METROPOLITAN UTILITIES DISTRICT OF OMAHA
OMAHA, NEBRASKA

SPECIFICATIONS FOR DUCTILE IRON PIPE FOR WATER DISTRIBUTION SERVICE

NOTE: This document has undergone a comprehensive formatting update as of 10/27/2025. Please review all sections for changes.

1.0 General

1.1 Purpose and Scope. This specification defines the minimum requirements for the material, procurement, logistics, and assurances of ductile iron pipe used within the District's municipal water system. Throughout this specification, 'pipe' and 'fittings' shall refer to ductile iron pipe and fittings, respectively, unless otherwise specified.

1.2 Applicable Codes and Standards. The requirements of all referenced documents shall apply, except where superseded or supplemented herein. In case of conflict, these specifications shall govern. Unless otherwise specified, all external documents referenced shall be their latest edition.

2.0 Materials

2.1 Conformance.

2.1.1 Pipe shall conform to AWWA C151 *Ductile-Iron Pipe, Centrifugally Cast.*

2.1.2 Rubber gaskets shall conform to AWWA C111 *Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.*

2.1.3 Cement-mortar lining shall conform to AWWA C104 *Cement-Mortar Lining for Ductile Iron Pipe and Fittings.*

2.1.4 Zinc coating shall conform to ISO 8179-1 *Ductile iron pipes, fittings, accessories and their joints — External zinc-based coating — Part 1: Metallic zinc with finishing layer.*

2.1.5 Polyethylene encasement (tube) shall conform to AWWA C105 *Polyethylene Encasement for Ductile-Iron Pipe Systems.*

3.0 Pipe

3.1 Wall Thickness.

3.1.1 Unless otherwise specified, 6” through 20” pipe shall be Special Thickness Class 52.

3.1.2 Unless otherwise specified, 24” and larger pipe shall be Pressure Class 200.

3.2 Design.

3.2.1 Pipe shall be designed in accordance with AWWA C150 *Thickness Design of Duction Iron Pipe*. Unless otherwise specified, the pipe shall be designed using the following minimum requirements:

(1) 150 psi working pressure
(2) 100 psi surge allowance
(3) Existing and proposed cover
(4) Type 3 trench
(5) 120 pcf earth load
(6) H-20 truck load

3.2.2 If there are plan and profile drawings for the job, follow the line and grade as closely as possible. Adjust pipe lengths for horizontal points of intersection (HPIs), vertical points of intersection (VPIs), and other control points such as air taps, automatic air reliefs, and line valves as shown on the drawings.

3.3 Interior Lining. Pipe shall be furnished with a cement-mortar lining and a compatible seal coat conforming to AWWA C104.

3.4 Exterior Coating. Pipe shall be furnished with a zinc coating and a compatible finishing layer conforming to ISO 8179-1.

3.5 Polyethylene Encasement.

3.5.1 The manufacturer shall furnish V-Bio® polyethylene encasement (white in color) for every pipe supplied.

3.5.2 Polyethylene encasement (tube) shall conform to AWWA C105 and it shall accompany the pipe shipment.

3.6 Lubricant. Furnish lubricant for all pipe.

3.7 Marking. Each pipe shall be marked with casting “lot numbers” to link the pipe to written test transcripts. Provide a written procedure for identifying pipe marking of “lot numbers” thus linking individual pipe lengths to pipe in the ground.

3.8 Test Results. The manufacturer shall provide written transcripts of all testing as required by AWWA C151 on all pipe supplied under this specification as requested by the District.

4.0 Joints and Fittings

4.1 General.

4.1.1 Joints shall comply with the contract drawings and this section.

4.1.2 Furnish all joint materials.

4.1.3 For other fittings, refer to MUD 111 *Specifications for Ductile Iron Fittings*.

4.2 Push Joints. The District approves the use of the following push joints:

(1) “Fastite” by American Cast Iron Pipe Company
(2) “Tyton” by U.S. Pipe and McWane Ductile

4.3 Restrained Joints.

4.3.1 Restrained joints and pipe shall withstand 180 psi hydrostatic test pressure and the thrust for the fitting without thrust blocks.

4.3.2 The District approves the use of the following restrained joints:

(1) “Lok-Ring” and “Flex-Ring” by American Cast Iron Pipe Company
(2) “TR Flex” and “MJLJ Pipe” by McWane Ductile
(3) “TR Flex”, “HDSS”, and “HP Lok” by U.S. Pipe

4.3.3 Other restrained joints may be considered for use, provided they meet the specified performance criteria and receive approval from the Design Engineer for the project or the Senior Design Engineer.

4.3.4 All restrained joint pipe shall be approved by the Design Engineer for the project or the Senior Design Engineer. Submittal of data and design must be approved prior to bid submittal.

4.4 Ball Joints.

4.4.1 Ball joints and pipe shall withstand 180 psi hydrostatic test pressure after installation. Joints shall withstand the thrust for fittings and large pipe deflections without the use of thrust blocks.

4.4.2 The District approves the use of the following ball joints:

(1) “Flex-Lok” by American Cast Iron Pipe Company
(2) ”M-Flex” by U.S. Pipe

4.4.3 Other ball joints may be considered for use, provided they meet the specified performance criteria and receive approval from the Design Engineer for the project or the Senior Design Engineer. Joints must be approved prior to bid submittal.

4.5 Mechanical Joints.

4.5.1 Mechanical joints and all joint materials including glands, bolts, nuts and gaskets shall conform to AWWA C111.

4.5.2 Accessories for the mechanical joint consisting of the gasket, gland, and fasteners shall be furnished and packaged separately from the pipe.

4.5.3 All glands shall be ductile iron.

4.5.4 All tee-head bolts and hexagon nuts shall be manufactured in the United States by Birmingham Fastener.

4.6 Weld-On Outlets and Bosses.

4.6.1 General.

4.6.1.1 Weld-on outlets and bosses are allowed.

4.6.1.2 Weld-on bosses and weld-on outlets shall have a minimum working pressure rating of 250 psi.

4.6.1.3 Outlets and bosses shall be factory-welded according to manufacturers’ recommendations.

4.6.1.4 Unless otherwise specified, the nominal diameter of the outlet/boss shall not be greater than 1/3 the nominal diameter of the parent pipe.

4.6.1.5 No pipe shall be used to move the boss away from the parent pipe.

4.6.1.6 No tangential outlets are allowed unless otherwise specified on the project drawings.

4.6.2 Parent Pipe Wall Thickness.

4.6.2.1 The parent and outlet pipe for weld-on-outlets shall be, at a minimum, Special Thickness Class 53.

4.6.2.2 Parent pipe in sizes 24” through 36” with weld-on-bosses shall be, at a minimum, Pressure Class 250.

4.6.2.3 Parent pipe in sizes 42” and 48” with weld-on-bosses shall be, at a minimum, Pressure Class 350.

4.6.2.4 The thickness of the parent pipe in sizes greater than 48” with weld-on-bosses shall be per pipe manufacturer’s recommendation. However, it shall not be less than Pressure Class 350.

5.0 Handling, Shipping, Delivery, and Storage

5.1 Handling.

5.1.1 All piping and related materials shall be handled with care. Pipe shall be handled by use of ropes, wide belt slings, or other suitable tools and equipment that will not damage the material. Handling shall not be conducted with chains or cables.

5.1.2 Pipe and related materials shall not be dropped or rolled as a means of handling.

5.2 Shipping.

5.2.1 Care shall be taken during shipment to prevent damage to the pipe’s liner and coating.

5.2.2 Stack all pipe for shipment on flatbed trucks. Pipe shall be delivered in single layers with each layer being individually banded. Each layer of pipe shall have spacers with a minimum of 4" nominal thickness between them, including a 4" spacer between the bottom pipe layer and the trailer bed. The spacers shall remain with the pipe upon delivery at no additional cost to the District. Do not band individual layers to stringers.

5.2.3 Blocking and hold-downs shall be used during transportation to prevent shifting and movement. Chains or cables shall not be used for hold-downs.

5.3 Delivery. The District reserves the following rights in the event of the delivery of non-conforming pipe and/or fittings. Neither action shall result in charges to the District.

5.3.1 Refusal of Delivery. The District can refuse any and all loads at the time of delivery if they are found to be out of specification.

5.3.2 Rejection after Inspection. The District can reject any and all loads that are out of specification after it has had a reasonable opportunity to inspect them following delivery.

5.4 Storage.

5.4.1 Pipe and fittings shall be stored in a manner as to prevent damage to them. Pipe and fittings shall not be stored directly on the ground. Instead, they shall be stored on suitable supports (e.g., pallets, timbers, etc.). The storage area shall be a relatively smooth, level surface free of stones, debris or other materials that could damage the pipe or fittings.

5.4.2 Remove all pipe and fittings contaminated with mud or surface water from the construction site. These materials shall not be used unless they are thoroughly cleaned, inspected, and approved for use by the District.

5.4.3 All materials shall be used on a first-in, first-out (FIFO) basis. The oldest inventory in stock shall be used before newer stock to ensure proper stock rotation and prevent material obsolescence.

6.0 Warranties and Guarantees

6.1 Warranty. The manufacturer shall warrant pipe and/or fittings for a minimum period of five (5) years after delivery to the jobsite or the District's storage yard. Within this period, costs accrued by the District for replacement or repair of pipe and/or fittings found to have defects in material and workmanship and/or not complying with this specification and/or the manufacturer's documents shall be the responsibility of the manufacturer.

6.2 Affidavit of Compliance. If requested by the District, the manufacturer shall provide an affidavit with each pipe and/or fitting shipment that all materials comply with the requirements of this specification. The affidavit shall include the manufacturer's production code, including the day, month, and year of production, and all material testing results required by the applicable AWWA standard.