

DuPont™ Nomex® LT

Electrical Insulation

TECHNICAL DATA SHEET

Product Description

DuPont™ Nomex® LT Type 180 is a new non-woven electrical insulation product for motors, generators, and transformers. This proprietary sheet structure has been developed by the makers of Nomex® brand paper. This high tear strength material is specifically designed by DuPont to meet the performance requirements for system applications of 180 °C (Class H) or lower. Available product ranges from 2.4 to 10 mil in thickness and appearance is yellow in color.

Applications

The DuPont™ Nomex® LT product line is designed for applications including conductor wrap, phase and layer

insulation for coils. In such end-uses, DuPont™ Nomex® LT provides design engineers many advantages including mechanical strength, elongation, and enhanced resin saturability.

Mechanical Properties

The typical mechanical property values for DuPont™ Nomex® LT structures are shown in **Table 1**. This product has superior initial tear, tear propagation, and elongation performance — benefiting equipment designers and manufacturers.

Electrical Properties

The typical electrical property values for DuPont™ Nomex® LT structures are shown in **Table 2**. The AC rapid rise dielectric strength data represents voltage stress

levels that the structure withstood for 10 to 20 seconds at a frequency of 60 Hz. These values differ from long-term strength potential. The dielectric strength data are typical values and not recommended for design purposes. DuPont recommends that continuous stresses in electrical equipment not exceed 1.2 kV/mm (30 V/mil) to minimize the risk of partial discharges (corona).

Impregnation

The excellent impregnability of DuPont™ Nomex® LT by resins or varnishes can result in significantly enhanced electrical properties as shown in **Table 3**. Processing characteristics of this structure are similar to other insulation materials used in the industry.

Thermal Properties

DuPont™ Nomex® LT is designed specifically for 180 °C (Class H) and 155 °C (Class F) applications, where flame resistance is not required. For applications where conditions may exceed 180 °C, consider Nomex® Type 410 and 418 products, rated 220 °C (UL).

Table 1 — Typical Mechanical Properties

Property	Nominal Thickness, (mil)	2.4	5	7	10	Test Method
Thickness	mil	2.4	5.4	7.1	11.0	ASTM D374*
Basis Weight	oz/yd ²	1.6	3.1	4.5	6.6	ASTM D646
Density	g/cc	0.9	0.8	0.9	0.8	
MD Tensile Strength	lb/in	25	45	60	80	ASTM D828
XD Tensile Strength	lb/in	10	25	35	45	ASTM D828
MD Elongation	%	25	30	30	25	ASTM D828
XD Elongation	%	25	25	25	25	ASTM D828
MD Initial Tear Strength	lb	3	6	8	12	ASTM D1004
XD Initial Tear Strength	lb	4	7	11	17	ASTM D1004
MD Elmendorf Strength	gm	230	560	870	1390	TAPPI 414
XD Elmendorf Strength	gm	510	1110	1480	2710	TAPPI 414
UL Thermal Electrical Insulation System Component, Rating	°C	180	180	180	180	UL 1446

* Except 25 psi foot pressure is applied

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Table 2 — Typical Electrical Properties

Property	Nominal Thickness (mil)	2.4	5	7	10	Test Method
AC Rapid Rise Breakdown	V/mil	160	120	120	110	ASTM D149*
Surface Resistivity	Ohms/sq	10 ¹⁶	10 ¹⁶	10 ¹⁶	10 ¹⁶	ASTM D257
Volume Resistivity	Ohms-cm	10 ¹⁷	10 ¹⁷	10 ¹⁷	10 ¹⁷	
Dielectric Constant at 60 Hz	23 °C	1.56	1.87	1.85	2.06	ASTM D150
	180 °C	1.87	1.99	2.05	2.36	
Dissipation Factor at 60 Hz	23 °C	0.004	0.006	0.006	0.008	ASTM D150
	180 °C	0.044	0.066	0.082	0.070	

*Tested with 2" diameter electrode

Table 3 — Impregnated AC Dielectric Properties

Product		Dry	Resin ¹	Resin ²	Test Method
DuPont™ Nomex® LT 2.4 mil	V/mil	180	1520	990	ASTM D-149*
DuPont™ Nomex® LT 5 mil	V/mil	130	1320	1170	ASTM D-149*

Samples were prepared by coating and curing the resin.

*Tested with 1/4" diameter electrode

¹Commercial Epoxy Solventless Resin

²Commercial Thixotropic Polyester Resin

UL Systems

DuPont recently received approval for a new Class H Insulation System 16-9, which is based on DuPont™ Nomex® LT as the major insulation, per UL 1446 and IEC 61857. Contact DuPont for details of this new insulation system.

Specifications

The properties shown in this data sheet are typical values, and should not be used as specification limits. Contact DuPont for assistance in preparing specifications of these materials for your application.

Safety Information

A Material Safety Data Sheet (MSDS) describing proper use and handling of DuPont™ Nomex® LT is available upon request from DuPont.

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Product safety information is available upon request

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Please note:

The properties in this data sheet are preliminary average values and should not be used as specification limits. This data only represents a small amount of material and will likely change with more data collection. Unless otherwise noted, all properties were measured in air under "standard" conditions (in equilibrium at 23 °C, 50% relative humidity). Note that, like other products of papermaking technology, Nomex® papers have somewhat different properties in the papermaking machine direction (MD) compared to the cross direction (XD). In some applications it may be necessary to orient the paper in the optimum direction to obtain its maximum potential performance.

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