



MANUFACTURERS OF
ELECTRICAL INSULATION MATERIALS

INSULATING COMPONENTS FOR
POWER SYSTEMS EQUIPMENT

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MATERIAL DATA SHEET

Item:	GPO3 Glass Polyester Laminate		
Description:	GPO3 is a UL recognized product (QMFZ2.E101063) offering excellent track, arc, and flame resistance. It has good mechanical and thermal performance at an affordable price. The low smoke generation and flame spread characteristics make it a preferred choice for transit applications.		
Standards:	NEMA LI-1 Grade GPO-3 IEC 60893 UP GM 203		
Availability:	Laminate Sheets:	Thickness:	English Units 0.118" to 2.0" SI Units 3 mm to 50.8 mm
		Standard Sheet Sizes:	36" x 72" 48" x 96"
	Channels and Angles:	Four basic shapes (channels, hat-shaped channels, angles, & terminal strips) in various widths and thicknesses, please see the Angles & Channels selection chart	
	Fabricated Parts:	The Gund Company custom fabricates insulation materials to the exact specifications and drawings of our customers	

Key Characteristics	Units - English (SI)	Typical Values
Standard Color		Red ¹
Specific Gravity	lb/in ³ (g/cc)	0.065 (1.8)

¹Custom colors available upon request

NEMA LI-1 GPO-3 Required Properties

Key Characteristics	Test Method	Units	NEMA Required	Typical Values
Breakdown Voltage (0.062") Condition A Condition D-48/50	ASTM D-229	kV	40.0 min 15.0 min	45.0 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 (0.062") Condition E-48/50 LW CW	ASTM D-229	ksi (MPa)	18 min 18 min	23 20
IZOD Impact Strength LW CW	ASTM D-229	ft.-lb/in Notched	8.0 min 8.0 min	9.3 9.5
Tensile Strength	ASTM D-229	ksi	8.0 min	9.0
Compressive Strength, FW	ASTM D-229	ksi	30.0 min	34.0
Bonding Strength (0.500") Condition A Condition E-48/50	ASTM D-229	Lb	850 min 800 min	1840 1800
Moisture Absorption (0.125") Condition D24/23	ASTM D-570	%	0.60 max	0.25
Flammability Rating	UL94	Class	V-0	V-0
Tracking Resistance	D2303	min	300 min	1000

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. Under no circumstances shall we be liable for incidental or consequential loss or damage.

IEC 60893-2 UPGM 203 Required Properties

Key Characteristics	Test Method	Units	IEC Required	Typical Values
Flexural Strength @ Room Temp @ 130°C	ISO 178	MPa	130 min 65 min	152 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 x 10 ² min	10 ³
Comparative Tracking Index (CTI)	IEC 60112	V	500	600
Flammability Rating	UL94	Class	V-0	V-0
Water Absorption (1.5mm)	--	mg	55 max	45

Additional Engineering Properties

Key Characteristics	Test Method	Units - English (SI)	Typical Values
Shear Strength (punch type, 0.062")	ASTM D732	ksi (MPa)	13.0 (90)
Thermal Class	UL 746B	°C	130
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 30sec @ 960°C	
High Voltage Tracking Rate	UL746A	mm/min	0
High Voltage Arc Resistance	UL746A	seconds	300+
Volume Resistivity	ASTM D257	Ω-cm	10 ¹³ - 10 ¹⁴

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**SHERWIN
WILLIAMS.**

Chemical Coatings

CC-E14

POLANE® 700T Water Reducible Enamel

Black F63B520
Clear F63V521
White F63W522

<u>DESCRIPTION</u>	<u>CHARACTERISTICS</u>	<u>SPECIFICATIONS</u>
<p>POLANE® 700T Water Reducible Enamel is a low VOC, one component water reducible, polyurethane-acrylic enamel intended for the Business Machine and Electronic Cabinetry market. As a smooth or texture coating system, on structural foam or injection molded plastic or treated steel, it provides performance properties similar to two component solvent based polyurethanes in these markets.</p> <p>Advantages:</p> <ul style="list-style-type: none"> • VOC of less than 2.3 pounds/gallon at application • Volatile organic emissions of less than 1.0 pounds/gallon • High Quality - meets the performance requirements of the Business Machine/ Electronic Cabinetry market • No free isocyanate health hazard - urethane is pre-reacted • Water Based - No flash point - No fire hazard • Performance similar to solvent based polyurethanes in these markets • Improved performance over acrylic latex coatings • One Package - no catalyst • Excellent hardness • Available in a broad range of colors. • Air dry or force dry - low energy cure • Free of lead hazards as packaged in compliance with Consumer Product Safety Commission's (CPSC) 16CFR Chapter II: Subchapter B, part 1303 • Good solvent and chemical resistance • Reduction and clean up with water means cost savings for solvent and insurance, lower odors and improved working conditions. • Excellent resistance to color change as tested on HP-UV cabinet • Low HAPS solvent content 	<p>Gloss: 35-40 units Clear: 45-60 units may be adjusted lower with D64F505 Volume Solids: 37-40 ± 1% varies by color Viscosity: Brookfield #4 Spindle, RVT, 20 RPM 5500-6500 cps Recommended film thickness: Mils Wet 3.0 - 4.0 Mils Dry 1.2 - 1.6 Spreading Rate (no application loss) 360-548 sq ft/gal @ 1.2-1.6 mil dft Drying (1.2 mils dft, 77°F, 50% RH): To Touch: 20-30 minutes Tack Free: 30-40 minutes To Handle: 40-50 minutes To Pack: overnight Force Dry: 30 minutes at 140°F Good air movement and humidity control are necessary for proper drying of water reducible coatings. Flash 10-15 minutes between smooth and texture coats.</p> <p>Flash Point: none, Seta Flash Package Life: 1 year, unopened pH: 8.0 - 8.5</p> <p>Air Quality Data: (Theoretical) Non-photochemically reactive Volatile Organic Compounds (VOC) as packaged, maximum 2.3 lb/gal, 275 g/L Volatile Organic Emissions as packaged, maximum 1.0 lb/gal, 120 g/L</p> <p>An Environmental Data Sheet is available from your local Sherwin-Williams facility.</p>	<p>General: Substrate should be free of grease, oil, dirt, fingerprints, drawing compounds, any contamination, and surface passivation treatments to ensure optimum adhesion and coating performance properties. Consult Metal Preparation Brochure CC-T1 for additional details.</p> <p>Aluminum: Prime with Industrial Wash Primer, P60G2, or Kem Aqua® Wash Primer, E61G520.</p> <p>Galvanized Steel: Prime with Industrial Wash Primer, P60G2, or Kem Aqua Wash Primer, E61G520.</p> <p>Plastic: Due to the diverse nature of plastic substrates, a coating or coating system must be tested for acceptable adhesion to the substrate prior to use in production. Reground and recycled plastics along with various fire retardants, flowing agents, mold release agents, and foaming/blowing agents will affect coating adhesion. Wash the surface with isopropyl alcohol. The coating can be applied directly to most plastic surfaces. If needed, test with Kem Aqua Bonding Primer E61W525, Polane W₂ Primer, E61AC514, or Kem Aqua 65P SprayFil. Consult your Sherwin-Williams representative for system recommendations.</p> <p>Steel or Iron: Remove rust, mill scale, and oxidation products. For best results, treat the surface with a proprietary surface chemical treatment of zinc or iron phosphate to improve corrosion protection. Where a primer is needed use Polane W₂ Primer, E61AC514.</p> <p>Testing: Due to the wide variety of substrates, surface preparation methods, and application methods and environments, the customer should test the complete system for adhesion, compatibility and performance prior to full scale application.</p>

APPLICATION

Base coats/smooth coats can be applied using conventional, airless, air assisted airless, HVLP, or electrostatic methods. Texture coats must be applied using conventional spray.

Conventional Spray—smooth

Air Pressure 40-60psi
Fluid Pressure 10-12 psi
Tip055-.070
Reducer water
Reduction Rate ... as needed up to 10-25%

Conventional Spray—texture

Air Pressure 25-35 psi
Fluid Pressure 5-15 psi
Tip055-.070
Reduction Rate . as needed up to 10%
Over-reduction will give poor texture profile and appearance

HVLP:

Smooth Coat

Atomizing Air 10 psi max at cap
Fluid Pressure 6-10 psi
Tip055-.070
Reducer water
Reduction Rate 10-25%

Texture Coat

Atomizing Air 4-8 psi max at cap
Fluid Pressure 6-15 psi
Reduction Rate 0-10%

Cleanup:

Use water followed by a dilute blend of water and ammonia as soon as possible. For dried coating on equipment, use MIBK.

Follow manufacturer's safety recommendations when using any solvent.

Chemical Resistance

After ½ hour spot test and one hour recovery:
Isopropanol Good
10% NaOH Excellent
Ethyl Acetate Good
Ammonia Excellent
Ivory® Liquid Excellent
Clorox Formula 409® Excellent
MEK Good
Toluene Good
10% HCL Excellent
1 normal H2SO4 Excellent
5% Tide solution Excellent

Stain Resistance

After ½ hour spot test:
Coffee Excellent
Vaseline® Excellent
Coca-Cola Excellent
Catsup Excellent
Motor oil Excellent
Gasoline Excellent
Lipstick Excellent

SPECIFICATIONS

Product Limitations

- Avoid freezing. Store at temperatures of 40°F minimum to 100°F maximum - Freezing may destroy product.
- Allow 10-15 minutes flash off of basecoat before applying texture coat.
- Texture pattern is dependent on equipment set up, viscosity and operator technique.
- Keep container closed to prevent skinning of this fast dry coating. Filtering may be required.
- Product is thixotropic. Do not use viscosity cup to measure viscosity. Do not reduce over 25% for smooth coat or 10% for texturing.
- Water reducible coatings should be applied at high viscosity. They atomize very easily at higher viscosity.
- A minimum of 1.1 mils dry film per coat is required for good adhesion and film integrity.
- Other substrates may show lower pencil hardness with full cure. This may be due to adhesion, substrate profile, and substrate cleaning/pretreatment. Higher film thickness may also give lower pencil hardness.
- For optimum hardness and cure, allow 2-4 weeks of air drying for 1-1/2 to 2 mils dry film. Heavier film may require 6-8 weeks. For force dry curing of 30 minutes at 140°F or greater, full cure is attained after 48 hours additional air drying.
- Do not use Butyl Cellosolve or other cosolvents because of incompatibility.
- Do not use alkyd based primers under Polane 700T coatings.
- Products should be applied at temperatures above 50°F.
- Do not package Polane 700T coated products in air-tight plastic bags unless completely cured. Since Polane enamels continue to cure for several weeks, the build up of organic solvents and reaction by-products could cause improper cure and adhesion failure in use.

Performance Tests

Substrate: 24 gauge Bonderite 1000 steel panel, applied @ 1.5 mils dft cured 30 minutes at 140°F plus 48 hours air dry
Salt Spray Test 48-72 hours
Humidity 100 hours
Conical Mandrel Test passes
Impact Resistance, Reverse
No fracture 75 in lb
No Taped Pick Off 120+ in lb
Pencil Hardness HB-F
Crosshatch Adhesion Excellent
Taber Abrasion <75 mg
1000 cycles, CS17 wheel, 1000 g load
Freeze/Thaw Cycles 2 cycles
HPUV 350 hours, <2.0 Delta-E, FMC-2
Cure Test
100 MEK double rubs slight burnishing

CAUTIONS

FOR INDUSTRIAL SHOP APPLICATION

Thoroughly review product label and Material Safety Data Sheet (MSDS) for safety and cautions prior to using this product. A Material Safety Data Sheet is available from your local Sherwin-Williams facility. Please direct any questions or comments to your local Sherwin-Williams facility.

Note: Product Data Sheets are periodically updated to reflect new information relating to the product. It is important that the customer obtain the most recent Product Data Sheet for the product being used. The information, rating, and opinions stated here pertain to the material currently offered and represent the results of tests believed to be reliable. However, due to variations in customer handling and methods of application which are not known or under our control, The Sherwin-Williams Company cannot make any warranties as to the end result.