

University Contact: Energy & Engineering Group

(302) 831-1744

## SECTION 03 45 00\_PRECAST CONCRETE STRUCTURES

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 - Specification sections, apply to work of this section.

#### 1.02 SCOPE OF WORK

- A. This portion of the specification describes the materials and methods of concrete products that are manufactured in factory that is specially designed for precasting. Each unit conforms to the design drawings and is done under controlled supervision. The following precast manholes will be installed in this project:
  - Steam manholes: X-X
  - Precast vent basins for manhole: X-X.

#### 1.03 QUALITY ASSURANCE

- A. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- B. Codes and Standards: Comply with provisions of following codes, specifications and standards, except as otherwise indicated:
  - ASTM C-478 Precast Reinforced Concrete Manholes
  - ASTM C-891 Installation of Underground Precast Utility Structures
  - Municipality/DOT Specifications: Delaware
  - ASTM C-1433 Precast Reinforced Concrete Box Sections
- C. Fabricator Qualifications: The precast concrete producer shall not have less than 5 years' experience in providing structural precast concrete products and services normally associated with the industry.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. It is the responsibility of the contractor to supply an excavation large enough to accommodate the outside dimensions of the product as shown on the drawings. Delivery and setting of the products is made by concrete vendor's tractor-trailer or common carrier. The contractor should provide sufficient labor to assist the carrier in off-loading, rigging and setting the units.

A crane is required for unloading and setting of and it will be coordinated with the manufacturer's dispatch office in sufficient time to acquire the equipment.

**1.05 SUBMITTAL REQUIREMENTS**

- A. Shop Drawings: Submit for review by the Engineer detailed shop drawings as follows:
  - 1. Dimensioned plans, elevations and sections showing identification of each precast riser. Drawings submitted shall not be reproducible of the contract drawings. Coordinate with contractor sizes of risers to ensure they can be rigged. Ensure that splits are not located at wall penetrations and adjust splits as required.
  - 2. Production Drawings for all precast members including size, type and location of all lifting and handling devices and the estimated weights of all sections.
- B. The contractor shall submit certification to The Owner that all materials used in the work conform to the requirements of the drawings and specifications.
- C. Vendor shall provide a certified set of shop dimensioned fabrication drawings indicating locations of vent basin connections, grating, etc. Provide locations of steel reinforcements and design loads.
- D. Design Loads
  - 1. Design loading shall include dead load, live load, impact, loads due to water table, and any other loads that may be placed upon the structure. Unless indicated elsewhere it is assumed that the water table is 5 feet below grade.
  - 2. Live loading shall be for H-20 and/or HS-20 per A.A.S.H.T.O. Standard Specifications for Highway Bridges. Designed wheel load shall be 16 kips. Live load shall be that loading which produces the maximum shear and bending moments in the structure. All penetrations shall be reinforced as required to provide the specified loading.
  - 3. As part of their submittal package, the manufacturer shall provide design calculations verifying their design is suitable for the specified loading. A professional structural engineering licensed in Delaware shall stamp the calculation for submittal.
- E. Manufacturer and type flexible joint sealant and interior and exterior coating.

**PART 2 - PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- A. The following is approved vendor to the precast structures, any substitutions must be approved.
  - A.C. Miller

31 E. Bridge Street  
Spring City, PA 19475  
Phone: 610 644-7338

## 2.02 FORMWORK

- A. All forms used in the placing concrete are of sufficient design and bracing to maintain alignment under pressure during the pouring and vibrating of concrete.

## 2.03 DIMENSIONAL REQUIREMENTS

- A. Refer to construction drawings for dimensional requirements for the precast concrete structures. Wall, top and bottoms shall meet the required thicknesses indicated on the construction drawings.
- B. Wall thickness for the vent basin.
- C. Where pipe sleeves are indicated, they shall be minimum 0.25" thick carbon steel and shall include a minimum 2" wide water stop continuously welded to the sleeve. The sleeves shall be coated with red primer. Sleeves shall be provided by the mechanical contractor and coordinated with the piping vendor. Manufacturer: Metraflex, Century or approved equal.
- D. Provide shipping split of the quantity shown on the construction drawings. Adjust location of shipping splits to permit shipping but split may not be closer than 6" away from pipe penetration. Shipping splits shall be tongue and groove type and flexible joint sealant shall be provided.

## 2.04 CONCRETE REQUIREMENTS

- A. Concrete furnished under this specification shall conform to ASTM C94, Alternate No. 3, for a minimum compressive strength of 5000 psi at 28 days. Concrete shall contain minimum amount of portland cement required for size of aggregate used, as noted in Table 3.8.5.1b, ACI 301. Less portland cement may be used if supplier can demonstrate to the satisfaction of The Owner that the proposed proportions will produce concrete of acceptable finishing properties, durability, surface hardness, appearance, and will meet the strength requirements specified.

## 2.05 CONCRETE

- A. Aggregates. All aggregates, fine and coarse, conform to the specifications outlined by ASTM C-33. The aggregates are free of all deleterious substances that cause reactivity with oxidized hydrogen sulfide. Both types of aggregates are graded to produce a homogeneous concrete mix. All materials are accurately weighted at a certified central batching facility prior to mixing.

- B. Cement. Portland cement shall conform to ASTM C-150, Type 1. The cement content is adequate enough to produce a minimum strength of 5,000 psi or other specified strengths as might be needed.

2.06 FLEXIBLE JOINT SEALER

- A. Vendor shall provide submittal information for flexible joint sealant at shipping splits. Material shall conform to ASTM C990, "Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections. Flexible joint sealant shall be bituminous material.

2.07 LADDER

- A. Manufacturer: Halliday Product model L4B. No Substitutes.
- B. Ladders shall be fabricated from 304 stainless and shall be wall mounted.

**PART 3 – EXECUTION**

3.01 PRODUCTION OF STRUCTURES

A. Placing

1. All concrete is transferred from the mixer vehicle to the forms in a continuous fashion (as quickly as practicable) and without segregating or loss in ingredients until completion of each unit.
2. All concrete is compacted by mechanical internal or external vibrating equipment. The duration of the vibration cycle is limited to the time necessary to produce a satisfactory consolidation without causing objectionable segregation.

B. Curing

1. Form shall not be removed from the forms until the unit is able to withstand sufficient strength and any structural strain that might be applied during the form stripping process.
2. After the stripping of forms, further curing by means of water spraying or a membrane-curing compound may be used. This compound is either clear or white and conforms to ASTM C309.

C. Steel Reinforcement

1. All reinforcing steel, including welded wire fabric, is of the size and in the location as shown on the plans. All reinforcing is sufficiently tied to withstand any displacement

during the pouring operation.

2. All bars are intermediate or hard grade billet steel conforming to ASTM A615 Grade 60 and ACTM Grade 40. All welded wire fabric conforms to ASTM A185.
3. Tying wire shall conform to ASTM A112, except galvanizing may be omitted. All chairs, spacers, tie-wire, etc., shall be furnished as required for proper placement.

D. Interior Coating Material

1. The interior tops, floors and all sides of all manhole shall be coated with a high performance two-part epoxy sealant at the factory. A minimum of two coats is required to provide a minimum total application thickness of 10 mils. The color shall be gray.
2. The coating shall be applied to the tongue and groove area of the manhole sections as well. Prepare the surface, apply the coating and cure following the manufacturer's written instruction.
3. The coating shall be as manufactured by NSP Specialty Products, NSP120 High Performance Epoxy Coating; Phone: 1-800-248-8907.

E. Exterior Coating Material

1. The entire exterior (top, bottom and all sides) of the manhole shall be coated with a bituminous coating to a minimum 4 mil dry film thickness (minimum two coat at 2 mil dry film thickness per coat).
2. The coating shall be applied to the tongue and groove area of the manhole sections as well. Prepare the surface, apply the coating and cure following the manufacturer's written instruction. Cooper Creek Chemical Corporation Sealer Foundation Waterproof WP (Product WP) or approved equal.

3.02 MANHOLE INSTALLATION

A. Preparation of Subgrade

1. The subgrade shall be excavated to the required depth below the finished grade in accordance with the plans and sections indicated on the drawings. All organic and any other unstable material shall be removed to a depth of not less than 6 inches below subgrade elevation.
2. Prior to setting, the contractor shall provide a bed of crusher-run suitable for receiving the product in wet areas. The base material should be compacted 95% procter density and leveled to the proper elevation to receive the product in relation to all pipe entries and grade elevation requirements.

B. Off-loading and Setting

1. Prior to setting, the contractor shall provide a bed of crusher-run suitable for receiving

the product shall be provided in wet areas. The base material should be compacted and leveled to the proper elevation to receive the product in relation to all pipe entries and grade elevation requirements.

C. Riser Installation

1. See plans for construction details for the riser. Except where otherwise indicated, risers shall be formed and poured in the field using Sonatubes, reinforcing wire and Portland cement. Precast riser rings are not acceptable.
2. Manhole lid shall be minimum 2" above grade in grass areas and backfill to below the rim and slope top soil away to shed water. In roads, walkways, and parking lots, slope the asphalt to shed water. Install the manhole lid 1/8" above adjacent grade to shed water.
3. Provide a waterproof joint between the manhole top and field poured riser using specified waterstop. The waterstop shall be applied to the clean surface. Prepare the surface to accept the waterstop by grinding the surface with an abrasive wheel. Using the epoxy cement that is provided with the waterstop, attached it to the top of the manhole.
4. The manhole lid's rim shall be cast into the riser per manufacturers written instructions with the skirt attached using the adhesive provided.

D. Vent Basin

1. See plans for construction details for the vent basin.
2. Set vent basing minimum 3" above grade in grass areas and backfill to below the rim and slope top soil away to shed water. Vent basin shall not be installed in local low spots that can result in flooded manholes.
3. Install gating over the vent basin per specifications.

E. Backfill

1. Once the manholes have been set, the excavation within eight feet shall be backfilled with flowable fill to subgrade as indicated on the civil construction drawings.

F. Mechanical

1. Install specified ladder per manufacturer's written instruction in a manner that is OSHA compliant.

**END OF SECTION**