



MANUFACTURERS OF
ELECTRICAL INSULATION MATERIALS
 INSULATING COMPONENTS FOR
 POWER SYSTEMS EQUIPMENT

The Gund Company, Inc
 St. Louis, Missouri – USA
 TEL - 314.423.5200
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MATERIAL DATA SHEET

Item: NEMA Grade FR4 Glass Epoxy Laminates

Description: NEMA Grade FR4 materials are continuous filament woven fiberglass sheets bonded with epoxy resin. The material has the ability to maintain excellent mechanical, electrical, and physical properties at elevated temperature to 130C.

Standards: NEMA LI-1 Grade FR4
 IEC 60893 EP GC 202
 MIL-I-24768 /27 GEE-F

Availability: Laminate Sheets: Thickness: English Units .006" - 5.0"
 SI Units 0.1524mm - 127mm
 Sheet Sizes: 36" x 48", 39" x 48", 91.4cm x 122cm, 99cm x 122cm
 36" x 72", 48" x 48", 91.4cm x 182.8cm, 122cm x 122cm
 48" x 96", 48" x 108" 122cm x 243.8cm, 122cm x 274.3cm

Convolute Tubing: Available in an infinity of inner diameter / outer diameter combinations per customer requirements.

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

Key Characteristics:	Test Method	Units - English (SI)	Typical Values
Specific Gravity		lb/in ³ (g/cc)	0.067 (1.85)
Rockwell Hardness (0.500")		M Scale	98
Moisture Absorption (.062")	ASTM D570	%	0.10
Tensile Strength (.125") LW CW	ASTM D638	psi (MPa)	40,000 (275) 32,000 (220)
Compressive Strength flatwise (.500")	ASTM D695	psi (MPa)	66,000 (455)
Flexural Strength (.062") LW CW	ASTM D790	psi (MPa)	65,000 (448) 52,000 (358)
Flexural Modulus (.062") LW CW		ksi (MPa)	2,900 (19,995) 2,600 (17,926)
Shear Strength (perpendicular) (.062")	ASTM D732	psi (MPa)	21,500 (148)
Impact Strength IZOD E-48/50 LW CW	ASTM D256	ft-lbs/in notched	7.9 7.3
Coefficient of Thermal Expansion (.062") X-axis Y-axis		" / °C x 10 ⁻⁶	10.0 13.0
Bonding Strength (.500")	ASTM D229	Lb (kg)	2,300 (15)
Temperature Index (electrical/mechanical)		°C	130/140
Flammability Rating	UL94	Class	V-0



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Breakdown Voltage Condition A (.062") D-48/50	ASTM D149	kV	66 65
Dielectric Strength Condition A (.062") D-48/50	ASTM D149	V/mil	800 750
Dissipation Factor (.062") Condition D-24/23	ASTM D150		.032
Permittivity (.062") Condition D-24/23	ASTM D150		4.80
Comparative Tracking Index (.125)	D3638		300
Arc Resistance (.125")	ASTM D495	Sec	130
Tg		°C	130

All of the information, suggestions, and recommendations pertaining to the properties and uses of the products herein are based upon tests and data believed to be accurate; however, the final determination regarding the suitability of any material described herein for the use contemplated, the manner of such use, and whether the use infringes any patents is the sole responsibility of the user. There is no warranty, expressed or implied, including, without limitation warranty of merchantability or fitness for a particular purpose. Under no circumstances shall we be liable for incidental or consequential loss or damage.