

University of Houston Master Specification

<Insert Project Name>
<Insert U of H Proj #>

<Insert Issue Name>
<Insert Issue Date>

SECTION 33 3400 – SANITARY FORCE MAIN

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information

Edit and finalize this Section, where prompted by Editor's notes, to suit Project specific requirements. Make selections for the Project at text identified in bold.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
 - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

1.2 SUMMARY

- A. This Section specifies the requirements for furnishing and installing sanitary force main and appurtenances. The pipe shall be of the type and size as shown on the Drawings and shall be constructed in accordance with these Specifications.

1.3 APPLICABLE PUBLICATIONS

- A. The following publications of the latest issues listed below, but referred to thereafter by basic designation only, form a part of this Specification to the extent indicated by reference thereto:
 - 1. American National Standards Institute (ANSI).
 - a. ANSI B16.1 – Cast Iron Pipe Flanges and Flanged Fittings, Class 125.
 - 2. American Water Works Association (AWWA).
 - a. C-111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

University of Houston Master Specification

<Insert Project Name>

<Insert Issue Name>

<Insert U of H Proj #>

<Insert Issue Date>

- b. C-151 – Ductile Iron Pipe, Centrifugally Cast, For Water.
- c. C105 – Polyethylene Encasement for Ductile Iron Pipe Systems.
3. American Society for Testing and Materials Standards (ASTM).
 - a. ASTM D-2241 – Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe.
 - b. ASTM D-3139 – Push-On Joints for PVC Pipe.
4. American Society of Mechanical Engineers (ASME).
 - a. A112.1 4 Backwater Valves.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 1. Corrosion proof liner selected for protecting concrete pipe from sewer gases. Contractor shall submit data on the selected liner for approval prior to construction.
 2. Any special pipe fittings as shown in the Drawings.
 3. Backwater valves.
- B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- C. Field quality-control test reports.

1.5 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. LLDPE: Linear low-density, polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

<Insert A/E Name>

Sanitary Force Main

33 3400 - 2

AE Project #: <Insert Project Number>

UH Master:10.2020

University of Houston Master Specification

<Insert Project Name>

<Insert Issue Name>

<Insert U of H Proj #>

<Insert Issue Date>

1. Follow the University of Houston's Plant Operations Planned and Emergency Utility Outage Guidelines. See "COORDINATION" Article in this Section.
2. If work requires interference with any public sewer systems within or outside of Public Rights of Way or Easements, Contractor shall obtain prior written approval and coordinate with Owner and local municipality before commencing work.

1.7 DELIVERY STORAGE AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.

1.8 PERFORMANCE REQUIREMENTS

- A. Force-Main, Pressure-Piping Pressure Rating: At least equal to system operating pressure but not less than 50 psig or as directed by the Drawings.

1.9 COORDINATION

- A. Complete the Outage Planning Form in the University of Houston's Planned and Emergency Utility Outage Guidelines available in Section 00 6000 of these Specifications.

PART 2 - PRODUCTS

2.1 PIPE

- A. All materials and equipment shall be new, of best grade and standard manufacture.
- B. Ductile iron pipe shall conform to AWWA C151, latest edition. Wrap pipe in polyethylene per AWWA C 105.
- C. PVC pipe shall conform to ASTM D-2241 - SDR 21.

2.2 FITTINGS

- A. All materials and equipment shall be new, of best grade and standard manufacture.
- B. Cast iron fittings shall conform to ANSI B16.1, latest edition, Class 125, when using Ductile Iron Force Main.
- C. Cast iron fittings shall conform to AWWA C 111 when using PVC force main.
- D. Wrap cast iron fittings with polyethylene per AWWA C 105.

<Insert A/E Name>

AE Project #: <Insert Project Number>

Sanitary Force Main
UH Master:10.2020

33 3400 - 3

University of Houston Master Specification

<Insert Project Name>

<Insert U of H Proj #>

<Insert Issue Name>

<Insert Issue Date>

2.3 VALVES

- A. Gray-Iron Backwater Valves: ASME A112.1 4.1, gray-iron body and bolted cover, with bronze seat.
 - 1. Manufacturers:
 - a. Josam Company.
 - b. Smith, Jay R. Mfg. Co.
 - c. Wade Div.; Tyler Pipe.
 - d. Watts Industries, Inc.
 - e. Watts Industries, Inc.; Enpoco, Inc. Div.
 - f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
 - 2. Horizontal Type: With swing check valve and hub-and-spigot ends.
 - 3. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.
 - 4. Terminal Type: With bronze seat, swing check valve, and hub inlet.
- B. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.
 - 1. Manufacturers:
 - a. Canplas Inc.
 - b. IPS Corporation.
 - c. NDS Inc.
 - d. Plastic Oddities, Inc.
 - e. Sioux Chief Manufacturing Company, Inc.
 - f. Zurn Light Commercial Specialty Plumbing Products; Zurn Plumbing Products Group.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The interior of the pipe shall be kept relatively clean of all foreign matter before lowered into the trench and shall be kept clean during these operations.
- B. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for work.
- C. Install piping with a minimum of 4 feet of cover.
- D. When work is not in progress, open ends of pipes and fittings shall be securely closed so that water, earth, or other substances will not enter the pipes or fittings.
- E. All bends, tees and plugs shall have thrust blocks installed where applicable.

<Insert A/E Name>

AE Project #: <Insert Project Number>

Sanitary Force Main

UH Master:10.2020

33 3400 - 4

University of Houston Master Specification

<Insert Project Name>

<Insert Issue Name>

<Insert U of H Proj #>

<Insert Issue Date>

- F. Air release valves and cleanouts shall be installed at intervals as indicated on the Drawings. These fixtures shall be sufficient to withstand 200 psi surge in pressure.

3.2 FIELD QUALITY CONTROL AND TESTING

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials. Repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test sanitary force main according to the requirements of Section 33 1310 "Hydrostatic Tests."

END OF SECTION 33 3400

<Insert A/E Name>

AE Project #: <Insert Project Number>

Sanitary Force Main

UH Master:10.2020

33 3400 - 5