

**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. Pressure reducing valves.
- E. Water meters.
- F. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 21 1300 - Fire-Suppression Sprinkler Systems.
- C. Section 31 2316 - Excavation.
- D. Section 31 2323 - Fill and Backfill.
- E. Section 33 1416 - Site Water Utility Distribution Piping.
- F. SBMWD Standard Specifications and Drawings for Construction of Domestic Water Systems.

1.03 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- B. ASME B16.4 - Gray Iron Threaded Fittings: Classes 125 and 250; 2016.
- C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- E. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications; 2014.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2018.
- G. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- H. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).
- I. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2017.
- J. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- K. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 1998 (Reapproved 2011).
- L. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipe; 2015.
- M. AWWA C550 - Protective Interior Coatings for Valves and Hydrants; 2017.

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- N. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings; 2013.
- O. AWWA C700 - Cold-Water Meters -- Displacement Type, Metal Alloy Main Case; 2015.
- P. AWWA C703 - Cold-Water Meters -- Fire-Service Type; 2015.
- Q. AWWA C800 - Underground Service Line Valves and Fittings; 2014.
- R. AWWA M23 - PVC Pipe - Design and Installation; 2002.
- S. FM (AG) - FM Approval Guide; current edition.
- T. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. UL (DIR) - Online Certifications Directory; Current Edition.

104 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.
 - 4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.
- D. Certify that products meet or exceed specified requirements and SBMWD standards and specifications.

105 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- B. Coupling Manufacturer:
 - 1. Perform on-site training by factory-trained representative to Contractor's field personnel in the proper use of grooving tools and installation of grooved joint products.
- C. Products:
 - 1. Listed, classified, and labeled as suitable for the purpose specified and indicated.
 - 2. Refer to FM (AG) - FM Approval Guide, UL (DIR), and requirements by San Bernardino County Fire Department.
- D. Perform Work in accordance with the SBMWD Standard Specifications and Drawings for Construction of Domestic Water Systems.

PART 2 PRODUCTS

201 WATER PIPE

- A. PVC Pipe: Listed, AWWA C900.
 - 1. Fittings: AWWA C110
 - 2. Joints: PVC pipe shall be furnished in twenty-foot nominal laying length and have bell-end push-on joints employing a single elastomeric gasket in accordance with AWWA Standard C900.
- B. Ductile Iron Pipe and Fittings: Provide ductile iron pipe and fittings for riser sections, and above ground transitions. Comply with AWWA C151 and AWWA C110; cement-mortar lined per AWWA C104 and bituminous coated
 - 1. Joints: Mechanical joint per AWWA C111.

202 VALVES

- A. General:
 - 1. Valves shall be in conformance with the SBMWD Standard Specifications and Drawings for Facility Fire-Suppression Water-Service Piping

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Construction of Domestic Water Systems and Section 33 1416.

B. Detector Check with Water Meter:

1. The type of device approved shall be based on the existing or potential degree or hazard which exists, in the opinion of the Utility. All devices shall be approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, Los Angeles, CA 90089-2531.

The developer or his Contractor shall be responsible for the installation, initial test, and certification of all new backflow prevention devices. Thereafter, backflow prevention devices will be maintained and tested annually by the owner or water user.

The backflow prevention device installation shall be above ground, screened from view as approved by the utility, and shall conform with sections 4-08, 4-09 of the SBMWD Standard Specifications and Drawings for Construction of Domestic Water Systems.

2. Double Check-Detector Assemblies:

- a. ASSE 1048; NSF 61; epoxy-coated cast iron body; metered bypass, two independently operating, spring-loaded check valves with stainless steel springs; integral test fittings.
- b. Size: 2-1/2- to 10-inch NPS assembly with flanged OS&Y gate valves.

203 FIRE DEPARTMENT CONNECTIONS:

- A. Fire department connection shall be comparable to Potter-Roemer Inc., No. 5705 or 5745, two-way or three-way single clapper-ductile iron body, angle threaded outlet, as called out on plans. Red enamel finish, lettered "Auto. Spkr." brass swing clapper and pin lug swivels. Size 4 inches by 2-1/2 inches by 2-1/2 inches.
- B. Plugs shall be 5940 2-1/2 inch brass pin lug plug with chain on each inlet connection.
- C. Riser to be 4 inch galvanized steel pipe threaded to fit inlet connection above. Paint red and provide 4 inch check valve underground between inlet connection and sprinkler main.

PART 3 EXECUTION**301 INSTALLATION**

A. General Requirements:

1. Location of Water Lines:
 - a. Terminate the work covered by this Section at a point approximately 5 feet from the building unless indicated otherwise.
 - b. Do not install water line closer horizontally than 10 feet from any sewer line unless indicated otherwise.
 - c. Water Piping Parallel With Sewer Piping:
 - 1) Install water piping minimum 10 feet horizontally (measured edge-to-edge) from a sewer or sewer manhole where possible.
 - 2) Bottom (Invert) of Water Piping:
 - (a) Minimum 18 inches above top (crown) of sewer piping.
 - (b) Where this vertical separation of 18 inches above top (crown) of sewer piping cannot be obtained, the installation will be acceptable only when sewer piping is constructed of AWWA approved water pipe and pressure tested in place without leakage prior to backfilling.
 - d. Water Piping Crossing Sewer Piping:
 - 1) Crossing Under:
 - (a) Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber gasketed joints and no joint is located within 3 feet horizontally of the crossing.
 - 2) Crossing Over:

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2. Sleeving:
 - a. Sleeve water piping where piping is required to be installed within 3 feet of existing structures.
 - b. Provide ductile iron or Schedule 40 steel 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 and necessary 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 workday.
 - 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.

302 SERVICE CONNECTIONS

- A. Provide fire water service per SBMWD Standard Specifications and Drawings for Construction of Domestic Water Systems section 3-04, with reduced pressure backflow as shown on the construction plans.

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303 FIELD QUALITY CONTROL

- A. Field Tests and Inspections:
 1. 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.
 2. Fill pipeline 24 hours before testing and apply test pressure to stabilize system, using only potable water.
 3. Pressure test piping.
 4. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

5. Prepare reports of testing activities.

3.04 CLEANING

- A. Upon completion of the installation of water lines and appurtenances, remove and haul away all surplus material, including debris resulting from the work.

END OF SECTION

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