



# THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

## NEMA G-10

<b>Item:</b>	<b>NEMA Grade G-10 Glass Epoxy Laminate</b>			
<b>Description:</b>	NEMA Grade G-10 material is a continuous filament woven fiberglass sheet bonded with epoxy resin. The material has the ability to maintain excellent mechanical, electrical, and physical properties at elevated temperatures to 130°C. NEMA G-10 is a non-brominated, non-flame retardant grade of glass epoxy laminate. NEMA G-10 from The Gund Company is RoHs and REACH compliant to ensure reliability, safety, and consistency.			
<b>Standards:</b>	NEMA LI-1 (IM 60000): Grade G-10 • IEC 60893: EP GC 201 (sheet), IEC 61212: EPGC21 (tube) • MIL-I-24768/2 GEE			
<b>Availability:</b>	<b>Laminate Sheets:</b>		English Units (in)	SI Units (mm/cm)
		Thickness:	0.006 - 5.0	0.15 - 127 (mm)
	Sheet Size:	30 x 48 / 60 x 48 / 48 x 120	76 x 122 / 122 x 152 / `122 x 305 (cm)	
	<b>Convolute Tubing:</b>	G-10 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	--	Light Green <sup>1</sup>
Density	lbs/in <sup>3</sup> (g/cc)	0.067 (1.85)

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

### Additional Engineering Properties

Key Characteristics	Test Method	Units - English (SI)	Typical Values
Rockwell Hardness (0.062")	--	M Scale	98
Comparative Tracking Index (0.125")	ASTM D-3638	V	200
Arc Resistance (0.125")	ASTM D-495	Seconds	130
Dielectric Strength (     )	ASTM D-149	V/mil	485
Punch Shear Strength (0.125")	ASTM D-732	ksi (MPa)	25 (172)



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## NEMA IM 60000 G-10 Required Properties

Key Characteristics		Test Method	Units	NEMA Required	Typical Values
Breakdown Voltage (3mm) //	Condition A	ASTM D-149	kV	45.0 min	47
	Condition D-48/50			40.0 min	41
Permittivity at 1 MHz (3mm)	Condition A	ASTM D-150	--	5.20	4.8
	Condition D-24/23			5.40	4.7
Dissipation Factor at 1 MHz (3mm)	Condition A	ASTM D-150	--	0.025	0.016
	Condition D-24/23			0.035	0.019
Flexural Strength (3mm)	Lengthwise	ASTM D-790	ksi (MPa)	55 (380) min	63 (435)
	Crosswise			45 (311) min	54 (373)
IZOD Impact Strength (3mm)	Condition D-48/50	ASTM D-256	ft-lb/in, Notched	7.0 min	8.4
				Crosswise	5.5 min
Moisture Absorption (3mm)	Condition D-24/23	ASTM D-570	%	0.2	0.13
Flammability		UL94	Class	HB	HB

## IEC 60893 EPGC 201 Required Properties

Key Characteristics	Test Method	Units	IEC Requirement	Typical Values
Flexural Strength	ISO 178	MPa	340 min	483
IZOD Impact Strength Parallel to limitations //	ISO 180	kJ/m <sup>2</sup>	34 min	45
Perpendicular Electric Strength (90°C in Oil, 1.5 mm) ⊥	IEC 60243-1	kV/mm	13 min	15
Parallel Breakdown Voltage (Stepped 90°C in Oil, 3 mm) //	IEC 60243-1	kV	35 min	>45
Insulation Resistance (After Water Immersion)	IEC 60167	MΩ	5 x 10 <sup>4</sup> min	>10 <sup>7</sup>
Moisture Absorption (4 mm)	ISO 62	mg	23 max	15



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Breakdown Voltage (3mm) //	Condition A	ASTM D-149	kV	45.0 min	47	
	Condition D-48/50			40.0 min	41	
Permittivity at 1 MHz (3mm)	Condition A	ASTM D-150	--	5.20	4.8	
	Condition D-24/23			5.40	4.7	
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	Crosswise			45 (311) min	54 (373)	
IZOD Impact Strength (3mm)	Condition E-48/50	Lengthwise	ASTM D-256	ft-lb/in, Notched	7.0 min	8.4
		Crosswise			5.5 min	6.7
Moisture Absorption (3mm)	Condition D-24/23	ASTM D-570	%	0.2	0.13	
Flammability		UL94	Class	HB	HB	

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.