

L. F. Manufacturing, Inc.
SPECIFICATION # LP1056SP-VB

FIBERGLASS WETWELL WITH ATTACHED VALVE BOX

A.1 GENERAL:

Fiberglass reinforced polyester wetwells 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 wetwell and valve box 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 are 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 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 wetwell 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 wetwell bottom per A.S.T.M.-D3299.

FIBERGLASS REINFORCED TOP: The fiberglass wetwell 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 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 wetwell bottom per A.S.T.M.-D3299.

INTREGAL VALVE BOX: The fiberglass wetwell shall have a fiberglass valve box attached. The valve box shall be attached at factory by method of fiberglass lay-up. Fiberglass layup method to comply with A.S.T.M.-D3299 specifications. Fiberglass valve box shall be of same resin type as fiberglass wetwell.

INSTALLATION OF STUBOUTS: Effluent, service, or discharge lines may be factory installed. Approved methods are PVC sewer pipe, Inserta-Tee fittings or Kor-N-Seal boots. Installation of stubouts to be fiberglass layup 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. 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 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 wetwell 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 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.-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 form work. 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 provide 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 bear 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 wetwell. Wetwells shall be chocked if stored horizontally. If wetwells must be moved by rolling, the ground transversed shall be smooth and free of rocks, debris, etc. FRP wetwells 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 wetwell surface is prohibited. Wetwells may be lifted horizontally using one support point.

OPEN BOTTOM WETWELL INSTALLATION: Bottom of excavation should be compacted to 95% Standard Proctor Density. Pour reinforced concrete base one foot deep and at least two feet larger than the fiberglass wetwell outside diameter. As soon as the concrete has set-up enough to support the fiberglass wetwell, lower the wetwell into place. Pour a minimum of one foot of reinforced concrete on the inside, also a minimum of one foot deep and two feet from the fiberglass wetwell wall on the outside of the wetwell. Insert ram neck type sealant on the outside of fiberglass wetwell around the bottom where the fiberglass and concrete come together.

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.

INSTALLATION OF SEWER PIPE:

TYPE 1: Make the cutout in the wetwell 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 wetwell wall cutout on the inside and on the outside. Cover the outside siliconed area with epoxy grout and backfill.

TYPE 2: Make the cutout in the wetwell 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 wetwell 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 wetwell. Apply fiberglass putty to the inside and the outside of the wetwell 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 layup method to comply with A.S.T.M.-D3299 specifications.

TYPE 3: Install Insert-A-Tee type fitting per manufacturers instruction. (Fowler Mfg. Co., P.O. Box 767, Hillsboro, Or. 97123. PH. 503-359-5417) or approved equal.

CLOSED BOTTOM WETWELL INSTALLATION: Bottom of excavation should be compacted to 95% Standard Proctor Density. Wetwells with diameters less than 60 inches and depths less than 12 feet, require a base of 6 inches of crushed stone. Wetwells with diameters of 60 inches and larger and depths of 12 feet and greater, should have a poured reinforced concrete base at least one foot deep and at least two feet larger than fiberglass wetwell outside diameter. The fiberglass wetwell shall be lowered into the wet concrete and brought to plumb. Pour reinforced concrete over the anti-flotation flange. The concrete shall be a minimum of one foot deep and two feet from outside wall of the wetwell. More concrete may be required in high water table areas. In high water table areas you should consult your Engineer for backfill requirements.

INTERNAL BOTTOM RIBS: Wetwells with internal bottom stiffening ribs will require that concrete be poured on the inside of the wetwell to a depth equal to that of the stiffening ribs. This is typically 4 – 6 inches.

FIBERGLASS WETWELL 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.

BACKFILL:

BACKFILL MATERIAL: Unless shown otherwise on the drawings, sand or crushed stone shall be used for backfill around the wetwell 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. Location of stockpiles shall be approved by the Engineer. Top soil should be stockpiled separately and used for finish grading around the structure.

SCHEDULE OF BACKFILLING: The Contractor may begin backfilling of wetwell 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 wetwell without a fiberglass top you should pour a reinforced concrete slab support a minimum of two feet outside of fiberglass wetwell wall and a minimum of six inches thick. 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