

PART 205 – CONCRETE PIPE AND FITTINGS

205.1 CONCRETE PIPE AND FITTINGS FOR WATER

- 205.1.1 Where concrete pipe and fittings are specified or required for water, it shall be designed, manufactured, and tested in accordance with the current edition of ANSI/AWWA 301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type; and the current edition of ANSI/AWWA C304, Design of Prestressed Concrete Cylinder Pipe. All prestressed concrete cylinder pipe (PCCP) shall be manufactured by an established manufacturer who has had at least three years of experience in successfully building this type of pipe. All specials and fittings shall be built to the details furnished by the manufacturer and approved by the Engineer. Each special and each length of straight pipe shall be plainly marked to indicate the head for which the pipe is designed and to indicate where the pipe will be used by reference to the layout drawings. All closure fittings shall be furnished with a 24-inch flanged access manway with a 24-inch steel blind flange. 6-inch screw type hand hole fittings will not be permitted.
- 205.1.2 All concrete or mortar substrates must be sweep-abrasive grit blasted to create adequate profile then made dust free. All surfaces to be lined must be free of any oil, grease, or other deleterious materials. The surface must be dry to the touch (no standing water) but can have some surface discoloration due to moisture.
- 205.1.3 PCCP and fittings for water lines shall be designed for the following conditions (minimum): Normal operating pressure equal to 150 psi plus 50% for surge pressure plus earth load resulting from actual backfill depth, but not less than 8 feet plus external live load equal to AASHTO HS 20 loading. The thickness of the mortar coating shall provide a minimum cover of 1 inch over the reinforcing steel.
- 205.1.4 Prestressed concrete cylinder pipe and fittings for water lines shall be joined according to AWWA C301 and C304, as well as the current edition of AWWA Manual M9, Concrete Pressure Pipe.
- 205.1.5 Where AWWA C301, PCCP is to be tapped, the tapping saddle shall be fabricated in accordance with the current edition of AWWA Manual M9 and as recommended by manufacturers of Concrete Pressure Pipe. Saddle shall provide grout gaskets and grout opening to enable filling the wall space between saddle and pipe wall with grout, to assure complete protection of the steel pipe wall. The saddle shall also provide gland assembly, including gasket and flange, to insure a tight seal.
- 205.1.6 Openings of the sizes shown on the drawings shall be furnished with steel blind flanges of proper strength to withstand the working pressure of the line where no other provisions are made for closing the openings. Blind flanges shall be fabricated from material as specified under AWWA C207. All bolts shall be carbon steel ASTM A307, Grade A only, in accordance with AWWA C207.

205.2 CONCRETE PIPE AND FITTINGS FOR STORMWATER

- 205.2.1 Where concrete pipe and fittings are specified or required for stormwater, except as herein modified, they shall be designed, manufactured, and tested in accordance with the current edition of ASTM C76, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe. Pipe shall be a minimum Class III. Pipe lengths shall be no less than 6 feet except for shorts and specials. Pipe sections connected to a manhole or structure shall be no more than 4 feet in length, as measured from the inside face of the structure to the point of flexure of the joint. Elliptical reinforcement is not allowed. At least three circumferential reinforcing bars shall be provided in each pipe bell equal in area to an equivalent length of outside cage in the pipe barrel. Concrete shall have a minimum 28-day compressive strength of 6,000 psi, and absorption not to exceed 6%. No lifting holes will be allowed on any reinforced concrete pipes or reinforced concrete boxes.
- 205.2.2 Testing shall be observed and reported by an independent testing laboratory approved by the Engineer. One Three-Edge Bearing Test in accordance with ASTM C497 shall be performed on a representative sample of each diameter and class of pipe to be furnished. One absorption test in accordance with ASTM C497 shall be performed for each 300 tons of pipe manufactured, not less than one test per day's production. Four concrete cylinders or core samples shall be tested for compressive strength from each day's production, two at seven days and two at 28 days. An in-plant hydrostatic test in accordance with ASTM C361 shall be performed on each section of pipe and each pipe joint at an internal hydrostatic head of 25 feet. The joints shall be tested for a minimum period of one hour under constant pressure as specified. Each pipe unit that satisfactorily passes all hydrostatic testing shall bear the seal of the testing laboratory. This seal does not constitute acceptance of the pipe installation, which will be subjected to further testing and inspection in the field.
- 205.2.3 In lieu of the in-plant hydrostatic testing of each joint, the Contractor may substitute the following procedure: 1. Perform one in-plant hydrostatic test per days production, in accordance with the previously specified criteria; and 2. Perform an air test on each joint in the field after assembly, in accordance with the City of Tulsa Water and Sewer Department Standard Air Test Procedure. The Contractor shall furnish all air test equipment. Testing and test conclusions shall be verified by the Engineer. The Engineer reserves the right to require additional in-plant hydrostatic testing.
- 205.2.4 Reinforced concrete pipe and fittings for storm sewer shall be jointed in accordance with the current edition of ASTM C361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe. Joints shall be concrete bell and spigot, employing a rubber gasket and cement mortar formed by a diaper. Rubber gaskets shall be either a standard O-ring gasket or a Forsheda pre-lubricated gasket, or equal. For the O-ring gasket, the spigot end shall contain a groove to confine and compress the gasket on four surfaces when the joint is in final position. The Forsheda joint shall be designed and installed in accordance with the manufacturer's recommendations.
- 205.2.5 REINFORCED CONCRETE PIPE AND FITTINGS ARE EXCLUDED FOR SANITARY SEWER.