

SECTION 224100 - PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and pipe fittings
- B. Valves
- C. Sanitary sewer piping system
- D. Domestic water piping system

1.2 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.3 PROJECT RECORD DOCUMENTS

- A. Record actual locations of piping including valves.

1.4 OPERATION AND MAINTENANCE DATA

- A. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.5 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum (3) years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with local Plumbing Codes.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.9 EXTRA MATERIALS

- A. Provide two repacking kits for each type and size valve.

PART 2 - PRODUCTS

2.1 SANITARY DRAINAGE, WASTE, AND VENT PIPING

- A. Schedule 40 PVC Pipe: ASTM D2665.
 - 1. Fittings: Schedule 40 PVC.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 T & P RELIEF VALVE AND WATER HEATER DRAIN PIPING

- A. Copper Tube: ASTM B88, Type L, Hard drawn.
 - 1. Fittings: ASME B16.23, cast brass, or ASME B16.29, wrought copper.
 - 2. Joints: ASTM B32, solder, Grade 95TA.

2.3 WATER PIPING, ABOVE AND BELOW GRADE

- A. CPVC Tubing: CPVC Schedule 80, conforming to ASTM D2846.
 - 1. Fittings: CPVC Schedule 80, conforming to ASTM D2846.
 - 2. Joints: CPVC cement conforming to ASTM F493.

2.4 BALL VALVES

- A. Subject to compliance with requirements, manufacturers offering similar products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Nibco Model 4770
 - 2. Apollo Model 70-200
 - 3. Watts Model B-6001
- B. One-piece molded CPVC body, socket ends, 150 psi non-shock cold working pressure. Valve shall be certified by NSF International for use with potable water.

2.5 RELIEF VALVES

- A. Subject to compliance with requirements, manufacturers offering similar products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Watts Model 40XL
 - 2. Wilkins Model TP220
- B. Bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated, emergency safety fuse plug, exterior valve boxes and roof drains, solenoid valves, capacities ASME certified and labeled.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections when joining dissimilar metals.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.

- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed.
- I. Establish elevations of buried piping outside the building to ensure proper slope and cover.
- J. Establish elevations of existing buried piping for connection to new Work to ensure proper slope and cover.
- K. Install valves with stems upright or horizontal, not inverted.

3.4 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers, all services.
- C. Contractor shall coordinate and make all final connections to equipment and site utilities.
- D. Coordinate prior to construction all required drop footings for stem wall penetrations and footing clearance for plumbing systems at no additional cost. Coordinate pipe placement in block walls with filled cell locations and adjust piping configurations accordingly.

3.5 ERECTION TOLERANCES

- A. Establish invert elevations, slopes as follows:
 - 1. Sanitary Piping: 1/8" per foot (one-percent).
- B. Slope water piping and sanitary vent piping to drain at low points.

3.6 TESTING OF DOMESTIC WATER SYSTEM

- A. Test the water system at a hydrostatic pressure not less than 25 psi above working pressure or a minimum of 100 psi. The water used for tests shall be obtained from potable source of water.
- B. Provide a pressure gauge located at the highest point of the system being tested. Pressure gauge shall have a shut-off valve and bleeder valve to check gauge operation. The test

shall be applied for 4 hours with no drop in gauge pressure. All joints shall be inspected during the test. No portion of the water system shall be concealed until tested.

3.7 TESTING OF SANITARY WASTE AND VENT SYSTEM

- A. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water but no section shall be tested with less than 10 ft. head of water. In testing successive sections at least the upper 10 ft. of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 ft. of the system) shall have been submitted to a test of less than a 10 ft. head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts; the system shall then be tight at all points.
- B. Defective work or material shall be replaced or repaired as necessary and inspection and test repeated. Repairs shall be made with new materials. No caulking of screwed joints or holes will be acceptable.
- C. If tests are made with air, a pressure of 5 psi shall be applied and maintained 15 minutes. A mercury column gauge shall be used in making the air test.

3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION 224100