

Section 02634**DUCTILE IRON PIPE AND FITTINGS****1.0 GENERAL****1.01 SECTION INCLUDES**

- A. Ductile iron pipe and fittings for water mains, wastewater force mains, gravity sanitary sewers, and storm sewers.
- B. References to Technical Specifications:
 - 1. Section 01350 – Submittals
 - 2. Section 02676 – Hydrostatic Testing of Pipelines
 - 3. Section 02533 – Sanitary Sewage Force Mains
 - 4. Section 02630 – Polyethylene Wrap
 - 5. Section 02510 – Water Mains
 - 6. Section 02530 – Gravity Sanitary Sewers
- C. Referenced Standards:
 - 1. American National Standards Institute (ANSI)
 - a. ANSI A21.51, Ductile-Iron Pipe Centrifugal Cast, in Metal Molds
 - b. ANSI A21.11, Rubber Gasket Joints Cast and Ductile Iron Press Pipe
 - c. ANSI A21.15, Flanged Cast and Ductile Iron
 - d. ANSI A21.50, Thickness Design of Ductile Iron Pipe
 - e. ANSI A21.10, Cast Iron and Ductile Iron Fittings, 2 thru 48 in./Water
 - f. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
 - g. ANSI A21.53, Ductile-Iron Compact Fittings for Water Service
 - h. ANSI A21.4, Cement-Mortar lining/Cast and Ductile Iron Pipe and Fittings
 - 2. American Water Works Association (AWWA)
 - a. AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - b. AWWA C110 Ductile-Iron and Gray Iron Fittings for Water
 - c. AWWA C153 Ductile-Iron Compact Fittings for Water Service
 - d. AWWA C600 Installation for Ductile-Iron Water Mains and Their Appurtenances
 - 3. Steel Structures Painting Council (SSPC)
 - a. SSPC-SP 6, Commercial Blast Cleaning
 - 4. American Society for Testing and Materials (ASTM)

- a. ASTM G 62, "Standard Test Method for Holiday Detection in Pipeline Coatings"
- b. ASTM D 1248, "Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable"

1.02 MEASUREMENT AND PAYMENT

- A. Unless indicated as a Bid Item, no separate payment will be made for ductile iron pipe and fittings under this Section. Include cost in Bid Items for Water Mains, Sanitary Sewage Force Mains, Gravity Sanitary Sewers, and Storm Sewers.

1.03 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01350 – Submittals.
- B. Submit Shop Drawings showing design of new pipe and fittings indicating alignment and grade, laying dimensions, fabrication, fitting, flange, and special details. Show station numbers for pipe and fittings corresponding to Plans. Production of pipe and fittings prior to review by the Engineer is at Contractor's risk.

1.04 QUALITY CONTROL

- A. Provide manufacturer's certifications that all ductile iron pipe and fittings meet provisions of this Section and have been hydrostatically tested at factory and meet requirements of ANSI A21.51.
- B. Provide certifications that all pipe joints have been tested and meet requirements of ANSI A21.11.

2.0 PRODUCTS

2.01 DUCTILE IRON PIPE

- A. Ductile iron pipe barrels: ANSI A21.15, ANSI A21.50 or ANSI A21.51; bear mark of Underwriters' Laboratories approval.
- B. Provide pipe sections in standard lengths, not less than 18 feet long, except for special fittings and closure sections as indicated on Shop Drawings.
- C. Unless otherwise shown on Drawings, use minimum Pressure Class 250 for waterlines or thickness Class 52 for waterlines in casing or augered hole. Provide minimum thickness Class 52 for sanitary sewers. Provide minimum Pressure Class 350 for flanged pipe.

2.02 JOINTS

- A. Joint types: ANSI A21.11 push-on; ANSI A21.11 mechanical joint; or ANSI A21.15 flanged end. Provide push-on joints unless otherwise indicated on the Plans or required by these specifications. For bolted joints, bolts shall conform to requirements of AWWA C111.
- B. Where restrained joints for buried service are required by Plans, provide one of the following, or Approved Equal (restrained joints shall be polyethylene wrapped):
1. Super-Lock Joint by Clow Corporation.
 2. Flex-Ring or Lok-Ring by American Cast Iron Pipe Company.
 3. TR-Flex Joint by U.S. Pipe and Foundry Company.
 4. EBAA IRON MEGALUG Mechanical Joint Restraint.
- C. Threaded or grooved type joints which reduce pipe wall thickness below minimum required are not acceptable.
- D. Provide for restrained joints designed to meet test pressures required under Section 02676 - Hydrostatic Testing of Pipelines or Section 02533- Sanitary Sewage Force Mains, as applicable.
- E. Where ductile iron water main is cathodically protected from corrosion, bond rubber gasketed joints as shown on Plans to provide electrical continuity along entire pipeline, except where insulating flanges are required by Plans.

2.03 GASKETS

- A. Furnish, when no contaminant is identified, plain rubber (SBR) gasket material; for flanged joints 1/8-inch thick gasket in accordance with ANSI A21.15.
- B. Pipes to be installed in potentially contaminated areas, especially where free product is found near the elevation of the proposed pipeline, shall have the following gasket materials for the noted contaminants:

CONTAMINANT	GASKET MATERIAL REQUIRED
Petroleum (diesel, gasoline)	Nitrile Rubber, Nitrile Rubber, FKM Viton Type Gasket (ASTM 1418)
Other contaminants	As recommended by the pipe manufacture

2.04 FITTINGS

- A. Use fittings of same size as pipe. Reducers are not permitted to facilitate an off-size fitting. Reducing bushings are also prohibited. Make reductions in piping size by reducing fittings. Line and coat fittings as specified for pipe they serve.
- B. Push-on Fittings will not be allowed above grade.
- C. Flanged Fittings: ANSI A21.10; ANSI B16.1 cast or ductile iron. Flanges: ANSI B16.1, Class 125; pressure rated at 250 psig.
- D. Mechanical Joint Fittings: ANSI A21.10 (AWWA C110); pressure rated at 250 psi.
- E. Ductile Iron Compact Fittings for Water Mains: ANSI A21.53 (AWWA C153); 4-inch through 12-inch diameter; cement-mortar lining; conform to requirements of Section 02630 – Polyethylene Wrap.

2.05 COATINGS AND LININGS

- A. Water Main Interiors: ANSI A21.4, cement lined with seal coat.
- B. Sanitary Sewer and Force Main Interiors:
 - 1. Preparation: Commercial blast cleaning conforming to SSPC-SP6.
 - 2. Liner thickness: Nominal 40 mils, minimum 35 mils, for pipe barrel interior; minimum 6 - 10 mils at gasket groove and outside spigot end to 6-inches back from end.
 - 3. Testing: ASTM G 62, Method B for voids and holidays; provide written certification.
 - 4. Acceptable Lining Materials:
 - a. Virgin polyethylene conforming to ASTM D 1248, with inert fillers and carbon black to resist ultraviolet degradation during storage heat bonded to interior surface of pipe and fittings; “Polyline” by American Cast Iron Pipe Company; or Approved Equal.
 - b. Polyurethane: Corro-pipe II by Madison Chemicals.
 - c. Ceramic Epoxy: Protecto-401 by Enduron Protective Coatings.
- C. Sanitary Sewer Point Repair Pipe: For pipes which will be lined with high density polyethylene liner pipe or cured-in-place liner, provide cement-lined with seal coat in accordance with ANSI A21.4. For pipes which will not be provided with named liner, provide pipe as specified in this Section, 2.05B “Sanitary Sewer and Force Main Interiors”.

- D. Exterior: Prime coat and outside asphaltic coating conforming to ANSI A21.10, ANSI A21.15, or ANSI A21.51 for pipe and fittings in open cut excavation and in casings.
- E. Polyethylene Wrap: For buried water lines and sanitary sewers, including point repairs, provide polyethylene wrap unless otherwise specified or shown. Provide Polyethylene Wrap for all buried ductile iron pipe, including polyurethane coated pipe.
- F. For flanged joints in buried service, provide petrolatum wrapping system, Denso, or Approved Equal, for the complete joint and all alloy steel fasteners. Alternatively, provide bolts made of Type 304 Stainless Steel.
- G. Pipe to be installed in potentially contaminated areas shall have coatings and linings recommended by the manufacturer as resistant to the contaminants.

2.06 MANUFACTURERS

- A. Pre-approved manufacturers of ductile iron are American Cast Iron Pipe Co., McWane Cast Iron Pipe Co., and U. S. Pipe and Foundry Co.

3.0 EXECUTION

3.01 INSTALLATION

- A. Conform to installation requirements of Section 02510 – Water Mains, Section 02530 – Gravity Sanitary Sewers, and Section 02533 – Sanitary Sewage Force Mains, except as modified in this Section.
- B. Install in accordance with AWWA C600 and manufacturer's recommendations.
- C. Install all ductile iron pipe in polyethylene wrap, unless cathodic protection is provided. Do not use polyethylene wrap with a cathodic protection system.

3.02 GRADE

- A. Unless otherwise specified on Plans, install ductile iron pipe for water service to clear utility lines with following minimum cover:

DIAMETER (INCHES)	DEPTH OF COVER (FEET)
16 and 24	5
12 and smaller	4

END OF SECTION