



DuPont Teijin Films™

**Kaladex®**

PEN Film

## Product Information

### **Kaladex® 2000L**

#### **Product Description**

Kaladex® 2000L 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® 2000L is a lightly filled film to give good handling properties and is currently available at a thickness of 50 micron with additional thicknesses to be added in due course. Kaladex® is the trademark for a range of PolyEthylene Napthalate (PEN) films from DuPont Teijin Films.

#### **Typical Applications**

Kaladex® 2000L has been engineered to provide a controlled lower shrinkage level and is particularly suitable for applications such as flexible printed circuits and flat flexible cables as well as many industrial applications where the enhanced properties of PEN over standard PET films offer benefits.

#### **General Information**

Kaladex® 2000L can withstand a broad range of temperatures and has good resistance to moisture and most chemicals. As per Article 3(3) of the REACH regulation (EC) No 1907/2006 Kaladex® 2000L 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® 2000L has not been assessed against Food Contact Legislation

## Film Properties

Property	Unit	Typical Values	Test Method
General		50	
Density	g/cm³	1.36	ASTM D1505-79
Area Yield	m²/kg	14.71	
Mechanical		50	
F5 Value MD	kg/mm²	15	ASTM D882-83
F5 Value TD	kg/mm²	15	ASTM D882-83
Tensile Strength MD	kg/mm²	20	ASTM D882-83
Tensile Strength TD	kg/mm²	28	ASTM D882-83
Elongation to Break MD	%	100	ASTM D882-83
Elongation to Break TD	%	70	ASTM D882-83
Optical		50	
Haze	%	13	ASTM D1003-77
Thermal		50	
Melting Point	°C	269	DSC
Glass Transition Temperature	°C	121	DSC
Shrinkage - 220°C, 10min (MD)	%	1.3	ASTM D1204-78
Shrinkage - 220°C, 10min (TD)	%	0.4	ASTM D1204-78
Shrinkage - 150°C, 30 min (MD)	%	0.35	ASTM D1204-78
Shrinkage - 150°C, 30 min (TD)	%	0.25	ASTM D1204-78
Co-efficient of Thermal Expansion (MD)	10(-6)/°C	18	ASTM E831-06
Co-efficient of Thermal Expansion (TD)	10(-6)/°C	16	ASTM E831-06
Co-efficient of Hydroscopic Expansion (MD)	10(-6)/% RH	11	DTF Method
Co-efficient of Hydroscopic Expansion (TD)	10(-6)/% RH	11	DTF Method

## Disposal Advice

Disposal of Kaladex® 2000L does not present special disposal problems. Where waste occurs in a clean, uncontaminated form it can be recycled. In most circumstances, once Kaladex® 2000L has been laminated, coated, printed or metallised, incineration with Energy Recovery is the most environmentally efficient recovery route. Kaladex® 2000L 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.

Date of Last Revision: 26 Jul 2021

DuPont Teijin Films Contacts			
<b>Continental Europe</b> DuPont Teijin Films (Luxembourg) SA BP-1681 L-1016 Luxembourg Telephone +352 2616 4004 Fax +352 2616 5000	<b>United Kingdom</b> DuPont Teijin Films (UK) Ltd The Wilton Centre Redcar, TS10 4RF England, UK Telephone +44 (0) 1642 572000 Fax +44 (0) 1642 572075	<b>United States</b> DuPont Teijin Films USA 3600 Discovery Drive Chester, VA 23836 Telephone 804-530-4076 Toll Free 800-635-4639	<b>China</b> DuPont Teijin Films China Limited Room 702, 7th Floor, China Life Center, Tower A, One Harbour Gate, No. 18 Hung Luen Road, Hung Hom, Kowloon, Hong Kong Telephone +852-2734 5345 Fax +852-2724 4458 jianan.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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