

CONSTRUCTION STANDARD SPECIFICATION

SECTION 02725

SEWER MANHOLES

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SEWER MANHOLES

PART 1 - GENERAL

1.01 SUMMARY

- A. This specification shall apply to the materials and operations required for the installation of sanitary sewer and storm sewer manholes.
- B. The extent of the work is indicated on the Contract Drawings.
- C. Related Sections: Refer to the following sections for related work:
 - 1. Refer to Section 02200, "Earthwork".
 - 2. Refer to Section 02720, "Storm Sewer Systems".
 - 3. Refer to Section 02730 "Sanitary Sewer Systems".
 - 4. Refer to Section 03300 "Cast-in-Place Concrete".
 - 5. Refer to Section 04220 "Concrete Masonry Unit".

1.02 QUALITY ASSURANCE

The materials and practices comprising the work shall conform to this and other referenced standard specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement shall conform to the following requirements:
 - 1. Cement for use in mortar shall conform to ASTM C91.
 - 2. Portland cement for use in precast and cast-in-place concrete, and in masonry grout and mortar shall conform to ASTM C150, Type II, IIA, or I-II.
- B. Block, Brick, Precast Barrels, Steps, Frames & Covers:
 - 1. Riser Sections and Tops: Precast reinforced concrete conforming to ASTM C478. Precast tops shall be either eccentric cone or flat slab type. Concrete for precast sections shall have 4000 psi 28-day strength.
 - 2. Riser Joints: Rubber gasket conforming to ASTM C443, bituminous mastic gasket, or butyl rubber gasket.
 - 3. Concrete Masonry Units: Solid precast segmental block conforming to ASTM C139.
 - 4. Mortar: Type M, conforming to Sandia Standard Specifications "Concrete Masonry."
 - 5. Brick: Grade MS, conforming to ASTM C32.
 - 6. Steps: Steel reinforced polypropylene conforming to ASTM C478.
 - 7. Frames and Covers: Gray cast iron conforming to ASTM A48 Class 25C. Bearing surfaces shall be ground or machined, such that the cover shall seat firmly onto the frame without rocking. Manhole frame and cover shall not weigh less than 325 pounds combined, and the cover shall not weigh less than 180 pounds. In sanitary sewer systems, the word "SEWER" shall be cast onto the top of the cover. In storm sewer systems, the word "STORM" shall be cast onto the top of the cover. Letters shall be not less than 1" in height. Frame and cover shall be constructed as detailed on the Standard Drawings or approved equal.

PART 3 - EXECUTION

3.01 MANHOLE CONSTRUCTION

- A. General: Manholes shall be constructed at the locations and elevations indicated and as detailed on the Contract Drawings. Installed pipe invert elevations at manholes shall not vary by more than 0.05' from the invert elevations designated on the Contract Drawings.
- B. Manhole Bases: Prior to manhole installations, prepare a subgrade soil foundation a minimum of 12" beneath the elevation of the bottom of the concrete manhole base and compact to 95% maximum density as determined by ASTM D1557. Cast-in-place concrete for the base shall have 3000 psi 28-day strength.

- C. Joints in precast riser sections and tops shall be made using gasket materials in accordance with the manufacturer's written installation instructions.
- D. Concrete Block Manhole Walls:
 - 1. Concrete block walls shall not be laid on a base until the base has been allowed to cure for at least 24 hours.
 - 2. Concrete blocks shall be soaked or wetted with water prior to placing on a mortar bed or placement of mortar joints.
 - 3. Blocks shall be laid plumb, level and true in full beds of mortar with "push joints." All joints shall be completely filled with mortar. The concrete block wall shall be plastered inside and outside with a layer of mortar 1/2" thick.
 - 4. Concrete block walls shall be built around adjoining sewer pipe sections. Steps shall be built into the wall as the work progresses.
 - 5. Manholes greater than 18' in depth shall be constructed of precast concrete sections only.
- E. Sewer pipe joints shall be located immediately outside the manhole barrel both upstream and downstream. Pipe sections built into manhole walls shall be reinforced with grout so that the manhole and adjoining pipe sections are monolithic.
- F. Manhole Floors: Manhole floors shall be made of grout and the work shall be free of any rough corners or sudden changes in direction such that a steady uniform flow with a minimum of wave action will be provided. Changes in direction and grade will consist of the largest curve radius the manhole diameter will permit. Free vertical drop from any branch or service line shall not exceed one half the mainline pipe diameter measured from the mainline upstream invert.
- G. Manhole steps shall be cast-in-place or driven into precast or site-drilled holes. Steps shall be installed not more than 16" apart vertically on the interior wall directly beneath the manhole cover according to ASTM C478.
- H. Manhole frames and covers shall be installed as detailed and adjusted to required elevation by building up courses of manhole brick on full beds of mortar with "push joints" or by using precast concrete adjustment rings set in full beds of mortar.
- I. Fill all lifting holes and other voids inside and outside with non-shrink grout. The inside of the manhole shall be cleaned of all loose mortar, framing materials and other debris.
- J. Bituminous waterproof coating shall be applied to the exterior surface of the manhole. When designated on the Contract Drawings, the interior of the manhole shall be coated with a corrosion resistant material.

3.02 TESTING

The water exfiltration test shall consist of filling the entire manhole with water to the bottom of the frame elevation. A stabilization period of one hour will be allowed for absorption, after which the manhole shall be refilled as necessary before starting the test. The test period shall be two (2) hours, after which the manhole shall be refilled, measuring the necessary quantity of water. The allowable leakage shall be 0.25 gallons per foot diameter per vertical foot per day, and is represented by the following formula:

$$V = 0.25 DHT/24$$

where; V = Allowable loss in gallons
D = Manhole diameter in feet
H = Initial depth of water to invert in feet
T = Duration of test in hours

Sanitary and storm sewer manholes shall be tested at random; however, not less than 20% of the total number of manholes identified in the contract documents shall be tested.

END OF SECTION