

SECTION 15056 – DUCTILE IRON FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes materials, installation, and testing of ductile iron fittings 48 inches and smaller.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 – Record Drawings and Submittals
- B. Section 01600 – Materials and Equipment
- C. Section 02140 – Dewatering
- C. Section 02223 – Trenching, Backfilling and Compaction
- D. Section 09800 – Painting and Coating
- E. Section 15000 – General Piping Systems and Appurtenances

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

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.

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|----|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1. | ANSI B16.42 | Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300 |
| 2. | AWWA C110 | Ductile-Iron and Gray-Iron Fittings for Water |
| 3. | AWWA C111 | Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings |
| 4. | AWWA C144 | Standard Specification for Aggregate for Masonry Mortar |
| 5. | AWWA C151 | Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids |
| 6. | City of Oceanside Water, Wastewater, and Recycled Water and Design Construction Manual (Oceanside Water Utilities Manual) | |

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the standard specifications.

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- B. Provide an affidavit of compliance with standards referenced in this Specification, e.g. AWWA C151.
- C. Submit manufacturer's literature on ductile iron pipe and fittings including dimensions, thickness, weight, coating, lining, and a statement of inspection and compliance with the acceptance tests of AWWA C151 and C110, respectively.
- D. Submit dimensions of push-on joints and other joints which do not conform to rubber gasket joints in accordance with AWWA C111.
- E. Submit joint details.
- F. Submit calculations and/or test data proving that the proposed restrained joint arrangement can transmit the required thrust.
- G. Submit copy of manufacturer's quality control check of pipe material and production.
- H. Submit test report on physical properties of rubber compound used in the gaskets.
- I. Submit manufacturer's catalog data and descriptive literature on marking tape.

1.5 INSPECTION AND FIELD VERIFICATION

- A. The AGENCY may inspect materials, productions, and testing of pipes, fitting, and special pieces at manufacturer's plant. All costs shall be borne by the CONTRACTOR.
- B. Where new pipelines are to be connected to existing pipelines, the CONTRACTOR shall verify in the field the location, elevation, bearing, inclination, pipe material, pipe outside diameter, and any other characteristics of the existing pipeline before proceeding with the installation. This field verification shall be performed in the presence of the AGENCY.

PART 2 - MATERIALS

2.1 FITTINGS

- A. Fittings shall be in accordance with the Water Utilities Manual.
- B. Fittings shall meet the requirements of ANSI/NSF 61 Drinking Water System Components – Health Effects.

2.4 LINING AND COATING FOR FITTINGS

- A. Linings for ductile iron fittings shall be in accordance with the Water Utilities Manual.

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- B. Coat the exterior of buried pipe and fittings with an asphalt material per AWWA C151. Apply coatings in the shop.
- C. Polyethylene encase buried pipe and fittings and apply wax tape coating as required in accordance with the Water Utilities Manual.
- D. Coat exposed unburied pipe in accordance with the standard specifications.

2.5 FLANGES

- A. Flanges shall be in accordance with the Water Utilities Manual.

2.6 BOLTS, NUTS AND GASKETS FOR FLANGES

- A. Bolts, nuts and gaskets for flanges shall be in accordance with the Water Utilities Manual.

2.7 TYPE OF PIPE JOINTS

- A. All aboveground piping joints or piping located in vaults and structures shall be flanged, unless flange adapters are specifically indicated and shown on the Drawings and approved by the AGENCY.
- B. Joints in buried piping shall be push-on in accordance with AWWA C111 except where flanged joints are required to connect to valves, and other equipment.

2.8 POLYETHYLENE ENCASEMENT

- A. Polyethylene encasement shall be in accordance with the Water Utilities Manual.

2.9 WAX TAPE COATING

- A. Wax tape coating shall be in accordance with the Water Utilities Manual.

2.10 MARKING TAPE

- A. Marking tape shall be in accordance with the Water Utilities Manual.

PART 3 - EXECUTION

3.1 PRODUCT MARKING

- A. Plainly mark each length of straight pipe to identify the ductile iron wall thickness and date of manufacturer. Mark the spigot end of restrained joint pipe to show clearly the required depth of insertion into the bell.

3.2 DELIVERY AND TEMPORARY STORAGE OF PIPE

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- A. Limit onsite pipe storage to a maximum of one week. Place the pipe alongside the trench and secure it from rolling. Support the pipe on wooden blocks, sandbags, mounds of sand, or other suitable supports. Do not roll or drop the pipe on the ground or allow the pipe to fall from the pipe trailer trucks.
- B. Do not install pipe or fittings with damaged linings.
- D. If necessary, use plastic sheet bulkheads to close pipe ends and keep mortar linings moist.

3.3 HANDLING OF PIPE

- A. Lift pipes with mechanical equipment using wide belt slings. Do not use cable slings or chains. Do not move pipe by inserting any devices or pieces of equipment into the pipe barrel.

3.4 SANITATION OF PIPE INTERIOR

- A. During laying operations, do not place tools, clothing, or other materials in the pipe.
- B. When pipe laying is not in progress, including the noon hour, close the ends of the installed pipe with a plug to deter entry of vermin, children, dirt, storm water, or foreign material.

3.5 INSTALLING PIPE IN TRENCH

- A. See the standard specifications for trenching, backfilling, and compaction requirements.
- B. Inspect each pipe and fitting before lowering into the trench. The AGENCY will inspect all pipe prior to installation for damage to interior linings. Pipe with damaged linings or coatings shall be repaired or replaced per manufacturer's recommendations. If approved by the AGENCY, repair damaged coatings in the field with material similar to the original and in accordance with the manufacturer's recommendations. Clean ends of pipe thoroughly. Remove foreign matter and dirt from the inside of pipe and keep it clean during and after laying.
- C. Handle pipe in a manner to avoid any damage to the pipe. Do not drag pipe over the ground, drop it onto the ground, or drop any object on it. Do not drop or dump pipe into trenches.
- D. Laying tolerances for the installed pipe shall not vary greater than 0.1-foot horizontally, or greater than 0.1 foot vertically from the alignment and elevations shown on the Drawings.
- E. Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with allowance for pipe thickness. Remove hard spots that would prevent a

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uniform thickness of pipe base material such as imported crushed rock or sand. Before laying each section of the pipe, check the grade with a straightedge and correct any irregularities found. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between the bell holes, except that the grade may be disturbed for the removal of pipe handling slings.

- F. At the location of each joint, dig bell holes in the bottom of the trench and at the sides to permit visual inspection of the entire joint and to prevent the pipe from being supported by the bell end or fitting.
- G. Keep the trench in a dewatered condition during pipe laying.

3.6 INSTALLING POLYETHYLENE ENCASEMENT

- A. Wrap buried pipe, fittings, couplings, restrained joints, adapters, and flanged joints with two layers of polyethylene material in accordance with the Water Utilities Manual. Use only tube type for pipe. Complete the wrap prior to placing concrete anchors, collars, supports or thrust blocks per the standard specifications. Repair polyethylene material damaged during construction.

3.7 ASSEMBLING PIPE JOINTS

- A. The spigot and integral bell shall be dirt free and slide together without displacing the rubber ring gasket. Lay the pipe section with the integral bell facing upstream.
- B. Clean the groove of the bell of all foreign materials. Insert the gasket into the groove of the bell prior to installation. Observe the correct direction of the shaped gasket. Feel that the gasket is completely and evenly seated in the groove.
- C. Lubricate the exposed gasket surface and the beveled spigot up to the full insertion length with the lubricant supplied by the pipe manufacturer. If the lubricated pipe end touches dirt, clean the pipe and reapply lubricant.
- D. Insert the spigot into the bell and force it slowly into position. DO NOT OVER INSERT the spigot into the bell.
- E. Check that the rubber ring gasket has not left the groove during assembly by passing a feeler gage around the completed joint.

3.8 INSTALLING BURIED FITTINGS

- A. The AGENCY's inspector will inspect all fittings prior to installation for damage to interior protective coating. Coating shall be holiday free on interior surfaces. Patch damaged areas in the field with material similar to the original.
- B. For push-on joint fittings, clean the bell ends of the fitting of all foreign material and dirt. Insert the gasket in the groove of the bell and make sure the gasket faces the correct direction. Feel that the gasket is completely and evenly seated

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in the groove. When pipe is cut in the field, bevel the plain end prior to installation. Lubricate the exposed gasket surface and the beveled pipe spigot with the same lubricant supplied by the pipe manufacturer. Insert the spigot into the bell and force it slowly into position. Keep the joint straight while pushing the spigot into the bell.

- C. When necessary to deflect pipe from a straight line in either the horizontal or vertical plane, use a high deflection coupling per Oceanside Water Utilities Manual and this specification section.

3.9 JOINT DEFLECTIONS FOR BURIED PIPE

- A. Joint deflections for buried pipe shall be in accordance with the Water Utilities Manual.

3.10 INSTALLING PIPE IN VAULTS

- A. Install aboveground or exposed piping in accordance with the standard specifications.

3.11 INSTALLING FLANGED JOINTS

- B. Flanged joints shall be installed in accordance with the standard specifications.

3.12 INSTALLING MARKING TAPE

- A. After the pipe zone and the first 12 inches in the trench zone have been backfilled and compacted, place the marking tape on the compacted backfill and center over the pipe.
- B. Run tape continuously along the trench and tie ends of pipe together. Wrap marking tape around valve box extension pipes and continue along pipe.

3.13 PAINTING AND COATING

- A. Coat exterior surfaces of bare ductile iron pipe in vaults per the standard specifications. Apply finish coats in the field.

3.14 PRESSURE TESTING AND DISINFECTION

- A. See the Water Utilities Manual Appendix for pressure testing and disinfection requirements.

****END OF SECTION****