



HOBAS®

Fiberglass Manholes and Wetwells

Specifications

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SCOPE OF WORK

This specification shall govern for the furnishing of all work necessary to accomplish the installation of glass-fiber reinforced polyester Manholes and wetwells. Glass-Fiber Reinforced Polyester Manholes and Wetwells shall be designed unit constructed of glass-fiber reinforced, unsaturated commercial grade polyester resin. Fiberglass manholes and wetwells shall be manufactured in accordance with ASTM D3753 "Standard Specification for Glass-Fibered Reinforced Polyester Manholes", by Hobas Pipe USA, Houston, Texas.

GOVERNING STANDARDS

Manholes shall conform to the following design criteria

1. ASTM D3262 – Standard Specification for "Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe1, 2.
2. ASTM D3753 – Standard Specification for Glass-Fiber-Reinforced Polyester Manholes1.
3. ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
4. ASTM D3681 – Standard Test Method for Chemical Resistance of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting -Resin) Pipe in a Deflected Condition1.
5. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics.
6. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
7. ISO 9001:2015 – Quality managements systems - Requirements.

GENERAL DESCRIPTION

Dimensions

1. The manholes shall be a circular cylinder, reduced at the top to a circular manway not smaller than 22 ½" inside diameter. Manholes shall be produced in half-foot increments in lengths +/- 2". Nominal inside diameters shall be 42", 48", 54", 60", 66", 72" or larger diameters as agreed upon between purchaser and the manufacturer are covered by this section. Configuration may include reducer sections for larger diameter manholes (>60").

Manhole Top Configurations

1. Cone Sections
 - a. The manhole cone top must provide a bearing surface on which a standard ring and cover may be supplied and adjusted to grade. The cone top shall be concentric or eccentric and shall be joined to the barrel section at the factory with resin and glass fiber reinforcement, thus providing required monolithic design to prevent infiltration and/or exfiltration through the manhole.

(continued)

GENERAL DESCRIPTION

Manhole Top Configurations (continued)

2. Flat Tops (by others)

- a. Reinforced concrete flat tops with integral FWC coupling and PVC or FRP corrosion barrier can be used for larger diameters where full barrel access is required or where FRP cone is not practical.
- b. Class – The manhole shall be manufactured in one class of load rating This class shall have a minimum HS-20-wheel load (16,000 pounds dynamic wheel load).
- c. Connections and Stub outs
 - i. Inlet and outlets connections will be made of FRPM pipe material laminated to FRPM riser pipe and shipped with one spigot end (outlet) and one FWC coupling and (inlet) unless otherwise directed by the purchaser.
 - Identified PVC or FRP branch connections will be cored and attached to the manhole riser with fiberglass laminations at the design engineer's flow line elevations, vertical and horizontal angles. All small diameters lateral stub-outs to be furnished as plain end (spigot).
 - Field connections of 4"-15" PVC lines can be accomplished with Insert-a-Tee connectors, Boot-type-connectors, or similar.
- d. Manhole Bottom
 - i. Resin and glass reinforced manhole bottoms will be provided with a glass reinforced bottom section with integral FWC coupling for watertight attachment to FRP tee-base riser neck.
 - ii. Full bench and invert manholes will have a bench manufactured utilizing non-corrosive materials encapsulated in fiberglass minimum 1/4" thick.
- e. Marking and Identification – All manholes shall be marked with the following information:
 - i. Manufacturer's name
 - ii. Riser vertical height
 - iii. ASTM D3753 Designation
 - iv. Station number or manhole ID, per project plans.

MATERIALS

1. **Resin** The resin used shall be a commercial grade unsaturated polyester resin or vinyl ester resin. Resins shall be suitable for the service environment intended (i.e. domestic sanitary wastewater).
2. **Reinforcing Materials** The reinforcing material shall be commercial grade fiberglass in the form of mat, chopped roving, roving fabric, or both, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
3. **Riser and Cone** Riser pipe shall be manufactured per ASTM D3262 with cone manufactured of similar materials.
4. **Interior Surfacing Material** The inner surface of the riser pipe exposed to the environment shall have a resin rich non-reinforced layer (nominal 40 mils in thickness) to resist abrasion and crack resistance.
5. **Fillers and Additives** Fillers, when used, shall be inert to the environment and manhole construction. Additives, such as thixotropic agents, catalyst, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of the referenced ASTM standards.

MATERIALS (continued)

6. Exterior Surface

- a. Cones – Exterior surface shall be coated with suitable gel coat as an additional UV and water barrier. Gel coat shall be pigmented to resist ultraviolet. The exterior surface shall be relatively smooth with no sharp projections free of blisters, de-laminations or exposed fiberglass. Indentations or other shape imperfections that will not affect performance are allowed.
- b. Riser Sections and Tee-bases – Manhole riser section exterior will be constructed of a sand rich layer without reinforcing glass to provide UV resistance. Tee base fittings shall be constructed of the same pipe material as the main line pipe.

MANUFACTURING

Manhole cylinders, manway reducers, and joints shall be produced from fiberglass reinforced polyester resin using a combination of centrifugal casting, continuous winding, or spray process.

1. **Acceptable Manufacturer** Manufacturer shall have experience in the manufacture of fiberglass pipe and products for use in domestic or industrial sanitary sewer applications. Acceptable manufacturer shall have a quality control program that is currently ISO 9001 certified. The manufacturer shall be Hobas Pipe USA, Inc.
2. **Tee-Base Connection** Fiberglass manhole risers shall be joined to a pipe stub rising vertically from in-line tee fitting. Manhole risers shall be connected to the vertical pipe using an FWC pipe coupling cast into the bottom of the fiberglass riser. Pipe coupling shall seal to the tee-base using a flexible compression gasket compatible with the tee-base pipe material. Pipe coupling shall be permanently bonded into the base of the riser using fiberglass laminate. Pipe coupling shall be joined to the in-line tee fitting by placing the manhole riser on top of the tee outlet and applying downward pressure until the vertical pipe stub is inserted into the pipe coupling to the proper depth. See homing line mark on tee base branch (neck) for depth of penetration into FWC coupling.
3. **Diameter Transition** Individual fiberglass components of manhole shall be joined by fiberglass reinforced laminations or be fiberglass bonded.
4. **Diameter Transition** Manholes with riser diameters greater than 6-feet and larger shall be reduced to an inside diameter of 4'-5', using a reducer.
5. **Anti-Flotation Flange** Exterior of manhole riser shall incorporate a 3" minimum wide flange at its base. Upon joining of manhole riser to pipe tee, sufficient concrete shall be poured around tee and manhole riser to prevent buoyancy. Anti-flotation flange shall be encased with 6" of concrete (minimum), in addition to required tee base concrete encasement height.
6. **Height Adjustment** Fiberglass manholes shall be height adjustable using external grade rings or adjustment with an FWC coupling riser joint. Top riser sections can be cut for height adjustment and shall be rejoined with an FWC coupling.
7. **Ring and Cover Platform** Top of cone/reducer shall have a fiberglass support platform upon which grade rings may be installed to accept a typical cast iron ring and cover. Grade rings, ring and cover shall be placed over fiberglass neck (chimney) in a manner that evenly distribute loading onto grade rings only. No loading shall be placed onto fiberglass neck.

REQUIREMENTS

- 1. Repairs** Any manhole repair is required to meet all requirements of this specification.
- 2. Manhole Riser Lengths** Riser lengths shall be in whole or ½-foot increments +/- 2”.
- 3. Load Rating** The complete manhole riser shall have a minimum dynamic load rating of 16,000 lbf (71 172 N) when tested in accordance with ASTM D3753, 8.4. To establish this rating the complete manhole shall not leak, crack, or suffer other damage when load tested to 40,000 lbf (71 929 N) and shall not deflect vertically downward more than 0.25 in. (6.35 mm) at the point of load application when loaded to 24,000 lb. (106 757 N).
- 4. Stiffness** The cylindrical portion of the manhole riser is to be tested in accordance with ASTM Method D2412. The riser cylinder shall have the minimum pipe-stiffness values shown in the table below, when tested in accordance with ASTM D3753, Section 8.5.

Minimum Pipe Stiffness Values	
3'-6' Manhole Depth	46 psi
7'-12' Manhole Depth	46 psi
13'-20' Manhole Depth	46 psi
21'-25' Manhole Depth	46 psi
26'-45' Manhole Depth	46 psi

- 5. Soundness** In order to determine soundness, an air or water test is to be applied to the manhole riser test sample. While holding the pressure between 3-5psi, the entire manhole riser must be inspected for leaks. Any leakage through the laminate is cause for failure of the test. Refer to ASTM D3753, Sec. 8.6. Manufacturer to provide documentation of previous test per ASTM D3753 Sec. 8.6.
- 6. Chemical Resistance** Manhole riser pipe shall meet the chemical testing outlined in ASTM D3262 when tested in accordance with ASTM D3681. Cones shall be manufactured with similar materials.

TEST METHODS

- All test shall be performed as specified in ASTM D3753, Section 8, Titled “Test Methods”. See ASTM D3753, Section 8, Note 5, for test method D790 and test method D-695.

QUALITY ASSURANCE/QUALITY CONTROL

- 1. Examinations** Each Manhole riser component part shall be examined for dimensional requirements, hardness, and workmanship.
- 2. Composition Control** Controls on glass and resin content shall be maintained for all manufacturing processes and for each portion of the manhole riser fabrication. Records shall be maintained for these control checks. Proper glass content may be shown by glass usage checks or glass and resin application rate checks, in accordance with the material composition test in ASTM D375.