ELANTAS
Electrical Insulation

Technical Data Sheet

Electronic & Engineering Materials

ELAN-Film® HT-180

Electrical Insulating Film

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Product Description

ELAN-Film® HT-180 is a PET film coated on each side with a 0.5 mil layer of ELANTAS PDG, Inc. Tritherm® polyamideimide wire enamel. The Tritherm® coating is applied on the PET giving the film a fully integrated composite structure suitable for slitting, forming and cutting.

Areas of Application

ELAN-Film® HT-180 can be used in slot liners, wedges and phase applications in electric motors and in layer insulation for transformers.

Features and Benefits

- Superior electrical properties
- Low moisture absorption
- Class H UL rating
- Excellent adhesion to impregnating resins
- Excellent chemical/refrigerant resistance

Application Methods

- Mechanical insertion

Standard Dimensions/Storage/Transportation

Standard film rolls of 1.42 m (56") wide with Tritherm® coating width of 1.37 m (54") on a 1.52 m (60") long, 15.2 cm (6") ID cardboard core shrink wrapped to standard pallet. Depending upon thickness, roll length averages from 1000 m to 3000 m. Special size rolls up to 1.52 m (60") coating width and converted film shapes are available through distribution. Thicknesses available from 3mil - 26mil (75µm - 660µm).

Store in a dry area out of elements.

Film rolls are shipped in crates as non-hazardous, Class 55 cargo. No special shipping instructions.

Health / Safety

See MSDS for specific safety and health information.

Typical Properties and Performance of Material as Supplied

UL Classification

Property	Test Method	Unit	Value	Class
Thermal Classification	UL 1446	°C	180	H

Electrical Properties of ELAN-Film® HT-180

Property	Test Method	Units	5 mil film (127 µm)	7.5 mil film (190 µm)	11 mil film (279 µm)
Dielectric Strength	ASTM D149	Volts	11,800	14,300	16,100
Volume Resistivity	ASTM D257	ohms-cm	10^{15}	10^{15}	10^{15}
Surface Resistivity	ASTM D257	ohms/square	10^{13}	10^{14}	10^{14}

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Water Absorption of ELAN-Film® HT-180

Property	Test Method	Unit	5 mil film (127 µm)	7.5 mil film (190 µm)	11 mil film (279 µm)
Water Absorption	Full immersion of test sample in water for 24 hours @ 25°C	Percent gain	0.7	0.5	0.4

Freon Extraction of ELAN-Film® HT-180

Property	Test Method	Units	5 mil film (127 µm)	7.5 mil film (190 µm)	11 mil film (279 µm)
Weight loss upon Freon extraction		Weight percent	0.1	0.1	0.1

Film Yield at Various Thicknesses of ELAN-Film® HT-180

Thickness	Yield, kg/m^2	Yield, m^2/kg	Yield, $lb./yd^2$	Yield, $yd^2/lb.$
5 mil (127 µm)	0.17	5.8	0.31	3.2
7.5 mil (190 µm)	0.26	3.8	0.48	2.1
11 mil (279 µm)	0.38	2.6	0.70	1.4

Adhesion of ELAN-Film® HT-180 with impregnating resins

*ELAN-Film® HT-180 was dipped in impregnating resin for 1-2 minutes, taken out and held vertically until dripping ceased and then cured at the conditions described below. Adhesion of the cured resin was measured by cross cut adhesion test (**ASTM D3359**, tape ipg #51578, Byk Gardner 6 x 1mm crosshatch cutting blade).*

Material	Curing conditions	Adhesion
Alkyd resin	2 hrs @150 °C	Excellent
Waterborne polyester	2 hrs @150 °C	Excellent
Epoxy emulsion	2 hrs @165 °C	Excellent
Unsaturated polyester in VT	2 hrs @150 °C	Excellent
Epoxy	4.5 hrs @160 °C	Excellent

Mechanical Properties of ELAN-Film® HT-180

Property	Test Method	Units	5 mil film (127 µm)	7.5 mil film (190 µm)	11 mil film (279 µm)
Tensile Strength	ASTM D882	MPa	137	134	107
Tensile Modulus	ASTM D882	MPa	3235	3150	2360
Tear Strength	ASTM D1004	N/mm	378	394	388
Elongation	ASTM D882	%	88	106	144

Dissipation Factor and Dielectric Constant of ELAN-Film® HT-180 in Humid Environments (8.5 mil / 215 µm total film thickness)

Conditions (DC and DF tested @ 25°C)	Dielectric Constant			Dissipation Factor		
	100 Hz	500 Hz	1 kHz	100 Hz	500 Hz	1 kHz
Tested as is	2.4	3.1	3.4	0.003	0.003	0.008
After 168 hours in 100% humidity at 40° C	2.2	3.1	3.7	0.002	0.005	0.008

Thermal Conductivity of ELAN-Film® HT-180

Property	Film Thickness	Test Method	Temperature, ^{0}C	Result, w/m*K
Thermal Conductivity	8.5 mil (215 µm)	ASTM E 1530	25	0.19
			90	0.18
			125	0.18
	11 mil (279 µm)	ASTM E 1530	25	0.20
			90	0.19
			125	0.19

The above properties are typical values and are not intended for specification use.