



# METERING MANHOLE SPECIFICATION

## SECTION 11210 METERING MANHOLES

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Metering manholes.

#### 1.2 RELATED SECTIONS

#### 1.3 REFERENCES

- A. ASTM C 581 – Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass-Fiber Reinforced Structures Intended for Liquid Service.
- B. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.
- C. ASTM D 695 – Test Methods for Compressive Properties of Rigid Plastics.
- D. ASTM D 790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D 2583 – Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- F. ASTM D 2584 – Test Method for Ignition Loss of Cured Reinforced Resins.
- G. ASTM D 3753 – Standard Specification for Glass-Fiber Reinforced Polyester Manholes.
- H. AASHTO H-20 – Axial Loading.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Test results of representative fiberglass reinforced plastic laminate.
- C. Shop Drawings: Show:
  - 1. Critical dimensions, jointing and connections, fasteners and anchors.
  - 2. Materials of construction.
  - 3. Sizes, spacing, and location of structural members, connections, attachments, openings, and fasteners.
  - 4. Color(s).
- D. Samples: 8-inch square sample of representative fiberglass reinforced plastic laminate.
- E. Manufacturer's installation instructions.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products indoors or in weather protected area until installation. Protect from construction traffic and damage.
- B. During the loading, unloading, and storage, care should be taken to ensure that the manhole is not dropped or otherwise damaged.
- C. The manhole should be stored on a smooth surface free of sharp objects.
- D. Nylon or fabric slings should be used in conjunction with a spreader bar to lift or move the manhole.
- E. UNDER NO CIRCUMSTANCES SHOULD CABLES OR CHAINS BE USED.
- F. If the manhole is stored horizontally, the manhole should be placed in such a way as to avoid damage to the flume, cover, and end adapters.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. The product shall be manufactured by TRACOM, Inc.; 6575-A Industrial Way, Alpharetta, Georgia 30004; Tel. (877) 435-8637, Fax (770) 664-6565, [www.tracomfrp.com](http://www.tracomfrp.com).
- B. Requests for substitution must be made in writing and received by the engineer's office a minimum of ten (10) business days before bid opening. Substitutions shall be made in accordance with the provisions of Section 01600.
- C. Substitutions: Manufacturers not pre-approved shall not be allowed.
- D. Fiberglass tanks modified for flume installation shall not be allowed.
- E. Warranty: Manholes shall be warranted to be free of defects in workmanship and materials for a period of two years from shipment.

### 2.2 METERING MANHOLES

- A. The manhole shall be \_\_\_\_\_ (*select 48 inch, 60 inch or 72 inch*) in diameter by \_\_\_\_\_ high.
- B. Construction:
  - 1. Fiberglass reinforced plastic, complying with ASTM D 3753-81.
  - 2. Factory-assembled, ready for installation except for field-installed equipment.
  - 3. The exterior surface shall be relatively smooth with no sharp projections. The surface shall be free of blisters larger than 0.5 inch in diameter, delamination and fiber show.
  - 4. The interior surfaces shall be resin rich with no exposed fibers. The interior surface shall be smooth for improved corrosion resistance and reduced sludge build-up. The surface shall be free of crazing, delamination, blisters larger than 0.5 inch in diameter, and wrinkles of 0.125 inch or greater in depth.
  - 5. Minimum 0.480 inches wall thickness.
  - 6. Integral fiberglass ladder bolted and glassed to the manhole wall with 1 1/2 inch by 1 1/2 inch pultruded fiberglass rungs with a *photoluminescent* high

visibility non-slip top surface and reinforced with threaded T-304 5/6 inch diameter stainless steel rods.

7. Integrally molded inlet and outlet PVC or fiberglass pipe stubs of \_\_\_\_\_ diameter laminated to both the interior and exterior surfaces of the manhole.
8. Integrally molded inlet and outlet flat-faced fiberglass flanges \_\_\_\_\_ size, \_\_\_\_\_ style (ANSI 150 pound standard).
9. Integrally molded inlet and outlet PVC or fiberglass caulking collars to fit in \_\_\_\_\_ I.D. pipe.
10. Flexible PVC boots with stainless steel bands to connect \_\_\_\_\_ diameter manhole pipe stubs to \_\_\_\_\_ diameter \_\_\_\_\_ style pipe (*for use with Item 7 pipe stubs*).
11. A 3/4 inch thick expanded polystyrene bead board shall be supplied to place under the manhole on the concrete slab.
12. A four (4) inch integrally mounting flange shall be molded around the circumference of the manhole for anchoring to concrete.
13. An OSHA approved "Confined Space Entry" sign shall be applied to the interior surface of the manhole above the first ladder rung.
14. One (1) 2 inch NPT coupling to facilitate the installation of sample or bubble tubing, electrical power, or other cabling into the manhole.

C. Materials:

1. The resins used shall be unsaturated, supplier certified, isophthalic polyester resins. Mixing lots of resin from different manufacturers, or "odd-lotting" of resins shall not be permitted. Quality assurance records on the resin shall be maintained. Non-pigmented resin is required to allow for light or "sand" color of manhole surface in order to facilitate easy from grade interior inspection. U.V. inhibitors shall be added directly to the resin to prevent photodegradation
2. 15 mil Isophthalic U.V. resistant gel coat on all exterior surfaces
3. Reinforcing materials shall be commercial grade E-glass with a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
4. The laminate shall consist of multiple layers of glass matting and resin. The surface exposed to the sewer / chemical environment shall be resin rich and shall have no exposed fibers.
5. Tensile strength (ASTM D 638): 14,000 psi.
6. Flexural strength (ASTM D 790): 25,000 psi.
7. Flexural modulus (ASTM D 790): 1,000,000 psi.
8. Barcol hardness (ASTM D 2583): 40.
9. Stiffness (ASTM D2412):

| Manhole Length (ft.) | PSI  |
|----------------------|------|
| 3-6                  | 0.72 |
| 7-12                 | 1.26 |
| 13-20                | 2.01 |
| 21-25                | 3.02 |
| 26-35                | 5.24 |

D. Manhole Type: Provide metering manholes of the following types(s):

1. (*Select 48 inch / 60 inch / or 72 inch*) full diameter, fully opening dome top

cover rated for 1,000 P.S.F. static loading with stainless steel piano hinge, stainless steel lockable hasp, locking cover support bar, and soft neoprene sponge gasket for sealing.

2. H-20 loading manway reducer designed to withstand a 16,000 pound vertical dynamic wheel load mounted on a (*select 48 inch or 60 inch*) diameter manhole. The manhole opening shall be (*select 22 1/2 inch or 31 3/4 inch opening*) for use with grade rings and cover (provided by others) suitable for H-20 loading. A T-304 locking stainless steel ladder assist shall be standard on all manholes over 4 FEET 0 INCHES in depth and attached to the FRP ladder rungs.
  - i. Options:
    - a. Composite, corrosion-proof, non-sparking, RF wave transparent manhole cover and with cast iron frame.
3. A (*select watertight or non-watertight*) (*select aluminum or steel*) access hatch \_\_\_\_\_ inches wide x \_\_\_\_\_ inches long and rated for pedestrian loading (300 P.S.F. live load) for mounting in a (*select 48 inch / 60 inch / or 72 inch*) diameter manhole. The access hatch shall be fabricated with structural grade aluminum diamond plate with a minimum plate thickness of 3/16 inch. The door shall be provided with an automatic locking hold open arm and a stainless steel, recessed lift handle, and staple for user supplied padlock. All hardware is to be stainless steel. A bituminous coating shall be applied to the frame exterior and the hatch shall be guaranteed for materials and workmanship for a period of ten (10) years.
  - i. Options:
    - a. Stainless steel snap lock with removable handle.
    - b. Recessed hasp.
    - c. Stainless steel pentahead.
    - d. Keyed deadbolt lock.
    - e. Compression spring assist.
    - f. Fiberglass insulation.
    - g. Safety chains and posts.
    - h. T-304 Stainless steel ladder assist (attached to FRP ladder rungs).
    - i. Special engraving.
4. Height:
  - i. The manhole shall be \_\_\_\_\_ high.
    - a. Dome top manholes: inlet invert to surface grade plus one foot (typical).
    - b. H-20 manholes: inlet invert to surface grade minus one foot (to allow for grade ring(s) and cover – by others).
    - c. Aluminum hatch: inlet invert to surface grade.

E. Manhole Options:

1. Two-piece construction for field assembly, including: T-304 stainless steel connection hardware, predrilled manhole barrel connection flanges, and silicone sealant.

2. (*Select full or half diameter*) intermediate platform \_\_\_\_\_ feet from the top of the manhole constructed of open-cell fiberglass grating with stainless steel piano hinge and fiberglass support flange.
3. Fiberglass instrument shelf 12 inches deep by 18 inches wide.
4. Fiberglass instrument mounting plate 18 inches high by 24 inches wide.
5. Vapor-resistant 100-watt incandescent light with weatherproof switch (not wired).
6. GFI, duplex outlet in die cast aluminum housing (not wired).
7. Screened gooseneck vent, 4 inch diameter.
8. In-line intake or exhaust fan with screened gooseneck vent, 4 inch diameter (not wired).
9. T-304 stainless steel anchor bolts (1 set).
10. Other: \_\_\_\_\_.

F. Flume Type:

1. \_\_\_\_\_ type (*select Parshall, Palmer-Bowlus, Trapezoidal, or H-flume*), \_\_\_\_\_ size with integral inlet and outlet end adapters.

G. Flume Options:

1. Stilling well:
    - a. 8 inch diameter, attached.
    - b. 12 inch diameter, attached.
  2. 5-mil mylar, laminated, high visibility staff gauge:
    - a. graduated in tenth and hundredths of a foot.
    - b. graduated in meters with 2 millimeter divisions.
    - c. graduated in MGD (*select sizes only*).
    - d. custom: \_\_\_\_\_.
  3. Removable T-304 1/8 inch O.D. stainless steel bubble tube.
  4. Removable T-304 3/8 inch O.D. stainless steel sample tube.
  5. 2 inch bushing for ultrasonic mounting stand.
  6. 1 3/4 inch T-304 stainless steel ultrasonic mounting stand (for 3/4 inch NPT sensor).
  7. Adjustable T-304 stainless steel and aluminum ultrasonic mounting stand (for 3/4 inch NPT sensor).
  8. Removable stainless steel probe carrier (specify length and O.D. of probe).
  9. Submerged probe / area velocity probe cavity (specify length and O.D. of probe).
  10. Flat, bolted FRP cover, T-304 stainless steel hardware.
  11. FRP grating over flume.
  12. Molded-in Drexelbrook track.
  13. Bullseye level.
  14. Special resin for temperatures above 150 degrees F or chemical resistant service. Temperature: \_\_\_\_\_, Chemical(s): \_\_\_\_\_.
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## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that the flume dimensions are correct and project conditions are suitable for installation. Do not proceed with installation until condition deficiencies have been corrected.

### 3.2 INSTALLATION

- A. Install products in accordance with engineer's instructions, plans, blueprints, etc, local codes, and in a manner consistent with the installation instruction and recommendation of the manufacturer.
- B. Ensure that the product is installed plumb and true, free of twist or warp, within the tolerances specified by the manufacturer and as indicated in the contract documents.
- C. Nylon or fabric slings should be used in conjunction with a spreader bar to lift or move the manhole.
- D. UNDER NO CONDITIONS SHOULD CHAINS OR CABLES BE USED.
- E. Excavate an area large enough to contain the manhole and the concrete pad while allowing for sufficient space to allow for a safe work environment.
- F. Follow all OSHA requirements for open trench construction.
- G. Pour a pad of sufficient width and length to support all of the manhole, the flume, and the connecting piping. The thickness of the pad shall be \_\_\_\_\_ and shall be sized to ensure that proper loading is observed and that the manhole will not float. The surface of the pad should be troweled and level to one-eighth (1/8) inch.
- H. Clean the concrete slab of all sharp objects and debris before laying the foam pad provided with the manhole.
- I. If PVC boots are provided, install them on the manhole pipe stubs before lowering the manhole into the opening.
- J. Lower the manhole onto the pad.
- K. Drill holes in the foam and concrete pads to accept the stainless steel anchor bolts *(provided as a manhole option if indicated, supplied by others if not)*.
- L. Check to ensure that the flume is level from side to side and from front to back, adjust the pad and anchor bolts as necessary.
- M. Connect and secure piping. DO NOT LUBRICATE THE PVC BOOTS IF PROVIDED.
- N. Grout under all section of the manhole above the slab.
- O. Backfill with pea gravel, 1/4 inch to 3/4 inch in diameter, using uniform lifts of no more than 12 inches.
- P. ***WARNING: METERING MANHOLES MAY BE CLASSIFIED AS CONFINED SPACE ENTRY LOCATIONS. CONSULT ALL APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS BEFORE ENTERING.***

### 3.3 ADJUST AND CLEAN

- A. Clean surfaces in accordance with the manufacturer's instructions.
- B. Remove trash and debris, and leave the site in a clean condition.

END OF SECTION

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