

SECTION 21 1100
FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water pipe.
- B. Valves.
- C. Fire department connections.
- D. Accessories.

1.02 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
- B. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2011.
- C. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- E. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications; 2014.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- G. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape-Hot-Applied; 2008.
- H. AWWA C206 - Field Welding of Steel Water Pipe; 2011.
- I. AWWA M11 - Steel Water Pipe - A Guide For Design and Installation; 2004 w/Errata.
- J. NFPA 13 - Standard for the Installation of Sprinkler Systems; 2016.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.
- C. Product Data:
 - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
 - 2. Provide manufacturer's catalog information.
 - 3. Indicate valve data and ratings.
- D. Project Record Documents:
 - 1. Record actual locations of piping mains, valves, connections, fire hydrants, free-standing fire department connections, underground manholes and vaults, valve boxes, thrust restraints, and invert elevations.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.
- B. Welder Qualifications:
 - 1. Provide certificate of compliance from local Authority Having Jurisdiction, indicating approval of welders.
- C. Perform Work in accordance with local authorities having jurisdiction, municipality, and water utility requirements.

PART 2 PRODUCTS

2.01 WATER PIPE

- A. Steel Pipe and Fittings:
 - 1. Pipe: Standard weight, zinc-coated, listed, ASTM A53/A53M.
 - 2. Fittings: Comply with ASME B16.3, Class 150, zinc coated, threaded or ASME B16.4, Class 125, zinc-coated
 - 3. Mechanically Factory Applied Protective Materials:
 - a. Clean by wire brushing and solvent cleaning.
 - b. Apply one coat of coal-tar primer and two coats of coal-tar enamel conforming to AWWA C203.
 - c. Protect threaded pipe ends and fittings prior to coating.

2.02 VALVES

- A. Valves: Manufacturer's name and pressure rating marked on valve body.

2.03 FIRE DEPARTMENT CONNECTIONS:

- A. Free-Standing Inlet:
 - 1. Construction:
 - a. Listed.
 - b. Type: Free standing type, ASTM B584 poured brass alloy.
 - c. Inlets: Two way, 2-1/2 inch female inlets, thread size compatible with fire department hardware.
 - d. Rated Working Pressure: 175 psi.
 - e. Double clapper-valves, rocker-lug caps and chain, and cast-in function-identifying lettering.
 - f. Finish: Polished brass.
 - g. Label: Sprinkler - Fire Department Connection.

2.04 ACCESSORIES

- A. Outdoor Backflow Enclosures:
- B. Tracer Wire:
 - 1. Provide magnetic, detectable conductor with clear plastic covering and imprinted with "Water Service" in large letters.
 - 2. Conductor to be of sufficient length to be continuous over each separate run of nonmetallic pipe.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.03 INSTALLATION

- A. General Requirements:
 - 1. Location of Water Lines:
 - 2. Sleeving:
 - a. Sleeve water piping where piping is required to be installed within 3 feet of existing structures.
 - b. Provide ductile iron, Schedule 40 steel, or _____ sleeves.
 - c. Fill annular space between pipe and sleeves with mastic.

- d. Install water pipe and sleeve without damaging structures or causing settlement or movement of foundations or footings.
3. Pipe Laying and Jointing:
- a. Remove fins and burrs from pipe and fittings.
 - b. Prior to placing in position, clean pipe, fittings, valves, and accessories, and maintain in clean condition.
 - c. Provide proper facilities for lowering pipe sections into trenches.
 - d. Dropping or dumping of piping, fittings, valves, or any other water line material into trenches is not permitted.
 - e. Cut pipe in a neat workmanlike manner accurately to length established at the site and work into place without forcing or springing.
 - f. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
 - g. Wedging or blocking between bells and spigots will not be permitted.
 - h. Install bell-and-spigot pipe with the bell end pointing in the direction of laying.
 - i. Grade the pipeline in straight lines avoiding the formation of dips and low points.
 - j. Support piping at proper elevation and grade.
 - k. Secure firm, uniform support.
 - l. Wood support blocking will not be permitted.
 - m. Install pipe so that the full length of each pipe section and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
 - n. Provide anchors and supports where indicated, necessary, and _____ for fastening work into place.
 - o. Provide proper provisions for expansion and contraction of pipelines.
 - p. Keep trenches free of water until joints have been properly made.
 - q. Close open ends of piping temporarily with wood blocks or bulkheads at the end of each work day.
 - r. Do not install pipe during unacceptable trench conditions or inclement weather.
 - s. Minimum Depth of Pipe Cover: Not less than 2-1/2 feet.
4. Connections to Existing Water Lines:
- a. Ensure minimal interruption of service on the existing line.
 - b. Make connections to existing lines under pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.
5. Penetrations:
- a. Provide ductile-iron, Schedule 40 steel, or _____ for pipes passing through walls of valve pits and structures.
 - b. Fill annular space between sleeves and walls with rich cement mortar.
 - c. Fill annular space between pipe and sleeves with mastic.
- B. Special Requirements:
1. Steel Piping:
- a. Jointing:
 - 1) Welded: Make welded joints in accordance with AWWA C206 and install in accordance with AWWA M11.
 - b. Allowable Offsets:
 - c. Pipe Anchorage:
 - 1) Provide concrete thrust blocks (reaction backing) for pipe anchorage, except where metal harness is indicated.
 - 2) Thrust blocks to be in accordance with the recommendations for thrust restraint in AWWA M11, except that size and positioning of thrust blocks are to be as indicated.
 - 3) Use ASTM C94/C94M concrete having a minimum compressive strength of 2500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.

- 4) Metal Harness:
 - (a) Provide in accordance with the recommendations for joint harnesses in AWWA M11, except as otherwise indicated.
 - (b) Fabricated by the pipe manufacturer and furnished with the pipe.

C. Valves:

1. Set valves on solid bearing.
2. Center and plumb valve box over valve.
3. Set box cover flush with finished grade.

3.04 SERVICE CONNECTIONS

- A. Provide fire water service to Local Authority Having Jurisdiction requirements with reduced pressure backflow preventer and water meter with by-pass valves and sand strainer.

3.05 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. See Section 01 4000 - Quality Requirements, for additional requirements.
2. Provide all labor, equipment, and incidentals required for field testing, except that water and electric power needed for field tests will be furnished as set forth in Section 01 5100 - Temporary Utilities.
3. Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently and at least 5 days after placing of concrete after concrete thrust blocks have hardened sufficiently, at least 5 days after placing of concrete, and _____.
4. Fill pipeline 24 hours before testing and apply test pressure to stabilize system, using only potable water.
5. Pressure test piping to ____ psi.
6. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
7. Prepare reports of testing activities.

3.06 CLOSEOUT ACTIVITIES

END OF SECTION 21 1100