



Warminster Fiberglass
Water and Wastewater Treatment Products
Keeping Americas' Water Clean

SECTION 11300

FIBERGLASS FLAT LAUNDER COVERS FOR ODOR CONTROL

PART 1 GENERAL

1.1 EXTENT OF WORK

A. The extent of work specified in this Section includes furnishing all Materials, labor, tools and equipment, and performing all operations Necessary to install items of fiberglass reinforced plastic (F.R.P.), as Shown on the Contract Drawings and as specified herein.

B. The work includes the following items in general.

1. Pre-Engineered Flat F.R.P. Launder/Weir Covers for Primary Clarifier Tanks (Secondary).

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Ventilation F.R.P. piping, dampers and supports are specified in Section 15600 - VENTILATING SYSTEMS FOR ODOR CONTROL.

1.3 STANDARDS

A. Applicable Standards of the American Society for Testing and Materials (ASTM).

1.4 SHOP DRAWINGS

A. Shop drawings shall be submitted to the Engineer for review, in accordance with Section - SUBMITTALS.

B. As a minimum, the submittal for the F.R.P. flat covers shall include the following:

1. Shop drawings complete with materials of construction as specified.
2. Shop drawings shall specify core material, steel, flatness, handles, fasteners, gasket profiles, sizes, spacing and locations of Structural members, connections, attachments and openings, in strict accordance with the plans and Specifications.
3. Product data sheets.
4. Manufacturer's certificate of compliance with the plans and Specifications.
5. The name, address, phone number and location of 5 installations, engineering firm, contractor, and plant manager, for reference, with equipment typical to that specified, produced and which has performed satisfactorily for a minimum period of 5 years.
6. Manufacturer's test results of cover meeting L/240 as a maximum allowable deflection.

1.5 GUARANTEE AND RESPONSIBILITY

A. Performance Bond (if required by engineer/city)

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1. A performance bond in the amount of 2 times the amount of the contract for the covers plus the contractor's cost for installation, shall be provided by the manufacturer of the Odor Control Covers prior to receiving a contract to supply covers. Proof that a bond will be issued shall be presented along with the bid in writing by the bonding company. Any bid not accompanied by this proof will not be considered and will be rejected as being non-responsive. The performance bond will insure the covers meet the physical and structural properties of the specifications and the air velocity in feet per minute and H₂S gas in parts per million as specified.

B. Material and Workmanship

1. All materials and workmanship shall be guaranteed free from any inherent or hidden flaws or defects for a period of two (2) years from the date of beginning of full-time operation, ordinary wear and tear expected. Any defects occurring as stated above shall be repaired or made good without any expense or operating inconvenience to the Owner. Any material or workmanship that is found to have been defective during the first two years of full time operation shall be replaced and corrected promptly by the Contractor at no cost or operating inconvenience to the Owner.
2. Failure of the manufacturer to submit the specified materials, in compliance with the specifications, will be considered non-responsive/responsible and will result in rejection of their product.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and directions for storage.

B. All materials shall be promptly unloaded upon arrival at the site. Materials stored in such a way as to eliminate potential damage resulting from accidental impact. The F.R.P flat covers shall be stored off the ground on a level surface in such a manner as to prevent warping or fracturing of the parts.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Provide products manufactured by Warminster Fiberglass Company; P.O Box 188, Southampton, PA 18966-0188; <http://www.warminsterfiberglass.com/> Tel. (215) 953-1260, Fax. (215) 357-7893.

B. Products from other manufacturers may be considered for substitution 4 weeks prior to receipt of bids. Legitimate manufacturers (not suppliers/distributors) only will be reviewed for approval. Requests for substitution after the job bids will not be considered. Requests for substitution must include the following information to be considered:

1. Formal written request certifying that products to be substituted are equal in all respects to the specified products in terms of materials, structural properties, dimensions, physical, appearance, quality level, and quantities, and that they will perform the same function in the same manner and will achieve the same result.

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2. Manufacturer's material data sheets, specifications, and performance data for evaluation and approval.
3. Manufacturer shall submit a list of ten or more projects in satisfactory service for not less than five years with covers identical to those being proposed for substitution, For each project, include name, address, and telephone number of the engineer, the contractor, and the plant manager.
4. Name of manufacturing company, address, phone number, fax number.

C. Pre-engineered airtight Launder Covers with Scum Baffles molded integral with top cover.

1. Fiberglass reinforced plastic covers with accessories shall be designed, manufactured and installed to cover new or existing circular or rectangular primary clarifier effluent launders and weirs, as shown on the Drawings and as herein specified.
2. The General Contractor shall field measure the inside diameter of the Primary Clarifiers, and the circumference of the scum baffle. The covers shall meet the following requirements:

a). Basis of Design

- 1). Loading conditions. The launder/weir cover shall be designed and tested to withstand a uniform load of 45 pounds per square foot and a 250-pound load over one square foot. Use $L/240$ for the maximum allowable deflection.
- 2). Covers shall be flat or crowned up to 1/4-inch, to prevent water and debris build-up. Panels that bow down are unacceptable.

3. Functional Requirements.

a). The flat cover design shall provide for expansion and contraction due to climatic change without damage to covers under the following conditions.

- 1). Winter Conditions (-30°F)
- 2). Summer Conditions (140°F)

b). The bolted cover sections shall be air tight to the fullest extent possible.

c). The cover and accessories shall be resistant to corrosive atmosphere such as H_2S gas and corrosive condensate containing sulfuric acid.

d). PERFORMANCE - When installed the Cover System shall be tightly sealed with minimal air gaps and exhibit a minimum of 12 air changes per hour.

- 1). The correct air flow in C.F.M. (cubic feet per minute) at the correct velocity in f.p.m. must be maintained throughout the entire chamber formed by the Covers to exhibit 12 complete air changes per hour with "NO" dead air spaces. Proper design of flow distribution is critical around each half of the clarifier in round or rectangular clarifiers to effectively move the H_2S gas from the inlet duct, to the exhaust duct in the most efficient and effective manner. When flow distribution is properly designed, the incoming air pushes out all the air and gases ahead of it to the exhaust duct and into the scrubber system.

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- e). **STRUCTURAL** - Build to withstand 45 p.s.f. load on top of Cover. A 6" x 6" sample piece of the proposed cover construction shall be sent to the engineer for evaluation prior to bidding the project, by or equal manufacturers.
- f). **LIVE LOAD TEST** - A live load test shall be performed at the manufacturer's facility applying 45 pounds per square foot maintained over a period of 24 hours, with a deflection not to exceed L/240. A height gauge shall be set at "0" at the start of the test and shall be read and recorded every 500 pounds until completion of the test. A reading shall also be recorded after the 24 hour period has expired. and test results certified by a Registered Professional Engineer.
- g). **DOCUMENTATION** - Photographs of the set-up, loading and gauges shall be taken when cover is empty and periodically during the test until fully loaded. The owner, engineer and contractor have the right to observe the test at the manufacturer's facility. A test report along with photographs shall be sent to the owner for documentation and verification. Test results shall be certified by a Registered Professional Engineer. Owner may require test results of previous installations, the names and phone numbers of the engineering firm, contractor and facility where installed. Failure to submit the required information will result in rejection of the product and installation will be disallowed.
- h). **TESTING OF THE COMPLETED INSTALLATION BY THE MANUFACTURER** - The air velocity shall be tested at 12 locations around the clarifier beneath the Cover and recorded using a Veloci-Calc plus air velocity meter which measures and automatically records the air velocity. The air velocity shall meet the F.P.M. (feet per minute) required to develop a minimum of 12 air changes per hour beneath the Cover. Testing for P.P.M. H₂S gas shall be performed at a number of locations in close proximity to the water line in the launder. Testing will be performed with the exhauster in operation for a minimum of 1 hour before testing in order to evacuate built up gases beneath the Cover. A properly designed and balanced system shall contain no dead air pockets exhibiting high concentrations of H₂S gas. Submit results along with live load tests
The gas meter readings may be from "0" at the inlet area, 4 to 6 P.P.M. around clarifier and up to 8 to 10 P.P.M. (max) at the exhaust duct. The reason for the higher reading at the exhaust area is that gas is being collected as gas is moved from the inlet to the exhaust. Document and record readings at each location tested. Submit results along with live load tests

D. FABRICATION.

1. **Materials.** The materials used in the manufacturing of the F.R.P. flat covers shall contain the following elements:
2. The launder/weir cover with scum baffle molded integral forms a one-piece unit of composite construction.
 - a). The Launder/Weir Cover with Scum Baffle molded integral shall form a one-piece unit, consisting of Isophthalic gel coat, polyester resin, balsa core, steel tubing and fiberglass reinforcement. Separate scum baffle unacceptable.
 - b). The combination Launder Cover and Scum Baffle molded in one piece, forms a confined region free from air gaps or leaks as required for complete removal of air and gas at a rate of 12 air changes per hour at the specified velocity measured at 30 degree intervals around the covers. Cover and baffle shall be molded in one piece.

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c). There shall be no air gaps allowable as gaps cause short-circuiting and major air reductions, inefficiency, reduced number of air changes, low air velocity flowing through the system and dead air pockets. The scum baffle and flat cover shall be molded in one-piece, on a curved mold, to form the true circular shape of the clarifier and the scum skimmer diameter. No further adjustment is necessary at installation, as the true molded-in circular shape is maintained throughout the entire circumference. The laminate shall be a minimum of 3/16" thick on both the exterior and the interior of the cover. The interior core-material shall be a minimum of 1-inch thick balsa core and 1" x 1" x 1/8" steel tubing molded in for structural rigidity, flatness, stiffness and maintenance free service. The total thickness of the cover shall be a minimum of 1-3/8" thick. Launder Cover segments shall be a nominal 12' long with each joint being radial to the center line and sealed with a 1/4" X 3" neoprene sponge rubber gasket. The radial flanges shall be butt type 3-1/2" high x 3/8" thick and bolted together using 1/2 x 2 type 316 stainless steel hex bolts, nuts and flat washers on 8" centers. Each segment shall contain 3 hatch covers for wall-mounted troughs and 6 hatch covers for inboard troughs.

d). Weir Hatch Covers shall be match-metal-die molded and shall have a vertical flange 9/16" high all around. The cover shall be 41-3/8" long by 7-5/8" wide by 3/16" thick. Two stainless steel piano hinges .050 thick by 4" long by 2" open, shall be used for attachment. One hand pull shall be molded-in as an integral part of the cover, and shall be 5" long by 3-1/4" wide by 1-1/2" deep, and contain a 3/8" diameter solid stainless steel rod for lifting. A custom designed neoprene bulb "p" gasket with a "U" shaped leg shall be bonded around the entire perimeter of the hatch cover, on both sides of the vertical leg and shall be used to seal the hatch cover, also acting to hold hatch cover in place without latches. Flat gaskets are unacceptable.

e). Molded curved continuous fiberglass circular wall angles either 1/4 x 4 x 4 or 1/4 x 4 x 6 and fiberglass scum baffle brackets for supporting the flat covers are used for flexibility and adjustability in setting the elevation of the cover and the scum baffle diameter. Fiberglass angles with saw cuts, which compromise the structural integrity, are unacceptable. Scum baffle mounting brackets shall be 6"x8" and molded using the match-die-molding method. Brackets shall be spaced on 24" centers.

f). Anti-skid silica grit coating shall be applied to the top surface. Molded-in textured surface is unacceptable.

g). One air inlet with grating shall be sized to remove air and gas beneath the covers at the rate of 12 changes per hour, in a totally sealed system, at the specified velocity as calculated to achieve 12 complete air changes per hour.

h). A flow distribution splitter baffle will be molded into the air inlet opening to uniformly distribute the air to each half in circular clarifiers. The flow splitter baffle will be molded with a curved face on each side to enhance the equalization of airflow.

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i). One exhaust opening shall be located 180° from the inlet opening. The contractor will supply the exhaust duct with damper, for adjusting the air velocity to the required F.P.M.

3. Fiberglass reinforced polyester resin composite laminate shall exhibit the following minimum properties.

| TEST METHOD | ASTM | MINIMUM TEST RESULT |
|-----------------------|-------------|----------------------------------|
| Impact, Notched, Izod | D256 | 10 Ft. lbs. per/in. |
| Heat Distortion Point | D648 | 175 Degrees |
| Water Absorption | D570 | 0.2% 24 hours |
| Tensile Strength | D638 | 11,000 PSI |
| Thermal Expansion | D696 | 10.5 x 10 ⁻⁶ in/in/°F |
| Flexural Strength | D790 | 18,000 PSI |
| Flexural Modulus | D790 | 0.9 x 10 ⁶ |
| Hardness Test, Barcol | D2583 | 40 Minimum |

4. Procedure used in determining the above properties shall be in accordance with the ASTM Standards, using the method designated above. Hardness tests shall be made on the resin-rich surfaces of the test samples. Test coupons shall be prepared in accordance with the appropriate ASTM test method.
5. A pigmented exterior gelcoat (20 mils thick) containing UV inhibitors is required. Gelcoat shall exhibit a minimum of 40 barcol hardness.
6. The underside of the cover shall receive a resin coating 10 mils thick to form a resin rich barrier.

PART 3 EXECUTION

3.1 INSTALLATION

A. Launder Covers shall be installed as shown, and in accordance with the manufacturer's instructions, and approved shop drawings.

B. The anchoring of the F.R.P. cover/scum baffle segments to the existing concrete tank walls shall be in

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accordance with the approved design and details of the cover manufacturer. Wedge anchors shall be 1/2 x 4-1/4 Type 316 stainless steel.

3.2 FIELD TESTS, PERFORMANCE AND CERTIFICATIONS

- A.** Upon completion of installation, testing and inspection functions shall be performed jointly for H₂S gas and air velocity in F.P.M. by the manufacturer and contractor.
- B.** The entire system shall be balanced to function at the designed airflow rate, in F.P.M.
- C.** System shall be checked for leakage and all gaps, cracks and leaks sealed with a RTV silicone sealant. Gaps are unacceptable. Minor leaks exhibiting minimal loss are acceptable providing the air velocity in feet per minute (F.P.M.) is achieved.
- D.** Test and record H₂S gas in PPM at 12 locations 1-inch above water level in the trough. The test result shall show maximum gas removal, with no dead air spaces.
- E.** The scum baffle shall form a true circular shape and shall be set accurate to plus or minus 1/8-inch, and match precisely with the circularity of the scum skimmer mechanism.
- F.** The top cover shall slope toward the scum baffle from 1/8 to 1/4, for complete drainage of water.
- G.** The covers shall be molded flat or up to 1/8" crown to prevent water and debris buildup on the Cover.
- H.** Contractors/Manufacturer's certification that the air flow beneath the cover is uniform, continuous and meets the minimum velocity in F.P.M. to completely evacuate the air at 12 changes per hour and that no dead air spaces exist. The system is designed airtight and that no air gaps exist in the system.
- I.** Submit certified test results recorded at 12 air velocity and H₂S gas test points located 30 degrees apart from each clarifier in the system.
- J.** Field Test - A load of 250 pounds on a 12" x 12" area will be placed on the covers as directed by the Engineer and deflection created by the load will be measured.
- K.** A load test shall be performed at the factory to validate that the cover will support a load of 45 P.S.F. using the L/240 formula for deflection. Refer to 2.01 F and G for details. Manufacturer will certify that test has been performed and covers meet the requirements of the specification.
- L.** Covers that do not meet the full requirements of the specification and do not meet the performance requirements specified will be rejected and removed immediately at the manufacturer's expense.

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