

1 MIL WHITE COATED BLACK POLYIMIDE FILM

POLYONICS XF-106 is a high temperature, high opacity flexible substrate that includes a 1 mil black polyimide film coated with a durable, highly reflective white topcoat that can be printed with conductive inks via digital and flexographic print methods.

XF-106



FEATURES

- High opacity and reflectivity
- REACH and RoHS compliant
- Dimensionally stable at high temperatures
- Chemically resistant
- Heat, cold, solvent and voltage resistant
- The white topcoat is designed to be ink receptive with conductive inks
- Passes the requirements of circuit board processing as noted by MIL-STD-202G, Notice 12, Method 215K and MIL-STD- 883E, Notice 4, Method 2015.13.

APPLICATIONS

- Lighting devices (LEDs, etc.) that require substrates with both high reflectivity and minimal light leakage (high opacity).
- Electronic applications that are exposed to temperature extremes, cycling between high and low temperatures, or high temperatures for a prolonged period of time where dimensional stability of the film is critical to prevent breaks in the printed circuits.
- Those that need a substrate with high volume resistivity and the ability to withstand strong electric fields and high voltages.
- The topcoat on this product is a good choice for high density printed circuits that require high resolution printing.

SPECIAL CONSIDERATIONS

- Intended for industrial use only
- For screenprinted applications that use vacuum ports for holding substrates in place during printing, the 1 mil polyimide should be evaluated to confirm film deflection does not cause print defects.
- The conductive ink system manufacturers identified in the Technical Data table on page 2 have printed on the gloss white polyimide and found acceptable results in terms of image quality and ink anchorage. Please consult with these manufacturers for suitable inks for your application.

TECHNICAL DATA

Properties	Test Method	Average Results (Value)	Average Results (Units)
Thickness	ASTM D-1000	0.0014 (35.6)	Inch (µm)
Surface Finish	High Gloss, 75-80 GU		
Color	L = 80 - 90; a = -1.5 +/- 0.5; b = -3.5 +/- 0.5 (CIE L*a*b*)		
Opacity	>97%		
Reflectivity	>90%		
Thermal Expansion 1 mil Polyimide	TMA	20	PPM/degree Celsius
Thermal Conductivity 1 mil Polyimide	ASTM F-433-77 (1987)	0.12	W/m·K
Tensile Strength 1 mil Polyimide	ASTM D882	231	MPa
Tensile Modulus 1 mil Polyimide	ASTM D882	2.5	GPa
Elongation 1 mil Polyimide	ASTM D882	72%	@ 20 °C
Volume Resistivity 1 mil Polyimide	ASTM D-257	10 ¹⁷	Ohm-cm
Dielectric Constant 1 mil Polyimide	IPCTM-650	3.4	@ 1 MHz
Breakdown Voltage 1 mil Polyimide	ASTM D-149	7.7 (303)	kV/mil (kV/µm)
Ink Systems Recognized	Conductive Compounds, HC Starck Clevios, Johnson Matthey		

DURABILITY TESTING

Properties	Test Method	Test Fluid	Results
Chemical Resistance	MIL-STD-202G, Notice 12, Method 215K MIL-STD-883E, Notice 4, Method 2015.13	Solvent A- 1 part IPA, 3 parts mineral spirits	No visible effect
		Solvent B- 1, 1, 1-Trichloroethane	Solvent deleted per notice 12
		Solvent C- Terpene Defluxer	No visible effect
		Solvent D- Saponifier	No visible effect
Heat/Chemical	Polyonics 80386	Immersed in chemical at 70 °C for 5 min	Image Degradation
		Kyzen Corp. Aquanox SSA 30% aqueous	No degradation
		Re-entry KNI 2000 Terpene 40-45 °C	No degradation
		Alpha Metals 2110 Saponifier 10% aqueous	No degradation
		Isopropanol 99%	No degradation
Weathering Test	ASTM G154	-	No visible effect
Temperature Rating	Long Term	-	100 hours at 302 °F (125 °C)
	Operating	-	5 minutes at 500 °F (260 °C)
	Short Term	-	90 seconds at 572 °F (300 °C)
Shelf Life	1 year below 80 °F (27 °C) and 60% R.H.		

All SI units are mathematically derived from U.S. conventional units.

NOTE: All values shown are averages and should not be used for specification purposes. Test data and test results contained in this document are for general information only and shall not be relied upon by POLYONICS customers for designs and specifications, or be relied on as meeting specified performance criteria. Customers desiring to develop specifications or performance criteria for specific product applications should contact POLYONICS for further information.

References: ASTM: American Society for Testing and Materials (U.S.A.) SI: International Systems of Units.

Trademarks: XJN+ & Aquanox SSA-TM is a trademark of Kyzen Corporation RE-ENTRY™ is a registered trademark of EnvironsolvInc.

POLYONICS MATERIAL COMPLIANCE

RoHS (Restriction of Hazardous Substances) EU Directive 2002/95/EC	Limits set forth in Directive 2011/65/EU
REACH (Registration Evaluation and Authorization of Chemicals) EU Directive 1907/2006/EC	Limits set forth in Directive 1907/2006/EC Article 7 (2)
Halogen Free - Restriction use of Halogen (IEC 61249-2-21)	Limits set forth in International Electrochemical Commission

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