

# DUPONT™ NOMEX® LAMINATE TYPE NMNE

## TECHNICAL DATA SHEET

### Product description

DuPont™ NOMEX® Laminate Type NMNE is a 3- or 4-ply laminate constructed of lower-cost calendered NOMEX® paper bonded to polyester film with a proprietary high temperature adhesive system. This laminate is designed not to delaminate or blister at high temperatures.

The interior polyester film in this laminate contributes high dielectric strength, as well as good initial tear strength and tensile properties. The calendered NOMEX® paper provides long-term thermal stability, as well as improved propagation tear strengths. The outer polyester film in the

4-ply laminate, typically a very thin (1/2 to 1 mil) film, is used to improve the insertion characteristics of the laminate in applications using automatic insertion equipment.

### Application

This laminate is broadly used in the manufacture of motors and generators of many sizes and temperature classes. The most important applications are for slot liners, wedges and phase insulation in Class H motors and generators, as well as in large and specialty Class F motors. This 3-ply laminate is typically used in cost-critical designs. Motors used in

the automotive industry are the largest specific user of this type of 4-ply laminate.

There are a number of insulation systems recognized by Underwriters Laboratories (UL), which include this laminate for both Class F and Class H motors. Upon request, access to these insulation systems is available from DuPont.

### Case histories

Case histories detailing the use of Type NMNE laminate in motors and generators are available upon request.

### PRODUCT DATA

Product	ASTM D374 Thickness Nominal (inches)	Product Yield (yd <sup>2</sup> /lb) (lb/yd <sup>2</sup> )		ASTM D149 Dielectric Strength (volts)	ASTM D257 Volume Resistivity (ohms-cm)	ASTM D257 Surface Resistivity (ohms/square)	ASTM D882 MD Tensile Strength (lb/in width)	ASTM D882 XD Tensile Strength (lb/in width)	ASTM D1004 MD Tear Strength (lbs)	ASTM D1004 XD Tear Strength (lbs)
NMNE 2-2-2	0.0066	3.13	0.32	10,900	10 <sup>15</sup>	10 <sup>15</sup>	93	81	5.5	4.5
NMNE 2-3-2	0.0076	2.70	0.37	12,500	10 <sup>15</sup>	10 <sup>15</sup>	115	115	7	6
NMNE 2-5-2	0.0095	1.92	0.52	15,800	10 <sup>15</sup>	10 <sup>15</sup>	141	166	10	8.5
NMNE 2-7½-2	0.0122	1.45	0.69	19,000	10 <sup>15</sup>	10 <sup>15</sup>	177	201	16.5	16
NMNE 2-10-2	0.0145	1.18	0.85	21,000	10 <sup>15</sup>	10 <sup>15</sup>	197	253	27	25.5
NMNE 2-14-2	0.0185	0.92	1.09	24,000	10 <sup>15</sup>	10 <sup>15</sup>	257	337	39	37
NMNE 2½-5-2½*	0.0103	1.86	0.54	19,000	10 <sup>15</sup>	10 <sup>15</sup>	152	155	22.5	25
NMNE 2½-10-2½*	0.0156	1.14	0.89	21,500	10 <sup>15</sup>	10 <sup>15</sup>	248	271	42.5	51
NMNE 2½-14-2½*	0.0194	0.87	1.14	21,800	10 <sup>15</sup>	10 <sup>15</sup>	281	282	58	52
NMNE 4-5-4*	0.0117	1.55	0.64	17,800	10 <sup>15</sup>	10 <sup>15</sup>	187	183	27	23
NMNE 4-7½-4*	0.0156	1.21	0.83	20,000	10 <sup>15</sup>	10 <sup>15</sup>	239	196	42	33
NMNE 4-10-4*	0.0184	1.01	0.99	22,000	10 <sup>15</sup>	10 <sup>15</sup>	278	254	48	46
NMNE 2-7½-2-5	0.0130	1.33	0.75	20,000	10 <sup>15</sup>	10 <sup>15</sup>	198	229	21	18
NMNE 2-10-2-5	0.0152	1.09	0.92	22,000	10 <sup>15</sup>	10 <sup>15</sup>	202	258	29	27.5

\*The data for these constructions only represents a small amount of material, and will likely change with more data collection.



### 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.

### Shelf life

The shelf life of NOMEX® laminates is in excess of one year when they are stored at or below room temperature.

### Safety precautions

A Material Safety Data Sheet (MSDS) describing the use of this product is available upon request from DuPont.

### Availability

DuPont™ NOMEX® Laminate, Type NMNE is available from Von Roll Isola USA, DuPont's authorized sales agent, or from your local authorized distributor. For the name of a local fabricator or distributor, or for more information on this product, contact Von Roll Isola.

### USA

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**Product safety information is available upon request.**

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