

L. F. Manufacturing Inc.
SPECIFICATION # LP1057SP

FIBERGLASS WETWELL OR LIFT STATION LINER

A.1 GENERAL:

Fiberglass reinforced polyester wetwell liner 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 sulphide and dilute sulfuric acid as well as other gases associated with the wastewater collection systems. The wetwell 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 wetwell 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. Hand-work 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 TOP: The fiberglass wetwell liner 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 wetwell liner pipe with fiberglass layup to comply with A.S.T.M.-D3299 specifications. When reinforcement is necessary for strength, the reinforcement shall be fiberglass channel laminated to the inside of the liner top and shall comply with A.S.T.M.-D3299.

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. Crazing: 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 wetwell liner 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 wet well 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.

STIFFNESS: The wetwell liner cylinder shall have a minimum pipe-stiffness value shown in Table 1 when tested in accordance with Section A.5.

TABLE #1		STIFFNESS REQUIREMENTS	
		LENGTH - FT.	F/AY - PSI
		10 to 20	2.01
		21 to 30	3.02
		31 to 40	5.24
PHYSICAL PROPERTIES:		HOOP DIRECTION	AXIAL DIRECTION
a.	Tensile Strength (psi)	18,000	5,000
b.	Tensile Modules (psi)	0.8×10^6	0.7×10^6
c.	Flexural Strength (psi)	26,000	4,500
d.	Flexural Modules (psi)		
	(no ribs - 48", 60", 72")	1.4×10^6	0.7×10^6
	(with ribs - 96", 144")	0.7×10^6	0.7×10^6

A.5 TEST METHODS: Tests shall be performed as specified in A.S.T.M.-D3757 latest edition, Section 6.

A.6 INSTALLATION: Remove top slab, pumps, and equipment needed to permit insertion of fiberglass liner into the existing wetwell. Lower fiberglass liner into the old wetwell and mark contour of the bench area at the bottom onto the inside wall of the fiberglass wetwell liner. Remove fiberglass liner and cut away the marked area at the bottom of the fiberglass liner. In the old wetwell measure depth and size of all incoming sewer lines. Measure and mark the fiberglass liner for cutouts to be made for incoming sewer lines. Make the cutouts 1/2 inch larger than the outside diameter of the incoming sewer pipe. After the cutouts have been made, line up the cutouts with the incoming sewer lines and lower the fiberglass liner into place. Center the fiberglass liner up and chock into place. Seal the inside bottom of the fiberglass liner using a non-shrinking epoxy grout. Take a piece of PVC pipe the same size of your incoming sewer lines and cutout about a one inch wide strip horizontally. Band the PVC pipe together and insert them into the incoming sewer lines. Take the bands off the PVC pipe and let it expand against the incoming sewer line walls.

BACKFILL: Brace the fiberglass liner walls at the bottom before beginning backfill. Pour two vertical feet of concrete grout in one foot lifts between the walls of the old wetwell and the new fiberglass liner. Let the concrete grout set-up before continuing backfill procedure. Pour about four vertical feet of concrete grout in one foot lifts and let the concrete set-up. Pour the remainder of the concrete grout backfill in one foot lifts.

COMPLETION OF INSTALLATION: Remove the cut PVC from all incoming lines. Use a non-shrinking grout to seal area between the wall of the old wetwell and the new fiberglass liner. Replace all the pumps and equipment that had to be removed and set concrete top slab back on top of wetwell.

HANDLING: Do not drop or impact the wetwell liner. The wetwell liner shall be chocked if stored

horizontally. If wetwell liner must be moved by rolling, the ground transversed shall be smooth and free of rocks, debris, etc. Fiberglass wetwell liner may be lifted by the installation of two lifting lugs as specified by the manufacturer on the inside surface near the top or by a sling or "choker" connection around the center. Use of chains or cables in contact with the wetwell surface is prohibited. Wetwell liners may be lifted horizontally using one support point.

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

FIBERGLASS WETWELL LINER TOP: The fiberglass top may have stubouts installed or may have a raised fiberglass collar around the hatch opening. The fiberglass top has been designed to withstand the weight of a concrete reinforced slab to be installed over it.

TOP SLAB SUPPORT: Fiberglass wetwell liner without a fiberglass top should have a reinforced concrete slab support around the outside of fiberglass wetwell wall. The slab shall be specified and designed by project engineer.

MARKING AND IDENTIFICATION: Each wetwell shall be marked with the following information.

- (1) Manufacturer's name or trademark
- (2) Manufacturing special number
- (3) Total length and nominal diameter