

Section 02083

FIBERGLASS MANHOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass manholes for unpaved areas placed on top of a precast base to form a manhole.
- B. Fiberglass for construction in back lot easements placed on cast-in-place base.
- C. Fiberglass manholes are not permitted underneath existing or proposed pavement.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.

- 1. Payment for fiberglass manholes is on unit price basis for each manhole installed.
- 2. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 REFERENCES

- A. ANSI B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- B. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- C. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- D. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
- E. ASTM D 698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600kN-m/m³)).
- F. ASTM D 2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste and Vent Pipe and Fittings.
- G. ASTM D 2996 - Standard Specification for Filament-Wound AFiberglass@ (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.

- H. ASTM D 2997 - Standard Specification for Centrifugally Cast AFiberglass@ (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.
- I. ASTM D 3753 - Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wetwells.
- J. American Association of State Highway and Transportation Officials (AASHTO).

1.04 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit manufacturer's data and details of following items for approval:
 - 1. Design and fabrication details of fiberglass manhole components
 - 2. Installation instruction for fiberglass manholes
 - 3. Frames, grates, rings, and covers
 - 4. Materials to be used in fabricating drop connections
 - 5. Materials to be used for pipe connections at manhole walls
 - 6. Materials to be used for stubs and stub plugs, if required
 - 7. Plugs to be used for sanitary sewer hydrostatic testing
 - 8. Manufacturer's data for pre-mix (bag) concrete if used for channel inverts and benches
- 3. Submittals listed in Section 02082, paragraph 1.04.

PART 2 PRODUCTS

2.01 FIBERGLASS MANHOLES AND BASE SECTIONS

- A. Provide prefabricated fiberglass manholes, which conform in shape, size, dimensions, and details shown on Drawings. Unless modified by Drawings, use manhole sections conforming to ASTM D 3753.
- B. Acceptable Manufacturer: Provide fiberglass manholes manufactured by Containment Solutions, Inc., or L.F. Manufacturing, Inc., or approved City of Tomball Standard Product.
- C. Mark date of manufacture and name or trademark of manufacturer in 1-inch high stenciled letters on inside of barrel.

- D. Unless larger size is required, provide 48-inch-diameter barrel for fiberglass manholes. Provide wall section thickness for depth of manhole according to ASTM D 3753, but not less than 0.48 inches in thickness.
- E. Provide fabricated reducer bonded at factory to form one continuous unit at top of manhole barrel to accept concrete grade rings and cast iron frame and cover. Reducer design shall be of sufficient strength to safely support HS-20 loading in accordance with AASHTO.
- F. Provide manhole base of precast concrete conforming to Section 02082 - Precast Concrete Manholes, unless cast-in-place base is indicated on Drawings. For precast manhole bases, use an approved steel-reinforced design of sufficient strength to withstand imposed loads. Form base so that joint with fiberglass manhole barrel is sealed against leakage, as shown on Drawings.

2.02 C O N C R E T E

- A. Conform to requirements of Section 03315 - Concrete for Utility Construction.
- B. Channel Inverts: Use 5 sack premix (bag) concrete or Class A concrete for inverts not integrally formed with manhole base, with minimum compressive strength of 4000 psi.
- C. Concrete Foundation: Use Class A concrete with minimum compressive strength of 4000 psi for cast-in-place base and for foundation slab under manhole base section where indicated on Drawings.
- D. Cement Stabilized Sand Foundation: In lieu of foundation slab, provide cement stabilized sand foundation under base section, when shown on manhole Drawings, conforming to requirements of Section 02321 - Cement Stabilized Sand.

2.03 R E I N F O R C I N G S T E E L

- A. Provide reinforcing steel conforming to requirements of Section 03315 - Concrete for Utility Construction.

2.04 M O R T A R

- A. Conform to requirements of ASTM C 270, Type S using Portland cement.

2.05 M I S C E L L A N E O U S M E T A L S

- A. Provide cast-iron frames, rings, and covers conforming to requirements of Section 02084 - Frames, Grates, Rings, and Covers.

2.06 D R O P C O N N E C T I O N S A N D S T U B S

- A. Provide drop connections and stubs conforming to same pipe material requirements used in main pipe, unless otherwise indicated on Drawings.

2.07 PIPE CONNECTIONS FOR SANITARY SEWERS

- A. Provide pipe connections conforming to requirements of Section 02082 - Precast Concrete Manholes.
- B. For drop, provide manufactured connector, such as Insert-a-Tee or equal, which provides positive seal between pipe and to wall.

2.08 SEALANT MATERIALS

- A. Provide sealing materials between precast concrete adjustment ring and manhole cover frame, such as Adeka Ultraseal P201, or approved equal.
- 2. Butyl Sealant: Provide Press-Seal EZ Stick, or equal, for HDPE rings.

2.09 BACKFILL MATERIALS

- A. Backfill materials shall conform to requirements of Section 02317 - Excavation and Backfill for Utilities.

2.10 NON-SHRINK GROUT

- A. Provide prepackaged, inorganic, flowable, non-gas-liberating, nonmetallic, cement-based grout requiring only addition of water.
- B. Grout shall meet requirements of ASTM C 1107 and shall have minimum 28-day compressive strength of 7000 psi.

2.11 VENT PIPES

- A. Provide external vent pipes for manholes, where indicated on Drawings.
- B. Buried Vent Pipes: Provide 3-inch or 4-inch PVC DWV pipe conforming to ASTM D 2655. Alternately, provide FRP pipe as specified for vent outlet assembly.
- C. Vent Outlet Assembly: Provide vent outlet assembly as shown on Drawings, constructed of following specified materials:
 - 1. FRP Pipe: Provide filament-wound FRP conforming to ASTM D 2996 or centrifugally cast FRP conforming to ASTM D 2997. Seal cut ends in accordance with manufacturer's recommendations
 - 2. Joints and Fittings: Provide epoxy bodied fittings and join pipe to fittings with epoxy adhesive, according to pipe manufacturer's instructions

3. Flanges: Provide socket-flange fittings for epoxy adhesive bonding to pipe ends where shown on Drawings. Flanges shall meet bolt pattern and dimensions for ANSI B16.1, 125-pound flanges. Flange bolts shall be hot-dip zinc coated, conforming to ASTM A 307, Class A or B.
4. Coating: Provide 2-component, aliphatic polyurethane coating using primer or tie coat recommended by manufacturer. Provide two or more coats to yield dry film thickness of at least 3 mils. Provide Amersfield, Themec 74, or equal. Color shall be selected by City Engineer from manufacturer's standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that lines and grades are correct.
- B. Determine if sub grade, when scarified and recompactd, can be compacted to 95 percent of maximum Standard Proctor Density according to ASTM D 698 prior to placement of foundation material and base section. When it cannot be compacted to that density, moisture condition sub grade until that density can be reached or treat as an unstable sub grade.
- C. Do not build manholes in ditches, swales, or drainage paths unless approved by City Engineer.

3.02 PLACEMENT

- A. Install fiberglass manholes to conform to locations and dimensions shown on Drawings. Do not install underneath existing or proposed pavement.
- B. Place sanitary sewer manholes at points of change of alignment, grade, size, pipe intersections, and end of sewer.

3.03 MANHOLE BASE SECTIONS AND FOUNDATIONS

- A. Place base section and foundation as required in Section 02082 - Precast Concrete Manholes.

3.04 CAST-IN-PLACE FOUNDATION

- A. Where Drawings indicate cast-in-place manhole base, place concrete as shown on Drawings on 4-inch (minimum) layer of either crushed stone, cement stabilized sand, or seal slab. When unstable sub grade is identified, over-excavate sub grade to allow for placement of 12-inch thick layer of crushed stone wrapped in filter fabric.

3.05 MANHOLE BARREL

- A. Lower manhole barrel onto base section. Seal with manufacturer's gasket or approved sealant. Wrap joint with external sealing material, minimum 12-inch width.
- B. Where cast-in-place base is used, support manhole barrel in place and brace it from sides of excavation to prevent any movement of barrel during concrete placement and while concrete is setting. Provide minimum clearance between reinforcing steel and manhole barrel bottom as shown on Drawings. Do not support manhole barrel on reinforcing steel. Place bead of water swelling sealant around inside of barrel near bottom, as shown on Drawings, to form seal.

3.06 PIPE CONNECTIONS AT PRECAST MANHOLE BASE

- A. Install approved resilient connectors at each pipe entering and exiting sanitary sewer manholes in accordance with manufacturer's instructions.
- B. Ensure that no concrete, cement stabilized sand, fill, or other solid material is allowed to enter space between pipe and edge of wall opening at and around resilient connector on either interior or exterior of manhole. When necessary, fill space with compressible material to ensure full flexibility provided by resilient connector.
- C. Test connection for watertight seal before backfilling.

3.07 PIPE CONNECTIONS AT CAST-IN PLACE BASE

- A. Cut manhole barrel for pipe penetrations following curvature of pipe and with maximum of 1-inch clearance. Seal cut edges with resin. Hole may be circular or cutout with semi-circular top, which extends to bottom of barrel.
- B. Place continuous bead of water swelling sealant, as shown on Drawings, around pipe penetrations on interior of manhole barrel. Roughen surface of fiberglass prior to placement to improve bond with sealant. Allow sealant to completely cure before placing concrete against it.
- C. Extend pipe entering manhole at least 8 inches into manhole. Fit pipes with neoprene water-stop gasket seal placed tightly around pipe using stainless steel clamp. Alternately, pipes may have continuous bead of water swelling sealant, as detailed on Drawings, placed around pipe circumference.
- D. When forming invert surface in bottom of manhole, mound concrete around pipe penetrations so that water swelling sealant beads and neoprene water-stop gasket have minimum 2 inches of concrete cover.
- E. Test connection for watertight seal before backfilling.

3.08 INVERTS FOR SANITARY SEWERS

- A. Construct invert channels as required in Section 02082 - Precast Concrete Manholes.

3.09 DROP CONNECTIONS FOR SANITARY SEWERS

- A. Backfill drop assembly with crushed stone wrapped in filter fabric, cement stabilized sand, or Class A concrete to form solid mass. Extend cement stabilized sand or concrete outside of bells minimum 4 inches.
- B. Install drop connection when sewer line enters manhole higher than 24 inches above invert of manhole.
- C. At drop pipe connections through fiberglass barrel, cut circular hole sized to requirements of manufactured connector. Seal cut edge with resin. Install watertight connector according to manufacturer's recommendations.

3.10 STUBS FOR FUTURE CONNECTIONS

- A. Where future connections are indicated on Drawings, install resilient connectors and pipe stubs with approved watertight plugs in manholes.
- B. At cast-in-place base, where future connections are indicated on Drawings, install section of pipe extending no further than 12 inches from edge of foundation, ending in bell and provided with rubber-gasket watertight plug.

3.11 ADJUSTMENT RINGS AND FRAME

- A. Combine precast concrete or HDPE adjustment rings so that elevation of installed casting cover matches pavement surface. Do not load manhole except on load bearing shoulder of manhole. Seal between adjustment ring and fiberglass manhole with approved sealant material. Apply a latex bonding agent to precast concrete surface and join with non-shrink grout. Set cast iron frame on adjustment ring in bed of approved sealant material. Install sealant bed consisting of two beads on sealant, each bead having minimum dimensions of 2-inch and 2-inch wide.
- B. Wrap manhole frame and adjustment rings with external sealing material, minimum 3 inches beyond joint between ring and frame and ring and precast section.
- C. Set cast iron frame on top of cone or adjustment rings using water swelling sealant materials and adjust elevation of casting cover to match pavement surface. For manholes in unpaved areas, set top frame minimum of 6 inches above existing ground line unless otherwise indicated on Drawings.

3.12 BACKFILL

- A. After leakage testing, place and compact backfill material in area of excavation surrounding manholes in accordance with requirements of Section 02317- Excavation and Backfill for Utilities. Use embedment zone backfill material, as specified for adjacent utilities, from manhole foundation up to an elevation 12-inches over each pipe connected to manhole. Provide trench zone backfill, as specified for adjacent utilities, above embedment zone backfill.
- B. In unpaved areas, provide positive drainage away from manhole frame to natural grade. Provide minimum of 4-inches of topsoil conforming to requirements of Section 02911 - Topsoil and seed in accordance with Section 02921 - Hydro-mulch Seeding. When shown on Drawings, sod disturbed areas in accordance with Section 02922- Sodding.

3.13 FIELD QUALITY CONTROL

- A. Conduct leakage testing of manholes in accordance with requirements of Section 02533 - Acceptance Testing for Sanitary Sewers.

3.14 PROTECTION

- A. Protect manholes from damage until work has been finally accepted. Repair damage to manholes at no additional cost to City.

END OF SECTION