

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Bidding requirements, conditions of the contract and pertinent portions of sections in Division 1 of these specifications and MaineDOT Standard of Specifications (current version – as revised), and the most current Construction Standards of Portland Water District, apply to the section as fully as though repeated herein.
- B. Section Includes:
 - 1. Pipe and fittings for site water line including domestic water line and fire water line.
 - 2. Valves.
 - 3. Hydrants.
 - 4. Positive displacement meters.
 - 5. Backflow preventers.
 - 6. Underground pipe markers.
 - 7. Bedding and cover materials.
- C. Related Sections:
 - 1. Excavation and Fill: Section 02315
 - 2. Embankment: Section 02330
 - 3. Subgrade and Roadbed: Section 02335

1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. American Society of Mechanical Engineers:
 - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- C. American Society of Sanitary Engineering:
 - 1. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent.
 - 2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
- D. ASTM International:
 - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
 - 2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 - 3. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
 - 4. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 5. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).

6. ASTM D1785 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 7. ASTM D2241 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
 8. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 9. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
 10. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 11. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
 12. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
 13. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- E. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- F. American Water Works Association:
1. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 2. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
 3. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 4. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
 5. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
 6. AWWA C502 - Dry-Barrel Fire Hydrants.
 7. AWWA C504 - Rubber-Sealed Butterfly Valves.
 8. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in. Through 24 in. NPS.
 9. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
 10. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
 11. AWWA C606 - Grooved and Shouldered Joints.
 12. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.
 13. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
 14. AWWA C702 - Cold-Water Meters - Compound Type.
 15. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
 16. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.
 17. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.
 18. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
- G. Underwriters Laboratories Inc.:
1. UL 246 - Hydrants for Fire - Protection Service.

1.03 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Sustainable Design Requirements:
- C. Perform Work in accordance with Portland Water District and MaineDOT applicable standards.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver and store valves in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.01 WATER PIPING

- A. Ductile Iron Pipe: AWWA C151, C104
 - 1. Fittings: Ductile iron, standard thickness.
 - 2. Joints: AWWA C111, rubber gasket with rods.
 - 3. Jackets: AWWA C105 polyethylene jacket, Double layer, half lapped, 10 mil polyethylene tape.

2.02 GATE VALVES

- A. 3 inches and Larger: AWWA C500/509

1. This standard describes iron-body, brass-mounted, nonrising-stem (NRS) gate valves, including tapping gate valves, 3-in. NPS through 48-in. NPS, and outside screw and yoke (OS&Y) rising-stem gate valves, 3-in. NPS through 24-in. NPS, with either double-disc gates having parallel or inclined seats, or solid-wedge gates.
2. These valves are suitable for use in approximately level settings in water systems.
3. These valves are intended for applications where fluid velocities do not exceed 16 ft/sec when the valve is in the full open position.

2.03 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.
- B. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Water Service" in large letters.

2.04 BEDDING AND COVER MATERIALS

- A. Bedding: As specified in Sections 02315 and 02335, depth per Drawings
- B. Cover: As specified in Sections 02315 and 02335, depth per Drawings
- C. Soil Backfill from Above Pipe to Gravels or Topsoil: As specified in Sections 02315 and 02335.

2.05 ACCESSORIES

- A. Concrete for Thrust Restraints: Pour in Place Concrete.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

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 BEDDING

- A. Excavate pipe trench in accordance with Section 02315 for Work of this Section.
- B. Form and place concrete for pipe thrust restraints at change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide sufficient thrust restraint bearing on subsoil.
- C. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth; compact to 95 percent.
- D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 95 percent.
- E. Maintain optimum moisture content of fill material to attain required compaction density.

3.04 INSTALLATION - PIPE

- A. Maintain 10.0' minimum separation of water main from sewer piping in accordance with applicable code.
- B. Install pipe to indicated elevation to within tolerance of 5/8 inches.
- C. Install ductile iron piping and fittings to AWWA C600.
- D. Install grooved and shouldered pipe joints to AWWA C606.
- E. Route pipe in straight line.
- F. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- G. Install access fittings to permit disinfection of water system.
- H. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- I. Establish elevations of buried piping with not less than 6 ft of cover (6' min. cover under roads, walks and drives as required by Portland Water District).
- J. Install plastic ribbon tape continuous buried 6 inches below finish grade, above pipe line.
- K. Install trace wire continuous (as required by Local Water Utility) over top of pipe above pipe line.
- L. Backfill trench in accordance with Section 02315.
- M. Install Work in accordance with Portland Water District and MaineDOT standards.

3.05 INSTALLATION - VALVES AND HYDRANTS

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.
- C. Install Work in accordance with Portland Water District and MaineDOT standards.

3.06 SERVICE CONNECTIONS

- A. Install water service in accordance with Portland Water District requirements with reduced pressure backflow preventer, double check valve backflow preventer and water meter with by-pass valves and sand strainer as required.
- B. Install service to 5 feet of building. Connect to building water service. Coordinate with Mechanical Contractors
- C. Install Work in accordance with Portland Water District and MaineDOT standards.

3.07 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Portland Water District standards.

3.08 FIELD QUALITY CONTROL

- A. Perform pressure test on domestic site water distribution system in accordance with AWWA C600 and applicable standards of Local Water Utility.
- B. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

END OF SECTION 02510