

DuPont™ Pyralux® AC

FLEXIBLE CIRCUIT MATERIALS

Technical Information

Description

DuPont™ Pyralux® AC flexible circuit materials are single-sided copper-clad laminates with all-polyimide composite of polyimide film on copper foil. Pyralux® AC products are ideal for use in single-sided applications such as: display drivers, multilayer digital cameras or rigidflex camcorder circuits that require thin, light and high density circuitry along with chip on flex attachment. Techniques commonly used in the manufacture of flexible circuits can be used to process Pyralux® AC products.

Specifications

- Excellent dimensional stability (Figure 1)
- Low moisture absorption
- High modulus
- Excellent thermal resistance
- Excellent long term thermal aging (Figures 2 and 3)
- Thermal/humidity resistance (Figure 4)
- Low CTE
- UL 94 recognition: V-0

Typical physical and electrical properties along with applicable test methods are shown in Table 2.

Constructions

Standard Pyralux® AC products are listed in Table 1. The polyimide base substrate is available in thicknesses of 12 μm (0.5 mil), 20 μm (0.8 mil) and 25 μm (1 mil). Rolled-annealed (RA) copper foil weight is available in 18 μm (1/2 oz/ft²). Electro-deposited (ED) copper foil weight is available in 12 μm (1/3 oz/ft²) and 18 μm (1/2 oz/ft²). μm .

Packaging

Pyralux® AC is supplied in standard widths of 9.84 in (250 mm) and 19.68 in (500 mm). Roll length is 164 ft (50 m) or 328 ft (100 m) on a nominal 9.5 cm core. Other sizes are available by special order. All packaging materials are 100% recyclable.

Table 1
Single-Sided Pyralux® AC Product Offerings

| Product Codes | Copper μm (oz/ft ²) | Copper Type | Polyimide μm (mil) |
|---------------|---|-------------|----------------------------------|
| AC 354500R | 35(1.0) | RA | 45(1.8) |
| AC 352500R | 35(1.0) | RA | 25(1.0) |
| AC 182500R | 18(1/2) | RA | 25(1.0) |
| AC 182000R | 18(1/2) | RA | 20(0.8) |
| AC 181200R | 18(1/2) | RA | 12(0.5) |
| AC 182500RT | 18(1/2) | RA-T | 25(1.0) |
| AC 181200RT | 18(1/2) | RA-T | 12(0.5) |
| AC 182500RH | 18(1/2) | RA-H type | 25(1.0) |
| AC 182000RH | 18(1/2) | RA-H type | 20(0.8) |
| AC 181200RH | 18(1/2) | RA-H type | 12(0.5) |
| AC 182500RHA | 18(1/2) | RA-H type | 25(1.0) |
| AC 182000RTH | 18(1/2) | RA-TH type | 20(0.8) |
| AC 182500EM | 18(1/2) | ED-M type | 25(1.0) |
| AC 182000EM | 18(1/2) | ED-M type | 20(0.8) |
| AC 122500EM | 12(1/3) | ED-M type | 25(1.0) |
| AC 122000EM | 12(1/3) | ED-M type | 20(0.8) |
| AC 121200EM | 12(1/3) | ED-M type | 12(0.5) |
| AC 354500EY | 35(1.0) | ED-Y type | 45(1.8) |
| AC 352500EY | 35(1.0) | ED-Y type | 25(1.0) |
| AC 182500EY | 18(1/2) | ED-Y type | 25(1.0) |
| AC 122500ES | 12(1/3) | ED-M type | 25(1.0) |
| AC 092500EV | 9(1/4) | ED-V type | 25(1.0) |
| AC 091200EV | 9(1/4) | ED-V type | 12(0.5) |

Rev. 03/24/09

Product Description

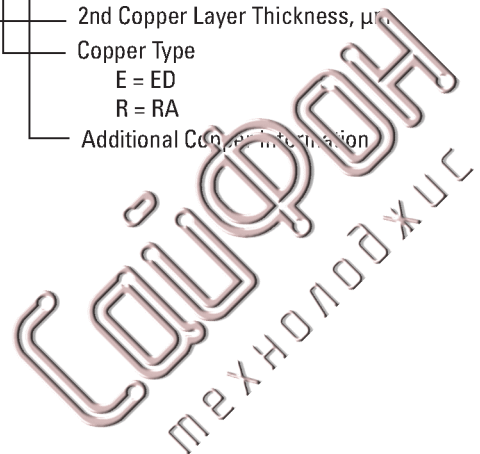
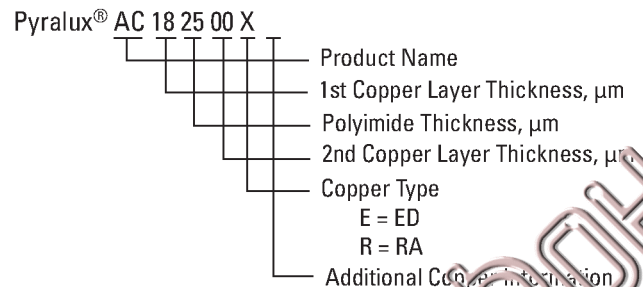


Table 2
Pyralux® AC Material Properties

| Property | Typical Value | Test Method |
|--|------------------|-----------------------------|
| Adhesion to Cu (Peel Strength*) | | IPC-TM-650, Method 2.4.9 |
| As Received, N/mm (lb/in) | 1.19 (6-7) | Method B |
| After Soldering, N/mm (lb/in) | 1.19 (6-7) | Method D |
| Solder Float | | IPC-TM-650, Method 2.4.13 |
| 10 sec at 288°C (550°F) | Pass | Method B |
| Dimensional Stability, % | | IPC-TM-650, Method 2.2.4 |
| | -0.02 | Method B, % |
| | -0.04 | Method C, % |
| Dielectric Constant (at 1 MHz) | 3.7 | IPC-TM-650, Method 2.5.5.3 |
| Dissipation Factor (at 1 MHz) | 0.0014 | IPC-TM-650, Method 2.5.5.3 |
| Dielectric Strength, kV/mm (Kv/mil) | 200 (4.9) | ASTM D-149 |
| Volume Resistivity (damp heat), megohm | 10 ¹⁰ | IPC-TM-650, Method 2.5.17.1 |
| Surface Resistance (damp heat), megohm | 10 ⁹ | IPC-TM-650, Method 2.5.17.1 |
| Moisture Absorption, % | 0.94 | IPC-TM-650, Method 2.6.2 |
| CTE, ppm/°C | 19 | ASTM D-696-91 |
| CHE, ppm/% RH | 8.0 | |
| Propagation Tear Strength ¹ , g | 3.0 | IPC-TM-650, Method 2.4.17.1 |
| Initiation Tear Strength ¹ , g | 400-700 | IPC-TM-650, Method 2.4.16 |
| Tensile Strength, Mpa (kpsi) | 193 (28) | IPC-TM-650, Method 2.4.19 |
| Tensile Modulus, Mpa (kpsi) | 7580 (1100) | ASTM D-882-91 |
| Elongation, % | 21 | IPC-TM-650, Method 2.4.19 |
| Flammability | V-0 | UL-94 |

* Peel strength method is 180° instead of 90°

¹ With exception to IPC-TM-650, Method 2.4.17.1, Propagation Tear Strength

² With exception to IPC-TM-650, Method 2.4.16, Initiation Tear Strength

Processing

In general a surface treatment of the polyimide surface will improve the adhesion with bonding films. Bond strength results will vary depending on circuit processing and material selection. Additional treatment is required for those applications requiring pre-pregs.

Please specify DuPont™ Pyralux® AC *Plus* flexible circuit material for use with pre-pregs. Pyralux® AC *Plus* is specifically treated for additional bond strength.

Storage Conditions/Shelf Life

DuPont™ Pyralux® AC flexible laminates are warranted for two years from the date of manufacturing when stored in the original packaging at temperatures of 4-29°C (40-85°F) and below 70% relative humidity. The products do not require refrigeration and should not be frozen. The material should be kept clean and well protected from physical damage.

Safe Handling

Although DuPont is not aware of anyone developing contact dermatitis when using Pyralux® AC products, some individuals may be more sensitive than others.

Anyone handling Pyralux® AC should wash their hands

with soap before eating, smoking or using restroom facilities. Gloves, finger cots and finger pads should be changed daily.

As with all thin, copper-clad laminates, sharp edges present a potential hazard during handling. All personnel involved in handling Pyralux® AC should be cautioned and provided with suitable gloves to minimize potential cuts.

Pyralux® AC is fully cured when delivered. However, lamination areas should be well ventilated with a fresh air supply to avoid build-up from trace quantities of residual solvent (typical of polyimides) that may volatilize during press lamination. When drilling or routing parts with Pyralux® AC, provide adequate vacuum around the drill head to minimize worker exposure to dust.

Pyralux® AC products do not contain polybrominated biphenyls (PBBs) or polybrominated biphenyl oxides (PBBOs).

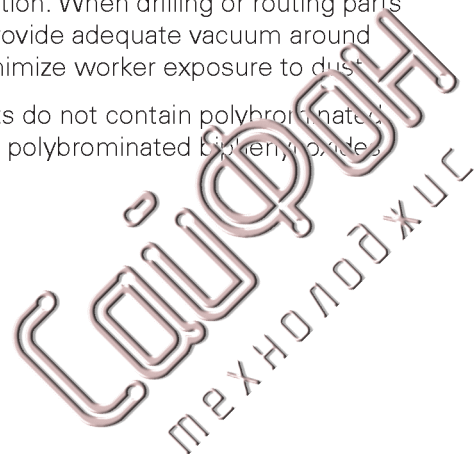


Figure 1. Typical Dimensional Stability at 200°C (392°F)
(25 µm dielectric, 18 µm Cu)

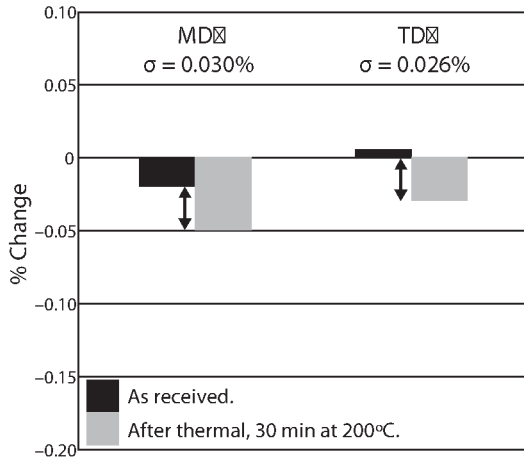


Figure 2. Typical Bond Strength—Pyralux® AC 182500R

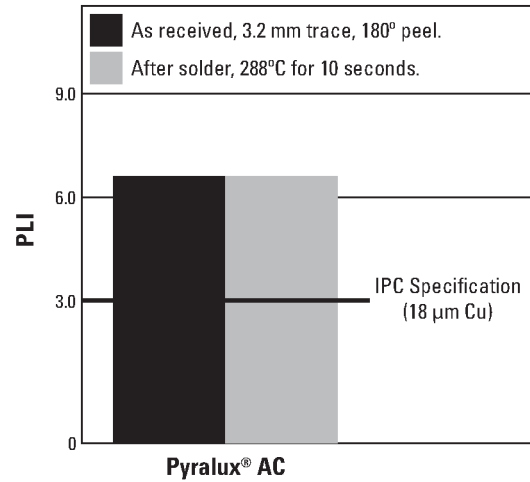


Figure 3. Temperature/Humidity Aging at 85°C (185°F)/85% RH for 2,000 hours

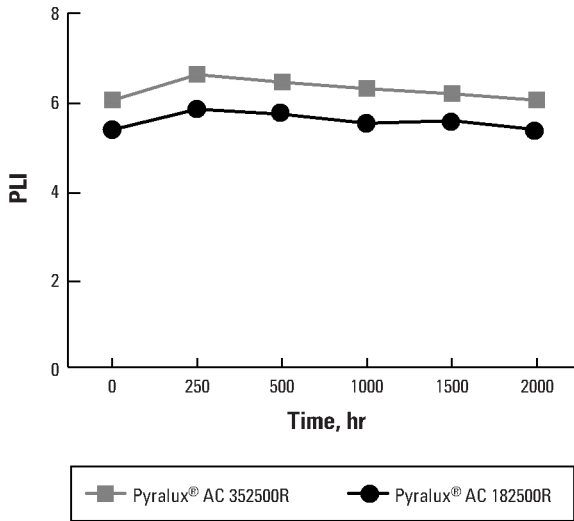
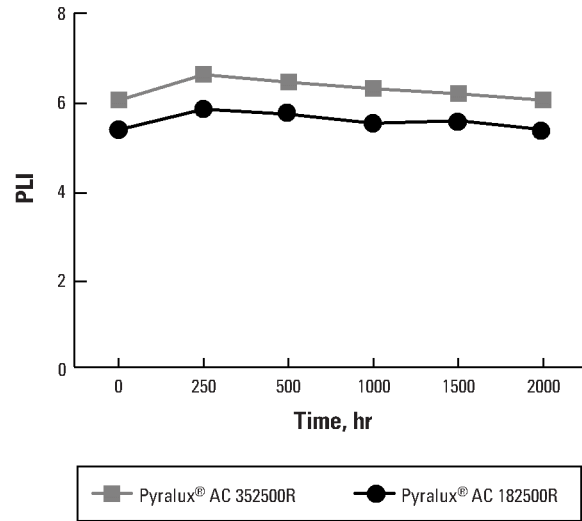


Figure 4. Temperature/Humidity Aging at 150°C (302°F) for 2,000 hours



For more information on DuPont™ Pyralux® flexible circuit materials and other DuPont High Performance Laminates products, please contact your local representative, or visit our website for additional regional contacts:

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