

SECTION 14 RELATED TECHNICAL STANDARDS - SEWER

14.1 Materials

Materials used in the construction of sewers, force mains and outfalls shall be as follows:

- (a) Gravity sewers shall be constructed of cast iron, ductile iron or PVC pipe.
- (b) Inverted siphons, force mains and outfalls shall be constructed of ductile iron or steel pipe, unless otherwise permitted by the Authority.

14.2 Ductile Iron Pipe and Fittings

Ductile iron pipe shall conform to the requirements of the American Standards Association Specification A21.51 as amended and revised to date. Unless otherwise specified herein, ductile iron pipe shall be thickness Class 52.

"Tyton" joints shall conform to the American National Standards Specification A21.11 as amended and revised to date.

All cast iron fittings, including Y-branches, shall conform to the requirements of the current American Water Works Association Specifications therefore, except that fittings shall be provided with joints suitable for use with the adjoining pipe. Unless otherwise specified herein, cast iron fittings shall be 250 PSI for sizes 12 inches and less, and 150 PSI for sizes 14 inches and greater. Cast iron saddles shall be subject to the approval of the Engineer.

14.3 Polyvinyl Chloride (PVC) Sewer Pipe

Shall be made of PVC plastic having a cell classification of 12454-B or 12454-C or 13364-B (with minimum tensile modulus of 500,000 psi) as defined in ASTM Specification D-1784. Fittings shall be made of PVC plastic having a cell classification of 12454- B, 12454-C, or 13343-C as defined in Specification D1784. Compounds that have different cell classifications because one or more properties are superior to those of the specified compounds are also acceptable.

All fittings shall utilize rubber gasket joints, the rubber gaskets complying in all respects with the physical requirements specified in ASTM F-477, D-1869, C-361 or C-443.

The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density, and other physical properties.

PVC pipe and fittings shall be Type PSM SDR 35 Gravity Sewer Pipe conforming to ASTM D3034 as manufactured by Johns-Manville, CertainTeed or approved equal.

PVC pipe and fittings, for depths greater than (8') eight feet shall be Type PSM SDR 26 Gravity Sewer Pipe conforming to ASTM D3034 as manufactured by Johns-Manville, CertainTeed or approved equal.

All pipe and fittings shall receive a protective lining consisting of two (2) coats of asphaltic paint equal to Inertol No. 49 as manufactured by Inertol Co., Inc. The total dry film thickness shall not be less than 4 mils.

Materials for house service from the main to two (2) feet inside of the curb line shall be cast iron pipe. The cleanout shall be located two (2) feet inside the curb line. House connections from the building to the cleanout shall be cast iron or approved equal.

14.4 Manholes

14.4.1 Construction

All manholes shall be constructed of precast reinforced concrete riser sections, an eccentric conical or flat slab top section, and a base section as shown or required. Where required, eccentric reducing sections shall be used to join riser sections of different diameters.

Precast manhole sections shall be manufactured in accordance with ASTM Designation C478. Manholes shall be manufactured by the "wet" process and shall be cured in the forms for several hours. The minimum compressive strength of the concrete for all sections shall be 4000 lbs. per+square inch.

The maximum allowable absorption of the concrete shall not exceed 8% of the dry weight. Tests shall be similar to those described in ASTM C-76. The circumferential reinforcement in the walls of all sections shall be a minimum of 0.12 square inch per linear foot for inside diameters up to and including 54 inches, and 0.17 square inch per linear foot for the larger sizes. Reinforcement in flat slab top sections shall be designed for the load to be supported. Additional reinforcement shall be provided at all openings larger than six (6) inches.

Joints of the sections shall be formed entirely of concrete in accordance with ASTM Designation C443 and shall be made with a rubber gasket installed in accordance with the manufacturer's recommendations. Joints shall be self-centering and watertight against internal and external hydrostatic pressure with the gasket utilized as the sealing element and external and internal seams grouted.

Base sections shall be furnished by the manufacturer with either a compressible rubber ring equal to the Omega manhole, or with a flexible sleeve equal to the Interpace flexible manhole sleeve. Waterways shall be constructed by a journeyman mason in the field after the manhole has been installed. The shape and size of waterways shall conform to the shape and size of connecting pipes as shown or ordered. Special shall be taken to form channels with curved shapes that will provide the best hydraulic conditions for smooth flow. Benches shall be sloped to drain to the waterways. Concrete used in forming water ways shall be a stiff, rich mix, and shall be given a steel trowel finish.

Riser sections, conical sections, and the outsides of flat slab top sections, shall be given a protective lining consisting of two (2) shop coats of asphaltic paint. The total dry film thickness shall be not less than 4 mils. The line shall be applied in accordance with the manufacturer's recommendations.

Foundation material under manholes shall be crushed stone. Excavation and earthwork shall be as specified.

Manhole frames shall be adjusted to finish grade by building a circular brick-in-mortar collar above the precast manhole opening. Maximum height of the collar shall be 12 inches except where otherwise ordered. Brick shall be sound, hard, well-burned, sewer brick conforming to the requirements of ASTM Designation C-32, Grade MA and shall be laid radially. Mortar shall consist of two (2) parts sand to one (1) part cement, thoroughly mixed in the required proportions before adding water. After laying up the collar and setting the frame in a full bed of mortar, the exterior of the collar shall receive a minimum 3/4 inch thick mortar coat to provide water tightness.

14.4.2 Manhole Appurtenances

Appurtenances shall include manhole frames and covers, and manhole rungs. Manhole frames and covers shall be of the best quality, close grained grey iron castings conforming to the requirements of ASTM Designation A 48, Class No. 30. Seating surfaces of manhole frame and covers shall be machined to insure a nonchattering fit. Manhole frames and covers shall be properly cleaned and coated with a waterproof asphaltum applied by immersion, while the castings are hot.

Unless otherwise indicated, manhole frames and covers shall be of the circular flared type frame with round flange equal to Catalog No. 1217 as manufactured by Campbell Foundry Company or Bridgestate Pattern 1206 or 1012A..

Locking devices, equal to Campbell No. 1487, shall be provided on frames and covers on all manholes located in easements. Locking type covers shall also be provided with a single recessed lifting handle. Lifting handle shall be equal to that shown for Campbell No. 1255. A key shall be supplied with each locking type unit.

Frames and covers equal to those specified above as manufactured by the Campbell Foundry Co Neenah Foundry Co. will be acceptable.

All covers shall be cast with identifying letters shown. Letter shall be two (2) inches high and embossed against a recessed background.

Manhole rungs shall be extruded aluminum alloy of the step drop front design. Rungs shall be cast in the vertical sides of the manhole sections on twelve (12) inch centers.

Special details shall be provided for drop manholes with invert differences exceeding two (2) feet, and for shallow manholes where the grade-to-invert depth is less than 5'-6".

Between manholes, pipe shall be straight and at uniform grade. Spacing shall not exceed 400 feet for sewers 18 inches or less and 500 feet for sewers greater than 18 inches in diameter.

The Contractor shall modify existing manholes by cutting masonry, setting pipe in place and filling with nonshrink grout. Waterways shall be chipped and roughened, and then finished with cement mortar to provide the best hydraulic conditions for smooth flow.

Flexible joints shall be placed at the manhole wall, and within four (4) feet of the wall.