



# THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

## NEMA G-3

<b>Item:</b>	<b>NEMA Grade G-3 Glass Phenolic Laminate</b>			
<b>Description:</b>	NEMA Grade G-3 material is a woven glass fabric laminate with a high-temperature phenolic resin. Glass phenolic insulating materials offer good flexural, compressive, and impact strength at elevated temperatures as well as good moisture resistance.			
<b>Standards:</b>	NEMA LI-1: Grade G-3 • IEC 60893: PF GC 201 • MIL-I-24678/18-GPG			
<b>Availability:</b>	<b>Laminate Sheets:</b>		English Units (in)	SI Units (mm/cm)
		Thickness:	0.008 to 4.0	0.2 to 101.6 (mm)
		Sheet Size:	36 x 48 to 48 x 108	91.4 x 122 to 122 x 274.3 (cm)
	<b>Convolute Tubing:</b>	G-3 convolute tubes are available from The Gund Company in nearly any custom size of inside and outside diameter, per customer requirements.		
<b>Fabricated Parts:</b>	The Gund Company custom fabricates insulation materials to the exact specifications and drawings specified by our customers.			

Key Characteristics	Units - English (SI)	Typical Values
Standard Color	--	Brown, Black <sup>1</sup>
Density	lbs/in <sup>3</sup> (g/cc)	1.9

<sup>1</sup> Custom colors available upon request

### Additional Engineering Properties

Key Characteristics	Test Method	Units - English (SI)	Typical Values
Tensile Strength (0.125"), Lengthwise	ASTM D-638	ksi (MPa)	40 (276)
Compressive Strength (0.500"), Flatwise	ASTM D-695	ksi (MPa)	76 (524)
Flexural Modulus (0.062")	ASTM D-790	ksi (GPa)	3 (21)
Shear Strength (punch type, 0.062")	ASTM D-732	ksi (MPa)	21.5 (148)
Coecient of Thermal Expansion	ASTM E-228	""/"°Cx10 <sup>-6</sup>	15
Temperature Index	ASTM D-2304	Electrical	140
		Mechanical	170
Arc Resistance (0.125")	ASTM D-495	Seconds	100
Comparative Tracking Index (0.125") <sup>2</sup>	IEC 60112	V	165
Dielectric Strength (Condition A)	ASTM D-149	kV/mm	14.8

<sup>2</sup>ASTM D-3638 & IEC 112 are the same test method - IEC 60112 is slightly different, but the results are similar



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## NEMA LI-1 G-3 Required Properties

Key Characteristics		Test Method	Units - English (SI)	NEMA Required	Typical Values
IZOD Strength (0.50 ")	Lengthwise	ASTM E-48/50	ft - lb	6.5	12
	Crosswise			5.5	8.5
Flexural Strength (0.062")	Lengthwise	ASTM D-790	ksi (MPa)	40 (276)	55 (379)
	Crosswise			30 (207)	49 (338)
Bonding Strength (0.500"), Condition A		ASTM D-229	lb/kg	850 (385)	1,500 (681)
Moisture Absorption (0.062"), Condition D 24/23		ASTM D-570	%	2.7	0.5
Flammability Rating		UL94	--	HB	HB

## IEC 60893-3-2 PFGC 201 Required Properties

Key Characteristics	Test Method	Units	IEC Requirement	Typical Values
Flexural Strength	ISO 178	MPa	140	380
Charpy Impact Strength	ISO 179	kJ/m <sup>2</sup>	25	40
Perpendicular Electric Strength (90°C in Oil, 1.5 mm)	IEC 60243-1	kV/mm	5.7	6.7
Parallel Breakdown Voltage (Stepped 90°C in Oil, 3 mm)	IEC 60243-1	kV	20	22
Insulation Resistance (After Water Immersion)	--	MΩ	1 X 10 <sup>2</sup>	3.5 X 10 <sup>2</sup>
Moisture Absorption (3 mm)	--	mg	153 max	130

Data supplied above are typical values and are not to be considered specification values. 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 suitability of any material described herein for the contemplated application, 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.