SECTION
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NON-METALLIC FRAMES AND COVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Molded composite manhole frames and covers for application in water or wastewater system and facilities.

B. All composite moldings shall consist of a thermosetting resin matrix blended and/or combined with reinforcing fiber rovings, short fiber filaments, or equivalent nonmetallic reinforcing structure(s). The thermosetting resin matrix shall be a polyester, vinylester, polyurethane, epoxy, phenolic, methacrylate or a blend of these. The moldings shall be true to pattern in form and dimension and free from cracks, pores, knit-lines, or other defects in locations affecting their strength and value for the service intended.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices.
1. No payment will be made for Composite Frames and Covers under this Section. Include payment in unit price for related item.
2. Payment to install on existing manhole is on a unit price basis for each manhole.
3. Refer to Section Measurement and Payment for unit price procedures

B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 REFERENCES

A. AASHTO - American Association of State Highway and Transportation Officials
1. M306-10: Drainage, Sewer, Utility, and Related Castings
   a. Manufacture
   b. Proof Testing
   c. Inspection
   d. Certification
   e. Marking
2. Standard Specification for Highway Bridges

B. ASTM G154 – Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

C. ASTM C 1028 – Standard Test Method for Determining the Static Coefficient of Friction

D. ASTM D256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

E. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

F. TCEQ Chapter 217 Design Criteria for Wastewater Systems Section 217.55 Manhole Covers

G. Texas Department of Transportation Approval

H. 19 U.S. Code § 1304 (e) Country of Origin Markings for Manhole Rings and Covers

1.04 SUBMITTALS

A. Conform to requirements of Submittals Section - Submittal Procedures.

B. Submit copies of manufacturer's specifications, testing data, certifications, load tables, dimension diagrams, anchor details, and installation instructions.

C. Submit shop drawings for fabrication and installation of casting assemblies that are not included in Drawings or standard Utility details. Include plans, elevations, sections and connection details. Show anchorage and accessory items. Include setting drawings for location and installation of castings and anchorage devices.

PART 2 PRODUCTS

2.01 MANHOLE RING AND COVER

A. All rings and covers units shall be made from high strength nonmetallic fiber reinforced polymer/composite materials. The material shall be a resin thermoset matrix that can be reinforced with continuous filament engineered fabrics, fiber rovings, short fiber filaments, or equivalent nonmetallic reinforcing structure(s). Sealing gaskets shall be bonded to the frame continuously at the interface with the cover to reduce wear, shock, noise, malodors and

B. Rings and covers intended for traffic service shall be capable of withstanding AASHTO M306: Proof Testing (includes items such as frames, covers etc.)

C. Fabricate rings and covers to conform to shapes, dimensions, and with wording or logos shown on Utility Drawings as required.

D. MOLDING PROCESS

1. Before the moldings are removed from the molding operation, they shall be thoroughly de-flashed and cleaned at the parting lines, holes, notches and all exposed edges.
2. If using a lock, or latch, these must be independent of the method used to open the

cover to ensure the cover can be opened in the event of lock or latch failure.

3. Metal reinforcements or metal hinges molded within the composite shall not be permitted. Small non-stress bearing pieces of metal may be encapsulated or attached.

E. All rings and covers shall be molded and assembled in the United States in accordance with the requirements of AASHTO M306.

F. Watertight cover assemblies shall be provided with a positive sealing mechanism by means of no more than four (4) austenitic 316 stainless-steel one-half inch (1/2") nuts and bolts # 13 National Coarse Thread. For bolted manhole covers a thin film of an "Anti-Seize" lubricant, approved by the Engineer, or the designated representative shall be applied to all bolts. Bolts shall be threaded by hand prior to the use of wrenches. Bolts shall be hand tighten to avoid stripping the 316 SS threads (<20 ft lb.). Avoid power tools to tighten bolts though removing bolts with power tools should be acceptable. Other equivalent locking mechanisms must be approved by the Utility.

G. Receptor nuts shall be molded in or attached at pre-molded designated points of the frame. Nuts shall remain fastened to the frame in a secure manner passing the falling ball test.

H. Water-resistant cover assemblies (i.e., if selected vs. the watertight option) shall be provided with a minimum of two (2) austenitic 316 stainless steel, swinging paddle fasteners to secure the cover to the frame.

I. Surcharge-release cover assemblies shall be provided with a minimum of two (2) austenitic 316 stainless steel, swinging spring-loaded paddle fasteners to allow pressure beneath the cover to lift the cover slightly from the gasketed frame. The surcharge cover shall not be able to dislodge from the frame with simultaneous upward pressure and twisting of the cover.

J. Composite covers shall contain encapsulated natural magnets and shall be detectable by metal detectors. Externally attached magnets or non-316 SS shall not be used for metal detection.

K. Composite frames shall have anchor holes located on the flange. Frame walls shall be vertical and perpendicular to the flange (with little or no draft angle) to allow for washers to sit flat on the frame flange (ie. Not tilted up against the vertical frame wall).

L. Composite Covers shall be furnished with 316 stainless steel lifting eyelet(s) fastened into the top of the cover and 2 optional concealed pick holes molded with 316 stainless steel inserts to facilitate removal and replacement.

M. MARKINGS: Covers and Frames shall have the following permanently molded or inscribed into the substrate of the cover top surface so it visible after installation in the ground.

1. Name (or abbreviation) of molder
2. Country of Origin per 19 U.S. Code § 1304 (e). The country of origin shall be the location where the resin and glass are completely transformed by molding process.
3. Molding Date
4. Indication that material is non-metallic

N. Composite frame and covers shall be Composite Access Products, L.P., McAllen, Texas or pre-approved equal as documented by the Utility.

2.02 TESTING AND PERFORMANCE REQUIREMENTS

A. Testing shall be performed in accordance with the following inspection criteria unless otherwise specified in the contract or purchase order. The manufacturer/supplier shall be responsible for carrying out all the required tests and inspections. All testing shall be conducted in the United States using purchaser approved reliable facilities. The manufacturer/supplier shall maintain complete records of all such tests and inspections. All testing shall be paid for by the manufacturer/supplier.

B. Frames and Covers shall be "Proof Load" tested in accordance with AASHTO M306.

C. Heavy Duty: A load of 50,000lbs shall be concentrated on a 9" x 9" block with rubber or fiber backing pad for one minute. After no more than 1 minute from when the load is removed, a Permanent Set (Deflection) of more than 1/8" (.125") measured at center of load area will be cause for rejection. All testing shall be conducted on a NIST calibrated and Certified load test machine..

D. Deflection Under Load: During the application of the 50,000 lb load, covers shall not deflect more than 2% of the clear opening diameter of the cover's frame. E.g. a 30 inch clear opening cover should not deflect more than 0.60 inches during application of a 50,000 lb load on a 9"x 9" platen using a Proof Load tester.

E. Ultimate Load: after the proof load test with 50,000 pounds, the ultimate load test shall be performed. Covers shall resist at least 90,000 ft. lbs. with a 9" x 9" platen before higher ft. lbs. of force will no longer be resisted.

F. Ultraviolet resistance: ASTM G154 Cycle 1 for 1000 hrs. Specimens shall be tested for ultimate flexural strength, retaining at least 75% of control values for load and deflection at failure.

G. Coefficient of Friction: Shall be greater than 0.6 when tested in accordance to ASTM C1028.

H. Watertight Submerged: Assemblies shall allow no more than 0.1 gallon per minute over a 24 hour period to be completely submerged in water. The water level shall be at least 6 inches above the top of the cover and no more than 16 inches above the top of the cover.

I. At the request of the Project Manager, the quality process manual shall be available for review. Manufacturing facility shall also be available for inspection to ensure quality standards are met along with EPA and OSHA standards.

J. Falling Ball Test on Frame Nuts: After threading a bolt into a frame nut with at least 3 rotations, drop a 1 lb steel ball through a 2 ft. long pipe that is held completely vertical. The nut shall remain attached to the frame after impact from the falling steel ball.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install composite frames and covers according to approved shop drawings, instructions in related specifications and details, and written installation instructions from manufacturer.

B. If non-concrete grade or riser rings are installed beneath the composite frames, the contractor shall not use shims or other items between the grade ring layers or ring and frame junction. Excess sealant should also be avoided.

C. Set units accurately at required locations to proper alignment and elevation. Keep units plumb, level, true, and free of trash. Measure location accurately from established lines and grades. Brace or anchor frames temporarily in form work until permanently set.

D. Units in the roadway shall be secured so that they will not shift after installations.