

**SECTION 33 14 15
SITE WATER DISTRIBUTION PIPING**

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications sections "General Conditions to the Construction Contract", "Special Conditions" and "Division 01 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY

- A. This Section includes piping and specialties for potable-water service outside the building.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated or advised by AHJ:
 - 1. Potable-Water: 160 psig.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe and fittings.
- B. Coordination Drawings: For piping and specialties including relation to other services in same area. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- C. Record Drawings: At Project closeout of installed water-service piping according to Division 01 Section "Contract Closeout."
- D. Test Reports: As specified in "Field Quality Control" Article in Part 3.
- E. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.
- F. Operation and Maintenance Data: For specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated.
- B. Comply with requirements of utility supplying water.

- C. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.
- D. Potable-water piping and components shall comply with NSF 14 and NSF/ANSI 61 Annex G and NSF/ANSI/ 372 for 0.25% maximum lead content requirement. Plastic piping components shall be marked with "NSF-pw."
- E. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- B. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- C. Protect flanges, fittings, and specialties from moisture and dirt.

1.7 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Verify that water-service piping may be installed to comply with original design and referenced standards.
- C. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings. Client Agency assumes no responsibility for interpretations or conclusions drawn from this information.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate connection to the site water main provided by the Site Contractor.
- B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building water distribution piping.
- C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 PIPES

- A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.
- B. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

2.2 PIPE FITTINGS

- A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.
- B. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- C. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.
- D. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Units have 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections. Include 250-psig minimum working-pressure rating; epoxy, interior coating according to AWWA C550; length for offset and expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- E. Ductile-Iron, Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include 250-psig minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; deflection of at least 20 degrees; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- F. Ductile-Iron Expansion Joints: 3-piece assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include 250-psig minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; length for expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

2.3 JOINING MATERIALS

- A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.
- B. Ductile-Iron Piping: The following materials apply:
 - 1. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.

2. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel bolts and nuts.
3. Gaskets: Rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
4. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

2.4 PIPING SPECIALTIES

- A. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.
- B. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum pressure to suit system pressures.

2.5 PE ENCASEMENT

- A. PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch minimum thickness, tube or sheet.

2.6 ANCHORAGES

- A. Clamps, Straps, and Washers: ASTM A 506, steel.
- B. Rods: ASTM A 575, steel.
- C. Rod Couplings: ASTM A 197, malleable iron.
- D. Bolts: ASTM A 307, steel.
- E. Cast-Iron Washers: ASTM A 126, gray iron.
- F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psig.
- G. Cement: ASTM C 150, Type I.
- H. Fine Aggregate: ASTM C 33, sand.
- I. Coarse Aggregate: ASTM C 33, crushed gravel.
- J. Water: Potable.

2.7 IDENTIFICATION

- A. Refer to Division 31 Sections for underground warning tape materials.
- B. Arrange for detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Refer to Division 31 Sections for excavation, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:
 - 1. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.
 - 2. Do not use flanges or keyed couplings for underground piping.
- B. Potable Water-Service Piping: Use the following:
 - 1. Ductile-iron, mechanical-joint pipe, with mechanical-joint fittings.

3.3 JOINT CONSTRUCTION

- A. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.
- B. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.
- C. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.
- B. Install piping at indicated slope.
- C. Install components with pressure rating equal to or greater than system operating pressure.
- D. Install piping free of sags and bends.
- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install fittings for changes in direction and branch connections.
- G. Piping Connections: Unless otherwise indicated, make piping connections as specified below:

- H. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
- I. Install dielectric fittings to connect piping of dissimilar metals.

3.5 PIPING INSTALLATION

- A. Install ductile-iron piping according to AWWA C600.
- B. Encase ALL piping installations with PE film according to ASTM A 674 or AWWA C105.
- C. Bury domestic water piping with depth of cover over top at least 54 inches, with top at least 12 inches below level of maximum frost penetration.
- D. Sleeves are specified in Division 22 Section "Common Work Results for Plumbing."

3.6 ANCHORAGE INSTALLATION

- A. Install anchorages for plugs and caps. Include anchorages for the following piping systems:
- B. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
- C. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.7 IDENTIFICATION INSTALLATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.8 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 4 hours.
- C. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig. Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.
- D. Prepare reports for testing activities.

3.9 CLEANING

- A. Clean and disinfect water distribution piping as follows:
 - 1. Purge new water distribution piping before use.

- B. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651 or as described below:
 - 1. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 2. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine. Isolate system or part thereof and allow to stand for 24 hours.
- C. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
- D. Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.
- E. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- F. Prepare reports for purging and disinfecting activities.

END OF SECTION