

DuPont™ Nomex® 414 Paper, 10 mil Nominal Thickness

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

Material Notes:

Nomex® Type 414 is designed for uses requiring a strong, yet flexible and conformable sheet. It is electrically and thermally similar to Type 410. Type 414 was designed as slot insulation in hand-wound motors and for linear wrapping of wire, but is also used where its specific characteristics are desirable, such as folded or punched parts. Nomex® Type 414 is also used in fluid filled transformers due to its improved impregnability compared to Type 410. 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 411) 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-414-Paper-10-mil-Nominal-Thickness.php

Physical Properties	Metric	English	Comments
Bulk Density	0.950 g/cc	0.0343 lb/in ³	
Density	0.950 g/cc	0.0343 lb/in ³	
Thickness	254 microns	10.0 mil	Nominal
	267 microns	10.5 mil	Typical; ASTM D374

Mechanical Properties	Metric	English	Comments
Film Elongation at Break, MD	13 %	13 %	ASTM D828
Film Elongation at Break, TD	16 %	16 %	ASTM D828
Flex Crack Resistance	7700	7700	Cycles of Fold Endurance; ASTM D2176
Tear Strength, Total	38.0 N	8.54 lb (f)	Initial in TD; ASTM D1004
	73.0 N	16.4 lb (f)	Initial in MD; ASTM D1004

Mechanical Properties	Metric	English	Comments
Film Tensile Strength at Break, MD	44.6 MPa	6470 psi	Calculated from mfr's report of 229 N/cm per ASTM D828 and the typical thickness
Film Tensile Strength at Break, TD	44.6 MPa	6470 psi	Calculated from mfr's report of 119 N/cm per ASTM D828 and the typical thickness

Thermal Properties	Metric	English	Comments
Maximum Service Temperature, Air	220 °C	428 °F	Electrical insulation

Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+15 ohm-cm	1.00e+15 ohm-cm	50% RH; ASTM D257
Dielectric Constant	2.7 @Frequency 60 Hz	2.7 @Frequency 60 Hz	ASTM D150
	2.7 @Frequency 1000 Hz	2.7 @Frequency 1000 Hz	ASTM D150
Dielectric Strength	29.0 kV/mm	737 kV/in	AC Rapid Rise; ASTM D149
	51.0 kV/mm	1300 kV/in	Full-wave Impulse; ASTM D3426
Dissipation Factor	0.0080 @Frequency 60 Hz	0.0080 @Frequency 60 Hz	ASTM D150

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