

San Antonio Water System Standard Specifications for Construction

ITEM NO. 814

Ductile Iron Pipe

814.1 DESCRIPTION: This item shall consist of ductile iron pipe installation in accordance with these specifications and as directed by the Engineer.

814.2 REFERENCED STANDARDS: Reference standards cited in this Specification Item No. 814 refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification Item No. 814, unless a date is specifically cited.

1. San Antonio Water System (SAWS):
 - a. Specifications for Water and Sanitary Sewer Construction
 - b. SAWS Materials Specifications
2. City Of San Antonio (COSA) Standard Specifications for Construction
3. Texas Commission of Environmental Quality (TCEQ)
 - a. Chapter 290 Public Drinking Water
4. American Society for Testing and Materials (ASTM) International:
 - a. ASTM D 1248 - Standard Specification Polyethylene Plastics Molding and Extrusion Materials for Wire and Cable.
 - b. ASTM F 477 - Elastomeric Seals (gaskets) for Joining Plastic Pipe.
 - c. ASTM G 62 - Standard Test Methods for Holiday Detection in Pipeline Coatings.
5. American National Standard Institute (ANSI)
 - a. ANSI A 21.4 (AWWA C 104) - Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings, for Water.
 - b. B. ANSI A 21.10 (AWWA C 110) - Standard for Ductile-Iron and Gray-Iron Fittings, 3-in. through 48-in.
 - c. C. ANSI A 21.11 (AWWA C 111) - Standard for Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - d. D. ANSI A 21.15 (AWWA C 115) - Standard for Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges.
 - e. E. ANSI A21.16 (AWWA C 116) - Protective Fusion Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile Iron and Grey iron Fittings for Water Supply Service.
 - f. F. ANSI A 21.50 (AWWA C 150) - Standard for Thickness Design of Ductile-Iron Pipe.
 - g. G. ANSI A 21.51 (AWWA C 151) - Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water and Other Liquids.
 - h. H. ANSI A 21.53 (AWWA C 153) - Standard for Ductile Iron Compact Fittings, 3 inches through 24 inches and 54 inches through 64 inches for Water Service.
 - i. ANSI/AWS D11.2 –Guide for Welding Iron Castings
6. American Society of Mechanical Engineers (ASME)
 - a. ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
7. American Water Works Association (AWWA)

San Antonio Water System Standard Specifications for Construction

1. AWWA C 105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
2. AWWA C 300 - Standard for Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and other Liquids.
8. International Organization of Standardization (ISO)
 - a. ISO9001

814.3 SUBMITTALS: Contractor shall submit manufacturer's product data, installation recommendations, shop drawings, and certifications prior to performing any work.

814.4 MATERIALS: The materials for ductile iron pipe shall conform to the specifications contained within the latest revision of SAWS Material Specification Item Nos. 05-11, "Ductile-Iron Pipe," 10-10, "Gray-Iron and Ductile-Iron Fittings," and 100-34, "Ductile-Iron Couplings, 100-40 PolyTape.

814.5 CONSTRUCTION:

1. Excavations at Bells and Collars:
 - a. Ductile iron pipe shall be installed as specified within Specification Item No. 812, "Water Main Installation."
 - b. Bell holes of sufficient size shall be provided at each joint to permit the joints to be made properly.
 - c. For mechanical type joints, the minimum clearance between the bell and natural ground shall be 6 inches in all directions.
 - d. Subject to the above provisions, the length of excavation for bell holes below grade of the trench bottom shall be kept to a minimum.
2. Corrosion Protection for Ferrous Pipe, Fittings, and Valves:
 - a. Except as otherwise shown in the contract documents or as directed by the Engineer, anti-corrosion embedment shall be provided for all ductile iron pipe, fittings, and valves and at all valves, fittings, or outlets for nonferrous or reinforced concrete steel cylinder pipe.
 - b. The embedding material shall be Modified Grade 5 gravel which conforms to the requirements as set forth in Specification Item No. 804 - Excavation, Trenching and Backfill.
 - c. The preparation of the trench shall be in accordance with applicable provisions of Specification Item 804 -Excavation, Trenching and Backfill.
 - d. After the subgrade has been prepared, the pipe shall be laid to grade.
 - e. The pipe, fitting, or valve shall be firmly embedded in and surrounded by the embedding material. See details in Specification Item 804 - Excavation, Trenching and Backfill Drawing Series DD-804.
3. Coating and Wrapping of Underground Pipe:
 - a. Ductile Iron Pipe In Casing:
 - i. Where ductile iron pipe is to be installed in a bore, the pipe shall be thoroughly cleaned down to the coal-tar enamel pipe coating by approved methods.
 - ii. Where damaged, a prime coat, compatible to the polyvinyl tape to be used, shall then be applied to the pipe.

San Antonio Water System Standard Specifications for Construction

- iii. Following the application of the prime coat, the pipe shall be wrapped with SAWS approved polytape as per Material Specification 100-40 Polytape.
 - iv. The tape shall not be applied until the prime coat is completely dry.
 - v. The tape shall be spirally and tightly wrapped on each section of the pipe with a 50% overlap.
 - vi. The wrap shall be made to the bell on the bell end and to a point 6 inches from the spigot end.
 - vii. The joint shall be protected with tape 6 inches in width on pipe 12 inches or less in size and with tape 8 inches in width on pipe greater than 12 inches in size.
4. Open Trench:
- a. Ductile iron pipe to be installed in a trench shall be protected in the following manner.
 - b. Each pipe joint shall be covered with an 8 mil thick polyethylene sleeve that is 2 feet longer than the pipe joint.
 - c. The sleeve shall cover the full length of the pipe joint, lap over 1 foot on each end of the adjoining pipe joints, and be secured with a minimum of two circumferential turns of pressure sensitive polyvinyl tape.
 - d. Excess material should be neatly drawn up around the pipe barrel, folded into an overlap on top of the pipe, and held in place by means of pieces of pressure sensitive tape at approximately 5 foot intervals.
 - e. After assembling the joint, the polywrap tube from the previously installed pipe shall be pulled over the joint and secured by the Contractor.
 - f. The polywrap tube from the new joint shall be pulled over the first tube and secured by the Contractor to provide a double seal.
 - g. Cast iron and ductile iron fittings and valves shall be completely wrapped in 8 mil thick polyethylene film with a minimum of a 1 foot overlap on each end and appropriately taped.
 - h. Laps shall cover joints with adjoining pipe joints or fittings when installed.
 - i. Fire Hydrant barrel, from the surface to the valve, shall be wrapped as specified herein.
 - j. Any damaged areas in the polyethylene film shall be repaired by covering the area with a sheet of polyethylene film large enough to lap over the damaged area 1 foot minimum in any direction and appropriately taped.
 - k. Extreme care shall be taken at service tap locations to insure that the tape extends beyond the corporation and onto the service line pipe by a minimum of 1 foot.
 - l. Refer to Specification Item No. 804 - Excavation, Trenching and Backfill prior to placing pipe in trench.
 - m. Backfill material shall be carefully placed on the pipe so as to avoid any damage to the polyethylene sleeve.
 - n. The Contractor shall use care to protect and preserve the polyethylene

San Antonio Water System Standard Specifications for Construction

- wrap around ductile iron water mains when installing service corporations.
- o. The required method is to wrap pipe tape around the pipe over the polywrap in the area to be tapped.
 - p. The tap is to be made through the tape and polywrap. It is not necessary to remove and replace poly wrap.
 - q. All exposed pipe, the corporation, and the first 3 feet of the service shall be wrapped and taped to achieve a complete seal.
 - r. A sand envelope shall extend over and around the connection to a depth of 12 inches above the main.
5. Protective Coating on Joints
- a. All bolts and nuts destined for underground service on valves, fire hydrants, cast-iron mechanical joint fittings, pipe joints, and other ferrous metal appurtenances shall be packed in an approved protective coating material after installation.
 - b. After the joint has been made and bolts drawn to the proper tension, the joint including glands, flanges, bolt heads, and nuts shall be covered with an approved SAWS coating.
 - c. Such protective coating shall be supplemental to anti-corrosive sand embedment as set forth in Item No. 804 - Excavation, Trenching and Backfill.
 - d. Asphaltic material such as Talcote shall not be used
 - e. Coating and wrapping of joints will be considered incidental to the installation, and no separate payment will be made for this item. .
6. Cutting Ductile Iron Pipe
- a. All cuts made on ductile-iron pipe shall be done with a power saw or approved mechanical cutter.
 - b. The cuts shall be made at right angles to the pipe axis and shall be smooth.
 - c. The edges of the cut shall be finished smoothly with a hand or machine tool to remove all rough edges.
 - d. The outside edge of pipe should be finished with a small taper at an angle of about 30 degrees.
 - e. To facilitate future repair work on water mains, no sections less than 3 feet in length between fittings shall be allowed.
7. Galvanic Anode Cathodic Protection
- a. A complete galvanic anode cathodic protection system shall be installed as per Specification Item No.819 Galvanic Cathodic Protection and plan drawings.

814.6 MEASUREMENT: Ductile iron pipe will be measured by the linear foot for each size and type as follows:

1. Measurements will be from the center line intersection of runs and branches of tees to the end of the valve of a dead end run.
2. Measurements will also be between the center line intersection of runs and

San Antonio Water System Standard Specifications for Construction

branches of tees.

3. Where the branch is plugged for future connection, the measurement will include the entire laying length of the branch or branches of the fitting.
4. The measurement of each line of pipe of each size will be continuous and shall include the full laying lengths of all fittings and valves installed between the ends of such line except that the laying length of reducers will be divided equally between the connected pipe sizes.
5. Lines leading to a tapping connection with an existing main will be measured to the center of the tapped main.

814.7 PAYMENT: Payment for water main installed will be made at the unit price bid per linear foot of pipe of the various sizes installed by the open cut method.

1. Such payment shall also include excavation, selected embedment material, backfill, compaction, polyethylene sleeve, hauling and disposition of surplus excavated material, including all existing pipe, fittings, cathodic protections, appurtenances to be abandoned or removed, installation of all-weather surface, and other required testing as per Specification Item No. 804 - Excavation, Trenching and Backfill.
2. Materials paid on site will be in accordance with Table 1 of Specification Item No. 100 Mobilization

-End of Specification-