

FIBERGLASS REINFORCED PLASTIC (FRP) FLAT COVER SYSTEM

PART 1 GENERAL

1.1. SUMMARY

- A. This Section includes fiberglass reinforced plastic (FRP) flat cover systems for clarifier effluent, filter basins, U/V tanks, and other applications as shown on the Contract Drawings.

1.2. QUALITY ASSURANCE

- A. The material covered by these specifications shall be furnished by a reputable and qualified manufacturer of proven ability that is regularly engaged in the manufacture and installation of FRP products.
- B. Fabricator shall be experienced in successfully producing FRP products specified for this project, with sufficient production capacity to produce required units without causing delay in the work.
- C. Fabricator shall provide a list of five (5) installations of comparable size in operation for at least three (3) years.

1.3. SUBMITTALS

- A. The following shall be submitted in accordance with the General and Special Provisions.
 - i. Shop Drawings
 - a. Dimensions.
 - b. Job specific layout.
 - c. Sectional assembly.
 - d. Location and identification mark.
 - e. Cover locations and attachment
 - f. Support locations and attachment.
 - g. Accessories, attachments, transition pieces.
 - h. Connection details.
 - ii. Manufacturer's catalog data showing:
 - a. Dimensions, spacing, and construction details
 - b. Materials of construction.
 - c. Description.
 - iii. Certificates
 - a. Submit Manufacturer's certification that all materials furnished are in compliance with the applicable requirements of this specification.
 - iv. Manufacturer's Instructions

- a Submit complete information and instructions relating to the storage, handling, installation, and inspection of all equipment related to this Section.

1.4. SHIPPING AND STORAGE INSTRUCTIONS

- A. All FRP components shall be shop fabricated and assembled into the largest practical size suitable for transporting.
- B. The parts and assemblies that are shipped unassembled shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final assembly in the field.
- C. All FRP materials shall be stored before, during, and after shipment in a manner to prevent cracking, twisting, bending, breaking, chipping or damage of any kind to the materials.

PART 2 PRODUCTS

2.1. MANUFACTURERS

- A. The following manufacturer is named to establish a standard of quality necessary for the Project:

MFG Construction and Water Products Company, 55 Fourth Avenue, Union City, Pennsylvania 16438.

- B. Manufacturer and Supplier of cover system shall be NSF 61 Certified and listed on NSF website as a certified manufacturer.
 - i. When a project is NSF61 Certified all drawings and shipping documents shall be stamped with the NSF61 logo.
- C. Manufacturer and supplier to supply a performance bond
- D. Manufacturer of products shall be ISO 9001 certified
- E. All FRP products shall be manufactured entirely in the United States

2.2 DESIGN CRITERIA

- A. Gravity Load - Downward vertical loads shall include the weight of the cover system and appurtenance attachments. Any additional loads, such as piping, etc., shall also be considered.
- B. Thermal Stresses - The cover system shall be designed to accommodate temperature induced stresses resulting from differences in coefficients of thermal expansion (contraction) between the cover and tank/support materials over temperature range of -10°F to 100°F.

2.3 MATERIALS

- A. The cover system laminate shall meet the following minimum physical and mechanical requirements:

Table 1. Laminate Mechanical and Physical Properties

<u>Property</u>	<u>Test</u>	<u>Minimum Value</u>
Tensile Strength	ASTM D-638	18,500 psi
Flexural Strength	ASTM D-790	27,900 psi
Flexural Modulus	ASTM D-790	1,080,000 psi
Barcol Hardness	ASTM D-2853	40
Notched Izod	ASTM D-256	15.4 ft-lbs/in
Water Absorption	ASTM D-570	0.13%

- B. Resin - The resin shall be a commercial grade isophthalic polyester thermosetting resin, which has either been evaluated in a laminate, or which has been determined to be acceptable for use in a waste treatment plant environment.
- C. Fillers: The resin shall contain no fillers. Thixotropic agents for viscosity control are acceptable. Colorants which have been determined by at least five years previous service to be acceptable for the service condition are acceptable. Ultraviolet stabilizers are required in all laminates. Catalysts, accelerators and/or promoters shall be added to provide complete cure of the laminate and must meet the physical properties as indicated in Section 2.3 Table 1.
- D. Ultraviolet Resistance - Ultraviolet resistance is required in all laminates exposed to ultraviolet light, whether it be in the form of pigmentation or ultraviolet absorbers or a surface veil.
- E. Metal Reinforcement - When metal reinforcements are used, they shall be free of rust, oil and any foreign matter. They shall be completely encapsulated with a minimum of 1/8" thick laminate.
- F. Reinforcement - E glass with silane finish.
- G. The content of the finished laminate shall be adequate to produce mechanical and physical properties conforming to Section 2.3, Table 1.
- H. Other Reinforcement – Additional reinforcement in the form of foam, balsa sheet or other reinforcement for high stress areas shall be completely encapsulated within the laminate. Care shall be taken to insure that these areas of the laminate are not designated as attachment points or drilled for any purpose.

I. Laminate Construction –

1. Cosmetic surface shall be a resin rich layer. A gelcoat surface shall be provided.
2. Structural layers shall consist of plies of chopped strand mat with a maximum of 2 ounces per square foot. Adequate contact molding pressure ensures complete resin wet-out of glass fibers.
3. Outer surface shall consist of a resin rich layer not less than 0.020 inches thick. The outer layer resin shall be applied after cure of the structural layer and suitably embed all reinforcing fibers.
4. Finished laminate shall be a minimum of 25% fiber reinforced with a minimum thickness of not less than 1/4”.

J. Materials used in the manufacture of the FRP products shall be new stock of the best quality and shall be free from all defects and imperfections that might affect the performance of the finished product.

K. Color: Project Specific

- a. Supply NSF labeled products and proof of certification

2.5 SUPPORTS AND HARDWARE

- A. Manufacturer shall be responsible for the design and fabrication of supports suitable for installation of the cover system specified herein.
- B. Supports may be hot dip galvanized steel, type 304 or 316 stainless steel, or contact molded FRP.
- C. All mounting hardware shall be Type 304 or 316 stainless steel and shall be supplied by the cover system manufacturer.

EXECUTION

3.1 STORAGE

- A. Should it be necessary to store product prior to installation, precautions should be taken to prevent cracking, twisting, warping, distortion, bending, breaking, chipping or damage of any kind to the materials.

3.2 INSTALLATION

- A. Install covers and supports in accordance with manufacturer's instructions and approved shop drawings.
- B. Field cutting of covers is allowed if necessary. All field cut edges and field drilled holes shall be sealed per the manufacturer's instructions.
- A. Ensure that covers and supports are installed plumb and true, free of warp or twist, within the tolerances specified by the manufacturer and as shown on the drawings.

END OF SECTION