo@4taconic.com

Europe/Middle East/Australia
Taconic International Ltd.
Republic of Ireland
Tel: +353-44-9395600
add@4taconic.com

Asia
Korea Taconic Company
Republic of Korea
Tel: +82-31-704-1858
ktc@4taconic.com

An ISO 9001:2000 Registered Company
www.taconic-add.com

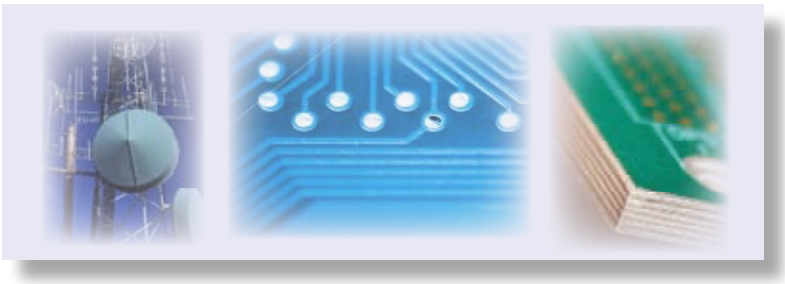
Laminating Procedure/Surface Preparation & Handling

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° F (220° C)

1. Bake the layers for one hour at 250° F (100° C) 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 TacBond 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° F/min (6 - 9° C/min) from ambient to 425° F (220° C).).
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° F (220° C) for 15 minutes. The temperature should not exceed 450° F (230° C).
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° F (100° C).



RoHS WEEE Compliant

rev. 6/08

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.