DuPont Electronic Materials

Flexible Circuit Materials

# Pyralux® FR™ Coverlay

**Flexible Composites**

## Description

Pyralux® FR™ coverlay is a composite of DuPont Kapton® polyimide film, coated on one side with a proprietary, flame retardant B-staged acrylic adhesive. Coverlay can be used to encapsulate etched details in flexible and rigid-flex multi-layer constructions (eight conductive layers or less) for environmental protection and electrical insulation.

## Construction

Coverlay is available in a variety of film and adhesive thicknesses. **Table 1** lists typical constructions.

The product code must be used when ordering coverlay from DuPont.

## Packaging

Pyralux® coverlay composites are 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, except the four coverlay constructions noted in **Table 1**, is certified to IPC specifications and tested according to IPC Test Method TM-650. See **Table 2**.

**Table 1**
**Coverlay Product Codes**

| Product Code | Adhesive mil (μm) | | Kapton® mil (μm) | | IPC Certification* |
|---|---|---|---|---|---|
| FR0110 | 1 | (25) | 1 | (25) | Yes |
| FR0120 | 1 | (25) | 2 | (51) | Yes |
| FR0130 | 1 | (25) | 3 | (76) | Yes |
| FR0150 | 1 | (25) | 5 | (127) | Yes |
| FR0210 | 2 | (51) | 1 | (25) | Yes |
| FR0220 | 2 | (51) | 2 | (51) | Yes |
| FR0230 | 2 | (51) | 3 | (76) | Yes |
| FR0250 | 2 | (51) | 5 | (127) | Yes |
| FR0310 | 3 | (76) | 1 | (25) | Yes |
| FR7001 | 1/2 | (13) | 1/2 | (13) | No |
| FR7013 | 1 | (25) | 1/2 | (13) | No |
| FR7082 | 2 | (51) | 1/2 | (13) | No |
| FR1510 | 1/2 | (13) | 1 | (25) | Yes |
| FR7332 | 3/4 | (19) | 1/2 | (13) | No |

*Certified to IPC-FC-232C/1: "Adhesive Coated Dielectric Films for Use as Cover Sheets for Flexible Printed Circuits"

**Table 2**
**Pyralux® FR™ Coverlay Properties**

| Property | Typical Coverlay Value | Test Method |
|---|---|---|
| Flammability* | VTM-0 | UL94 |
| Meets UL796 Direct Support Requirements | Yes | UL796 |
| Peel Strength* | — | IPC-TM-650, No. 2.4.9 |
| After lamination | 1.6 N/mm (9 lb/in) | Method B |
| After soldering | 1.6 N/mm (9 lb/in) | Method D |
| Solder Float Resistance 10 sec at 288°C (550°F) | Pass | IPC-TM-650, No. 2.4.13 Method B |
| Adhesive Flow, μm/μm (mil/mil) | 4.0 | IPC-TM-650, No. 2.3.17.1 |
| Thickness Tolerance | ±10% | IPC-TM-650, No. 4.6.2 |
| Dimensional Stability | –0.03% | IPC-TM-650, No. 2.2.4 Method A |
| Dielectric Constant (at 1 MHz) | 3.5 | IPC-TM-650, No. 2.5.5.3 |
| Dissipation Factor (at 1 MHz) | 0.02 | IPC-TM-650, No. 2.5.5.3 |
| Dielectric Strength | 137 kV/mm (3500 V/mil) | ASTM D-149 |
| Insulation Resistance (at ambient) | $10^6$ megohms | IPC-TM-650, No. 2.6.3.2 |
| Volume Resistivity (at ambient) | $10^9$ megohm-cm | ASTM D-257 |
| Surface Resistance (at ambient) | $10^7$ megohms | ASTM D-257 |

*Laminating Conditions: 14 kg/cm$^2$ (200 psi), 182°C (360°F), 1 hour to treated side of 1 oz RA copper foil.

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 |

Pyralux® FR™ can be processed like Pyralux® FR. Refer to publication "Pyralux® Flexible Composites Technical Manual" for further processing details.

## 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.

Coverlay 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 before being committed to production.

## Safe Handling

Pyralux® FR™ coverlay, sheet adhesive, and bond ply contain a B-staged adhesive. Since B-staged adhesive contains trace quantities (parts per million) of unreacted monomers, operators should take care to minimize contact.

Pyralux® FR™ copper-clad laminates contain fully cured (C-staged) adhesive.

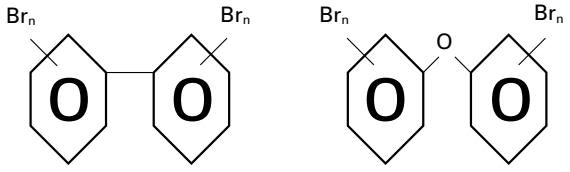
Although DuPont is not aware of anyone developing contact dermatitis when using Pyralux® FR™ products, some individuals may be more sensitive than others. Anyone handling Pyralux® FR™ copper-clad laminates should wash their hands with soap before eating, smoking, or using restroom facilities. Gloves, finger cots, and finger pads should be changed daily. Clothes should be washed frequently.

The unreacted acrylic monomer in the adhesive may impart a mild odor when the release film or paper is removed. We recommend that areas where B-staged materials are used, as well as lay-up and lamination areas, be well ventilated with a fresh air supply.

Pyralux® adhesive is cured during lamination. The curing reaction does not produce any vapors, although impurities may volatilize. When drilling or routing parts made with Pyralux® FR™ flexible composites, provide adequate vacuum around the drill head to minimize worker exposure to adhesive dust.

Thin copper-clad laminates can have sharp metal edges. People handling these materials should be cautioned and provided with suitable gloves to prevent cuts.

Pyralux® FR™ flexible composites DO NOT contain polybrominated biphenyls (PBBs), polybromined biphenyl oxides (PBBOs), or polybrominated diphenyl ethers (PBDEs).




**PBB** **PBBO**

**DuPont Electronic Materials · 14 T.W. Alexander Drive · Research Triangle Park, NC 27709-4425**

**(800) 243-2143, Ext. 3637**

**Come visit us on the Internet at: http://www.dupont.com/fcm**



H-73234 (10/00) Printed in U.S.A.

DuPont Electronic Materials