

SECTION 02545

PRECAST CONCRETE SECTIONAL MANHOLES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Precast reinforced concrete cylindrical sectional manholes, complete with openings, inserts, hardware, covers and frames.
 - 2. Precast reinforced concrete manholes with precast bases, barrels, risers, cones, and flat tops.
 - 3. For Cast-In-Place Concrete Specification, see Section 03310.
- B. Related Sections:
 - 1. Section 02302: Earthwork for Pipelines
 - 2. Section 03310: Reinforcing Steel, Cast-In-Place Concrete and Concrete Finish

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM), Standard Specifications:
 - 1. A36 Structural Steel
 - 2. A48 Gray Iron Castings
 - 3. C150 Portland cement
 - 4. C478 Precast Reinforced Concrete Manhole Sections
- B. American Association of State Highway and Transportation Officials (AASHTO), Standard Specifications for Highway Bridges.
- C. Federal Specification: SS-S-210: Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints.

1.03 SUBMITTALS

- A. Submit the following to the Engineer for review.
- B. Product Data:
 - 1. Descriptive details of the manufacturer's proposed standard products, including:
 - a. Precast manhole sections.
 - b. Precast roof slab or cone section.
 - c. Precast base slab.
 - d. Minimum concrete 28-day compressive strength.
 - e. Cement certification.
 - f. Manhole cover and frame.
 - 2. Shop drawings, including:
 - a. Design criteria.
 - b. Reinforcing steel location and concrete cover.
 - c. Layout of all inserts, attachments and openings.
 - d. Location and type of joints.

1.04 QUALITY ASSURANCE

- A. Provide products of a manufacturer who has been regularly engaged in the design and manufacture of the product for the last five years.
- B. Demonstrate to the satisfaction of the Engineer that the quality is equal to the product made by those manufacturers specifically named herein, if an alternate product manufacturer is proposed.

1.05 DELIVERY, STORAGE AND HANDLING

- A. General: Provide storage and handling of all materials so that upon delivery, they are undeteriorated and ready for use.

PART 2 - PRODUCTS

2.01 DESIGN CRITERIA

- A. General: ASTM C478, and also:
 - 1. Roof slab live load: AASHTO Loading Class HS 20-44.
 - 2. Backfill material: Suitable native or import backfill.

2.02 PRECAST SECTIONS

- A. General:
 - 1. Manhole cone section: Concentric taper.
 - 2. Cement: ASTM C150, Type V, low alkali.
 - 3. Roof slab opening: Size to support the manhole cover frame.
 - 4. Lifting eyes: Provide for each section.
- B. Manufacturer: Teichert Precast, Sacramento, CA; Cook Concrete Products; or equal.
- C. If manhole invert elevation is 5 feet or greater below grade, use concentric taper top cone section per Drawings.
- D. If manhole invert elevation is less than 5 feet below grade, do not provide a cone section, but install a flat top reinforced concrete slab per Drawings.

2.03 SEALANT GASKETS

- A. Type: Preformed, continuous rope form plastic material, protected by removable two-piece wrapper.
- B. Sealing Compound: Reinforced hydrocarbon resins blended with plasticizing compounds and reinforced with inert mineral filler. No solvents, irritating fumes or obnoxious odors.
- C. Adhesive and Cohesive Strength: Not dependent on oxidizing, evaporating, or chemical action.
- D. Conform to Federal Specification SS-S-210.

- E. Provide: RAM-NEK as manufactured by K. T. Snyder Company, Inc., Houston, TX; QUIKSEAL as supplied by Associated Concrete Products, Santa Ana, CA; Kent Seal; or equal.

2.04-A CAST- IRON FRAMES AND COVERS (IN ROADWAY)

- A. Material: Cast iron; ASTM A48, Class 30B.
- B. Marking: In raised letters on manhole cover as shown on the Standard Drawings.
- C. Coating: Bituminous paint, black.
- D. Size: 24-inch-diameter cover.
- E. Pick Hole: Closed.
- F. If specified on Drawings, provide a sealed (water tight) frame and cover. Connection shall be a bolt down cover into frame. Use four 3/8-inch diameter stainless steel bolts, coarse thread, flush with top seal with 1/8-inch thick, 1/2-inch-wide continuous circular neoprene gasket. Provide continuous 1/4-inch diameter neoprene "O" ring between frame and cover.
- G. Manufacturer: South Bay Foundry, Hayward, CA; D & L Supply; Alhambra Foundry Company Ltd., Alhambra, CA; or equal.

2.04-B COMPOSITE FRAMES AND COVERS (OUT OF ROADWAY)

- A. Marking: In raised letters on manhole cover as shown on the Standard Drawings.
- B. Coating: Black
- C. Size: 24-inch-diameter cover.
- D. Pick Hole: Closed.
- E. If specified on Drawings, provide a sealed (water tight) frame and cover. Connection shall be a bolt down cover into frame. Use four 3/8-inch diameter stainless steel bolts, coarse thread, flush with top seal with 1/8-inch thick, 1/2-inch-wide continuous circular neoprene gasket. Provide continuous 1/4-inch diameter neoprene "O" ring between frame and cover.
- F. Manufacturer: GMI Composites Inc. – 24" 2600 Series Titus Lock Frame & Cover

2.05 LADDER RUNGS (NOT USED)

2.06 ACCESSORIES

- A. Flexible Manhole Connectors: ASTM C923 and manufactured by Kor-N-Seal, A-Lok or equal.

- B. Epoxy bonding agent for manhole grade ring and frame: Sikadur 32, Hi-Mod; Master Builders Concrecive 1090; or equal.

2.07 WATERSTOP

- A. Rubber water seal shall be Adeka Ultraseal; Fernco Manhole Waterstop; or equal.

2.08 SOURCE QUALITY CONTROL

- A. Precast Sections:
 - 1. Verify concrete compressive strength test results are satisfactory for the sections supplied.
 - 2. State the curing method. Identify the start and end dates for the sections supplied.
- B. Frames and Covers:
 - 1. Verify cast test bar tensile strengths are satisfactory.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Compact subgrade to 93% relative density for 6-inch minimum depth.
- B. Provide a 6-inch gravel layer using 3/4-inch crushed rock under the base slab and compact to 93% relative density prior to placement.
- C. For poured in place base and precast manhole sections, set precast manhole sections in a concrete base joint groove, formed in the cast-in-place concrete base slab.
- D. Apply primer to joint surfaces in accordance with manufacturer's instructions. Make all joints watertight with sealant gaskets.
- E. Backfill around the manhole with Suitable Native or Import Backfill material. Compact the backfill material to 93% of relative density from the pipe bedding and base slab up to final finish grade or subgrade in paved areas or roadways, over an area defined as being within a distance of 2 feet from the exterior walls of the manhole. For open areas, compact to 90% of relative density. Backfill will be compacted by mechanical compactor and not a sheep's foot wheel roller.
- F. Accurately locate and place the manhole frames to within 1/8-inch vertical elevation in paved or roadway areas. In unpaved areas, manhole frames shall be 12- to 15-inches above existing grade unless otherwise specified on the Drawings. Coordinate the activities of all trades so that this tolerance is achieved.
- G. In paved areas, a concrete collar shall be used to secure frame per the Drawings. In unpaved areas, bond the cast iron frame to grade rings, cone section or flat top slab using epoxy adhesive.

- H. Install the manhole cover in the frame. Machine the cover if necessary to obtain a solid fit, without rattling under load.
- I. In unpaved areas, install a warning pole centered within 3 feet of manhole center as shown on the Drawings.
- J. Fill all precast base lifting lugs with non-shrink grout.

3.02 FIELD QUALITY CONTROL

- A. Verify all precast sections are continuously sealed with gaskets.
- B. Verify all manhole covers fit quietly in the frames.

3.03 TEST FOR MANHOLES

- A. Vacuum Testing: Perform vacuum testing of manholes in accordance with the following:
 - 1. Sewer manholes shall be vacuum tested in accordance with ASTM C1244 after installation, but prior to backfilling. Contractor will also vacuum test manhole after backfilling.
 - 2. All testing equipment and labor shall be provided by the Contractor.
 - 3. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole.
 - 4. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendation.
 - 5. A vacuum of 10 inches of mercury (approximately 5 psi) shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine inches. The manhole shall pass if the time is greater than 60 seconds for 48-inch diameter manhole, 75 seconds for 60-inch, and 90 seconds for 72-inch.
 - 6. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting and/or replacement shall proceed until satisfactory test is obtained. No grout shall be placed in the horizontal joints before testing.

END OF SECTION