Milwaukee
Water Works

City of Milwaukee
Department of Public Works

Milwaukee Water Works

Material Specifications for Ductile Iron Fittings for Water
Flanged or Rubber Gasketed Joints
Sizes 3" Through 54"

City of Milwaukee Specification No. 30-D-2
Revised March 2, 2012

841 N. Broadway
Zeidler Municipal Building
Room 409
Milwaukee, Wisconsin 53202

www.milwaukee.gov/water

Safe, Abundant Drinking Water.

I. **GENERAL REQUIREMENTS:** Vendors bidding through the Department of Administration – Business Operations Division, Procurement Services Section, shall comply with the latest version of City of Milwaukee Specification No. 70b –D – 7, except as modified herein. **MATERIAL FURNISHED UNDER THIS SPECIFICATION SHALL BE MANUFACTURED IN THE UNITED STATES.**

II. **WARRANTY:** The warranty requirements specified in Section IV of the Specification 70b – D – 7 are modified here to include, 100% Parts and Labor to remain in effect for a minimum of three (3) years from date of acceptance or two (2) years from date of installation, whichever occurs first.

Under this provision, the furnishing contractor also agrees to repair or replace within a time period not to exceed four (4) weeks, any fittings or accessories found to be defective during the warranty period at no cost to the City including all freight costs.

III. TECHNICAL REQUIREMENTS

A. **Description:** Fittings provided under this specification shall consist of coated foundry castings, in ductile iron unless otherwise noted, fashioned and equipped with accessories in such manner as to be readily installed with gray iron or ductile iron water pipe. Fittings shall be designed with an effective internal radius at all changes in flow direction.

B. **Standards:** Unless otherwise stated, fittings and materials shall conform to latest revisions of the following American Water Works Association Standards (AWWA):

1. AWWA C104 American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
2. AWWA C110 American National Standard for Ductile-Iron and Gray-Iron Fittings for Water
3. AWWA C111 American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
4. AWWA C115 American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
5. AWWA C116 Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service
6. AWWA C550 Protective Interior Coatings for Valves and Hydrants

C. **Design Features (General):**

1. Pressure Class: Fittings shall have a minimum pressure rating of 350 psi for 3” through 24” diameters and 250 psi for 30” through 54” diameters, or as otherwise noted.

2. Bolts and Nuts: Except as modified or supplemented herein, all bolts and nuts furnished on mechanical joint and special fittings shall be made of one of the following materials:

   a. High-strength, low-alloy, corrosion-resistant steel conforming to AWWA C111.
   b. 300 Series 18-8 Stainless Steel.
   c. Low-zinc bronze.

3. Coatings: Cement mortar lining or fusion bonded epoxy interior coating shall be used. Exterior coating may be fusion bonded epoxy or a petroleum asphaltic coating.

4. Markings: The markings shall conform to AWWA C110. The fitting cast date or code shall be cast into the outside of the fitting.

5. Joint Type: Fittings shall have joint ends as specified on the bid form and conform as follows:

6. Rubber Gasketed Joints

   a. Push-on Joints

      i. Rubber gaskets shall be furnished for each bell.
      ii. Sufficient lubricant shall be furnished for all joints.
      iii. Tyton gasket joints are required.

   b. Mechanical Joints

      i Plain rubber gasket and “full body” gland meeting the specified AWWA standard shall be furnished for each mechanical joint.

      ii A complete set of bolts and nuts shall be furnished for each mechanical joint fitting in sizes 20" through 48" diameter in accordance with Section II.G of this specification. Mechanical joint bolts and nuts for fittings in sizes 3" through 16" diameter are not required.

7. Flange Joints

   a. Full-faced rubber gaskets shall be furnished for each flange joint.

   b. A complete set of bolts and nuts for each flange joint shall be furnished in accordance with Tables 2 and 3 of AWWA C115. Bolts and nuts shall be 300 Series 18-8 Stainless Steel conforming to ASTM A276 or ASTM A193 and shall meet the following minimum values:

Tensile Strength	75,000 psi
Yield Strength	30,000 psi
Elongation	30%

The nuts shall be a heavy hex design. Certification requirements shall be as noted in section III.J.2 of this specification.

D. **Design Features (Special Fittings):** All required fittings that are not listed in AWWA C110 shall conform to thickness requirements of AWWA C110 for Class 350, and to all applicable requirements of AWWA standards.

1. Anchoring tees shall be supplied with mechanical joint ends on the run and a collared plain end (PE) on the branch to fit the bell of mechanical joint fittings. The bolts and nuts holding the two split halves of the rotating gland shall be furnished in accordance with section III.C.2 of this specification.

2. Anchoring couplings and bends shall be supplied with collared plain ends (PE) to fit the bell of mechanical joint fittings, and shall have an integral follower gland and one rotating gland. The bolts and nuts holding the two split halves of the rotating gland shall be furnished in accordance with section III.C.2 of this specification.

3. Dual-size sleeves for distribution mains shall be ductile iron with mechanical joint ends. The sleeve shall be capable of sliding over the Class C-D pipe to connect Class 55 ductile iron pipe to Class C-D pit cast pipe in accordance with the following sizes:

Nominal Size	Class 55 D.I. Pipe, Nominal O.D.	Class C-D Pit Cast End of Sleeve, Minimum I.D.
3”	3.96”	4.06”
4”	4.80”	5.10”
6”	6.90”	7.20”
8”	9.05”	9.40”
10”	11.10”	11.50”
12”	13.20”	13.60”
16”	17.40”	17.90”

a. The dual-size sleeve may be a standard mechanical joint sleeve machined to the proper oversize diameter. However, the thickness of the sleeve wall and the toe of the gland must meet minimum thickness requirements.

b. Mechanical joint bolts and nuts are not required.

c. A segmented gland and a split gasket may be substituted for the one-piece gland and gasket on the oversize end of the dual-size sleeve.

d. All sleeves and their glands shall be clearly marked to indicate that they are dual-size.

E. **Certification Requirements:** Upon request, the manufacturer shall submit the appropriate certifications in duplicate to the Superintendent of the Milwaukee Water Works for the following:

1. All fittings furnished in accordance with AWWA C110.

2. Certification for bolts and nuts furnished shall list as appropriate the nickel and chromium contents, yield and tensile strengths, and elongation of the sample taken and tested at the plant. Data shall also be furnished which shows the load capacity of each size bolt and nut. This information shall be available prior to or at the time of delivery.

3. The name and address of the manufacturer of all gaskets furnished shall be available from the bidder.

4. The results of the tests specified in AWWA C110 Sections 5.4, 5.5, 5.6, and 5.9 that correspond to the specific cast dates of shipped fittings.

IV. INSPECTION BY THE CITY

A. The Superintendent of Milwaukee Water Works or a duly authorized representative shall inspect the materials furnished under this specification.

B. Any fitting found not conforming to this specification will be rejected and shall be replaced. Replacements for fittings that have failed the inspection shall conform to all the requirements of this specification.