

SECTION 33 12 13
WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Pipe and fittings for domestic water service connections to buildings.
 2. Corporation stop assembly.
 3. Curb stop assembly.
 4. Water meters and meter setting equipment.
 5. Backflow preventers.
 6. Underground pipe markers.
 7. Bedding and cover materials.
- B. Related Sections:
1. Section 31 23 17 - Trenching: Excavating backfilling and compacting for Work of this section.
 2. Section 33 05 13 -Utility Manholes and Structures.
 3. Section 33 05 17 - Precast Concrete Valve Vaults and Meter Boxes
 4. Section 33 13 00 - Disinfecting of Water Utility Distribution

1.2 REFERENCES

- A. 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.
- B. American Society of Sanitary Engineering:
1. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent.
 2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
- C. ASTM International:
1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
 2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 4. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
 5. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 6. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 7. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 8. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- D. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- E. American Water Works Association:
1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
 2. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.

3. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
 4. AWWA C702 - Cold-Water Meters - Compound Type.
 5. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
 6. AWWA C800 - Underground Service Line Valves and Fittings.
 7. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in. for Water Service.
 8. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
- F. SCDOT Standard Specifications:
1. Standard Specifications for Roads and Structures, 2007, published by the South Carolina Department of Transportation.

1.3 DEFINITIONS

- A. Utility Company: City of Lancaster

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Provide shop drawings for precast concrete vaults to include detail drawings showing the vault and accessories.
- C. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles, backflow preventor, and accessories.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, curb stops, connections, thrust restraints, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with utility company standards and the SCDOT Standard Specifications.
- B. Maintain one copy of document on site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.

- C. Store products and materials off ground and under protective coverings and custody, away from walls and in manner to keep these clean and in good condition until used.
- D. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

PART 2 PRODUCTS

2.1 WATER PIPING AND FITTINGS

- A. Copper Tubing: ASTM B88, Type K, annealed:
 - 1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
 - 2. Joints: Compression connection or AWS A5.8, BCuP silver braze.

2.2 CORPORATION STOP ASSEMBLY

- A. Manufacturers:
 - 1. Ford Meter Box Company.
 - 2. Mueller Company.
 - 3. McDonald Company.
 - 4. Substitutions: Equal per Section 01 60 00 - Product Requirements.
- B. Corporation Stops:
 - 1. Brass or red brass alloy body conforming to ASTM B62.
 - 2. Inlet end threaded for tapping according to AWWA C800.
 - 3. Outlet end suitable for service pipe specified.
- C. Service Saddles: Double strap type, designed to hold pressures in excess pipe working pressure. Manufacturers:
 - 1. Rockwell.
 - 2. McDonald Company.
 - 3. Substitutions: Equal per Section 01 60 00 - Product Requirements.

2.3 CURB STOP ASSEMBLY

- A. Manufacturers:
 - 1. Ford Meter Box Company.
 - 2. Mueller Company.
 - 3. McDonald Company.
 - 4. Substitutions: Equal per Section 01 60 00 - Product Requirements.
- B. Curb Stops:
 - 1. Brass or red brass alloy body conforming to ASTM B62.
 - 2. Plug type valve.
 - 3. Positive pressure sealing.
- C. Curb Boxes and Covers:
 - 1. Cast iron body, Extension Type or Buffalo Type.
 - 2. Minneapolis or Arch Pattern Base.
 - 3. Lid with inscription WATER, with Pentagon Plug.

2.4 METER SETTING EQUIPMENT

- A. Manufacturers:
 - 1. Ford Meter Box Company.

2. Mueller Company.
3. Substitutions: Equal per Section 01 60 00 - Product Requirements.

B. Outside Meter Setting:

1. Meter Yokes: Copper or iron, riser type assembly with bronze inlet inverted key angle valve expansion type outlet connection and EII fitting; flared copper tubing connections both ends.
2. Meter Yokes: Copper or iron, inlet and outlet horizontal or vertical setting with matching couplings, fittings, and stops.

2.5 WATER METERS

A. Residential Manufacturers:

1. Rockwell/Sensus with leak detector. SSRIIBLBBWPIMEF or SRII mtr ECR-WP IM USG.
2. Substitutions: Equal per Section 01 60 00 - Product Requirements.

B. Commercial Manufacturers:

1. Rockwell/Sensus with leak detector. Call Public Work for specifications (803) 285-9431.
2. Substitutions: Equal per Section 01 60 00 - Product Requirements.

- C. AWWA C700, positive displacement disc type suitable for fluid with bronze case and cast iron frost-proof, breakaway bottom cap, hermetically sealed register, remote reading to AWWA C706.

2.6 BACKFLOW PREVENTERS

A. Manufacturers:

1. Watts Industries
2. Febco
3. Substitutions: Equal per Section 01 60 00 - Product Requirements.

B. Reduced Pressure Backflow Preventers:

1. Comply with ASSE 1013.
2. Bronze body, with bronze internal parts and stainless steel springs.
3. Two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve opening under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

- C. Double Check Valve Assemblies: Comply with ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.7 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon and Trace Wire Tape: Brightly colored blue continuously printed with "WATER SERVICE" in large letters, minimum 6 inches wide by 4 mils thick, with magnetic detectable conductor manufactured for direct burial service.

2.8 PRECAST CONCRETE VAULT

- A. Product Description: Precast vault designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

- B. Conform to Section 33 05 17 – Precast Concrete Vaults and Meter Boxes.
- C. Shape and Size: As indicated on Drawings.
- D. Frames and Covers: ASTM A48; Class 30B gray cast iron, machine finished with flat bearing surfaces. Furnish cover marked WATER SERVICE.
- E. Steps: Polypropylene plastic step with 1/2 inch steel reinforcement. Cast steps at 16 inches on center vertically.

2.9 CONCRETE

- A. Concrete: Class A Concrete conforming to Division 500 of the SCDOT Standard Specifications.
 - 1. Compressive strength of 3,000 psi at 28 days.
 - 2. Air entrained.
 - 3. Water cement ratio of 0.488 with rounded aggregate and 0.532 with angular aggregate.
 - 4. Maximum slump of 3.5 inch for vibrated concrete and 4 inch for non-vibrated concrete.
 - 5. Minimum cement content of 564 pounds per cubic yard for vibrated concrete and 602 pounds per cubic yard for non-vibrated concrete.

2.10 BEDDING AND COVER MATERIALS

- A. Backfill around pipe and above pipe: As specified in Section 31 23 17 -Trenching.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.
- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.2 INSTALLATION - CORPORATION STOP ASSEMBLY

- A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Engineer.
- B. Provide service clamps for mains other than of cast iron or ductile iron mains.
- C. Screw corporation stops directly into tapped and threaded iron main at 10 and 2 o'clock position on main's circumference; locate corporation stops at least 12 inches apart longitudinally and staggered.
- D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum 2-inch width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.

- E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Engineer.

3.3 EXCAVATION, BEDDING AND BACKFILL

- A. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section.
- B. Place bedding material at trench bottom, level in one continuous layer not exceeding 6-inch loose thickness; compact to 95 percent in accordance with Section 31 23 17.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 95 percent in accordance with Section 31 23 17.
- D. Maintain optimum moisture content of fill material to attain required compaction density.

3.4 INSTALLATION - PIPE AND FITTINGS

- A. Maintain separation of water main from sewer piping in accordance with local code or a minimum of 10 feet horizontal and 18 inches vertical distance.
- B. Group piping with other site piping work whenever practical.
- C. Install pipe to indicated elevation to within tolerance of 5/8 inch.
- D. Route pipe in straight line.
- E. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- F. Install access fittings to permit disinfection of water system performed under Section 33 13 00.
- G. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- H. Establish elevations of buried piping with not less than 3 feet of cover.
- I. Install plastic ribbon with trace wire continuous over top of pipe buried 6 inches below subgrade above pipe line; coordinate with Section 31 23 17.
- J. Backfill trench in accordance with Section 31 23 17.

3.5 INSTALLATION - CURB STOP ASSEMBLY

- A. Set curb stops on solid bearing of compacted soil.
- B. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

3.6 INSTALLATION - BACKFLOW PREVENTERS WATER METERS

- A. Install positive displacement meters in accordance with AWWA M6, as indicated on Drawings, and in accordance with manufacture's instructions.
- B. Install backflow preventer where indicated on Drawings and in accordance with manufacturer's instructions.

- C. Comply with local water company requirements and plumbing codes regarding testing and installation requirements.

3.7 SERVICE CONNECTIONS

- A. Install water service to 5 feet of building and plug.

3.8 PRECAST CONCRETE VAULT

- A. Construct valve vaults of precast concrete.
- B. Install in accordance with Section 33 05 17.
- C. Seal vault joints watertight with preformed plastic joint sealant compound. Apply asphalt waterproofing to exterior walls.
- D. Seal annular space between pipe and wall sleeves as indicated on Drawings.
- E. Install vault covers and frames; adjust to finished grade elevation.

3.9 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 13 00.

3.10 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing for bedding and backfill: Conform to Section 31 23 17.
- C. Pressure testing: Perform pressure test on water service connections in accordance with AWWA C600.
- D. Notification: Notify Engineer and Owner 72 hours in advance of test and have them witness test.
- E. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
- F. Procedure:
 1. After completion of pipeline installation, but prior to backfill and final connection to existing system, conduct concurrent pressure and leakage tests in accordance with AWWA C600.
 2. Provide equipment required to perform leakage and pressure tests.
 3. Conduct tests for at least two-hour duration.
 4. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of pressure test.
 5. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
 6. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.

7. Examine exposed piping, fittings, valves, and joints carefully during pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
8. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$L = (SDV \sqrt{P})/C$
L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during leakage test, in pounds per square inch gauge
C = 133,200

9. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

END OF SECTION