DuPont™ Pyralux® FR Bond Ply

flexible composites

Technical Information

Description

DuPont ™ Pyralux® FR bond ply is constructed of DuPont™ Kapton® polyimide film, coated on both sides with a proprietary, flame-retardant, B-staged acrylic adhesive. Bond ply is used to encapsulate two etched details for environmental protection and electrical insulation. Using bond ply can eliminate a layer of Kapton® and a layer of adhesive in low layer count multilayer constructions.

Construction

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

The product code must be used when ordering bond ply from DuPont.

Packaging

Pyralux® bond ply 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 bond ply constructions noted in **Table 1**, is certified to IPC specifications and tested according to IPC Test Method TM-650. See **Table 2**.

Table 1
Bond Ply Product Codes

Product Code	Adhesive	Kapton®	Adhesive	IPC
	mil (µm)	mil (µm)	mil (µm)	Certification*
FR0111	1 (25)	1 (25)	1 (25)	Yes
FR0121	1 (25)	2 (51)	1 (25)	Yes
FR0131	1 (25)	3 (76)	1 (25)	Yes
FR0212	2 (51)	1 (25)	2 (51)	Yes
FR7021	1/2 (13)	1/2 (13)	1/2 (13)	No
FR7016	1 (25)	1/2 (13)	1 (25)	No
FR7081	2 (76)	1/2 (13)	2 (76)	No
FR1515	1/2 (13)	1 (25)	1/2 (13)	Yes

*Certified to IPC-4203/1: "Adhesive Coated Dielectic Films for Use as Cover Sheets for Flexible Printed Circuits and Flexible Adhesive Bonding Films."

Exception: the DuPont flow requirement, using IPC-TM-650, Method 2.3.17.1, is 10.0 mils/mil of adhesive thickness.

Table 2
Pyralux® FR Bond Ply 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 Constance (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/cm² (200 psi), 182°C (360°F), 1 hour to treated side of 1 oz RA copper foil.
The values in Table 2 represent a typical 1 oz. RA copper foil, 1 mil adhesive and 1 mil Kapton® construction.

A Certificate of Conformance is available with every batch. Complete material and manufacturing records for each lot, with samples of finished product, are retained for reference purposes. 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® LF. Refer to publication "Pyralux® Flexible Composites Technical Manual" for further processing details.

Storage Conditions and Warranty

Pyralux® FR flexible laminates should be stored in the original packaging at temperatures of 4–29°C (40–85°F) and below 70% humidity. The product should not be frozen and should be kept dry, clean and well protected. Subject to compliance with the foregoing handling and storage recommendations, DuPont's warranties as provided in the DuPont Standard Conditions of Sale shall remain in effect for a period of two years following the date of shipment.

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.

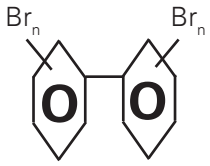
Although DuPont is not aware of anyone developing contact dermatitis when using Pyralux® FR products, some individuals may be more sensitive than others. Anyone handling Pyralux® FR copper-clad laminates should wash their hands with soap before eating, smoking, or using restroom facilities. Gloves, finger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

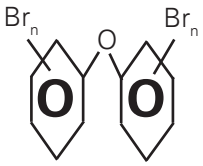
Pyralux® adhesive is cured during lamination. The curing reaction does not produce any vapors, although impurities may volatilize. When drilling or routing parts made with Pyralux® FR flexible composites, provide adequate vacuum around the drill head to minimize worker exposure to adhesive dust.

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

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