

SECTION 15420 - SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes sanitary drainage and vent piping inside building and to locations indicated.
- B. Related Sections include the following:
 - 1. Division 1 Section "Unit Pricing" for video taping of existing sanitary waste piping.
 - 2. Division 2 Section "Earthwork" for excavating, trenching and backfilling
 - 3. Division 2 Section "Sanitary Sewerage" for exterior sanitary sewer piping.
 - 4. Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.
 - 5. Division 15 Section "Hangers and Supports" for pipe hanger and support devices.
 - 6. Division 15 Section "Plumbing Fixtures" for drainage and vent piping fixtures.
 - 7. Division 15 Section "Plumbing Specialties" for drainage and vent piping system specialties.

1.03 DEFINITIONS

- A. Drainage and Vent Piping: Piping inside building that conveys waste water and vapors from fixtures and equipment throughout the building.
- B. The following are industry abbreviations for plastic and other piping materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene.
 - 2. EPDM: Ethylene-propylene-diene polymer, rubber.
 - 3. NBR: Acrylonitrile-butadiene rubber.
 - 4. PVC: Polyvinyl chloride.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with the following minimum working-pressure ratings, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Systems: 10-foot head of water.

1.05 SUBMITTALS

- A. Test Results and Reports: Specified in "Field Quality Control" Article.

1.06 QUALITY ASSURANCE

- A. Provide listing/approval stamp, label, or other marking on piping made to specified standards.
- B. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 PRODUCTS

2.01 PIPES AND TUBES

- A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

- B. Hub-and-Spigot, Cast-Iron Soil Pipe: ASTM A 74, Service and Extra Heavy classes. Include ASTM C 564 rubber gasket, with dimensions required for pipe class, for each hub.
- C. Hubless, Cast-Iron Soil Pipe: ASTM A 888 or CISPI 301.
- D. PVC Plastic Pipe: ASTM D 2665, Schedule 40.

2.02 PIPE AND TUBE FITTINGS

- A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.
- B. Hub-and-Spigot, Cast-Iron, Soil-Pipe Fittings: ASTM A 74, Service and Extra Heavy classes, hub and spigot. Include ASTM C 564 rubber gasket, with dimensions required for pipe class, for each hub.
- C. Hubless, Cast-Iron, Soil-Pipe Fittings: CISPI 301.
- D. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311 drain, waste, and vent pipe patterns.
- E. PVC Plastic, Tubular Fittings: ASTM F 409 drainage pattern, with ends as required for application.

2.03 JOINING MATERIALS

- A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.
- B. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for commonly used joining materials.
- C. Hubless, Cast-Iron, Soil-Piping Couplings: ASTM C 1277 assembly of metal housing, corrosion-resistant fasteners, and ASTM C 564 rubber sleeve or gasket with integral, center pipe stop. Include with compact stainless-steel couplings.
- D. Compact, Stainless-Steel Couplings: CISPI 310 with ASTM A 167, Type 301, or ASTM A 666, Type 301, stainless-steel corrugated shield; and stainless-steel bands. Include sealing sleeve.
 - 1. Clamp Width: 2-1/8 inches wide with 2 clamps, for piping 1-1/2 to 4 inch NPS.
- E. Compact Stainless-Steel Couplings: ASTM A 666, Type 304, stainless-steel shield; and 2 stainless-steel machine screws. Include gasket.

PART 3 EXECUTION

3.01 EXCAVATION

- A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.02 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.
- B. Aboveground, Soil, Waste, and Vent Piping: Use the following:
 - 1. 4 Inch NPS and Smaller: PVC plastic pipe, PVC socket fittings, and solvent-cemented joints.
 - 2. 4 Inch NPS and Smaller: Hub-and-spigot, cast-iron soil pipe, Service class; hub-and-spigot, cast-iron, soil-pipe fittings, Service class; and compression joints.
 - 3. 4 Inch NPS and Smaller: Hubless, cast-iron soil pipe; hubless, cast-iron, soil-pipe fittings; and one of the following hubless, cast-iron, soil-piping couplings:
 - a. Couplings: Compact, Type 304, stainless steel.
- C. Underground, Soil, Waste, and Vent Piping: Use the following:
 - 1. 2- to 4-Inch NPS: PVC plastic pipe, PVC socket fittings, and solvent-cemented joints.

3.03 PIPING INSTALLATION, GENERAL

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.
- B. Remove any existing galvanized sanitary waste and vent piping where piping is not indicated as being removed on the drawings, and install new pipe in accordance with this section of the specifications.
- C. Remove all existing p-traps and install new traps.
- D. Remove all existing damaged piping and install new pipe in accordance with this section of the specifications.

3.04 SERVICE ENTRANCE PIPING INSTALLATION

- A. Refer to Division 2 Section "Sanitary Sewerage" for exterior sanitary sewer piping.
- B. Extend building sanitary drain piping and connect to sanitary sewer piping in sizes and locations indicated for service entrances into building.

3.05 DRAINAGE AND VENT PIPING INSTALLATION

- A. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- B. Make changes in direction for drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not make change in direction of flow greater than 90 degrees. Use proper size of standard increasers and reducers if different sizes of piping are connected. Reducing size of drainage piping in direction of flow is prohibited.
- C. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

- D. Install drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - 1. Sanitary Building Drain: 2 percent downward in direction of flow for piping 3-inch NPS and smaller; 1 percent downward in direction of flow for piping 4-inch NPS and larger.
 - 2. Horizontal, Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- E. Install PVC plastic drainage piping according to ASTM D 2665.
- F. Install underground, PVC plastic drainage piping according to ASTM D 2321.

3.06 JOINT CONSTRUCTION

- A. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - 1. Compression Joints: Make with rubber gasket matching class of pipe and fittings.
 - 2. Hubless Joints: Make with rubber gasket and sleeve or clamp.
- B. PVC Piping Joints: Join drainage piping according to ASTM D 2665.
- C. Handling of Solvent Cements, Primers, and Cleaners: Comply with procedures in ASTM F 402 for safe handling during joining of plastic pipe and fittings.

3.07 HANGER AND SUPPORT INSTALLATION

- A. Refer to Division 15 Section "Hangers and Supports" for pipe hanger and support devices. Install the following:
 - 1. Short pipe strap, MSS SP-69 Type 26.
 - 2. Riser clamps, MSS Type 8 or Type 42, for vertical runs.
 - 3. Adjustable steel clevis hangers, MSS Type 1, for individual, straight, horizontal runs 100 feet and less.
- B. Install supports according to Division 15 Section "Hangers and Supports."
- C. Support vertical piping at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for PVC plastic piping with the following maximum spacing and minimum rod diameters:
 - 1. 2-Inch NPS and Smaller: Maximum horizontal spacing, 48 inches with 3/8-inch minimum rod diameter; maximum vertical spacing, 48 inches.
 - 2. 4-Inch NPS: Maximum horizontal spacing, 48 inches with 5/8-inch minimum rod diameter; maximum vertical spacing, 48 inches.
- F. Support piping not listed above according to MSS SP-69 and manufacturer's written instructions.

3.08 CONNECTIONS

- A. Connect service entrance piping to exterior sewerage and drainage piping. Use transition fitting to join dissimilar piping materials.
- B. Connect drainage piping to service entrance piping, and extend to and connect to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section "Plumbing Fixtures."

2. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section "Plumbing Specialties."
3. Equipment: Connect drainage piping as indicated.

3.09 FIELD QUALITY CONTROL

- A. Inspect drainage and vent piping as follows:
 1. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - a. Roughing-In Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- B. Test drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedure, as follows:
 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved.
 3. Roughing-In Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10 feet of head. Water level must not drop from 15 minutes before inspection starts through completion of inspection. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects using new materials and retest piping or portion thereof until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTING

- A. Clean interior of piping system. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with 2 coats of water-based latex paint.

3.11 SPECIAL REQUIREMENTS

- A. Pressure flush existing below slab sanitary piping using minimum 12 GPM @ 4,000 PSI water stream.
- B. After pressure flushing, video tape interior of piping to assure quality and condition of piping. Video shall indicate date, time and distance along pipe from approximately 10 feet beyond the exterior wall outdoors to where the piping turns up. Perform this work as directed by CHA and in accordance with the unit pricing schedule. Refer to Division 1, Section 01270- Unit Prices.
- C. Provide CHA a copy of video tape within 48 hours of video taping (exclude weekends and holidays).

END OF SECTION 15420

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