

SECTION 15140  
PLUMBING PIPING AND SPECIALTIES

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. Work Included: Plumbing piping systems and specialties, from connections to existing systems within the building.
  - 1. Sanitary waste and vent piping system.
  - 2. Storm drainage system.
  - 3. Protected water piping system extensions.
- B. Related Work Specified in Other Sections:
  - 1. Piping joining materials and joint construction: Section 15050, "Basic Mechanical Materials and Methods"
  - 2. Plumbing piping insulation: Section 15080, "Mechanical Insulation."
  - 3. Pipe Identification: Section 15075, "Mechanical Identification."
  - 4. Valves: Section 15110, "Valves."

1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, except where indicated otherwise:
  - 1. Soil, Waste, and Vent Systems: 10-foot head of water.
  - 2. Storm Drainage Systems: 10-foot head of water.
  - 3. Water piping Systems: 150 PSIG.

1.04 SUBMITTALS

- A. Product data for the following plumbing piping products:
  - 1. Couplings and fittings for no-hub piping systems.
  - 2. Cleanouts, cover plates, and access panels.
  - 3. Vent caps, vent terminals, and roof flashing assemblies.
  - 4. Roof drains.
  - 5. Sleeve penetration systems.
- B. Test results and reports specified in "Field Quality Control."

## 1.05 QUALITY ASSURANCE

- A. Comply with the provisions of ASME B31.9 "Building Services Piping" for materials, products, and installation.
- B. Electrical Component Standard: NFPA 70, "National Electrical Code."
- C. Listing and Labeling: Provide equipment that is listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- D. Design Concept: The Drawings indicate capacities, sizes, and dimensional requirements of system components. Components having equal performance characteristics that deviate from the indicated size and dimensions may be considered, provided deviations do not change the design concept or intended performance. The burden of proof for equality of products is on the Contractor. Refer to Division 1 Section "Product Substitutions."

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Roof Drains: Subject to compliance with requirements, provide products by one of the following:
  - 1. Josam Co.
  - 2. Smith by Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.
  - 3. Zurn by Hydromechanics Div., Zurn Industries Inc.
  - 4. Watts Drainage, (Ancon).
- B. Sleeve Penetration Systems: Subject to compliance with requirements, provide products by one of the following:
  - 1. Proset Systems, Inc.
  - 2. Hilti Systems
  - 3. 3M Corporation

### 2.02 ELEVATOR SUMP PUMPS

- A. Submersible, Waste-Water Sump Pumps: Simplex, submersible, direct-connected type.
  - 1. Casing: Cast iron with integral, cast-iron inlet strainer. Include discharge companion flange arranged for vertical discharge and suitable for plain-end pipe connection.
  - 2. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings.
  - 3. Seal: Mechanical seal.
  - 4. Motor: Hermetically sealed capacitor-start type, with built-in overload protection. Include a 3-conductor waterproof power cable of length required, but not less than 10 feet (3 m), with a grounding plug and cable-sealing assembly for connection at pump.
  - 5. Controls: 120 volts AC., plug-in cord with switch on cord.

## 2.03 CLEANOUTS

- A. General: Size cleanouts as indicated on drawings, or where not indicated, same size as connected drainage piping. Cleanouts larger than 4 inches are not required except where indicated.
- B. Cleanouts: ASME A112.36.2M, cast-iron body with straight threads and gasket seal or taper threads for plug, flashing flange and clamping ring, and a brass closure plug. Cleanouts for installation in floors not having membrane waterproofing may be furnished without clamping ring.

## 2.04 ROOF DRAINS

- A. General: Provide products as indicated in Drain Schedule on the drawings.
- B. Roof Drains: ASME A112.21.2M, cast-iron body, with combination flashing ring and gravel stop, cast-iron dome except where other dome material is specified, extension collars, underdeck clamp, and sump receiver. Roof drains for installation in cast-in-place concrete decks may be furnished without underdeck clamp and sump receiver. For dimensions, sump size, dome material, and specific features, refer to drain schedule.
- C. Expansion Joints: ASME A112.21.1M, assembly for roof drain outlet, consisting of cast-iron body, with bronze sleeve, packing gland, and packing, of size and end types corresponding to connected piping.
  - 1. Size: Same as roof drain outlet when connected to roof drain and same as connected piping when installed in piping.

## 2.05 SLEEVE PENETRATION SYSTEMS

- A. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
  - 1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on 1 end for installation in cast-in-place concrete slabs.
  - 2. Stack Fitting: ASTM A 48, cast-iron, hubless-pattern, wye branch stack fitting with neoprene O ring at base and cast-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
    - a. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.

## 2.06 PIPES AND TUBES

- A. General: The application of the following pipe, tube, and fitting materials and joining methods required for plumbing piping systems are indicated in Part 3 Article "Pipe and Fittings Applications."
- B. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.

C. Hub and Spigot, Cast-Iron Soil Pipe: ASTM A 74, Service Class.

D. Hubless, Cast-Iron Soil Pipe: CISPI 301.

## 2.07 PIPE FITTINGS AND TUBE FITTINGS

A. Wrought-Copper, Solder-Joint, DWV Drainage Fittings: ASME B16.29.

B. Cast-Copper-Alloy, Solder-Joint, DWV Drainage Fittings: ASME B16.23.

C. Wrought copper solder joint pressure fittings: ASME B16.22.

D. Galvanized, Cast-Iron Threaded Drainage Fittings: ASME B16.12, recessed drainage pattern, with threads conforming to ASME B1.20.1.

E. Hub and Spigot, Cast-Iron Soil Pipe Fittings: ASTM A 74, Service Class.

F. Hubless, Cast-Iron Soil Pipe Fittings: CISPI 301.

## 2.08 JOINING MATERIALS

A. Solder, brazing, and welding filler metals are specified in Division 15 Section "Basic Mechanical Materials and Methods."

B. Cast-Iron Soil Pipe and Fittings: ASTM C 564 neoprene rubber gaskets and lubricant.

C. Ductile-Iron Pipe and Ductile-Iron or Cast-Iron Fittings: The following materials apply:

1. Push-On Joints: AWWA C111 rubber gaskets and lubricant.

D. Stainless Steel, Heavy-Duty Couplings for Hubless Cast-Iron Soil Pipe and Fittings: ASTM C 564 neoprene sealing gasket, with Type 304 stainless-steel housing or shield and stainless-steel clamps. Coupling shall be 3 inches wide in sizes 1-1/2 to 4 inches and 4 inches wide in sizes 5 to 10 inches.

E. Cast-Iron, Heavy-Duty Couplings for Hubless Cast-Iron Soil Pipe and Fittings: ASTM C 564 neoprene sealing gasket, with cast-iron housing and stainless steel bolts.

## PART 3 - EXECUTION

### 3.01 PIPE AND FITTINGS APPLICATIONS

A. General: Use pipe, tube, fittings, and joining methods for piping systems according to the following applications.

B. Soil, Waste, and Vent Piping Above Ground: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; stainless-steel, cast-iron, or FM-type heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.

1. Waste Vent Piping Option: Hard copper, Type L water tube; wrought-copper or cast-copper-alloy pressure fittings; and soldered joints with Alloy E or Alloy Sn50 solder.
- C. Storm Drainage Piping Above Ground: Hubless cast-iron soil pipe, hubless cast-iron soil pipe fittings, stainless steel, cast iron, or FM type heavy-duty couplings for hubless cast iron soil pipe and fittings; and hubless joints.
- D. Sump pump discharge: Type "L" hard-drawn copper tubing with wrought copper and/or cast bronze drainage pattern fittings, and soldered joints.

### 3.02 PIPING INSTALLATION, GENERAL

- A. Basic piping installation requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Clean interior of piping system to remove dirt and debris as work progresses.

### 3.03 DRAINAGE, SUMP DISCHARGE AND VENT PIPING INSTALLATION

- A. Install cast-iron soil pipe and cast-iron soil pipe fittings according to CISPI 1990 revised and edited edition of "Cast Iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- B. Make changes in direction for drainage and vent piping using appropriate Y branches, Y branches with 1/8 bends, and long-sweep 1/4, 1/5, 1/6, 1/8, and 1/16 bends. Sanitary tees and short-sweep quarter bends may be used on vertical stacks of drainage lines where change in direction of flow is from horizontal to vertical. Use long-turn double-Y-branch and 1/8-bend fittings where 2 fixtures are installed back to back or side by side and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. Make no change in direction of flow greater than 90 degrees. Where different sizes of drainage pipes and fittings are connected, use proper size standard increasers and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.
- C. Lay buried building drains beginning at low point of each system, true to grades and alignment indicated, with unbroken continuity of invert. Place hub or bell ends of piping facing upstream. Install required gaskets according to manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Maintain swab or drag in piping and pull past each joint as completed.
- D. Install drainage and vent piping at the following minimum slopes, except where another slope is indicated:
  1. Horizontal Storm and Sanitary Drainage Piping: 1/4 inch per foot (2 percent) for piping 3 inches and smaller; 1/8 inch per foot (1 percent) for piping 4 inches and larger.
  2. Vent Piping: 1/8 inch per foot (1 percent).
  3. Sump pump discharge: 1/8" per foot, where installed horizontally.
- E. Sleeves are not required for cast-iron soil pipes passing through concrete slab, without membrane waterproofing, on grade.

### 3.04 JOINT CONSTRUCTION

- A. Basic piping joint construction is specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Cast-Iron Soil Pipe and Cast-Iron Soil Pipe Fitting Joints: Make joints according to recommendations in CISPI 1990 revised and edited edition of "Cast Iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  - 1. Compression Joint: Make with neoprene gasket matching class of pipe and fittings.
  - 2. Hubless Joint: Make with neoprene gasket and sleeve or clamp.

### 3.05 PIPING SPECIALTY INSTALLATION

- A. Install expansion joints on vertical risers, stacks, and conductors as indicated.
- B. Install cleanouts in above-ground piping and building drain piping as indicated, and where not indicated, according to the following:
  - 1. Size same as drainage piping up to 4-inch size. Use 4-inch size for larger drainage piping except where larger size cleanout is indicated.
  - 2. Locate at each change in direction of piping greater than 45 degrees.
  - 3. Locate at minimum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping.
  - 4. Locate at base of each vertical soil or waste stack.
- C. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

### 3.06 ROOF DRAIN INSTALLATION

- A. Install roof drains at low points of roof areas, according to the roof membrane manufacturer's installation instructions. Position roof drains for easy accessibility and maintenance.
- B. Secure with under-deck clamping assembly, without the use of wood or wood blocking.
- C. Install drain flashing collar or flange so no leakage occurs between roof drain and adjoining roofing. Maintain integrity of waterproof membranes, where penetrated.

### 3.07 CONNECTIONS

- A. Connect to existing Storm and Sanitary waste services, in locations shown.
- B. Make connections to various existing building systems, as defined on the Plumbing drawings.

### 3.08 HANGERS AND SUPPORTS INSTALLATION

- A. Hanger and support devices are specified in Section 15060 "Hangers and Supports ."

### 3.09 FIELD QUALITY CONTROL

#### A. Inspect drainage piping as follows:

1. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the authority having jurisdiction.
2. During progress of installation, notify the plumbing official having jurisdiction at least 24 hours prior to time such inspection must be made. Perform tests specified below in presence of the plumbing official.
  - a. Roughing-In Inspection: Arrange for inspection of piping system after system roughing-in, before concealing, and prior to setting fixtures.
  - b. Final Inspection: Arrange for final inspection by plumbing official to observe tests specified below and to ensure compliance with requirements of plumbing code.
3. Reinspections: Make required corrections and arrange for reinspection by plumbing official when piping system fails to pass test or inspection.
4. Reports: Prepare inspection reports signed by the plumbing official.

#### B. Drainage and Vent Piping System Tests: Test drainage and vent systems according to procedures of authority having jurisdiction or, in absence of published procedure, as follows:

1. Test for leaks and defects in new drainage and vent piping systems and parts of existing systems that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
2. Leave uncovered and unconcealed in new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose for testing work that has been covered or concealed before it has been tested and approved.
3. Rough Plumbing Test Procedure: Except for outside leaders and perforated or open-jointed drain tile, test piping of plumbing drainage and venting systems on completion of roughing-in piping installation. Tightly close all openings in piping system and fill with water to point of overflow, but not less than 10 feet head of water. Water level shall not drop during the period 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 their traps filled with water, test connections and prove gastight and watertight. Plug stack openings on roof and building drain where it leaves the building and introduce air into the system equal to pressure of 1-inch water column. Use a U tube or manometer inserted in the trap of a water closet to measure this pressure. Air pressure shall remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Sump pump discharge piping shall be tested to 100 psig for a period of 30 minutes, and proved tight.
6. Repair leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
7. Prepare reports for tests and required corrective action.

3.10 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of day or when work stops.

END OF SECTION 15140