DuPont Electronic Materials

Flexible Circuit Materials

# Pyralux® LF™ Sheet Adhesive

**Flexible Composites**

## Description

Sheet adhesive in the Pyralux® product line is a proprietary B-staged modified acrylic adhesive coated on release paper. Sheet adhesive is used primarily to bond flexible innerlayers or rigid cap layers in multilayer lamination. It is also widely used to bond flexible circuits to rigid boards during the fabrication of rigid-flex circuits, as well as to bond stiffeners and heat sinks.

## Construction

Sheet adhesive is available in a variety of thicknesses; see **Table 1**. The release paper is 7 mils (178 µm) thick. The product code must be used when ordering sheet adhesive from DuPont.

**Table 1**
**Sheet Adhesive Product Codes**

| Product Code | Adhesive Mil (µm) | IPC Certification* |
|---|---|---|
| LF0100 | 1 (25) | Yes |
| LF0200 | 2 (51) | Yes |
| LF0300 | 3 (76) | Yes |
| LF0400 | 4 (102) | Yes |
| LF1500 | ½ (13) | Yes |

*Certified to IPC-232C/18: "Flexible Adhesive Bonding Film (Acrylic)"

## Packaging

Sheet adhesive is supplied on 24 in (610 mm) wide by 250 ft (76 m) long rolls, on nominal 3 in (76 mm) cores. Narrower widths or cut sheets are also available by special order.

## Typical Data

Each manufactured lot of sheet adhesive is certified to IPC specifications and tested according to IPC Test Method TM-650. See **Table 2.**

**Table 2**
**Sheet Adhesive Properties versus IPC Specifications**

| Property | IPC Spec | Typical Sheet Adhesive Value |
|---|---|---|
| Peel Strength*, min. lb/in (kg/cm) | | |
| After lamination | 8 (1.4) | 10 (1.8) |
| After solder | 7 (1.3) | 9 (1.6) |
| Solder Resistance 10 sec at 288°C (550°F) | Pass | Pass |
| Adhesive Flow, max. mil/mil adhesive (µm/µm) | 5.0 (127) | 2–4 (51–102) |
| Dielectric Constant, max. (at 1 MHz) | 4.0 | 3.6–4.0 |
| Dissipation Factor, max. (at 1 MHz) | 0.05 | 0.02–0.03 |
| Dielectric Strength volts/mil (kV/mm) | 1,000 40 | 2,000–3,000 80–120 |
| Insulation Resistance megohm | $10^4$ | $10^5$ |
| Volume Resistivity megohm-cm (ambient) | $10^6$ | $10^8$ |
| Surface Resistivity, min. megohm-cm (ambient) | $10^6$ | $10^7$ |

*Laminating Conditions: 21 kg/cm² (300 psi), 190°C (375°F), 1 hour to treated copper side.

A Certificate of Compliance (COC) is available with every batch. Complete material and manufacturing records for each lot, with samples of finished laminate, are retained for reference purpose. The roll labels contain the lot number, DuPont order number, customer order number, IPC specification, customer specification, and customer part number; save these labels for reference in case of inquiries.

## Processing

Laminating conditions for Pyralux® flexible composites are typically in the following ranges:

| | |
|---|---|
| Part Temperature: | 182–199°C (360–390°F) |
| Pressure: | 14–28 kg/cm$^2$ (200–400 psi) |
| Time: | 1–2 hours, at temperature |

For further processing information refer to DuPont publication H-09706, "Pyralux Processing Guide."

## Storage

Pyralux flexible composites will retain their original properties for a minimum of one year when stored in the original packaging at temperatures of 4–29°C (40–85°F) and below 70% humidity. The products do not need refrigeration and should not be frozen. Keep the material clean and well protected.

Sheet adhesive should not be automatically discarded if storage conditions have deviated from these limits. We recommend that material which has been stored outside these conditions be examined in a practical test run before being committed to production.

## Safe Handling

Pyralux sheet adhesive contains a B-staged adhesive. Because B-staged adhesive contains trace quantities (parts per million) of unreacted monomers, precautions and recommendations should be taken to minimize contact.

DuPont is not aware of anyone developing contact dermatitis, or suffering any other medical discomforts, when using Pyralux products. The uncured acrylic monomers in the bond ply adhesive may impart a mild odor. However, these products have been extensively tested under operating conditions (drilling and lamination conditions) and found to liberate measurable volatiles only well below[1] accepted safe limits (e.g., PEL).

To eliminate contact between the skin and the adhesive, wear lint-free gloves or fingerpads. Anyone handling Pyralux should wash their hands with soap before eating, smoking, or using restroom facilities. Gloves and fingerpads should be changed daily, and wash other protective clothing frequently.

Adequate ventilation and exhaust is recommended in press rooms to prevent the buildup of potentially harmful vapors, to remove disagreeable odors, and to dissipate heat. Drill rooms should be furnished with standard equipment recommended by drill vendors and required by OSHA standards.

For further information on safe handling, refer to DuPont publication H-46862, "Pyralux® LF and FR Safe Handling;" and refer to "Industrial Ventilation," 18th Edition or latest available from the American Conference of Governmental Industrial Hygienists, 6500 Glenway, Building D-5, Cincinnati, OH 45211.

[1] Values for all materials monitored were well below 10% of their accepted limits (PEL or TLV). In only one case, did the concentration reach approximately 40% of its limit. This was an oven used to dry the uncured acrylic material. This oven drying is not normally used in the process and during the exposure the oven was unventilated. Adequate ventilation is normally recommended for any heating process.

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