

## CHAPTER 3.13 MANHOLES

### Sections:

- 3.13.005 General.
- 3.13.010 Concrete Bases.
- 3.13.015 Wall and Cone Sections.
- 3.13.020 Iron Castings.
- 3.13.025 Manhole Steps.

**3.13.005 GENERAL.** This Chapter covers the requirements for Manhole materials and installation.

**3.13.010 CONCRETE BASES.** Manhole bases may be either precast or cast-in-place unless otherwise specified. Precast manhole bases shall have pipe inverts, a neoprene boot with strap for each pipe connecting to the manhole, and a minimum of six (6) inches of compacted gravel base under the manhole. Cast in place pipe connections may also be utilized as outlined on the drawings.

A. Where sewer lines enter manholes, the invert channels shall be smooth and semi-circular in cross section, conforming to the details shown on the Drawings. Changes of direction of flows within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the channels shall be smooth and slope toward the channel at not less than one-half ( $\frac{1}{2}$ ) inch per foot.

B. The connecting boots shall be made of neoprene compound meeting ASTM C-443 Specifications. The boot shall have a wall thickness of three-eighths ( $\frac{3}{8}$ ) inch. The boot shall either be "cast-in-place" in the precast base or attached to the precast base by means of an internal expanding band. When the boot is attached to the precast base, a watertight seal between the boot and the precast base must be accomplished.

C. An external band shall be supplied and used to clamp and seal the boot to the pipe. The band shall be made of 300 series non-magnetic corrosion-resistant steel. After the band has been placed, it shall be completely coated with a bituminous material approved by the Engineer.

D. All manholes with three (3) or more pipes entering the base or pipes larger than thirty (30) inches in diameter shall be sixty (60) inch inside diameter; all others shall be forty eight (48) inch inside diameter.

E. Concrete for manhole bases shall comply with the requirements of Chapter 3.05 of this Title.

**3.13.015 WALL AND CONE SECTIONS.** All manholes shall be precast, sectional, reinforced concrete pipe of either forty eight (48) or sixty (60) inch I.D., as specified. Both cylindrical and taper sections shall conform to all requirements of ASTM Designation C-76 for Reinforced Concrete Culvert Pipe with the following exceptions:

A. The throat section of the manhole shall be adjustable, by use of pipe sections, up to eighteen (18) inches in height.

B. The taper section shall be a maximum of three (3) feet in height, shall be of eccentric conical design, and shall taper uniformly to thirty (30) inches inside diameter.

C. The pipe used in the base section shall be furnished in section lengths of one (1), two (2), three (3), and four (4) feet as required.

D. Reinforcing steel shall consist of a circular cage with a minimum cross sectional area of 0.25 square inch of steel per foot for cylindrical sections and 0.20 square inch per foot for cone sections.

E. All joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned and wet prior to setting precast sections. Joints shall be set in mortar consisting of one (1) part cement and one and one half (1½) parts sand with sufficient water added to bring the mixture to workable consistency.

F. Bituminous jointing material may be used in lieu of cement mortar and shall be installed in accordance with manufacturer's recommendations. All joints shall be watertight and free from appreciable irregularities in the interior wall surface.

**3.13.020 IRON CASTINGS.** All iron castings shall conform to the requirements of ASTM Designation A-48 (Class 30) for grey iron castings.

A. Rings and covers shall be thirty (30) inch diameter as supplied by "D&L Supply" Model A-1180 (vented) for Sewers unless the lids will be buried then a Model A-1181 (solid) for sewers or a Model A-1165 for drains or an approved equal. Each cover shall contain one (1) pick hole. The cover shall be marked "SEWER" or "STORM DRAIN," as appropriate.

**3.13.025 MANHOLE STEPS.** All sanitary sewer and storm drain manholes over six (6) feet in depth shall be provided with manhole steps as shown on the drawings. All steps shall be securely grouted into the wall section and shall be water tight. Steps shall be uniformly spaced at one (1) foot maximum and shall be polypropylene covered steel steps, Model PSI-PF as manufactured by "M. A. Industries" or an approved equal.