



November 1, 1975
New Information
Mailed to: E, D, C/2159/PL, DB

Flexible Copper-Clad Materials

Copper Clad Kapton® Film

Product is available with rolled or electrodeposited copper foil on one or both sides, in a variety of thicknesses of foil and film.

Available in rolls in a variety of widths and diameters.

Properties

Peel strength (on 0.062" conductors) 90 degree angle at 2"/min., lbs./inch. 8
Insulation Resistance, megohms. Greater than 1×10^5 , per Western Electric Spec. MS58538
Solder Resistance at 500°F (as a circuit) 30 seconds
Melt Index Fisher Johns, °C. Greater than 270°C
Guide to Circuit Lamination in press. a. Dry coversheet and circuit.
b. Load in padded press at contact pressure for 6 min. at 360°F.
c. Apply pressure of 300 psi for 5 min.
d. Remove hot.

Typical Values

® DuPont's Trademark for their Polyimide Film

Adhesive Coated Kapton Film

This product is coated on one side to a variety of thicknesses. It has excellent electrical properties and shelf life.

Available in rolls in a variety of widths and diameters.

Properties

Thickness of adhesive. From 0.0005" to 0.002"
Type of adhesive. Epoxy
Melt Index of adhesive, Fisher Johns, °C. 165°C
Insulation Resistance. Greater than 1×10^5 megohms, per Western Electric Spec. MS58538
Guide to Circuit Lamination in press. a. Dry coversheet and circuit.
b. Load in padded press contact pressure for 6 min. at 360°F.
c. Apply pressure of 300 psi for 5 min.
d. Remove hot.
Solder resistance of laminated Circuit. Greater than 30 sec. at 500°F

Typical Values

SOLDER FLEX™

(Polyamide-imide Insulated Copper Foil)
This adhesiveless system is available on rolled and electrodeposited copper foil from 1 to 4 oz./sq. ft. Maximum coating thickness 0.001" \pm 10%/oz. Double clad available with epoxy adhesive system.

This is typical test data taken from production material.

Properties of .002 SOLDER FLEX on 2 oz. Copper

Electric Strength, KV, ASTM D149
1/4" Electrode. 6
Dissipation Factor, ASTM D150. 60 HZ. 25C
0.006
60 HZ. 180C
0.015
Dielectric Constant, ASTM D150. 25C 4.6
200C 4.9
Volume Resistivity, ohm-cm,
ASTM D257. 10^{15}
Tensile Strength, psi, ASTM D882. 25C 10,000
Elongation, percent, ASTM D882. 10
Water Absorption, percent, tested
after immersion in water for one week. 4.4
Shrinkage after etching away all
copper and exposure of film to
165°C for 1 hr. and conditioning for
1 hr. at 50% R.H., in./in.008" \pm .002"
Solder Resistance at 530°F, seconds. . 30
180° Bond Strength, 2 oz. Copper
(lb. per inch of width). 4 lb. min.
Fold Endurance MD + CMD. 200 Cycles
Insulation Type. Polyamide-imide
Solubility rate in 15% caustic
solution at 100°C, mils/min. 1.0
Maximum widths available. 18"
Standard Put-Up. 18", 12", 6" Rolls on 3"
ID Cores

Typical Values on Electrodeposited Copper

Typical Values on Rolled Annealed Copper

6
60 HZ. 25C
0.006
60 HZ. 180C
0.015
25C 4.6
200C 4.9
 10^{15}
25C 10,000
10
4.4
.004" \pm .002"
30
2-3 lb.
5,000 Cycles
Polyamide-imide
1.0
18"
18", 12", 6" Rolls on 3"
ID Cores



Copper Clad Polyester Film

Product is available with rolled or electro-deposited copper foil on one or both sides, in a variety of thicknesses of copper foil and film. It can be obtained as a fire retardant grade.

The material as listed meets or exceeds requirements specified in 1PC-FC-220, IPC-FC-231, IPC-CF-150, IPC-FC-241.

Available in rolls in a variety of widths and diameters.

Properties

		Typical Values			
Peel Strength, lbs./inch	.....	8			
Conductor Bend Resistance, cycles	.....	Approx. 100			
ED Copper (2 oz.)	.....	Approx. 250			
Rolled Copper (2 oz.)	.....	Etch			
Dimensional Change, Mils/in.	.....	40°C bath		Thermal	
				48 hrs./125°C	
		MD	CMD	MD	CMD
		1.0	1.0	Less than 10.0	1.0
Melt Index of adhesive, Fisher Johns, °C	.....	Greater than 210°C			
Insulation Resistance, megohms	.....	Greater than 1×10^5 , per Western Electric Spec. MS58538			
Flammability Requirements	.....	Tailored to fit (L01, UL, ASTM 568)			

Adhesive Coated Polyester Film

This product is coated on one or both sides to a variety of thicknesses with controlled shrinkage. It has excellent electrical properties and shelf life. Available in regular and fire retardant grades.

The material as listed meets or exceeds requirements specified in 1PC-FC-231.

Available in rolls in a variety of widths and diameters.

Properties

		Typical Values			
Thickness of adhesive, inches	.....	From 0.001" to 0.006" \pm 10%			
Type of adhesive	.....	Polyester			
Flammability requirements	.....	Tailored to fit any or all of the following requirements:			
		a. UL			
		b. L01			
		c. ASTM 568			
Melt Index of adhesive, Fisher Johns, °C	.....	Minimum 135°C. Maximum greater than 220°C.			
Insulation Resistance, megohms	.....	Greater than 1×10^5 per Western Electric Spec. MS58538			

Basic Materials

Copper Foil	.....	Meets IPC-CF-150 1 oz./sq. ft. and heavier gauges; rolled, hard or annealed; electro-deposited, high ductility; treated to withstand etching, plating and cleaning.
Polyester Film	.....	Meets IPC-FC-231. 1, 2, 3 and 5 mil gauges.
Polyimide Film	.....	Meets IPC-FC-231. 1, 2, 3 and 5 mil gauges.
Solder Flex	.....	Typical values per Westinghouse properties chart.