

SECTION 02420

PRECAST POLYMER CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all materials, labor, and equipment, and construct manholes, as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Submit to the **County** shop drawings of the products specified herein. Shop drawings of the precast structures shall show details of construction, reinforcing, and joints.
- B. Submit calculations signed by a Professional Engineer registered in the State of Georgia demonstrating the structure meets the design criteria specified herein.

1.03 INSPECTION

- A. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the **County**.
- B. At the time of inspection, the sections shall be carefully examined for compliance with the ASTM designation specified below and these Specifications, and with the approved manufacturer's drawings. Imperfections may be repaired, subject to the approval of the **County**, after demonstration by the manufacturer that strong and permanent repairs result.

1.04 MANUFACTURER

- A. Manufacturer of polymer concrete structures shall have been continuously producing structures under its current name for a minimum of four (4) years. Manufacturer shall have employed current manufacturing methods and material formulation for a minimum of five (5) years. Information demonstrating these requirements shall be submitted to the **County**.

PART 2 - PRODUCTS

2.01 PRECAST POLYMER CONCRETE MANHOLES

- A. Precast concrete manhole base, barrel, and **eccentric** top sections shall conform to Specifications for Precast Reinforced Concrete Manhole Sections, ASTM Designation C478-03, and for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures, ASTM Designation C 857, except as otherwise specified below to accept polymer construction instead of concrete. Manhole risers, transition slabs, cones, base and top slabs, and grade rings shall be of the same material. The method of construction shall conform to the Drawings and the following additional requirements:

1. Barrel sections shall have tongue and groove joints. Joints shall have elastomeric gaskets conforming to ASTM C443 standard specifications. Flexible plastic gaskets (Ram-Nek or equal) meeting Federal Specifications SS-S-210A "Sealing Compound, Preformed Plastic for Pipe Joints," Type I, Rope Form and AASHTO Designation M-198 75 1, Type B, Flexible Plastic Gasket (Bitumen) are also acceptable.
2. Materials of construction shall meet the Specifications for Polymer Concrete Pipe, ASTM Designation D 6783.
 - a. Resin: The manufacturer shall use only polyester or vinyl ester resin systems designed for use with this particular application. Resin content shall be a minimum of seven (7) percent by weight.
 - b. Polymer mixture: The mixture shall consist solely of thermosetting resin, sand, aggregate and quartz powder.
 - c. Additives: Resin additives, such as curing agents, pigments, dyes, fillers and thixotropic agents, when used, shall not be detrimental to the structural integrity and life of the manhole.
3. Polymer concrete shall have a minimum unconfined compressive strength of 9,000 psi when measured in accordance with ASTM C 497.
4. The date and location of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.
5. Top sections shall be concentric except that precast slabs shall be used where cover over the top of the pipe is less than four (4) feet for all manholes.
6. Precast slabs over top section, where required, shall be capable of supporting the overburden plus a live load equivalent to AASHTO H-20 loading.
7. Connectors between manholes structures, pipes, and laterals shall conform to ASTM C923 specification for resilient connectors.
8. **Manholes steps shall not be installed in Manholes.**
9. Holes in precast sections to receive sewer pipe shall be precast at the factory at the required locations. All precast holes shall have Kor-N-Seal (or equal) rubber boots.
10. The tops of bases shall be suitably shaped to mate with the precast barrel section.
11. All manholes with flat slab tops, except those located in paved areas or where precise adjustment of top elevation is required, shall be furnished with the cover frame cast into the top section.
12. Each manhole component shall be free of defects, including indentations, cracks, foreign inclusions, and resin starved areas that, due to their nature and degree or extent, detrimentally affect the strength and service of the component.
13. Manholes shall be reinforced per ASTM C478.
14. Manholes shall have a monolithic base slab.
15. Manhole components shall have the following minimum wall thickness:

- a. Forty eight (48) inch diameter: three (3) inches
 - b. Sixty (60) inch to ninety six (96) inch diameter: four (4) inches
 - c. One hundred twenty (120) inch diameter: six (6) inches
 - d. One hundred forty four (144) inch diameter: seven (7) inches
- B. Cast iron frames and covers shall meet the requirements of ASTM A 48 for Class 30 gray iron and all applicable local standards. Watertight frames and covers shall be approved equal with rubber gasket and stainless steel bolts.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Manholes and other precast structures shall be constructed to the dimensions as shown on the Drawings and as specified in these Specifications.
- B. Precast structure sections shall be set so as to be vertical and with sections in true alignment with a one-quarter (1/4) inch maximum tolerance to be allowed.
- C. If possible, holes in the manhole sections required for handling or other purposes shall not penetrate completely through the wall. Any penetrating lifting holes shall be permanently plugged.
- D. Where holes must be field cut in the precast sections to accommodate pipes, the holes shall be cored to provide a smooth sealing surface for connecting boots. All coring shall be done prior to setting the manhole sections in place.
- E. Invert Channels
 - 1. Invert channels can be precast with polymer concrete or can be constructed in the field after the manhole and pipe have been installed. If constructed in the field, the bench and channel shall be constructed with all resin aggregate material recommended by the manhole manufacturer. Alternative fill material is prohibited.
 - 2. Manholes shall have an invert channel shaped to correspond with the lower half of the pipe to provide smooth flow transition with no disruptions of flow at pipe-manhole connections. Provide curve transitions for side inlets and smooth pipe invert fillets for flow transitions between pipe inverts. The top of the shelf shall be sloped to drain toward the flowing through channel.
- F. The shipping, handling, and installation of the manholes shall be in accordance with the manufacturer's recommendations.
- G. Where adjustment or replacement of a manhole frame and cover is necessary, the following requirements shall apply:

1. Adjustment of frame and cover to grade shall be accomplished with a precast polymer concrete and/or HDPE leveling rings, fully bedded in Portland cement mortar. In no case, shall vertical adjustment exceed fourteen (14) inches.
2. The top of the frame shall be set flush with, and match the slope of, the surrounding pavement.
3. Frame shall be set in a Portland cement mortar bed (one and one half (1½) inch maximum thickness).
4. Exterior surface of rings used in leveling course area shall be coated with a Portland cement plaster one half (1/2) inch minimum thickness).
5. Adjustment or replacement of frame and covers on sewer outfall manholes shall require frame to be set on flexible plastic gasket (reference 2.01, A, 1. of this section), and anchored (along with any adjustment rings) to the manhole structure with four (4) on half (1/2) inch diameter Type 304 stainless steel threaded rods with nuts and washers. Rods shall be anchored into the existing structure using an epoxy adhesive equal to the Hilti H/T RE 500 V/V-3 System, following the manufacturer's instructions.

END OF SECTION