



THE GUND COMPANY

Manufacturers & fabricators of engineered material solutions

MATERIAL COMPARATIVE DATASHEET	
Items:	Convolute & Filament Wound Tubing from The Gund Company
Description:	<p>Glass Epoxy Filament Wound Tubing Filament wound tubes are wound from glass filaments dipped in epoxy resin. Once cured, the tube offers excellent mechanical, electrical, and physical properties at elevated temperatures from 130°C to 220°C.</p> <p>Glass Epoxy Convolute Wound Tubing Convolute wound tubes take shape from woven fiberglass sheets impregnated with epoxy resin. The material has the ability to maintain excellent mechanical, electrical, and physical properties at elevated temperatures from 130°C to 180°C.</p>
Fabricated Parts:	The Gund Company custom fabricates tube materials to the exact specifications and drawings of our customers.

COMPARISON OF STANDARD GLASS EPOXY GRADES				
Key Characteristics	Test Method	Units - English (SI)	F2016 - 130°C Filament Wound	G10 Convolute Wound
Base Material	--	--	Glass Epoxy	Glass Epoxy
Density	ASTM D-348	lb./in ³ (g/cm ³)	0.065 to 0.72 (1.8 to 2.0)	0.061 (1.70)
Flammability Rating	UL 94	--	HB	HB
Compressive Strength	ASTM D-638	psi (MPa)	28,000 (193)	28,000 (193)
Water Absorption	ASTM D-570	--	< 0.2%	< 0.4%
Dissipation Factor - Condition A	ASTM D-150	--	0.025	0.025
Permittivity - Condition A	ASTM D-150	--	4.8	4.8
Dielectric Strength (3mm thick)	ASTM D-149	V/mil (kV/mil)	250 (10)	200 (8)

	FILAMENT WOUND TUBES		CONVOLUTE WOUND TUBES		
Process Advantages	<ul style="list-style-type: none"> - High speed, low cost production process - Flexible winding angles, to optimize properties. - Stock tube length can be customized to greater than 100" 		<ul style="list-style-type: none"> - Wide range of resin options - Wide range of substrates, from glass cloth to paper and cotton cloth 		
Process Disadvantages	<ul style="list-style-type: none"> - Potentially more waste from end of tubes - Set up cost can be higher for low volume 		<ul style="list-style-type: none"> - Edgewise delamination - Stock tube length often fixed at 40" or 48", resulting in poor material yield 		
Material Compositions	<ul style="list-style-type: none"> - Epoxy is the most common resin - Glass filament/roving is the primary substrate 		<ul style="list-style-type: none"> - Resins include phenolic, epoxy, melamine & silicone - Substrates include glass cloth, cotton cloth, kraft paper, and mica paper 		
Typical Grades	Material	Grade - Similar To*	Material	NEMA	IEC
	Glass Epoxy	G-10/EPGC21	Paper Phenolic	XX	PFCP23
	Glass Epoxy High Temp	G-12 & G-11/EPGC22	Glass Epoxy	G-10	EPGC21
	Glass Epoxy High Temp, FR, & EN45545	G-13/EPGC23	Glass Epoxy High Temp	G-11/G-12	EPGC22
	*No NEMA or IEC Grades are Currently Available		Glass Melamine	G-5/G-9	MFGG21
		Glass Silicone	G-7	SIGC21	
		Glass Epoxy High Temp & EN45545	G-13	EPGC23	

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