



Kaladex®
PEN Film

Kaladex® 2000

Product Description

Kaladex® 2000 is a biaxially oriented PolyEthylene Napthalate (PEN) film. PolyEthylene Napthalate (PEN) is a high performance polyester that offers many enhanced properties such as strength, heat resistance, hydrolysis resistance, dimensional stability and low oligomer extraction, while maintaining the ease of processing found with standard PolyEthylene Terephthalate (PET) films. Kaladex® 2000 is a lightly filled film to give good handling properties and is currently available at a range of thicknesses between 16-125µm.

Kaladex® is the trademark for a range of PolyEthylene Napthalate (PEN) films from DuPont Teijin Films.

Typical Applications

Kaladex® 2000 can be used in a wide range of electrical and electronic applications such as capacitors, motors, transformers, flexible printed circuits and fuel cells, as well as many industrial applications where the enhanced properties over standard PET films offer benefits.

General Information

Kaladex® 2000 can withstand a broad range of temperatures and has good resistance to moisture and most chemicals. It contains no plasticisers and will not become brittle with age under normal conditions. As per Article 3(3) of the REACH regulation (EC) No 1907/2006 Kaladex® 2000 film is classified as an article. There are no substances intended to be released from the above film under normal, reasonably foreseeable conditions of use, as defined by Article 7(1).

Food Contact Advice

Kaladex® 2000 has not been assessed against Food Contact Legislation.

Film Properties

Property	Unit	Typical Values							Test Method
General		16	25	38	50	75	100	125	
Density	g/cm ³	1.36	1.36	1.36	1.36	1.36	1.36	1.36	ASTM D1505-79
Electrical		16	25	38	50	75	100	125	
Electrical Strength	kV/mm	370	300	260	245	200	185	165	ASTM D149
Mechanical		16	25	38	50	75	100	125	
F5 Value MD	kg/mm ²	15	15	15	15	15	15	15	ASTM D882-83
F5 Value TD	kg/mm ²	15	15	15	15	15	15	15	ASTM D882-83
Tensile Strength MD	kg/mm ²	24	24	24	24	24	24	24	ASTM D882-83
Tensile Strength TD	kg/mm ²	28	28	28	28	28	28	28	ASTM D882-83
Elongation to Break MD	%	90	90	90	90	90	90	90	ASTM D882-83
Elongation to Break TD	%	65	65	65	65	65	65	65	ASTM D882-83
Optical		16	25	38	50	75	100	125	
Haze	%	5	6	8	13	18	25	30	ASTM D1003-77

Thermal		16	25	38	50	75	100	125	
Melting Point	°C	269	269	269	269	269	269	269	DSC
Glass Transition Temperature	°C	121	121	121	121	121	121	121	DSC
Shrinkage (190°C, 5min) MD	%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	ASTM D1204-78
Shrinkage (190°C, 5min) TD	%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	ASTM D1204-78
Shrinkage (150°C, 30min) MD	%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	ASTM D1204-78
Shrinkage (150°C, 30min) TD	%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	ASTM D1204-78
Co-efficient of Thermal Expansion MD	10(-6)/°C	18	18	18	18	18	18	18	ASTM E831-06
Co-efficient of Thermal Expansion TD	10(-6)/°C	16	16	16	16	16	16	16	ASTM E831-06
Co-efficient of Hydroscopic Expansion MD	10(-6)/%RH	11	11	11	11	11	11	11	
Co-efficient of Hydroscopic Expansion TD	10(-6)/%RH	11	11	11	11	11	11	11	
Relative Temperature Index (UL File E93687):									
Mechanical	°C	160	160	160	160	160	160	160	UL 746B
Electrical	°C	180	180	180	180	180	180	180	UL 746B

Disposal Advice

Disposal of Kaladex® 2000 does not present special disposal problems. Where waste occurs in a clean, uncontaminated form it can be recycled. In most circumstances, once Kaladex® 2000 has been laminated, coated, printed or metallised, incineration with Energy Recovery is the most environmentally efficient recovery route. Kaladex® 2000 can also be burned in an incinerator with normal refuse or can be buried as a relatively inert material in a landfill. The disposal method should comply with appropriate local and country regulations.

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DuPont Teijin Films Contacts			
Continental Europe DuPont Teijin Films (Luxembourg) SA BP-1681 L-1016 Luxembourg Telephone +352 2616 4004 Fax +352 2616 5000	United Kingdom DuPont Teijin Films (UK) Ltd The Wilton Centre Redcar, TS10 4RF England, UK Telephone +44 (0) 1642 572000 Fax +44 (0) 1642 572075	United States DuPont Teijin Films USA 3600 Discovery Drive Chester, VA 23836 Telephone 804-530-4076 Toll Free 800-635-4639	China DuPont Teijin Films China Limited Units 1B – 3A, 37/F, 148 Electric Road, North Point Hong Kong Telephone +852 2734 5345 Telephone +852 2369 8151 jjanan.wang@dupont.com
http://www.dupontteijinfilms.com		e-mail: europe.films@dupont.com	

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Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Teijin Films Medical Caution Statement", H-50102-3-DTF and H-50103-3-DTF.

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