

TECHNICAL DATA SHEET

Linen Phenolic

Is a Fine weave of cotton cloth fabrics which are mixed with phenolic resins to provide better machinability than provided by the "C" and "CE" grades. The Linen-based grades also have higher density and good moisture resistance. "L" and "LE" phenolics are used for fine tooth gears, relay bases, radio parts, terminal bases and strips, often in high-humidity environments. The "LE" grade has better electrical properties than the "L" grade. Linen LE or L is composed of a continuous cotton woven cloth impregnated with a phenolic resin binder. This grade contains fine weave linen and like the canvas phenolic, is known for mechanical properties.

GENERAL DESCRIPTION

Phenolic Laminates are produced by applying heat and pressure to layers of paper, canvas, linen or glass cloth impregnated with synthetic thermosetting resins. When heat and pressure are applied to the layers, a chemical reaction (polymerization) transforms the separate layers into a single laminated material with a "set" shape that cannot be softened again -- therefore, these materials are called "Thermosets". A variety of resin types and cloth materials can be used to manufacture thermoset laminates with a range of mechanical, thermal, and electrical properties.

Benefits

- Moisture resistance
- Outstanding electrical properties
- Easily machined and fabricated
- Dimensionally stable
- Good wear characteristics

Applications

- Electrical insulating parts
- Terminal bases and strips
- Gears
- Relay bases
- Radio parts
- Pulleys
- Rollers
- Guides

SHAPES AVAILABLE



TYPICAL PROPERTIES of PHENOLIC LAMINATES (SHEET FORM)

(mechanical properties of rod and tube forms may differ)

ASTM or UL test	Property	Paper	Canvas	Linen
PHYSICAL				
D792	Density (lb/in ³) (g/cm ³)	0.049 1.35	0.050 1.37	0.048 1.34
D570	Water Absorption, 24 hrs (%)	2.0	2.5	1.8
MECHANICAL				
D638	Tensile Strength (psi) -lengthwise -crosswise	15,000 12,000	11,000 9,000	13,000 9,000
D790	Flexural Strength (psi)-lengthwise -crosswise	16,000 13,200	17,500 15,000	22,000 16,000
D790	Flexural Modulus (psi)-lengthwise -crosswise	1,100,000 900,000	1,600,000 1,500,000	1,600,000 1,200,000
D256	IZOD Notched Impact (ft-lb/in)- lengthwise -crosswise	0.65 0.60	1.70 1.50	1.35 1.10
D695	Compressive Strength (psi)	32,000	37,000	37,000
D785	Hardness, Rockwell M	M100	M100	M100
THERMAL				
D696	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F) -lengthwise -crosswise	0.80 1.20	1.10 1.22	1.00 1.06
-	Max Operating Temp (°F / °C)	257 / 125	257 / 125	285 / 140
C177	Thermal Conductivity (BTU-in/ft ² -hr-°F) (x 10 ⁻⁴ cal/cm-sec-°C)	2.03 7.0	2.03 7.0	2.03 7.0
UL94	Flammability Rating	H-B	H-B	H-B
ELECTRICAL				
D149	Dielectric Strength (V/mil) short time, 1/8" thick	750(XX)	550(CE)	625(LE)
D150	Dielectric Constant at 1 MHz	5	5	6
D150	Dissipation Factor at 1 MHz	0.045	-	0.045
D495	Arc Resistance (sec)	110	15	15

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets.
All values at 73°F (23°C) unless otherwise noted.