



# THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

## ENGINEERING RESOURCE

MOTOR INSULATION - MATERIAL COMPARATIVE DATA SHEET

Product Grades		The Gund. Co	APO-1	C109	C209	G-3	G-9	G-10	G-11H	Magnohl™	Nomex®	N155	N220	PET film	VARTM VIL	Flexible Laminates	Rotoguard Slot Armor
		NEMA	GPO-1	--	--	--	G-5/G-9	G-10	G-11	--	--	GPO-1	GPO-1	--	GPO-1	--	--
		IEC	UPGM 202	--	EPGC 202	--	MDGC 201	EPGC 201	EPGC 203	--	--	UPGM 201	UPGM 201	--	UPGM 201/EPGM 203	--	--
Construction			Glass Polyester	Semi-Conductive Glass Laminate	Semi-Conductive Glass Epoxy	Glass Fabric Laminate	Glass Melamine	Glass Epoxy	Glass Epoxy	Magnetic Glass Reinforced Laminate	Aramid Paper	High-Temp Glass Polyester	High-Temp Glass Polyester	Polyester Film	Custom Molded Composite Material		
Standard Thickness Available			0.031" - 2.000"	0.020" - 0.500"	0.008" - 0.500"	0.008" - 4.000"	0.008" - 4.000"	.006" - 5.000"	--	0.062" - 0.400"	.0006"; .0012"	0.031" - 2.000", 0.118" - 1.500"	0.031" - 2.000", 0.118" - 1.500"	--	0.062" - 2.00"		
Mechanical Properties		Units														UPGM 201	EPGM 203
Rockwell Hardness		M Scale	--	--	--	110	115	98	--	--	--	--	--	--	--	--	--
Tensile Strength Lengthwise & Crosswise	LW	ksi	9.5	16.5	35	42	44	--	41	--	--	12	11	8.7	>30	>35	
	CW		--	--	--	34	34	--	--	--	--	--	--	--	--	--	--
Compressive Strength		ksi	33	42	58	76	70	--	70	46	--	40	32	--	>45	>50	
Flexural Strength, Lengthwise & Crosswise	LW	ksi	20	30	57	18	61.6	80	80	28	--	26	32	--	>41	>45	
	CW		--	33	80	14	51,500	70	70	--	--	22	--	--	--	--	
Shear Strength		ksi	13	17	21	21.5	--	25	--	18.5	--	--	12	--	--	--	
IZOD Impact Strength, LW		ft.-lbs./in. <sup>2</sup>	8.5	14	13	12.0	12.5	15	11	--	--	9.5	11.0	--	--	--	
Bonding Strength		lbs.	1,200	850	920	1,500	--	2,300	2,200	1,080	--	--	1,080	--	--	--	
Electrical Properties		Units															
Arc Resistance		Seconds	180	--	--	100	185	130	--	--	--	150	180	--	>130	>130	
Dielectric Strength		V/mil	450	--	--	14.8	450	485	485	--	3,650	450	550	2.0	450	450	
Breakdown Voltage		kV	> 40	--	--	55	65	50	--	--	--	30	50	--	>45	>45	
Surface Resistivity		Ohms/Sq.	--	--	--	--	600+	200	--	--	10 <sup>14</sup>	--	--	--	--	--	
Physical Properties		Units															
Water Absorption		%	--	--	--	--	0.60	--	--	--	--	0.25	0.25	.5	0.025	0.025	
Specific Gravity		lbs./in. <sup>3</sup>	0.066	0.054	0.03	0.068	--	0.067	0.069	0.108	--	0.066	0.061	0.0506	0.063	0.064	
Thermal Properties		Units															
Relative Temperature Index		°C	--	180	180	130/170	130	--	--	155	220	155	210	--	130	155	
Flame Resistance		Class	UL94 HB	--	--	UL 94 HB	UL94 V-0	UL 94 HB	UL 94 HB	UL 94 V-0	UL 94 V-0	UL 94 V-0	E323105	--	UL 94 HB		
Thermal Class		Class	--	--	--	--	B	--	--	F	R	F	--	--	--		

Contact us for a full list of flexible laminate materials and their specs.

Contact our Generator team for additional information on our Rotoguard family of products at [Generators@thegundcompany.com](mailto:Generators@thegundcompany.com)

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. The Gund Company will not be liable for incidental or consequential loss or damage.