

L. F. Manufacturing, Inc.  
SPECIFICATION # LP1056RT

## FIBERGLASS RECTANGULAR TANK

### A.1 GENERAL:

Fiberglass reinforced polyester rectangular tanks shall be manufactured from commercial grade polyester resin or vinyl ester resin with fiberglass reinforcements. The resin system shall be suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with the wastewater collection systems. The tank shall be a one-piece unit manufactured by L. F. Manufacturing, Inc., Giddings, Texas, 1-800-237-5791 or an approved equal.

### A.2 MATERIALS:

**RESIN:** The resins used shall be a commercial grade unsaturated polyester resin.

**REINFORCING MATERIALS:** The reinforcing materials shall be commercial Grade "E" type glass in the form of mat, continuous roving, chopped roving, roving fabric, or a combination of the above, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

**SURFACING MATERIALS:** If reinforcing materials is used on the surface exposed to the contained substance, it shall be a commercial grade chemical-resistant glass that will provide a suitable bond with the resin and leave a resin rich surface.

**FILLERS AND ADDITIVES:** Fillers, when used, shall be inert to the environment and rectangular tank construction. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used. The resulting reinforced plastic material must meet the requirement of this specification.

### A.3 FABRICATION:

**EXTERIOR SURFACE:** The exterior surface shall be relatively smooth with no sharp projections. Handwork finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 1/2 inch in diameter, delamination and fiber show.

**INTERIOR SURFACE:** The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, delamination, and blisters larger than 1/2 inch in diameter, and wrinkles of 1/8 inch or greater in depth. Surface pits shall be permitted up to 6 square feet if they are less than 3/4 inch in diameter and less than 1/16 inch deep.

**FIBERGLASS REINFORCED BOTTOM:** The bottom to be fabricated using fiberglass material as stated in section A.2. Material and installation to meet all physical requirements as per section A.4. Bottom to be attached to rectangular tank with a fiberglass lay-up to comply with A.S.T.M.-D3299 specifications. When reinforcement is necessary for strength, the reinforcement shall be completely enclosed with a fiberglass lay-up per A.S.T.M.-D3299.

**FIBERGLASS REINFORCED TOP:** The fiberglass rectangular tank top shall be fabricated using fiberglass material as stated in section A.2. Material and installation to meet all physical requirements as per section A.4. Top to be attached to rectangular tank with a fiberglass lay-up to comply with A.S.T.M.-D3299 specifications. When reinforcement is necessary for strength, the reinforcement shall be completely enclosed with a fiberglass lay-up per A.S.T.M.-D3299.

**INSTALLATION OF STUB OUTS:** Effluent, service, or discharge lines made be factory installed. Approved methods are PVC sewer pipe, Inserta-Tee fittings, or Kor-N-Seal boots. Installation of stub outs to be fiberglass lay-up to comply with A.S.T.M.-D3299 specifications.

**DEFECTS NOT PERMITTED:**

- a. Exposed fibers: glass fibers not wet out with resin.
- b. Resin runs: runs of resin and sand on the surface.
- c. Dry areas: areas with glass not wet out with resin.
- d. Delamination: separation in the laminate.
- e. Blisters: light colored areas larger than 1/2 inch in diameter.
- f. Cracking: cracks caused by sharp objects.
- g. Pits or Voids: air pockets.
- h. Wrinkles: smooth irregularities in the surface.
- i. Sharp projection: fiber or resin projections necessitating gloves for handling.

**A.4 PHYSICAL REQUIREMENTS:**

**LOAD RATING:** The complete rectangular tank shall have a minimum dynamic-load rating of 16,000 lbs when tested in accordance with Section A.5. To establish this rating, the complete rectangular tank shall not leak, crack, or suffer other damage when load tested to 40,000 lbs and shall not deflect vertically downward more than 1/4 inch at the point of load application when loaded to 24,000 lbs.

**WALL THICKNESS:** Since the design of rectangular tanks is considerably more complex than that of cylindrical tanks, no simple chart of wall thickness can be given. However, the minimum wall should be similar to that for cylindrical tanks with consideration given to the height of the tank relative to loadings and largest span relative to deflection. External ribs shall be used to prevent sidewall deflection from exceeding the tolerance in 3.6.3.3 (Voluntary Product Standard PS 15-69) (also see 3.3.6)

**A.5 TEST METHODS:** Tests shall be performed as specified in A.S.T.M.-D3753 latest edition, Section 8.

**A.6 INSTALLATION:****EXCAVATION:**

**GENERAL:** The limit of excavation shall be such to allow for placing and removing forms, installing sheeting, shoring, bracing, etc. The contractor shall pile excavated material in a manner that will not endanger the work and will avoid obstructing sidewalks, driveways, power poles, etc. Drainage shall be kept clear.

**VERTICAL SIDES:** When necessary to protect existing or proposed structures or other improvements, the Contractor shall maintain vertical sides of the excavation. The limit shall not exceed three feet outside the footing on a vertical plane parallel to the footing except where specifically approved otherwise by the Engineer. The Contractor shall provide and install any sheeting, shoring, and bracing as necessary to provide a safe work area as required to protect workmen, structures, equipment, power poles, etc. The Contractor shall be responsible for the design and adequacy of all sheeting, shoring, and bracing. The sheeting, shoring, and bracing shall be removed as the excavation is backfilled in such a manner as to prevent injurious caving.

**SLOPING SIDES:** Where sufficient space is available, the contractor shall be allowed to back slope the sides of the excavation. The back slope shall be such that the excavation shall be safe from caving. The type of material being excavated shall govern the back slope used, but in any case the back slope shall be no steeper than 1 foot horizontal to 1 foot vertical.

**DEWATERING:** The Contractor shall keep the excavation free from water by use of cofferdams, bailing, pumping, well pointing, or any combination as the particular situation may warrant. All dewatering devices shall be installed in such a manner as to provide clearance for construction, removal of forms, and inspection of exterior of formwork. It is the intent of these specifications that the foundation be placed on a firm dry bed. The foundation bed shall be kept in a dewatered condition a sufficient period of time to insure the safety of the structure. All dewatering methods and procedure are subject to the approval of the Engineer. The excavation shall be protected from excessive rainfall, drainage and drying. The excavation shall be inspected and approved by the Engineer before work on the structure

is started. It is the intent of these specifications that the contractor provides a relatively smooth, firm foundation bed for footings and slabs that bear directly on the undisturbed earth without additional cost to the Owner, regardless of the soil conditions encountered. The Engineer will be the sole judge as to whether these conditions have been met. The contractor shall pile excavated material in a manner that will not endanger the work.

**UNAUTHORIZED OVER EXCAVATION:** Excavation for slabs, footings, etc., that bare on earth shall not be carried below the elevation shown on the drawings. In the event the excavation is carried on below the indicated elevation, the Contractor shall bring the slab, footing, etc., to the required grade by filling with concrete having a minimum compressive strength of at least 3,000 psi at 28 days.

**HANDLING:** Do not drop or impact the rectangular tank. Fiberglass rectangular tanks may be lifted by the installation of two lifting lugs as specified by the manufacturer on the outside surface near the top or by a sling or "choker" connection around the center. Use of chains or cables in contact with the tank surface is prohibited. Rectangular tanks may be lifted horizontally using one support point.

**CUTOUTS:** Cutouts in rectangular tank wall should be made with proper cutting tools, such as jig saw or hole saw. Do not use axe or other impact-type tools.

#### **INSTALLATION OF SEWER PIPE:**

**TYPE 1:** Make the cutout in the rectangular tank wall, the outside diameter of pipe, plus 1/2 inch maximum. Slip pipe into position. Apply industrial grade silicone around the pipe next to the rectangular tank wall cutout on the inside and on the outside. Cover the outside silicone area with epoxy grout and backfill.

**TYPE 2:** Make the cutout in the rectangular tank wall, the outside diameter of pipe, plus 1/2 inch maximum. Grind the outside surface of the pipe and both the inside and the outside surfaces of the cutout in the rectangular tank wall. (Apply a priming agent to any PVC pipe that might be used before fiberglass lay-up.) Insert the pipe through the cutout in the wall of the rectangular tank. Apply fiberglass putty to the inside and the outside of the rectangular tank wall cutout, filling openings between pipe and cutout. Make a good radius for the fiberglass lay-up. After putty has set-up, fiberglass the pipe into place. Use one layer of woven roving sandwiched between two layers of fiberglass mat. Allow fiberglass to completely set-up before backfilling. Fiberglass lay-up method to comply with A.S.T.M.-D3299 specifications.

**TYPE 3:** Install Insert-A-Tee type fitting per manufacturer's instructions. (Fowler Mfg. Co., P.O. Box 767, Hillsboro, OR, 97123. PH. 503-359-5417) or approved equal.

#### **BACKFILL:**

**BACKFILL MATERIAL:** Unless shown otherwise on the drawings, sand or crushed stone shall be used for backfill around the rectangular tank for a distance of two feet from the outside surface and extending from the bottom of the excavation to the bottom of the top slab. Suitable material chosen from the excavation may be used for the remainder of the backfill. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction. This material will be subject to approval by the Engineer. Backfill material shall be free of vegetation or other extraneous material. Excavated materials which are to be used for fill or backfill may be stockpiled on the site. The Engineer shall approve location of stockpiles. Topsoil should be stockpiled separately and used for finish grading around the structure.

**SCHEDULE OF BACKFILLING:** The Contractor may begin backfilling of rectangular tank as soon as the concrete has been allowed to cure and the forms removed.

**BACKFILL LIFTS:** Backfill shall be placed in layers of not more than 12 loose measure inches and mechanically tamped to at least 95% Standard Proctor Density. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the structure.

**TOP SLAB SUPPORT:** When installing a fiberglass rectangular tank without a fiberglass top you should pour a reinforced concrete slab support a minimum of two feet outside of fiberglass rectangular tank wall and a minimum of six inches thick. The slab shall be specified and designed by project engineer.

**MARKING AND IDENTIFICATION:** Each rectangular tank shall be marked with the following information.

- (1) Manufacturer's name or trademark
- (2) Manufacturing special number
- (3) Total length, width and depth