

Arlon 37N

Electronic Substrates

No-Flow Polyimide Prepreg

- Low Temperature Cure
- High Tg – Thermally Stable
- Reduced Z-Direction Expansion
- No-Flow in Relief Areas

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MATERIALS FOR ELECTRONICS

No-Flow Polyimide Prepreg fills a need in three areas:

1. Bonding rigid-flexible printed wiring board (RFPWB) layers together and bonding rigid (0.005"/0.127mm polyimide) caps to flexible layers.

Acrylic adhesive used to bond flexible layers together has a high coefficient of thermal expansion. This frequently causes plated through hole failures during thermal cycling (cracked barrels, lifted pads and pullaway). Epoxy prepreg used to bond caps in place likewise has a relatively high expansion above its 125°C Tg contributing to PTH failures. Arlon's 37N no-flow has expansion characteristics similar to HI-3003 polyimide laminate which eliminates or greatly reduces the probability of PTH failures.

2. Bonding polyimide (0.005"/0.127mm unclad) insulators to polyimide PWB's.

Insulators frequently contain clearance areas (cutouts) which must remain free of resin flow. Epoxy or acrylic prepreg will not withstand the thermal cycling requirements and may delaminate. 37N no-flow thermal properties match those of the polyimide PWB.

3. Bonding heat sinks to polyimide PWB's.

Epoxy or acrylic prepreps may not withstand the thermal excursions required and result in failed bonds. As in the case of bonding insulators to PWB's, 37N no-flow has thermal performance equivalent to conventional polyimide.

Arlon's No-Flow Polyimide Prepreg is ideally suited for those applications which require:

1. Reduction in Z-axis expansion as compared to epoxy and acrylic systems.
2. Improvement in thermal stability over epoxy or acrylic.
3. Non-flowing into clearance/relief areas. [Clearance/relief areas are 1) clearances in an outer layer of material that provide access to the layer under it, usually for component mounting and 2) the demarcation line between rigid and flex portions (the section where the rigid polyimide cap steps down to the flexible layer) of rigid-flex PWB's.]

Arlon 37N prepreg is made with a proprietary modified bismaleimide resin system. This system is curable at low temperature (350 to 380°F/176-193°C) and attains a Tg of 200°C, or above. It has maximum resistance to flow during lamination and offers:

1. Compatibility with most rigid flex and bonding processes.
2. Low Z-axis expansion.
3. Resistance to high temperatures.

Mechanical and electrical properties meet the requirements of IPC 4101/42.

The logo for Arlon, featuring the word "ARLON" in a bold, red, sans-serif font. The letters are slightly slanted to the right.

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Arlon's 37N Prepreg is available as:

37N8060	60% Resin Content on 1080	Resin Flow of <3%
37N806006	60% Resin Content on 1080	Resin Flow of 6%
37N0666	66% Resin Content on 106	Resin Flow of <3%
37N066606	66% Resin Content on 106	Resin Flow of 6%

Process Guidelines

Because of varying storage conditions that exist, it is recommended that 37N prepreg be dried at 29" (736mm) Hg for 12 to 24 hours. This step is the same as for standard polyimide prepreg.

37N No-Flow prepreg is very process tolerant. It laminates well with either a cold platen press start or with a hot start. Vacuum or vacuum assist lamination is required for the removal of moisture and air. No-Flow products do not displace air voids as well as standard prepregs, and the vacuum will help assure a void free final product.

Use of a silicone rubber pad or other hydraulic material to balance pressure over the board area is also suggested in many flex-rigid applications.

Lamination Cycle

1. Vacuum draw down the package for 60 minutes at < 29" (736mm) Hg prior to loading in the press. Maintain the vacuum beyond the set point of the resin, i.e., above 320°F (160°C).
2. Use a platen temperature in the range of 360° to 380°F (182-193°C).
3. Control the heat rise to about 15° to 20°F (7° to 10°C) per minute between 200° and 300°F (93° and 149°C).
4. Use a pressure of 180 to 350 PSI (12.6 to 24 kg/sq.cm) depending on panel size and complexity. Following are recommended pressures relative to panel size to use as starting points:

PANEL SIZE		PRESSURE	
IN	Cm	PSI	kg/sq. cm
9 x 12	22 x 30	180	13
12 x 12	30 x 30	200	14
12 x 18	30 x 30	250	18
16 x 18	40 x 46	290	20
18 x 24	46 x 61	330	23
24 x 24	61 x 61	350	24

5. Cure time is 90 to 120 minutes at temperature.

The subsequent processing should be the same as those normally used for RFPWB's.



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Typical Properties: 0.0063"/0.16mm 2 ply 1080 Laminate per IPC 4101/42

Property	Required	Typical
Peel strength at elev. temp lbs/in (N/mm)	4.5 min (0.88)	5.5 (0.96)
Peel Strength after process solutions lbs./in. (N/mm)	5.0 min (0.88)	9.2 (1.61)
Volume Resistivity after Moisture Res. megohm-cm	1.0E4	8.2E7
Surface Resistivity after Moisture Res. megohm	1.0E4	4.4E6
Volume Resistivity at Elevated Temp. megohm-cm	6.0E4	4.7E9
Surface Resistivity at Elevated Temp. megohm	6.0E4	1.2E9
Electrical Strength volts/mil (kV/mm)	750 min. (29.6)	1330 (52.4)
Permittivity at 1 MHz	5.4 max.	4.25
Loss Tangent Factor at 1 MHz	0.035 max.	0.018
Arc Resistant (seconds)	120 min.	124

Other Properties

Property	Required
Thermal Conductivity BTU-in/HR/FT ² /°F (watts/m/k)	2.3 (0.33)
Tensile Strength psi (MPa min.) ASTM D 412, M.A.D.C	32,000 (220)
Elongation Min./Max. % ASTM D 412	4 - 6
Continuous Use Temperature (°C)	-65/200

Typical Physical Properties

Property	Required
Flexural Strength at Ambient, ksi (MPa)	60(400)
Flexural modulus at Ambient, ksi (MPa)	2347 (16,200)
Poisson's Ratio	0.17

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