

DuPont™ Nomex® 418 Paper, 5 mil Nominal Thickness

Category : Other Engineering Material , Composite Fibers , Polymer , Film , Thermoset , Aramid

Material Notes:

Nomex® Type 418 is designed for high-voltage applications such as motor conductor and coil wrap, transformer ground and layer insulation. It can be readily impregnated with varnishes. This calendared blend of aramid with mica offers improved voltage endurance over Type 410 when subjected to corona attack. General NOMEX Information: Nomex® is a family of aromatic polyamide (aramid) fibers. This family consists of staple fibers, continuous filament yarns, paper, and spunlaced fabrics. The paper is produced from two forms of the aramid polymer. Small fibrous binder particles (fibrils) derived directly from the polymer under high shear conditions are mixed with short fibers (floc) which are cut to length from a fiber filament. The floc and fibrils are combined in a water based slurry from which a continuous sheet is produced on a specialized papermaking machine. This initial paper (as in Type 419) is low density and has poor properties. Subsequent densification and internal bonding is achieved by high temperature calendaring. The resulting paper is mechanically strong and has good electrical properties. Some uses for paper product include insulation in electric motors and transformers, wire wrapping, and honeycombed strength members in many aircraft. Nomex® brand fibers are inherently flame resistant: the flame resistance is a polymer property and does not diminish with the life of the fiber. Nomex® meta-aramid, poly(meta-phenyleneisophthalamide), is prepared from meta-phenylenediamine and isophthaloyl chloride in an amide solvent. It is a long chain polyamide in which at least 85% of the amide linkages are attached directly to two aromatic rings. The meta oriented phenylene forms bends in the polymer chain, reducing chain rigidity as compared to the para orientation in the chemically similar Kevlar® chain. This flexible polymer chain gives Nomex® more textile-like qualities while retaining high temperature properties similar to Kevlar®. Information provided by DuPont.

Order this product through the following link:

http://www.lookpolymers.com/polymer_DuPont-Nomex-418-Paper-5-mil-Nominal-Thickness.php

Physical Properties	Metric	English	Comments
Bulk Density	1.13 g/cc	0.0408 lb/in ³	
Density	1.13 g/cc	0.0408 lb/in ³	
Thickness	127 microns	5.00 mil	Nominal
	132 microns	5.20 mil	Typical; ASTM D374

Mechanical Properties	Metric	English	Comments
Film Elongation at Break, MD	2.9 %	2.9 %	ASTM D828
Film Elongation at Break, TD	3.2 %	3.2 %	ASTM D828
Tear Strength, Total	10.0 N	2.25 lb (f)	Initial in TD; ASTM D1004
	16.0 N	3.60 lb (f)	Initial in MD; ASTM D1004
Elmendorf Tear Strength, MD	1.69 g/micron	43.0 g/mil	Calculated from mfr's report of 2.2 N per TAPPI-414 and the typical thickness
			Calculated from mfr's report of

Elmendorf Tear Strength, TD Mechanical Properties	2.24 g/micron Metric	57.0 g/mil English	2.9 N per TAPPI-414 and the typical thickness Comments
Film Tensile Strength at Break, MD	39.4 MPa	5710 psi	Calculated from mfr's report of 52 N/cm per ASTM D828 and the typical thickness
Film Tensile Strength at Break, TD	26.5 MPa	3840 psi	Calculated from mfr's report of 35 N/cm per ASTM D828 and the typical thickness

Thermal Properties	Metric	English	Comments
Maximum Service Temperature, Air	220 °C	428 °F	Electrical insulation
Oxygen Index	63 % @Temperature 23.0 °C	63 % @Temperature 73.4 °F	
Shrinkage, MD	0.10 %	0.10 %	at 300°C
Shrinkage, TD	0.00 %	0.00 %	at 300°C

Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+13 ohm-cm	1.00e+13 ohm-cm	50% RH; ASTM D257
	1.00e+16 ohm-cm	1.00e+16 ohm-cm	Dry; ASTM D257
Surface Resistivity per Square	1.00e+12 ohm	1.00e+12 ohm	50% RH; ASTM D257
	1.00e+15 ohm	1.00e+15 ohm	Dry; ASTM D257
Dielectric Constant	2.5 @Frequency 60 Hz	2.5 @Frequency 60 Hz	Dry; ASTM D150
	3.6 @Frequency 60 Hz	3.6 @Frequency 60 Hz	50% RH; ASTM D150
Dielectric Strength	35.0 kV/mm	889 kV/in	AC Rapid Rise; ASTM D149
	63.0 kV/mm	1600 kV/in	Full-wave Impulse; ASTM D3426
Dissipation Factor	0.0060 @Frequency 60 Hz	0.0060 @Frequency 60 Hz	Dry; ASTM D150
	0.12 @Frequency 60 Hz	0.12 @Frequency 60 Hz	50% RH; ASTM D150

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