SECTION 02300 – DUCTILE–IRON FITTINGS

PART 1 - GENERAL

1.1 WORK INCLUDED IN THIS SECTION

A. The WORK of this Section includes materials and installation procedures for ductile-iron fittings for potable and recycled water systems.

1.2 REFERENCE STANDARDS

A. The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
AWWA C110 - Ductile-Iron and Gray-Iron Fittings
AWWA C153 - Ductile-Iron Compact Fittings

1.3 SERVICE APPLICATION

A. Ductile-iron fittings shall be used as needed in conjunction with the installation of PVC pipe and ductile-iron pipe in locations shown on the Approved Plans.

1.4 DESIGN REQUIREMENTS

A. General

1. Ductile-iron fittings shall be manufactured per AWWA C110 and C153. Gray-iron or cast-iron fittings shall not be used. Gray iron or cast-iron flanges shall not be used.

2. Ductile-iron fittings shall be mechanical, flanged, or push-on joints in accordance with AWWA C110 and C153.

3. Except as amended herein, or otherwise shown on the Approved Plans, joints for ductile-iron fittings shall have a pressure rating equal to or greater than the adjacent piping.

B. Unless otherwise specified, ductile-iron flanged fittings shall be integrally cast in accordance with AWWA C110, rated at a working pressure of 1,724 KPa (250 psi). Gray-iron or cast-iron flanged fittings are not permitted.

C. The exterior surfaces of all ductile-iron fittings shall be factory-coated with a minimum one (1) mil thick petroleum asphaltic material, per AWWA C110 and C153.

D. All ductile-iron fittings shall be cement-mortar lined and seal-coated in accordance with AWWA C104. Cement-mortar shall be in accordance with ASTM C 150, Type II or Type V.

1.5 QUALITY ASSURANCE

A. The manufacturer of each shipment of ductile-iron fittings shall be required to supply a statement certifying that each lot or load of fittings has been subjected to and met the tests specified for ductile-iron fittings per AWWA C110 and C153, as applicable.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery, storage, and handling of ductile-iron fittings shall follow the recommendations of AWWA C600 and shall also be as specified herein:

1. Handling of fittings shall be performed with lifts, cranes, or other suitable equipment and devices. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the fittings, linings, and coatings. The fittings shall not be dropped or dragged.

2. During transport, fittings shall be supported and secured against movement using padded devices in such a manner to prevent damage.

3. Stored fittings shall be protected from damage and kept free from dirt and foreign materials by closing the ends of the pipe. Other pipeline materials shall be protected by appropriate packaging or wrapping. Gaskets shall be stored in a cool location out of direct sunlight. Bolts, nuts, and washers shall be handled and stored in a dry location.

4. Maintain plastic end caps on all fittings in good condition until the pipe is ready to be installed in the trench. Periodically open the plastic end caps and spray clean potable water inside fittings for moisture control.

5. Under no circumstances shall ropes or other handling devices be attached through the interior of fittings.

1.7 POLYETHYLENE WRAP

A. Polyethylene wrap shall be installed for buried ductile-iron fittings in accordance with Section 04200.

PART 2 - MATERIALS

2.1 DUCTILE-IRON FITTINGS

A. Ductile-iron fittings and appurtenant components and materials shall be selected from the Approved Materials List and in accordance with the Standard Drawings.

2.2 GASKETS

A. Mechanical-joint rubber gasket configuration and materials shall comply with AWWA C111 and shall be in accordance with the applicable joint type and pressure rating of the pipe system.

B. Flange gaskets shall be 3.2 mm (1/8”) thick aramid fiber bound with nitrile for all sizes of pipe. Gaskets shall be drop in or full-face type with pre-punched holes.

C. If soil is contaminated with organic solvents or petroleum products are encountered during the course of the WORK, alternate gasket materials or joint treatment may be required by the DISTRICT Engineer.

2.3 BOLTS AND NUTS FOR FLANGES

A. Bolts and nuts shall be in accordance with Section 02200 and shall be selected from the Approved Materials List.

2.4 PAINTING AND COATING

A. Buried ductile-iron fittings shall receive a shop applied asphaltic coating in accordance with AWWA C 151.

B. The DISTRICT may require alternative coatings based on special conditions and the Corrosion Engineer’s recommendations. Additional coating requirements shall be shown of the drawings.

C. Materials for coating of ductile-iron fittings located above ground and in structures shall be in accordance with Section 04000.

2.5 IMPORTED GRANULAR MATERIAL FOR PIPE AND TRENCH ZONES

A. Imported granular material for use in pipe and trench zones shall be in accordance with Section 02000.

2.6 CONCRETE

A. Concrete for thrust, anchor, and support blocks shall be in accordance with Section 03000.

PART 3 - EXECUTION

3.1 GENERAL

A. Ductile-iron fittings shall be installed in accordance with manufacturer’s recommendations.

3.2 TRENCHING, BACKFILLING AND COMPACTING

A. Trenching, backfilling and compacting shall be performed in accordance with Section 02000.

3.3 POLYETHYLENE WRAP

A. Polyethylene wrap shall be used for the buried installation of ductile iron fittings and shall be installed in accordance with Section 04200.

3.4 FLANGED FITTINGS

A. Flanged fittings shall be installed where indicated on the Approved Drawings.

1. Bolt holes shall straddle the vertical centerline.

2. The bolts, nuts and flange faces shall be thoroughly cleaned by wire brush prior to assembly.

3. Bolts and nuts shall be lubricated with a DISTRICT approved grease for protection of buried nuts and bolts.

4. Nuts shall be tightened in an alternating “star” pattern to the manufacturer’s recommended torque.

5. Coat the exterior of exposed flanges, bolts and nuts located above ground or within vaults in accordance with Section 04000.

3.5 MECHANICAL – JOINT FITTINGS

A. Install mechanical-joint fittings per AWWA C600 and the manufacturer’s recommendations.

B. Prior to installation of the mechanical join, clean the socket and plain end of the pipe. Lubricate both the gasket and plain end of the pipe within approved lubricant per AWWA C111 immediately prior to slipping the gasket onto the plain end of the pipe.

3.6 SUPPORT FOR DUCTILE-IRON FITTINGS

A. All ductile-iron fittings require concrete support blocks in accordance with Section 02100 to prevent the fittings weight from being carried by the adjacent pipe.

3.7 THRUST AND ANCHOR BLOCKS

A. Concrete thrust and anchor blocks shall be installed in accordance with the Approved Plans, Section 02100 and the Standard Drawings.

3.8 JOINT RESTRAINT SYSTEMS

A. Joint restraint lengths along new pipelines shall be as shown on the Approved Plans. If the installation of concrete thrust blocks is not practical and the use of joint restraint systems are approved by the DISTRICT Engineer, calculations indicating join restraint lengths along new pipelines shall be submitted to the DISTRICT Engineer for approval.

END OF SECTION