

**City of Milwaukee  
Department of Public Works**

**Milwaukee Water Works**

**Material Specifications for  
Prestressed Concrete Pressure Pipe and  
Fittings, Steel Cylinder Type, 20" Through 60"**



City of Milwaukee Specification No. 30-D-8  
Revised November 26, 2007

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.

II. **TECHNICAL REQUIREMENTS**

A. **Description** Prestressed concrete pipe consists of circumferentially prestressed concrete water pipe with a lined or embedded steel cylinder, with wire reinforcement and provided with self-centering steel joints sealed with preformed rubber gaskets.

B. **Standards** Unless otherwise stated, concrete pipe furnished shall conform to the latest revisions of the following American Water Works Standards:

1. AWWA C111 American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
2. AWWA C207 Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In.
3. AWWA C301 Standard for Prestressed Concrete Pressure Pipe, Steel-Cylinder Type
4. AWWA C304 Standard for Design of Prestressed Concrete-Cylinder Pipe
5. AWWA Manual M9 Concrete Pressure Pipe

C. **Pipe and Fitting Design** Pipe and fittings shall be designed and manufactured in accord with the following requirements:

1. Design pressure shall be 150 psi.
2. Surge pressure shall be a minimum of 40% of design pressure.
3. Pipe 42 inches in diameter and smaller shall be lined cylinder type (LCP) as previously produced by Price Brothers (LCP) or Cretex (SP-5).
4. Pipe 48 inches in diameter and larger shall be embedded cylinder type (ECP) as previously produced by Price Brothers (ECP) or Cretex (SP-12).
5. Specials and fittings shall be manufactured in accordance with Section 4.7 of AWWA Standard C301.
6. Pipe nominal laying length shall be 16 to 20 feet.
7. Bedding shall be as defined in the AWWA Standard C304.
8. Live load shall be equal to or greater than the American Association of State Highway and Transportation Officials HS20 loading.
9. The depth of cover is the vertical distance from the upper element of the barrel to the greatest depth, at either the existing or proposed grades. The design depth of cover

shall be fourteen feet unless otherwise indicated in the bid proposal or as follows if plans are provided:

- a. Eight feet for depth of cover that is 8 feet or less.
- b. Fourteen feet for depth of cover that is greater than 8 feet and equal to or less than 14 feet.
- c. The actual depth of cover when greater than 14 feet.

**D. Pipe Coatings** The pipe and fittings shall be coated as follows:

1. The portions of joint rings which are exposed after the pipe is cast shall be protected from corrosion by a metallic coating with a minimum thickness of 0.002 inches, applied by an approved method.
2. The exterior of all concrete pipe shall receive one coat of Bitumastic Concrete Penetrant or approved equal paint with a black color for color coding.
3. All fittings of ferrous metal which are not to be embedded in concrete shall be coated on the exterior with Bitumastic No. 50 and coated on the interior with Carboline Carboguard 891, or approved equals, and shall be dry prior to backfill.
  - a. The minimum thickness shall be 10 mils when dry.
  - b. All coatings shall be smooth, tough, tenacious, non brittle and impervious to water.
4. All damaged coating shall be repaired to conform to the requirements of this specification.

**E. Marking of Pipe and Fittings** The following shall be indelibly factory marked on or near the bell, on the interior wall, with a nontoxic material

1. Letters M.W.W.
2. Manufacturer's Mark
3. Year when manufactured, also date and period
4. Pipe Type
5. Identification of pipe in accordance with the approved layout
6. Identification of specials

**F. Accessories** All accessories such as gaskets, lubricant, nuts and bolts, lugs, and blind flanges shall be included.

1. The bolts and nuts for the blind flange shall be made from low zinc bronze or 300 Series 18 8 stainless steel or approved equal corrosion resistant material.
2. The bolts and nuts for the mechanical joint shall be high strength, low alloy, corrosion resistant steel conforming to AWWA Standard C111.
3. The gasket for the mechanical joint shall be plain rubber conforming to AWWA Standard C111.
4. The gasket for the inspection manhole pipe blind flange shall be 1/16 inch thick, full faced, and made from plant fiber or other approved material.
5. The blind flange for the inspection manhole pipe shall be in conformance with AWWA Standard C207.

**G. Submittals**

1. Submittals with the bid If required by the bid proposal the following data shall be submitted with the bid:
  - a. Name of proposed material supplier
  - b. Design calculations and design curves for all pipe to be supplied.
  - c. Material list including the design data and the total length of each size of pipe to be supplied.
  - d. The design data and drawings of all specials and fittings to be supplied.
2. Submittals After Award of Contract The successful bidder shall submit three (3) sets of certified drawings for each pipe or fitting being furnished to the Superintendent of the Milwaukee Water Works for approval.
  - a. Engineering Layout Consisting of drawings or schedules of the pipe and fittings to be furnished based on the pipe layout shown on the contract plans.

The layout may consist of drawings or printed schedules at the option of the contractor. The alignment and elevations of the horizontal and vertical tangents shall be as shown on the contract plans. Deviations are permissible at changes in horizontal or vertical alignments provided the proposed alignment satisfies the design and plan layout criteria. The detailed layout shall define the location of the entire length of pipeline in three dimension coordinates. Samples of layout drawings and layout schedules are available

for inspection.

- b. Revised material list based on the Engineering Layout if required.
- c. The City will promptly check and return one approved copy of each set of data or drawings. The contractor shall make the required corrections, if any, and send six copies of the corrected data or drawings to the Superintendent of the Milwaukee Water Works for distribution and record. This data shall become part of the contract documents and the pipe or fittings shall be manufactured and installed accordingly.

**H. Certification** As soon as possible after shipping units are assembled, three (3) copies of the manufacturer's certification data representing each pipe and fitting furnished shall be submitted to the Superintendent of the Milwaukee Water Works. The certification report shall clearly identify the pipe and fittings furnished. Certifications shall be submitted in triplicate and shall contain the following:

- 1. The results of the tests required in Section 5 of AWWA Standard C301 99.
- 2. Identification and description of coatings, when used, on either the exterior or interior of pipe or fittings.

**I. Approval** All design data, drawings or schedules, and certification shall be approved, in total, before any pipe and fittings will be inspected and approved for installation.

### III. INSPECTION AT MANUFACTURER'S PLANT

- A. Notification** The City of Milwaukee shall be notified at least 24 hours prior to fabrication and testing of steel cylinders, casting of concrete cores and prestressing and mortar coating of the pipe. Contact DPW, Infrastructure at (414) 286-3921.
- B. Hydrostatic Test** The bid proposal will specify if a hydrostatic test will be required and the pipe will be selected by the Milwaukee Water Works at random and subjected to a hydrostatic test of 425 psi, as a proof of design. If the pipe fails the test, all pipe may be rejected or additional tests may be required. The pipe used in this test shall not be included in shipment of pipe.
- C. Plant Test** The bid proposal will specify if a plant test will be required. If a plant test is required, it shall be performed on one pipe of each 300 with a minimum of one per purchase order. The pipe shall be hydrostatically tested to design pressure plus surge pressure. There shall be no harmful cracks or leakage.