

## Material Data Sheet

**Item:** Cotton Based Phenolic Laminate & Tube, NEMA Grades LE & CE

**Description:** NEMA Grades LE & CE are cotton based phenolic laminates and tubes. Specifically, LE is a linen phenolic material and CE is a canvas based phenolic material. Cotton with phenolic grades provide more mechanical strength than paper grades and have a finer surface with better machinability. These materials are used for gears, pinions, bearings, and many structural insulating applications.

**Availability:** **Laminate Sheets:** Thickness: .008" to 4.0"  
Sheet Sizes: 36" x 48", 39" x 48", 36" x 72"  
48" x 48", 48" x 96", 48" x 108"

**Convolute Tubing:** Available in an infinity of inner diameter / outer diameter combinations per customer requirements. Maximum Standard Wall Thickness: .500"

**Fabricated Parts:** The Gund Company custom fabricates insulation materials to the exact specifications and drawings of our customers.

<b>Typical Properties:</b>	<b>LE</b>	<b>CE</b>
Color	Nat/Blk	Natural
Density (lb/cu <sup>3</sup> )	0.050	0.050
Water Absorption (%)	1.0	1.1
Flexural Strength, Flatwise (PSI)	22,000	19,000
Tensile Strength, W/ Grain (PSI)	16,000	13,000
Compressive Strength, Flat w/ Grain (PSI)	38,000	37,000
Maximum Operating Temperature	125 C° (250 F°)	125 C° (250 F°)
Dielectric Strength, Perp. (VPM, Short T)	350	200
Dissipation Factor (10 <sup>6</sup> Cycles/ sec)	0.045	N/A
Dielectric Constant (10 <sup>6</sup> Cycles/ sec)	5.4	N/A
Arc Resistance	55	N/A