SECTION 330576 - FIBERGLASS MANHOLES

This section specifies fiberglass manholes and accessories typically used in gravity piping systems used to transport corrosive wastewater or chemicals. Included in this section are structures, frames, and covers.

Concrete manholes are specified in section 330561, and pe manholes are specified in section 330573.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Fiberglass manholes.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 033000 - Cast-in-Place Concrete: Manhole base pad.

Section 310001 – Earthwork Materials: Soils for backfill in trenches and after manhole installation; Filter fabric for subsurface drainage.

Section 310000 - Earthwork: Excavating for manholes, structures, and foundation slabs.

Section [**330505.33 - Infiltration and Exfiltration Testing**] [**330505.36 - Vacuum Testing**]: Testing requirements for manholes.

Section 330561 - Concrete Manholes: Requirements for manholes constructed of concrete.

Section 330573 - Polyethylene Manholes: Requirements for manholes constructed of PE.

Section 333100 - Sanitary Sewerage Piping: Piping connections to manholes.

Section 334200 - Stormwater Conveyance: Piping connections to manholes and structures.

* + - 1. DEFINITIONS

Limit list of definitions to terms unique to this section and not provided elsewhere.

* + - * 1. FRP: Fiberglass-reinforced plastic.
				2. HDPE: High-density polyethylene.
			1. REFERENCE STANDARDS

List reference standards included within text of this section, with designations, numbers, and complete document titles.

LEED requires compliance with specific editions of referenced standards. Consider including publication dates for referenced standards in this section to ensure that correct standard is used for LEED compliance.

* + - * 1. American Association of State Highway Transportation Officials:

AASHTO HB-17 - Standard Specifications for Highway Bridges.

AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.

AASHTO M306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.

* + - * 1. ASTM International:

ASTM A48 - Standard Specification for Gray Iron Castings.

ASTM A536 - Standard Specification for Ductile Iron Castings.

ASTM C581: Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass-Fiber Reinforced Structures Intended for Liquid Service.

ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.

ASTM D2563 - Standard Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts.

ASTM D3753: Standard Specification for Glass-Fiber Reinforced Polyester Manholes and Wetwells.

ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

* + - 1. COORDINATION
				1. Coordinate Work of this Section with connection to [**municipal sewer utility service**] and trenching.
			2. SUBMITTALS
				1. Only request submittals needed to verify compliance with project requirements.
				2. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				3. Manufacturer’s installation instructions shall be provided along with product data.
				4. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				5. Product Data: Submit manufacturer information for manhole covers, component construction, features, configuration, dimensions, catalog cuts, specifications, and installation instructions. [**, and**] <**\_\_\_\_\_\_\_\_**>.
				6. Shop Drawings:

Indicate structure locations and elevations.

Indicate sizes elevations, and relative orientation of [**piping,**] [**conduit,**] penetrations [**, and**].

* + - * 1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
				2. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
				3. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
				4. Qualifications Statement:

Coordinate following subparagraph with requirements specified in qualifications article.

Submit qualifications for manufacturer.

Remove paragraph below if not LEED project.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
				1. Section 018113 - LEED Documentation Requirements: Requirements for sustainable design submittals.
				2. Manufacturer's Certificate:

Certify that products meet or exceed specified sustainable design requirements.

Insert material certifications list below to suit products specified in this section and project sustainable design requirements.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify recycled material content for recycled content products.

Certify source for regional materials and distance from Project Site.

* + - * 1. Product Cost Data:

Submit cost of products to verify compliance with Project sustainable design requirements.

Exclude cost of labor and equipment to install products.

Provide cost data for following products:

Edit list of material cost data below to suit products specified in this section and project sustainable design requirements.

Salvaged, refurbished, and reused products.

Products with recycled material content.

Regional products.

* + - 1. CLOSEOUT SUBMITTALS
				1. Section 017716 - Contract Closeout: Requirements for submittals.
				2. Project Record Documents: Record actual locations of manholes and connections, and record invert elevations.
			2. QUALITY ASSURANCE
				1. Maintain [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
			3. QUALIFICATIONS

Coordinate following paragraph with requirements specified in submittals article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] years' [**documented**] experience.
			1. DELIVERY, STORAGE, AND HANDLING
				1. Section 016500 - Materials and Equipment: Requirements for transporting, handling, storing, and protecting products.
				2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
				3. Handling: Comply with manhole manufacturer instructions for unloading, and moving precast manholes and drainage structures.
				4. Storage:

Store materials according to manufacturer instructions.

Store manholes to prevent damage to Director’s Representative's property or other public or private property.

Repair property damaged from materials storage.

* + - * 1. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Take precautions to prevent damage to interior or exterior surfaces when handling.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
				1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

1. PRODUCTS
	* + 1. FIBERGLASS MANHOLES
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=13229&mf=04&src=wd):

Virtual Polymer Compounds, LLC. (585) 735-9668, 10478 Ridge Road, Medina, New York, 14103.

LFM Fiberglass Structures, (800) 237-5791, 5528 East Hwy. 290 Giddings, TX, 78942.

Approved equivalent.

Insert descriptive specifications below to identify project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Material: FRP resin.

One-Piece Monolithic Unit: ASTM D 3753.

Nominal Inside Diameter: [**48 inches**].

Minimum Wall Thickness: 0.480 inch.

Concentric Cone Top:

Minimum Clear Opening: [**30 inches**].

* + - * 1. Performance and Design Criteria:

Load Rating:

AASHTO HS-20 with 30% impact and 130 lb/cf equivalent soil pressure.

Chemical Resistance: Comply with ASTM C581 and D3753.

Flexural Strength (Conic Section):

Hoop: [**15.400 x 103**] <**\_\_\_\_\_\_\_\_**> psi.

Axial: [**17.200 x 103**] <**\_\_\_\_\_\_\_\_**> psi.

Flexural Strength (Cylindrical Section):

Hoop: [**22.500 x 103**] <**\_\_\_\_\_\_\_\_**> psi.

Axial: [**14.300 x 103**] <**\_\_\_\_\_\_\_\_**> psi.

Compressive Strength:

[**18.90 x 103**] <**\_\_\_\_\_\_\_\_**> psi.

Comply with ASTM D695.

* + - * 1. Surfaces:

Paint or other coatings will not be accepted.

Exterior: Free of blisters larger than 1/2 inch in diameter, delamination, and exposed fibers.

Interior: Resin-rich with no exposed fibers, crazing, delamination, blisters larger than 1/2 inch in diameter, and wrinkles greater than 1/4 inch in depth.

* + - * 1. Bottom:

Material: Match type and grade as used in fiberglass manhole.

Furnish integral 3-inch-wide anchoring flange.

Invert and Bench: [**Concrete, as specified in Section 033000 - Cast-in-Place Concrete**] [**Factory installed, using noncorrosive materials encapsulated in minimum 1/4-inch-thick fiberglass**].

* + - * 1. Connections:

PVC sewer plain-end pipe attached to manhole with resin and glass-fiber-reinforced layup.

Pipe: Match sewer pipe.

Resin and Fiberglass Layup: Match type and grade as used in fiberglass manhole.

Boots: Comply with ASTM C923.

* + - 1. FRAMES AND COVERS
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=13230&mf=04&src=wd):

Virtual Polymer Compounds, LLC. (585) 735-9668, 10478 Ridge Road, Medina, New York, 14103.

Neenah Foundry Company, (920) 725-7000, 2121 Brooks Ave, Neenah, WI, 54956.

Approved equivalent.

Insert descriptive specifications below to identify project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Material:

Cast iron.

Comply with [**ASTM A48, Class 30B**] [**AASHTO M306**].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Material:

Ductile iron.

Comply with ASTM A536.

Lid:

Bearing Surface: Machined flat.

Configuration: Removable.

Security: [**Lockable**] [**Boltable**] [**None**].

Cover Design: [**Closed**] [**Open checkerboard grille**] [**Waterproof**] <**\_\_\_\_\_\_\_\_**>.

Loading: [**Non-traffic**] [**H-20; AASHTO HB-17**].

[**Furnish sealing gasket.**]

Identification: Cast with [**identifying name and logo**] [**<\_\_\_\_\_\_\_\_> name and logo**] [**identifying name**] [**<\_\_\_\_\_\_\_\_> name**].

Grate: [**Diagonal**] [**Bicycle safe**] <**\_\_\_\_\_\_\_\_**>.

[**Lid**] [**Grate**] Diameter: <**\_\_\_\_\_\_\_\_**> inches.

Remove paragraph below if not LEED project.

* + - 1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this article to suit content of this section and project sustainable design requirements.

* + - * 1. Material and Resource Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

Insert list of materials specified in this section required to have recycled content.

<**\_\_\_\_\_\_\_\_**>.

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site [**including:**] [**.**]

Insert list of materials specified in this section required to be regional materials.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. MATERIALS
				1. Resin: Furnish UV inhibitors.
				2. Reinforcing Material: Glass mat, Grade E.
				3. Laminate: Multiple layers of glass matting and resin.

Select bedding material type for project conditions. If more than one type is required, edit following paragraph accordingly. Use material "Type" coding from Section 310001 in this section for uniformity of reference.

* + - * 1. Bedding: As specified in Section [**310001 – Earthwork Materials**].
			1. ACCESSORIES

Note that steps are not typically included on structures for DOCCS or OCFS projects.

* + - * 1. Steps:

Rungs: Formed [**HDPE**] [**galvanized steel**] [**aluminum**].

Diameter: [**3/4**] inch.

Width:

[**12**] inches.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

As indicated on Drawings.

Spacing:

[**16**] inches o.c. vertically, set into structure wall.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

As indicated on Drawings.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Base Pad:

Designer of Record should review subsurface data and provide required anti-flotation measures as needed.

Cast-in-place concrete as specified in Section [**033000 - Cast-in-Place Concrete**].

Increase thickness of concrete base to prevent flotation, as approved by Director’s Representative.

Anchor manhole to concrete base as indicated on [**Shop**] Drawings.

* + - * 1. Fasteners: [**Stainless steel; ASTM F593**] [**Galvanized steel; ASTM F1554**].
				2. Geotextile Filter Fabric: As specified in [**310001 – Earthwork Materials**].
			1. SOURCE QUALITY CONTROL
				1. Inspection and Testing:

Provide shop inspection and testing of completed assembly.

Maintain testing records and submit to Director’s Representative.

Inspection: Comply with ASTM D2563 for allowable tolerance based on defect.

Pinholes or Pores in Laminate Surface: None.

Exposed Glass: None.

Exposure of Cut Edges: None.

Scratches: None greater than 0.002 inch deep.

Foreign Matter: None.

Testing:

Test with water or air.

Hydrostatic Test:

Filling manhole with water and check for leaks.

Minimum Test Duration: One hour.

Air Test: 2 to 5 psig for 30 minutes.

Include one or both of following paragraphs to require Director’s Representative's inspection or witnessing of test at factory. Remove if factory testing is not required.

* + - * 1. Director’s Representative Inspection:

Make completed fiberglass manhole available for inspection at manufacturer's factory prior to packaging for shipment.

Notify Director’s Representative at least [**seven**] days before inspection is allowed.

* + - * 1. Director’s Representative Witnessing:

Allow witnessing of factory inspections and tests at manufacturer's test facility.

Notify Director’s Representative at least [**seven**] days before inspections and tests are scheduled.

Include following paragraph if reliance on manufacturer's approved quality-control program is sufficient for project requirements.

* + - * 1. Certificate of Compliance:

If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

Specified shop tests are not required for Work performed by approved manufacturer.

1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that items provided by other Sections of Work are properly sized and located.
				2. Verify that built-in items are in proper location and are ready for roughing into Work.
				3. Verify correct size of manhole and structure excavation.
				4. Verify that excavation base is ready to receive Work and excavations and that dimensions and elevations are as indicated on [**Drawings**] [**layout drawings**].
			2. PREPARATION
				1. Sewer Lateral Openings

Provide openings and install pipe connectors in strict accordance with the recommendation of the connector manufacturer.

* + - * 1. Mark each manhole with waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
				2. Coordinate placement of inlet and outlet pipe as required by other Sections.
				3. Do not install manholes where Site conditions induce loads exceeding structural capacity of manholes or structures.
				4. Inspect manholes immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.
			1. INSTALLATION
				1. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas.

Type of correcting materials (fine aggregate, coarse aggregate, or lean concrete) depends on type of subsoil, percolation characteristics, and compaction requirements.

* + - * 1. Correct over-excavation with [**fine aggregate**] [**coarse aggregate**] [**lean concrete**].
				2. Remove large stones or other hard matter impeding consistent backfilling or compaction.
				3. Protect manhole from damage or displacement while backfilling operation is in progress.
				4. Excavating:

As specified in Section [**310000 - Earthwork**] and in indicated locations and depths.

Provide clearance around sidewalls of manhole for construction operations [**, granular backfill**] [**, and**] [**placement of geotextile filter fabric**].

If ground water is encountered, prevent accumulation of water in excavations; place manhole in dry trench.

Where possibility exists of watertight manhole becoming buoyant in flooded excavation, anchor manhole to avoid flotation as indicated on the Contract Drawings

* + - * 1. Base and Alignment: Place foundation slab and trowel top surface level.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Base and Alignment: Install manholes supported at proper grade and alignment [**support system as indicated on Drawings**].
				2. Base Pad:

Form and place cast-in-place concrete base pad with provision for sewer pipe end sections.

Place manholes plumb and level and anchor to foundation slab.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Base Pad: Install manholes supported at proper grade and alignment [**as indicated on Drawings**].
				2. Attachments:

As Work progresses, build [**fabricated metal items**] [**and**].

Set cover frames and covers level to correct elevations without tipping.

* + - * 1. Backfilling: As specified in Section [**310000 - Earthwork**].
				2. Position tops of structures flush with finished grade.
			1. FIELD QUALITY CONTROL
				1. Perform testing on manholes as specified in Section [**330505.33 - Infiltration and Exfiltration Testing**] [**330505.36 - Vacuum Testing**].
				2. Equipment Acceptance: Adjust, repair, modify, or replace components failing to perform as specified and rerun tests. Coordinate with Director’s Representative.

END OF SECTION 330576