# Specifications for ProtectoliteTM Composites

# FRP Troughs and Launders

# GENERAL

**Description of Work**

 The scope of this specification is intended to cover all FRP Troughs and Launders and required

 accessories are shown on the drawings. This includes but is not limited to the following:

* Fiberglass Reinforced Plastic (FRP) Troughs,
* FRP mounting brackets,
* Fasteners to secure the Troughs and mounting brackets.

**References**

1. ANSI/ WWA F101: American Water Works Association for Contact Molded Fiberglass Reinforced Plastic, Wash Water Troughs and Launders.
2. ANSI: American National Standards Institute
3. ASTM D-256; American Standard Test Methods for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
4. ASTM D-570; American Standard Test Methods for Water Absorption of Plastics.
5. ASTM D-638; American Standard Test Methods for Tensile Properties of Plastics.
6. ASTM D-790; American Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1. ASTM D-2583; American Standard Test Methods for Indentation Hardness of Rigid Plastics by Means of a Barcol Impresser.
2. ASTM D-696; Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer

**Submittals**

**Product Data**

Submit manufacturer’s product data, including description and physical properties of FRP laminate. Submit manufacturer’s installation instructions.

Shop Drawings

Submit manufacturer’s shop drawings showing plans, elevations, components, supports, dimensions, attachments, mounting, fasteners and anchors.

Manufacturer’s Certification

Submit manufacturer’s certification that materials comply with specified requirements.

# PRODUCTS

**Manufacturer:**

 Protectolite Composites Inc.

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**Materials and Finishes**

* FRP Launders or Troughs shall be Protectolite™ Composites or an approved equal that conforms to these specifications.
* FRP Trough shall be manufactured using contact molding or vacuum infusion molding process with E-glass for premium grade and random chopped-strand type with minimum strand length of 1 inch or hand lay ups glass mat for the standard grade.
* Resin shall be premium grade Isophthalic Polyester for both premium and standard grade.
* Inner Trough surface shall have a resin-rich and smooth gel-coat surface with no glass fibers exposed.
* Outer Trough surface shall have a resin-rich surface with no glass fibers exposed.
* Outer Trough surface shall be hot coated.
* Minimum thickness ¼ inch

 **Glass Reinforcement**

* Reinforcement shall be continuous strand mat. Glass content shall be a minimum of 30% by weight.

 **UV Resistance**

* Panel material shall be made from a UV stabilized resin system. Additional UV resistance shall come from surfacing mats.
* Color: Grey. Color molded-in with ultraviolet inhibitor.
* All factory cuts shall be sealed using Pro’lac 100 penetrating sealant and not with a resin coating.

 **Fiberglass Reinforced Plastic (FRP) Premium Minimum Physical Properties**

Tensile Strength: ASTM D-638: 44,500psi

Flexural Strength: ASTM D-790: 57,000psi

Flexural Modulus: ASTM D-790: 1.93 x 106 psi

Barcol Hardness: ASTM D-2583: 35

Notch Izod Impact: ASTM D-256: >20 ft-lbs/inch

Water Absorption: ASTM D-570: <0.10%

Coef. Of Thermal Expansion: ASTM D-696: 10 x 10-6 in/in/°F (AVG)

Glass Content ASTM-D2584: 60%

##  FRP Troughs and Launders

1. Design to support the applied downward vertical or gravity loadings:
2. Fabrication
3. Attachments
4. Water fill
5. Design to resist buoyant or gravity water load deflection, maximum upward and downward deflection equal to or less than L / 1000 where L represents the unsupported Trough length in inches.
6. Round, square or “V” bottoms for trough with vertical sides.
7. Top edge straight with no more than 1/8 inch deviation from true plane.
8. Unit rigidity; longitudinal steel stiffening ribs integrally molded in as required.
9. Sufficient number of PVC, FRP or stainless steel spreader bars maintains uniform width over length of each Trough.
10. Open end condition: (select one)
	1. A two (2) inch wide, ½ inch thick wall, grouting rib molded outside of each trough at the gullet end acts as water stop when Trough grouted in place.
	2. A saddle at Trough end with slotted holes to allow a minimum vertical adjustment of one (1) inch.
11. Closed end of Trough when integrally molded in, should be a minimum ¼ inch thickness of the Trough body.
12. If required by specifications: Weir Plates; match-metal-die-molded (ANSI/AWWA F102) fiberglass reinforced plastic, V-notch design and specified depth, ¼ inch nominal thickness, appropriate number of 2-1/2 inch diameter holes on design specific centers. (See specification Weirs, Baffles and Baffle Supports).
13. Stainless steel spacer rods, in lieu of PVC spacer rods.
14. Fasteners and anchors; (Select one)
	1. Type 304 stainless steel.
	2. Type 316 stainless steel.

# EXECUTION

**Handling and Storage**

**Handling**

* Protect the surface of FRP Troughs and Launder components from cuts, scratches, gouges, abrasions, and impacts. Do not use wire slings unless the material is fully protected. Use spreader bars when lifting FRP.

**Storage**

* Store all FRP materials to prevent any type of damage prior to the installation.

**Installation of FRP Trough and Launders**

1. Trough dimensions require verification and project site conditions must be suitable for installation. Unsatisfactory site conditions must be corrected before product installation.
2. Products are to be installed as specified by the manufacturer, as shown in contract documents and in true and proper alignment.
3. Adjust weir plates per contract documents or as directed by the site Engineer.
4. Grout Trough in place after levelling.

1. When necessary to adjust lengths of plates due to field conditions and when approved by the site Engineer, seal cut or machined edges thus exposed with manufacturer’s supplied sealant. Excessive cutting will not be acceptable.
2. Surfaces are to be cleaned according to the manufacturer’s instructions.
3. Remove excess materials of construction and trash to leave the site in a clean condition for subsequent operation.

**Installation Instructions**

Installer must follow the manufacturer's installation instructions and the shop drawings.

Seal all field-cut edges with the manufacturer’s sealant, Pro’lac 100.

The property values are based upon tests believed to be reliable, performed on laboratory test plaques. However, no liability is assumed resulting from its use. We suggest that the user perform tests in order to establish the material suitable for the specific application.

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