

DIVISION IV
GRAVITY SEWERS, FORCE MAINS, AND PUMP STATIONS

SECTION 42

MANHOLES

42.1 GENERAL

Manholes shall be leak-tight and constructed of pre-cast concrete units.

42.2 PRE-CAST CONCRETE SECTIONS

42.2.1 GENERAL

Pre-cast manholes shall conform to specifications for Pre-cast Reinforced Concrete Manhole Sections, ASTM Designation C478, except as otherwise specified below.

42.2.2 MISCELLANEOUS REQUIREMENTS

The minimum wall thickness shall be 5 inches. Pre-cast manholes shall be constructed with a pre-cast monolithic base structure as shown on the STANDARD DRAWINGS. The minimum base thickness shall be 8 inches.

Concrete for manholes shall be Type II, 4000 psi at 28 days. Barrel, top, and base sections shall have tongue and groove joints. All jointing material shall be cold adhesive preformed plastic gaskets, conforming with FDOT Article 942-2. See Appendix C. Exposed joints and brick leveling courses shall be sealed using a heat shrinking polymer material as required and approved by the DIRECTOR.

The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on each pre-cast section.

Sections shall be cured by an approved method for at least 28 days prior to painting and shall not be shipped until at least 2 days after having been painted.

Pre-cast concrete top slabs shall be used where cover over the top of the pipe is less than 4 ft. Lift rings or non-penetrating lift holes shall be provided for handling pre-cast manhole sections. Non-penetrating lift holes shall be filled with non-shrink grout after installation of the manhole sections.

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Concrete surfaces shall have form oil, curing compounds, dust, dirt, and other interfering materials removed by brush or sand blasting and shall be fully cured prior to the application of any coatings.

Interior surfaces of manholes shall have a protective bituminous epoxy coating with a minimum dry mil thickness of 16 mils. Manholes that receive flows as a result of a force main discharge shall have an integrally attached total height interior liner of either high density polyethylene, polypropylene random copolymer, or fiberglass with a thickness as shown in the STANDARD DRAWINGS or as approved by the DIRECTOR. Exterior surfaces shall have a protective bituminous epoxy coating with a minimum dry mil thickness of 9 mils. Except where lined interiors are utilized, all coatings shall be applied in two (2) applications by the manhole manufacturer in strict accordance with the paint manufacturer's recommendations. See Appendix C.

42. 2. 3 INSPECTION

The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the CITY. Such inspection may be made at the place of manufacture, or at the site after delivery, or at both places, and the sections shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All sections which have been damaged after delivery will be rejected and, if already installed, removed and replaced, entirely at the CONTRACTOR's expense.

At the time of inspection, the sections will be carefully examined for compliance with the specified ASTM designation and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.

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42.3 CASTINGS

Gray iron castings for manhole frames, covers, adjustment rings, and other items shall conform to the ASTM Designation A 48, Class 30. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects which would impair their strength or otherwise make them unfit for the service intended. The seating surfaces between frames and covers shall be machined to fit true. No plugging or filling will be allowed. Lifting or "pick" holes shall be provided, but shall not penetrate the cover. Casting patterns shall conform to those shown or indicated on the STANDARD DRAWINGS. All manhole frames and covers shall be traffic bearing to meet AASHTO H20 loadings. Frames shall be suitable for the future addition of a cast iron ring for upward adjustment of top elevation. In certain locations, such as in flood prone areas, bolt down covers and gasketed covers shall be located as shown on the DRAWINGS.

42.4 CONSTRUCTION

42.4.1 BEDDING

Base sections shall be placed on bedding rock conforming to the requirements in Section 32.8.2. The bedding rock shall be firmly tamped, made smooth, and level to assure uniform contact and support of the pre-cast element. Refer to Section 32.9.2 for density requirements. Refer to the STANDARD DRAWINGS for additional bedding details.

42.4.2 CAST IN PLACE BASES

Cast in place bases shall be utilized only when specifically approved by the CITY. Unless otherwise specified, cast-in-place bases shall be at least eight (8) inches thick and shall extend at least six (6) inches outside of the outside dimension of the manholes section. Reinforcement and connection to the riser sections shall be designed by the DEVELOPER's ENGINEER and submitted to the CITY for approval.

42.4.3 PRE-CAST MANHOLES

A pre-cast base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported in true alignment and to insure that all entering pipes can be inserted on proper grade.

Pre-cast manhole sections shall be handled by lift rings or non-penetrating lift holes. Such holes shall be filled with non-shrink grout after installation of the manhole.

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The first pre-cast section shall be placed and carefully adjusted to true grade and alignment. All inlet pipes shall be properly installed so as to form an integral watertight unit. The sections shall be uniformly supported by the base structure and shall not bear directly on any of the pipes.

Pre-cast sections shall be placed and aligned to provide vertical alignment with a 1/4-inch maximum tolerance per 5 feet of depth. The completed manhole shall be rigid, true to dimensions, and watertight.

42. 4. 4 EXCAVATION AND BACKFILLING

Requirements of Section 32 shall apply.

42. 4. 5 PLACING CASTINGS

Casting shall be fully bedded in mortar with adjustment brick courses placed between the frame and manhole. Brick courses shall be a minimum of two (2) and a maximum of four (4). Mortar shall conform to ASTM C-270, type M. Bricks shall be made of clay and conform to ASTM C-216, grade SW, and sized 3 1/2 inches (w) x 8 inches (l) x 2 1/4 inches (h).

Top of manhole castings located in pavement, shouldered areas, and sidewalks shall be set flush with grade. Top of manhole castings located outside these areas shall be placed 2 inches above grade prior to sodding.

42. 4. 6 CHANNELS

Manhole flow channels shall be as shown in the STANDARD DRAWINGS, with smooth and carefully shaped bottoms, built up sides, and benching constructed using cement mortar and brick with no voids. Channels shall conform to the dimension of the adjacent pipe and provide changes in size, grade, and alignment evenly. Cement shall be Portland Cement Type II only.

42. 4. 7 PIPE CONNECTIONS

Special care shall be taken to assure that the openings through which pipes enter the structure are provided with watertight connections. For ductile iron and PVC pipe, connections shall conform with ASTM C 923, "Standard Specifications for Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes."

No service laterals shall be connected to a manhole without the specific approval of the DIRECTOR.

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42. 4. 8 DROP MANHOLE CONNECTIONS

Drop manhole connections shall conform in all respects to details shown on the STANDARD DRAWINGS or DRAWINGS. Internal drop manhole connections shall not be permitted, except in extreme cases and only with the specific written approval of the DIRECTOR.

42. 4. 9 DOGHOUSE MANHOLES

Doghouse type manholes shall be manufactured in accordance with Section 42.2. Voids between the existing pipe and the structure shall be completely sealed by non-shrink cement grout.

42. 5 CLEANING

All newly constructed manholes shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

42. 6 INSPECTION

No visible leakage in the manhole or at pipe connections will be permitted. All manholes shall be inspected by the CITY prior to acceptance. All manholes failing to meet the specification set forth in Section 42 above shall be reconstructed or replaced by the CONTRACTOR to comply with these specifications. Pressure grouting of manholes for repair shall not be accepted.