THE GUND COMPANY

Manufacturers & fabricators of engineered material solutions

Item:	GPO-3 Glass Polyester Laminate			
Description:	GPO-3 is a UL recognized product (QMFZ2.E101063) that offers excellent track, arc, and flame resistance. It has good mechanical and thermal performance. The low smoke generation and flame spread characteristics make it a preferred choice for transit applications.			
Standards:	NEMA LI-1: Grade GPO-3	MIL-I-24768/6	IEC 60893: UP GM 203	IEC EN45545 R22/HL3 and R23/HL3
Availability:			English Units (in)	SI Units (mm/cm)
	Laminate Sheets:	Thickness:	0.118 to 2.0	3 to 50.8 (mm)
		Standard Sheet Size:	36 x 72 and 48 x 96	92 x 183 and 122 x 305 (cm)
	Channels and Angles:	GPO-3 from The Gund Company is available in four basic shapes: channels, hat -shaped channels, angles, and terminal strips. All four standard shapes are available in various widths and thicknesses. For more information, please reference the sizing chart and available shapes sheets in this document.		
	Fabricated Parts:	The Gund Company custom fabricates insulation materials to the exact specifications and drawings of our customers.		

Engineering Properties

Key Characteristics	Test Method	Units - English (SI)	Typical Values
Density	--	lb/in^3 (g/cc)	0.065 (1.8)
Shear Strength (punch type, 0.062")	ASTM D-732	ksi (MPa)	13.0 (90)
Flexural Modulus	ASTM D-790	psi x 10^6	1.2
Tensile Modulus	ASTM D-638	psi x 10^6	1.7
Thermal Class	UL 746-B	°C	130
Thermal Conductivity	ASTM C-177	BTU in/(hr. ft^2 °F)	1.9
Railway Rolling Stock Fire Behavior NF F 16-101/102	STM-S-001 Index C	Class	F1/I1
Glow/Hot Wire Flammability	IEC 60695-2-11	No Visible Flame after 30 sec at 960 °C	
High Voltage Tracking Rate	UL 746-A	mm/min	0
High Voltage Arc Resistance	UL 746-A	Seconds	300+
Volume Resistivity	ASTM D-257	Ω-cm	10^{13} - 10^{14}

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 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. TGCR0617

THE GUND COMPANY

Manufacturers & fabricators of engineered material solutions

GPO-3 Glass Polyester Laminate

Material Data Sheet

NEMA LI-1 GPO-3 Required Properties

Key Characteristics		Test Method	Units	NEMA Required	Typical Values
Breakdown Voltage (0.062")	Condition A	ASTM D-229	kV	40.0 min	45.0
	Condition D-48/50			15.0 min	25.0
Perpendicular Electric Strength (0.062") in Oil S/T		ASTM D-229	V/mil	300 min	550
Arc Resistance		ASTM D-229	Sec	150 min	192
Flexural Strength[1] (0.062") Condition E-48/50	Length-Wise	ASTM D-229	ksi (MPa)	18 min	23
	Cross-Wise				20
IZOD Impact Strength	Length-Wise	ASTM D-229	ft-lb/in notched	8.0 min	9.3
	Cross-Wise				9.5
Tensile Strength[2]		ASTM D-229	ksi	8.0 min	9.0
Compressive Strength, Flat-Wise		ASTM D-229	ksi	30.0 min	33.0
Bonding Strength (0.500")	Condition A	ASTM D-229	LBs	850 min	1,840
	Condition E-48/50			800 min	1,800
Moisture Absorption (0.125") Condition D-24/23		ASTM D-570	%	0.60 max	0.25
Flammability Rating		UL 94	Class	V-0	V-0
Tracking Resistance		ASTM D-2303	min	300 min	1,000

[1] Flexural Strength for GPO-3 Shapes is 25,000 psi [2] Tensile Strength for GPO-3 Shapes is 15,000 psi

IEC 60893-2 UPGM 203 Required Properties

Key Characteristics		Test Method	Units	IEC Required	Typical Values
Flexural Strength	At Room Temp	ISO 178	MPa	130 min	152
	At 130°C			65 min	90
IZOD Impact Strength (Parallel to Laminations)		ISO 180	kJ/m^2	35 min	40
Perpendicular Electric Strength (90°C in Oil, 1.5mm)		IEC 60243-1	kV/mm	12 min	19
Parallel Breakdown Voltage (Stepped, 90°C in Oil, 3mm)		IEC 60243-1	kV	35 min	45
Insulation Resistance (After Water Immersion)		IEC 60167	MΩ	5×10^2 min	10^3
Comparative Tracking Index (CTI)		IEC 60112	V	500	600
Flammability Rating		UL 94	Class	V-0	V-0
Water Absorption (1.5mm)		--	mg	43	20

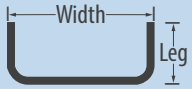
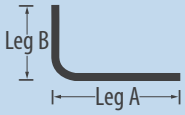
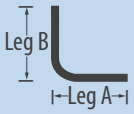
All of the information, suggestions and recommendations pertaining to the properties and uses of the products herein are based upon tests and data believed to be accurate; however, the final determination regarding suitability of any material described herein for the use contemplated, the manner of such 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. TGCR0617

THE GUND COMPANY

Manufacturers & fabricators of engineered material solutions

GPO-3 Glass Polyester Laminate

Material Data Sheet

Channel	Hat Shaped Channel	Terminal Strips	Unequal Leg Angles	Equal Leg Angles
				

Channels

Part#	Width		Leg		Thickness	
	in	mm	in	mm	in	mm
CHAN2700	1-1/4	31.75	3/8	9.52	1/8	3.18
CHAN2875	2	50.8	9/16	14.29	1/8	3.175
CHAN2617	2	50.8	13/16	20.64	1/8	3.175
CHAN1144	2	50.8	1	25.4	1/4	6.35
3242009	2	50.8	7/8	22.22	1/4	6.35
3232010	2	50.8	1	25.4	3/16	4.76
CHAN2212	2-5/16	58.74	3/4	19.05	1/8	3.175
CHAN1177	2-9/16	65.09	1-7/32	30.96	1/8	3.175
CHAN1166	3	76.20	7/8	22.22	1/4	6.35
CHAN2888	3	76.20	1-1/2	38.10	1/4	6.35
CHAN1939	3-9/16	90.49	2-9/16	65.09	3/16	4.76
CHAN1791	3-19/32	91.19	1-1/8	28.58	1/8	3.175
CHAN1155	4	101.6	1-1/8	28.58	1/4	6.35
CHAN2242	4	101.6	1-3/8	34.93	3/16	4.76
CHAN2872	4-1/2	114.3	2-1/2	63.5	1/8	3.175
CHAN1940	4-9/16	115.89	2-9/16	65.09	9/32	7.14
CHAN1788	4-3/4	120.65	1-5/8	41.28	3/16	4.76
CHAN2825	5-1/2	139.7	1-1/4	31.75	5/32	3.97
CHAN2288	6-3/8	161.92	2	50.8	9/32	7.14
CHAN1844	8-1/2	215.90	2-11/16	68.26	3/16	4.76
CHAN1936	9-21/32	245.27	1-5/8	41.28	1/8	3.175
CHAN2250	11-9/32	286.54	1-5/8	41.28	3/8	9.52
CHAN2120	11-1/2	292.10	1-7/16	36.51	5/32	3.97

Hat Shaped Channels

Part#	Width		Leg		Thickness	
	in	mm	in	mm	in	mm
CHAN1161	4-19/32	116.68	7/8	22.22	1/8	3.175
CHAN2091	5	127	1-3/8	34.93	1/8	3.175
CHAN1272	9-9/16	242.89	2-3/8	60.33	3/16	4.76

Unequal Leg Angles

Part#	Leg A		Leg B		Thickness	
	in	mm	in	mm	in	mm
ANGL2877	2-3/4	69.85	2	50.8	1/4	6.35
3133716	2-3/4	95.25	1-5/8	41.28	3/16	4.76
3142010	2	50.80	1	25.40	3/16	4.76

Equal Leg Angles

Part#	Legs A & B		Thickness	
	in	mm	in	mm
ANGL2878	1	25.4	1/8	3.175
ANGL2880	1-1/2	38.10	1/8	3.175
ANGL2881	1-1/2	38.10	3/16	4.76
ANGL2882	1-1/2	38.10	1/4	6.35
ANGL2884	2	50.8	1/4	6.35
ANGL2885	3	76.20	1/4	6.35
ANGL2889	1-1/4	31.75	1/8	3.175

Terminal Strips

Part#	Width		Leg		Thickness	
	in	mm	in	mm	in	mm
2710	7/16	11.12	1-1/2	38.10	1/4	6.35

Tolerances for Pultruded Shapes

Thickness	Angularity of Legs	Cut Length	Height & width	Straightness
± 0.020"	± 3°	+1.000" - 0.000"	± 5%	0.050" / ft

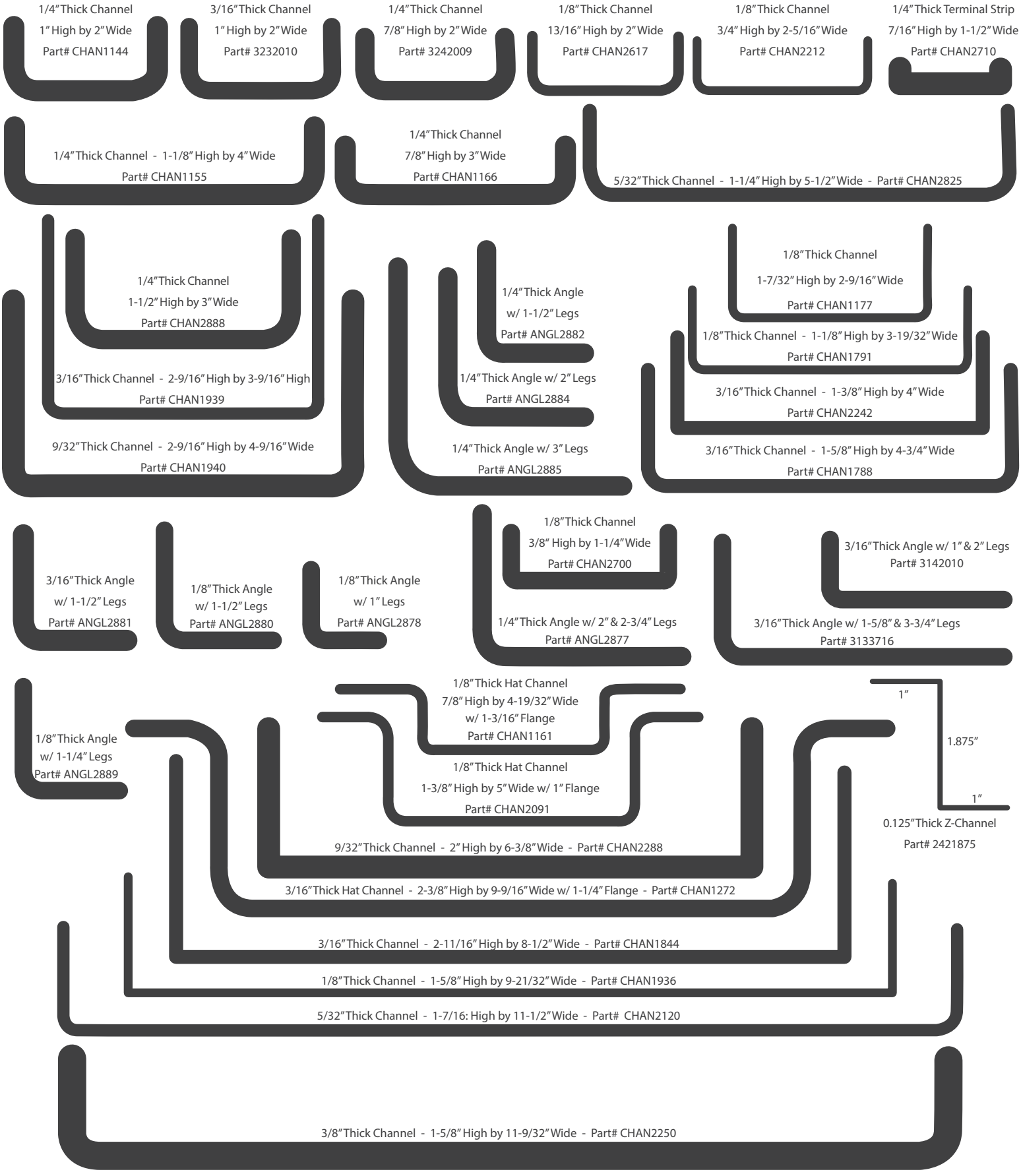
All of the information, suggestions and recommendations pertaining to the properties and uses of the products herein are based upon tests and data believed to be accurate; however, the final determination regarding suitability of any material described herein for the use contemplated, the manner of such 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. TGCR0422

THE GUND COMPANY

Manufacturers & fabricators of engineered material solutions

GPO-3 Glass Polyester Laminate

Material Data Sheet



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 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. TGCR0617