

SECTION 02610

PRECAST MANHOLES

PART 1 - GENERAL

1.1 SCOPE

The work covered by this section includes furnishing all labor, equipment, and materials required to install precast concrete manholes as described herein and/or shown on the Drawings.

1.2 DESIGN CRITERIA

- A. Manholes shall be constructed of specified materials to the sizes, shapes, and dimensions and at the locations shown on the Drawings or as otherwise directed by the Engineer. The height or depth of the manhole will vary with the location, but unless shown otherwise on the Drawings shall be such that the top of the manhole frame will be at the finished grade of the pavement or ground surface and the invert will be at the designed elevations.
- B. Where the difference in the invert elevation of a sewer 18 inches in diameter or smaller and any other sewer intersecting in one manhole is 2 feet or more, a drop manhole shall be constructed as shown on the Drawings. They shall be similar in construction to the standard manhole except that a drop connection of pipe and fittings of the proper size and material shall be constructed outside the manhole and supported by Class A concrete.

1.3 QUALITY ASSURANCE

- A. Prior to delivery all basic materials specified herein shall be tested and inspected by an approved independent commercial testing laboratory or, if approved by the Engineer, certified copies of test reports prepared by the manufacturer's testing laboratory will be acceptable. All materials which fail to conform to these specifications shall be rejected.
- B. After delivery to the site, any materials which have been damaged in transit or are otherwise unsuitable for use in the work shall be rejected and removed from the site.

1.4 SHOP DRAWINGS AND ENGINEERING DATA

Complete shop drawings and engineering data on frames, covers, steps, and precast manhole sections shall be submitted to the Engineer in accordance with the requirements of the section entitled "Submittals" of these Specifications.

1.5 SHOP PAINTING

Frames, covers, and steps shall be cleaned, shop primed, and shop painted with a bituminous paint in accordance with the requirements of the section entitled "General Materials Stipulations" of these Specifications.

1.6 GUARANTEE

Provide a guarantee against defective materials and workmanship in accordance with the requirements of the section entitled "Guarantees and Warranties" of these Specifications.

PART 2 - PRODUCTS

2.1 BRICK

Brick used in manhole construction shall be either solid or cored, medium hard or better, Grade SM brick conforming to requirements of ASTM C 32 for sewer and manhole brick.

2.2 MORTAR

Mortar for brick manhole construction shall be sand-cement mortar composed of one part Portland cement to two (2) parts clean sand conforming to ASTM C 144. Twenty (20) pounds of hydrated lime per sack of cement may be added. No retempered mortar shall be used.

2.3 PRECAST CONCRETE MANHOLES

- A. Precast concrete manholes shall consist of precast reinforced concrete sections, a conical or flat slab top section, and a base section conforming with the typical manhole details as shown on the Drawings.
- B. Precast manhole sections shall be manufactured, tested, and marked in accordance with the latest provisions of ASTM C 478.

- C. The minimum compressive strength of the concrete for all sections shall be 4,000 psi. Special corrosion resistant concrete utilizing Type II Portland Cement (ASTM Standard) with Class "F" fly ash or New-Cem by Blue Circle Cement must be used. The latest version of ASTM C 618 classification must be followed for chemical requirements, physical properties, and for all other technical and non-technical specifications. Verification of fly ash characteristics must be done according to the latest edition of ASTM C 311. Contractor to verify that supplier of fly ash has a quality control program in conformance with ASTM C 618. Proportioning of fly ash or New-Cem shall be as recommended by the manufacturer. The Contractor shall provide certification to the Engineer indicating that all precast manhole sections meet the Corrosion Resistant Cement requirements.
- D. The maximum allowable absorption of the concrete shall not exceed 8% of the dry weight.
- E. The circumferential reinforcement in the riser sections, conical top sections, and base wall sections shall consist of one line of steel and shall be not less than 0.12 square inches per lineal foot.
- F. The ends of each reinforced concrete manhole riser section and the bottom end of the manhole top section all be so formed that when the manhole risers and the top are assembled, they will make a continuous and uniform manhole.
- G. Precast reinforced concrete manhole sections shall conform to ASTM Specification C-478. All joints for precast sections shall be tongue and groove and shall be approved by the Engineer. All pipe connections to precast manholes shall use a flexible rubber sleeve and stainless steel clamps on sizes through 15 inch nominal pipe diameter. On larger sizes, expanding cement concrete shall be used for a watertight fit.
- H. Each section of the precast manhole shall have not more than two (2) holes for the purpose of handling and laying. These holes shall be tapered and shall be plugged with mortar after installation.
- I. Manhole steps shall be installed in each section of the manhole in accordance with the details on the Drawings. Maximum distance from the top manhole step to the top of the frame shall be 16 inches or less.

2.4 FRAMES, COVERS, AND STEPS

- A. Manhole frames and covers shall be cast iron conforming to the minimum requirements of Federal Specifications WW-I-652 or to ASTM A 48 for Class 30 Gray Iron Castings. All castings shall be made accurately to the required

dimensions, fully interchangeable, sound, smooth, clean, and free from blisters and/or other defects. Defective castings which have been plugged or otherwise treated shall not be used. All castings shall be thoroughly cleaned and painted or coated with a bituminous paint. Each casting shall have its actual weight in pounds stenciled or painted on it in white paint.

- B. Manhole steps conforming to the applicable provision of ASTM Standard Specification Serial Designation C478 such as "Wedg-Lok" as manufactured by Delta Pipe Products. Steps shall be constructed of ½-inch steel rod completely encased in a corrosion-resistant rubber. Each step shall have a vertical load resistant of 400 lbs. and a pull out resistance of 500 lbs. per leg. Steps shall have foot guide lugs and tracking cleats.
- C. Standard manhole frames and covers shall have a minimum of 21 inches clear inside diameter and shall be a minimum of 8 inches high, with guide ring, and shall weigh not less than 310 pounds, total. Frame and cover shall be Vulcan Foundry No. VM-3MOD, Neenah Foundry No. R-1708, U.S. Foundry No. 360-F, or approved equal.
- D. Watertight manhole covers shall be furnished with a rubber gasket, stainless steel bolts, machined bearing surfaces, and concealed water tight pickhole, and shall weigh not less than 345 pounds, and have minimum of 22 inches clear inside diameter and shall be a minimum of 7 inches high. Frame and cover shall be Vulcan Foundry No. VM-80WT, U.S. Foundry No. 385-E, Neenah Foundry No. R-1915-H2, or approved equal.
- E. All sanitary sewer manhole covers shall have the word "SEWER" cast on the top in letters 2 inches high, along with the date and the words "Utilities Board of the City of Ozark".
- F. The contact surfaces of all manhole covers and the corresponding supporting rings in the frames shall be machined to provide full perimeter contact.

PART 3 - EXECUTION

3.1 CONSTRUCTION OF PRECAST CONCRETE MANHOLES

- A. After placing manhole base, inverts shall be constructed using Class B concrete in accordance with details on contract drawings and inverts shall have the same cross section as the invert of the sewers which they connect. The manhole invert shall be carefully formed to the required size and grade by gradual and even changes in sections. Changes in direction of flow through the sewer shall be made to a true curve with as large a radius as the size of the manhole will permit.

- B. After the base section has been set, and inverts formed, the precast manhole sections shall be placed thereon, care being exercised to form the incoming and outgoing sewer pipes into the wall of the manhole at the required elevations.
- C. The cast iron frame for the manhole cover shall be set at the required elevation and properly anchored to the masonry. Where manholes are constructed in paved areas, the top surface of the frame and cover shall be tilted to conform to the exact slope, crown and grade of the existing adjacent pavement.
- D. Masonry work shall be allowed to set for a period of not less than 24 hours. Outside forms, if any, then shall be removed and the manhole backfilled and compacted. All loose or waste material shall be removed from the interior of the manhole. The manhole cover then shall be placed and the surface in the vicinity of the work cleaned off and left in a neat and orderly condition.
- E. After backfilling has been completed, the excavated area, if located in a street, alley or sidewalk, shall be provided with a temporary surface.

3.2 FIELD INSPECTION

- A. After completion, all manholes will be inspected. The Contractor shall make, at his own expense, all necessary changes, modifications, and/or adjustments required to assure satisfactory operation.

END OF SECTION 02560.