Hoffmann+ Krippner

DATASHEET

Polyester Film

Mechanical Properties

Properties	Benchmark (measured using polyester film with 12µm tickness)	Unit	Test Standard	Test Conditions
density	1,395	g/cm³	ASTM-D 1505-68 Methode C	23 °C
tensile strength	200	N/mm²	DIN 53455	haul-off speed 100mm/min; 23 °C, 50% r.H
ultimate elongation	100	%	DIN 53455	haul-off speed 100mm/min; 23 °C, 50% r.H
extensional strain associated elongation	100 4	N/mm² %	DIN 53455	haul-off speed 100mm/min; 23 °C, 50% r.H
modulus of elasticity	4,500	N/mm²	DIN 53457	haul-off speed 100mm/min; 23 °C, 50% r.H
flexing cycles	>100,000	flexing cycles	DIN 53448	
impact resistance lengthwise across	 1,400 1,800	 $\frac{mJ}{mm^2}$	DIN 53488	23 °C, 50 % r.H.
tear propagation strength	240	N/mm	DIN 53363	23 °C, 50 % r.H.
friction	50	%	DIN 53375	23 °C, 50 % r.H.
edge tear protection	150	N	DIN 40634	23 °C, 50 % r.H.

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Electrical Properties

Properties	Benchmark (measured using polyester film with 12µm tickness)		Unit	Test Standard	Test Conditions
dielectric strength measured using film thickness	6µm	580 410 300	kV/mm kV/mm kV/mm	DIN 40634 in air	23 °C; DC Voltage 23 °C; 50 Hz 150 °C; 50 Hz
	25µm	510 320 250	kV/mm kV/mm kV/mm		23 °C; DC Voltage 23 °C; 50 Hz 150 °C; 50 Hz
	190µm	420 150 135	kV/mm kV/mm kV/mm		23 °C; DC Voltage 23 °C; 50 Hz 150 °C; 50 Hz
relative permittivity	3.3 3.3 3.2 2.9 2.9 3.6			DIN 40634	23 °C; 50 Hz 23 °C; 1 kHz 23 °C; 1 MHz 23 °C; 240 MHz 23 °C; 9300 MHz 150 °C; 50 Hz
dielectric dissipation factor (tan λ)	0.0020 0.0052 0.0210 0.0060 0.0060 0.0048			DIN 40634	23 °C; 50 Hz 23 °C; 1 kHz 23 °C; 1 MHz 23 °C; 240 MHz 23 °C; 9300 MHz 150 °C; 50 Hz
resistance measured using film with 12µm thickness	10^{18} 10^{13}		Ω cm Ω cm	DIN 40634	23 °C 150 °C
surface resistance measured using film with 12µm thickness	>5	10^{14} 10^{14} 10^{14}	Ω Ω Ω	DIN 53482	23 °C; 25 % r.H 23 °C; 50 % r.H 23 °C; 75 % r.H
electrolytic corrosion	A1			DIN 53489	

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Thermal Properties

Properties	Benchmark (measured using polyester film with 12µm tickness)	Unit	Test Standard	Test Conditions
melting point	260	°C	(DTA) differential thermal analysis	
max. operating temperature	up to +150	°C		ambient temperature
short term	up to +180	°C		ambient temperature
low temperature resistance	-196	°C	DIN 53372	tested up to -196°C low temperature resistance according to DIN 53372 possible at lower temperatures
approved insulating class for electrical machinery	B		VDE 0530	
specific heat	1300	$\frac{J}{kg \times K}$		
thermal conductivity	0.13	$\frac{W}{m \times K}$	VDE 0340 / part 1/7.59	
flammability no flammable gases occur up to	400	°C		

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Optical Properties, Dimensional Stability, Physical & Chemical Properties

Properties	Benchmark (measured using polyester film with 12µm tickness)	Unit	Test Standard	Test Conditions
Optical Properties				
refractive index	1.6		DIN 53491	λ = 0.589 µm; 25 °C
transparency measured using polyester film with 25µm	85	%	ASTM-D 1003-61 method A	increased measuring angle
opacity measured using polyester film with 25µm	<15	%	ASTM-D 1003-61 method A	increased measuring angle
Dimensional Stability				
shrinkage	2	%	DIN 40634	150 °C; 15 min.
coefficient of linear thermal expansion	2×10^{-5}	1 / K	in-house method	20-50 °C
dimensional stability under pressure under tension	 240 240	 °C °C	 DIN 40634 DIN 40634	
moisture expansion coefficient	0.7×10^{-5}	$(\% \text{ r.F.})^{-1}$	in-house method	40-80 % r.F.
Physical and Chemical Properties				
water absorbtion (compared to dry state)	0.5	%	DIN 53472	storage in water for 4 days at 23 °C
conductivity of water-based extract	2	µS / cm	DIN 40634	1 kHz

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Chemical Resistance

alcohols	methyl alcohol	resistant
	ethyl alcohol	resistant
	isopropyl alcohol	resistant
	cyclohexanol	resistant
	glycol	resistant
	glycerin	resistant
	benzyl alcohol	partially resistant
aldehydes	acetaldehyde	resistant
	formaldehyde	resistant
hydrocarbons	benzene	resistant
	toluene	resistant
	xylene	resistant
	aliphatic hydrocarbons	resistant
	gasoline (petrol)	resistant
	mineral oils	resistant
chlorinated hydrocarbons	carbon tetrachloride	partially resistant
	chloroform	partially resistant
	chlorinated biphenyls	resistant
	trichloroethylene	resistant
esters	ethyl acetate	resistant
other organic solutions	ether	resistant
	acetone	resistant
	nitrobenzene	not resistant
	phenol	not resistant
acids	formic acid 50%	resistant
	acetic acid (all concentrations)	resistant
	hydrochloric acid 10%	resistant
	hydrochloric acid 30%	partially resistant
	hydrofluoric acid 10% and 35%	resistant

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Chemical Resistance

	nitric acid 10%	resistant
	nitric acid 65% and 100%	not resistant
	phosphoric acid 30% and 80%	resistant
	sulphuric acid 20%	partially resistant
	sulphuric acid 80% and above	not resistant
	sulphur dioxide gas, dry	resistant
water-based alkaline solutions	ammonium hydroxide	not resistant
	calcium hydroxide	partially resistant
	sodium hydroxide	resistant
salt solutions	bichromates	resistant
	alkaline carbonates	resistant
	cyanides	resistant
	fluorides	resistant
miscallaneous substances	chlorine	resistant
	water	resistant
	hydrogen peroxide	resistant
	oxygen	resistant

For this test, 12µm thick pieces of polyester film were stored in the indicated substances at room temperature over a period of 4 weeks. Assessment criteria included swelling, weight decrease and change in elongation.

Polyester films are resistant to common polyester and epoxy based insulating resins and coatings. Furthermore, polyester is resitant to polyurathane coatings and isocyanates. Some phenol resin types that release phenol or phenol derivatives at high temperatures or moisture levels can cause damages to the film.

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Permeability

Substance	Values (measured using polyester film with 25µm tickness)	Unit	Test Standard	Test Conditions
GASES:				
air	30			
nitrogen	20			
oxygen	70			
carbon dioxide	240			
argon	25			
helium	2000	$\frac{cm^3 *}{m^2 \times d \times bar}$	DIN 53380	23 °C
coal gas	450			
prussic acid	8000			
phosgene	50			
chlorine	60			
methyl bromide	50			
hydrogen	1100			
sulphur dioxide	1000			
hydrogen sulphide	500	$\frac{cm^3 *}{m^2 \times d \times bar}$	internal method	23 °C
ammonia, dry	4000			
ethylene oxide	650**			

VAPOURS:				
water	8	$g/m^2 \times d$	DIN 53122	
carbon tetrachloride	0.2			
carbon disulphide	3			
hexane	<0.1			
acetone	<0.1			
ethyl acetate	<0.1	$g/m^2 \times d$	internal method	23 °C
methyl alcohol	0.7			
ethyl alcholo	0.005			
benzene	<0.1			
formaldehyde (30% solution)	0.003			

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com

Hoffmann+ Krippner

DATASHEET

Polyester Film

Permeability

Substance	Values (measured using polyester film with 25µm tickness)	Unit	Test Standard	Test Conditions
AROMAS:				
geraniol	130 x 10^{-6}	g/m^2 x d	internal method	20 °C
eugenol	160 x 10^{-6}			
cinnamaldehyde	50000 x 10^{-6}			
eucalyptol	8000 x 10^{-6}			
diphenylmethane	4000 x 10^{-6}			
menthol	700 x 10^{-6}			
vanillin	10 x 10^{-6}			
campher	<3 x 10^{-6}			

* Unless otherwise stated, the values are converted to standard pressure and temperature.

** Values not converted to standard conditions

Hoffmann + Krippner Inc
PO Box 1489, Woodstock, GA 30188
Phone: (770) 487-1950
sales@hoffmann-krippner.com