SECTION 330573 - POLYETHYLENE MANHOLES

This Section specifies PE 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 fiberglass manholes are specified in Section 330576.

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

PE 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.

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 330576 - Fiberglass Manholes: Requirements for manholes constructed of fiberglass.

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. Bedding: Specialized material placed under manhole prior to installation and subsequent backfill operations.
        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 D638 - Standard Test Method for Tensile Properties of Plastics.

ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

ASTM D1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.

ASTM D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.

ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.

ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

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

ASTM F1473 - Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins.

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

ASTM F1759 - Standard Practice for Design of High-Density Polyethylene (HDPE) Manholes for Subsurface Applications.

* + - 1. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data: Submit manufacturer information for manhole covers, component construction, features, configuration, dimensions [**, and**] <**\_\_\_\_\_\_\_\_**>.
        5. Shop Drawings:

Indicate structure locations and elevations.

Indicate sizes and elevations 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.

Delete paragraph if not a 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. Specific certificate submittal and supporting data requirements are specified in Section 018113.

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. Specific cost data requirements are specified in Section 018113.

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

Include following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. 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. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         2. Handling: Comply with manhole manufacturer instructions for unloading, and moving precast manholes and drainage structures.
         3. Storage:

Store materials according to manufacturer instructions.

Store manholes to prevent damage to Director’s Representative 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. PE MANHOLES
          1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8750&mf=04&src=wd):

Advanced Drainage Systems, Inc., (800) 821-6710, 4640 Trueman Blvd., Hilliard, OH.

ISCO Industries, LLC, (800) 345-4726, 926 Baxter Ave., PO Box 4545, Louisville, KY 40204.

Plastic Fusion Fabricators, Inc., (256) 852-0378, 3455 Stanwood Blvd., Huntsville, AL 35881.

Approved equivalent.

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

* + - * 1. Description:

Material:

HDPE.

Type: 3408.

Comply with ASTM D3350.

Minimum Cell Classification: 345464 C.

Nominal Outer Diameter: As indicated on Drawings.

Bottom Thickness: Comply with ASTM F1759.

Inlets and Outlets:

Extrusion welded on inside and outside of manhole.

Furnish gussets at quarter points around inlets and outlets.

Connections:

Larger Than 4-Inch Pipe: [**Butt-fusion welded**] [**Electrofusion welded**] [**Flanged**].

4-Inch and Smaller Pipe: [**Butt-fusion welded**] [**Electrofusion welded**] [**Flanged**] [**Threaded**].

* + - * 1. Performance and Design Criteria:

Density:

Not less than <**\_\_\_\_\_\_\_\_**> lb./cu ft.

Comply with ASTM D1505.

Melt Index:

Not greater than <**\_\_\_\_\_\_\_\_**> lb. per 10 minutes.

Comply with ASTM D1238.

Flex Modulus:

<**\_\_\_\_\_\_\_\_**> to less than <**\_\_\_\_\_\_\_\_**> psi.

Comply with ASTM D790.

Tensile Strength at Yield:

<**\_\_\_\_\_\_\_\_**> to less than <**\_\_\_\_\_\_\_\_**> psi.

Comply with ASTM D638.

Slow Crack-Growth Resistance:

Greater than 100 hours.

Comply with ASTM F1473.

Hydrostatic Design Basis:

<**\_\_\_\_\_\_\_\_**> psi at <**\_\_\_\_\_\_\_\_**> degrees F.

Comply with ASTM D2837.

* + - 1. FRAMES AND COVERS
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=13269&mf=04&src=wd):

Neenah Foundry Company, P. O. Box 729, Neenah, WI 54957, (414) 729-3661

East Jordan Iron Works, P.O. Box 190, South Bay Rd., Cicero, NY 13039, (315) 699-2601

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**].

Lid:

Bearing Surface: Machined flat.

Configuration: Removable.

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

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

Loading: [**HS-20 with 30% impact**].

[**Furnish sealing gasket.**]

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

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

Remove paragraph if not a LEED project.

* + - 1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this Article to suit content of this Section and Project sustainable design requirements specified in Section 018113. Following two paragraphs contain examples.

* + - * 1. Section 018113 - LEED Documentation Requirements: Requirements for sustainable design compliance.
        2. 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

Select bedding material type for Project conditions. If more than one type is required, edit following paragraph accordingly. Use material "Type" coding from Section 310516 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 NYS DOCCS and OCFS Projects. Confirm with OGS PM.

* + - * 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. Steps: As required by [**applicable**] <**\_\_\_\_\_\_\_\_**> code.
        2. Base Pad:

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 Section 310001 – Earthwork Materials.
      1. SOURCE QUALITY CONTROL
         1. Inspection and Testing:

Provide shop inspection and testing of completed assembly.

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.

Maintain testing records and submit to the Director’s Representative.

Include one or both of following paragraphs to require Director’s inspection or witnessing of test at factory.

* + - * 1. Director’s Inspection:

Make completed PE 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 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**].
       2. PREPARATION
          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.
       3. 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 [**Subbase Course Type 2**] <\_\_\_\_\_>.
        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 approved by Director’s Representative.

* + - * 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. Bedding:

Place bedding material at trench bottom, and level materials in continuous layer not exceeding [**6**] [**8**] <**\_\_\_\_\_\_\_\_**> inches.

Compact bedding material to [**95**] <**\_\_\_\_\_\_\_\_**> percent maximum density.

Maintain optimum moisture content of bedding material to attain required compaction density.

* + - * 1. 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 [**on crushed stone bedding**] <**\_\_\_\_\_\_\_\_**> [**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**].
      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.
      2. ATTACHMENTS

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Consider including schedule if differing types, sizes, or construction methods are required.

Insert attachments following END OF SECTION. Consider following example when developing Project schedule.

* + - * 1. Manholes: PE construction, galvanized-steel steps, not less than 48-inch inside dimension, to depth indicated, with bolted lid.

END OF SECTION 330573