SECTION 333126 - SANITARY PRESSURE SEWER PIPING

This Section specifies pipe materials and accessories normally used with low-pressure sanitary sewage collection systems where on-lot grinder pumps are used to convey domestic sewage.

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

Sanitary sewer low-pressure pipelines.

Service connections.

Air release valves.

Valves.

* + - * 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: Concrete material requirements.

Section 310001 - Earthwork Materials: Soil backfill from above pipe to finish grade.

Section 310000- Earthwork: Excavation, backfilling, compacting, and fill.

Section 330505.31 - Hydrostatic Testing: Pressure testing of completed pressure sewer piping.

Section 330597 - Identification and Signage for Utilities: Pipe markers.

* + - 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 the correct standard is used for LEED compliance.

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

AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and a 18-in. Drop.

* + - * 1. ASTM International:

ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).

ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).

ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

* + - 1. COORDINATION
				1. Coordinate Work of this Section with connection to existing [**municipal sewer utility service**] <**\_\_\_\_\_\_\_\_**>.
			2. 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 indicating pipe material used, pipe accessories, valves, [**and**] <**\_\_\_\_\_\_\_\_**>.
				5. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit special procedures required to install specified products.
				2. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
				3. Qualifications Statement:

Coordinate following subparagraph with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer.

Remove 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 [**invert**] [**centerline**] elevations and actual locations of pipe runs, connections, and valves.
				3. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
			2. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

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. 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. Storage:

Store materials according to manufacturer instructions.

Do not store materials on private property without written permission of property Director’s Representative.

Do not stack pipe higher than recommended by pipe manufacturer.

* + - * 1. Protection:

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

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. LOW-PRESSURE SEWER PIPING
				1. Pipe: Comply with ASTM D2241; SDR21.
				2. Flexible Elastomeric Seals: Comply with ASTM D3139.
				3. Seal Material:

Elastomeric joints.

Comply with ASTM F477.

* + - * 1. Fittings:

Type: Socket.

Schedule 40.

Comply with ASTM D2466.

* + - * 1. Solvent Cement: Comply with ASTM D2564.
			1. AIR RELEASE VALVES
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8762&mf=04&src=wd):

American Valve, (800) 645-0101, 4321 Piedmont Pkwy, Greensboro, NC 27410

Spears Manufacturing, (800) 233-0275, 590 Industrial Dr., Suite 100, Lewisberry (Harrisburg), PA 1733

Approved equivalent.

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

* + - * 1. Description:

Body and Cover: Cast iron.

Stem and Float: Stainless steel.

Trim: Stainless steel.

Orifice Seats: Buna-N.

Backflushing and Cleaning Accessories:

Shutoff valve at bottom inlet.

Blowoff valve near bottom of valve body.

Clear-water inlet valve with quick-disconnect coupling.

Air inlet with quick-disconnect in valve cover.

Hose with quick-disconnect couplings.

* + - 1. VALVES
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8790&mf=04&src=wd):

American Valve, (800) 645-0101, 4321 Piedmont Pkwy, Greensboro, NC 27410

Spears Manufacturing, (800) 233-0275, 590 Industrial Dr., Suite 100, Lewisberry (Harrisburg), PA 1733

Approved equivalent.

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

* + - * 1. PVC Valves:

Comply with ASTM D1785, Class 12454.

Ball Valves:

Type: "True union," double entry.

Base Material: Fluorocarbon.

Seals: O-rings.

Seats: PTFE.

Pressure Rating: 150 psig.

Check Valves:

Description: Gravity-operated, flapper type that provides full-ported passageway when open.

Hinge Pin: Stainless steel.

Seal: Elastomeric.

Pressure Rating: 150 psig.

Remove this section 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 specified in Section 018113.

* + - * 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
				1. Concrete: As specified in Section 033000 - Cast-in-Place Concrete.
			2. ACCESSORIES
				1. Valve Boxes:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8792&mf=04&src=wd):

Star Pipe Products, (800) 999-3009, 4018 Westhollow Pkwy., Houston, TX 77082

Tyler Union, (800) 226-7601, 1501 West 17th Street, Anniston, AL 36201

Approved equivalent.

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

Valves 12 Inches and Smaller:

Type: Two-piece screw.

Material: Domestic cast iron.

Valves Larger Than 12 Inches:

Type: Three-piece screw.

Material: Domestic cast iron.

Base: Round.

Lid: Cast iron.

* + - * 1. Adjustable Valve Boxes:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8791&mf=04&src=wd):

Star Pipe Products, (800) 999-3009, 4018 Westhollow Pkwy., Houston, TX 77082

Tyler Union, (800) 226-7601, 1501 West 17th Street, Anniston, AL 36201

Approved equivalent.

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

Material: PVC, ABS, or reinforced olefin polymers.

Top Tube: Plastic.

Bottom: Belled.

Configuration: Bell arched and flanged.

Adjustment: Slide friction.

Top Collar and Lid: Cast iron.

Inscription:

Cast with lid.

"SEWER."

* + - * 1. Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.
1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that [**trench cut**] [**excavation base**] is ready to receive Work.
				2. Verify that excavations, dimensions, and elevations are as indicated on [**Drawings**] [**layout drawings**].
			2. PREPARATION

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

* + - * 1. Correct over-excavation with [**fine aggregate**] [**coarse aggregate**] [**lean concrete**] as specified in 310001 - Earthwork Materials.
				2. Remove large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.
				3. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
			1. INSTALLATION
				1. Bedding:

Excavate pipe trench as specified in Section [**310000 - Earthwork**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Place bedding material at trench bottom.

Level materials in continuous layer not exceeding [**6**] [**8**] <\_\_\_\_\_\_\_\_> inches.

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

* + - * 1. Piping:

Refer to geotechnical report for subsoil capability to support piping, and requirements for compaction of fill. Consider using ASTM D2321 to specify installation of plastic pipe.

To avoid conflicts, coordinate reference standard and manufacturer instructions.

Install pipe, fittings, and accessories according to [**ASTM D2321**] <**\_\_\_\_\_\_\_\_**>, and seal joints watertight.

Verify that sewer system is indicated on Drawings or will be included on Shop Drawings. Drawing details should describe location of aggregate types in relation to pipe and pipe bedding, dimensions of cut trench width, and details of connections to other Work.

Lay pipe to slope gradients as indicated on [**Drawings**] [**layout drawings**].

Maximum Variation from Indicated Slope: [1/8] <\_\_\_\_\_\_\_\_> inch in [10] <\_\_\_\_\_\_\_\_> feet.

Install bedding at sides and over top of pipe to minimum compacted thickness of [12] <\_\_\_\_\_\_\_\_> inches.

Backfilling and Compacting:

As specified in Section [**310000 - Earthwork**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Do not displace or damage pipe while compacting.

Connect to [**municipal sewer system**] <**\_\_\_\_\_\_\_\_**>.

Pipe Markers: As specified in Section 330597 - Identification and Signage for Utilities.

* + - * 1. Air Release Valves and Valves: Install at locations as indicated on Drawings and according to manufacturer instructions.
				2. Valve Boxes: Install at locations as indicated on Drawings and according to manufacturer instructions.
			1. FIELD QUALITY CONTROL
				1. Inspection: Request inspection prior to [**and immediately after**] placement of bedding.
				2. Pressure Testing: As specified in Section 330505.31 - Hydrostatic Testing.

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

* + - * 1. Pressure Testing:

Pressure:

Not less than <\_\_\_\_\_\_\_\_> psig or <\_\_\_\_\_\_\_\_> psi in excess of maximum static pressure, whichever is greater.

Maintain pressure within plus or minus 5 psi of test pressure.

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

Time Period: Conduct test for minimum two hours as indicated on [**Drawings**] [**piping schedule**].

Initial Procedure:

Install corporation cocks at high points.

Slowly fill section to be tested with water, expelling air from piping at high points from air vents and by opening corporation cocks.

Close air vents and corporation cocks after air is expelled.

Raise pressure to specified test pressure.

Testing:

Observe joints, fittings, and valves under test.

Remove and replace cracked pipes, joints, fittings, and valves showing visible leakage.

Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.

Leakage:

Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.

Maximum Allowable Leakage:

L = SD x sqrt(P)/C.

L = testing allowance, gph.

S = length of pipe tested, feet.

D = nominal diameter of pipe, inches.

P = average test pressure during hydrostatic test, psig.

C = 148,000.

If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.

Correct visible leaks regardless of quantity of leakage.

* + - * 1. Compaction Testing:

Select test standard(s) referenced in following subparagraph as appropriate for fill materials and for Project requirements.

Consult geotechnical report to select compaction test method appropriate to fill materials being used and Project requirements.

Comply with [**ASTM D1557**].

Testing Frequency: <**\_\_\_\_\_\_\_\_**>.

* + - 1. PROTECTION
				1. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 333126