

SECTION 113100
FIBERGLASS REINFORCED PLASTIC WETWELL (S-64)

1. DESCRIPTION

This specification shall govern all work necessary for the furnishing of all plant, labor, equipment, supplies, and materials and for performing all operations required to complete the wetwell. The Fiberglass Reinforced Plastic wetwell shall be a one-piece unit of one class, fabricated in a composite laminate to conform to the requirements as set forth in this specification.

2. GENERAL

- A. Dimensions: The wetwell shall be a ribbed, circular cylinder of minimum internal diameter as shown in the plans.
- (1) Wall component elements: isophthalic polyester resin, fiberglass chopped strand & continuous reinforcements.
- (2) Rib component elements: isophthalic polyester resin, Fiberglass chopped strand and woven roving reinforcements.
- B. Class: The wetwell shall be manufactured in one class of load rating. This class shall be H-20 wheel load (16,000 pounds dynamio wheel load).
- C. Governing Standards: Plastic laminate must meet the conditions of ASTM C582, and the chemical resistance test ASTM C581. Previous tests are acceptable provided laminates are representative.

3. MATERIALS:

- A. Resin: Unsaturated isophthalic polyester resins shall be used and they must meet the requirements listed below.

<u>Property</u>	<u>Test Method</u>	<u>Requirements</u>
1.Acid Number	ASTM D 465-59	Maximum = 15
2.Hydroxyl Number		Maximum = 30
3.Solids Content	ASTM D1259-61	Maximum = 50%

The following requirements are determined when testing the resin without any reinforcing material included.

<u>Property</u>	<u>Test Method</u>	<u>Requirements</u>
4. Flexural Strength	ASTM D 790-70	Min. 10,000 psi
5. Flexural E-modulus	ASTM D 790-70	Min.400,000 psi
6. Elongation at rupture	ASTM D 790-70	Min. 22%
7. Heat distortion temp.	ASTM D 648-61	Min. 167EF
8. Weight change after 28 days storing in distilled water	ASTM D 570-63	Max. 150 mg/sample
9. Surface hardness (Barcol)	ASTM D2583-67	Minimum 80% of resin's normal

- B. Reinforcement: Reinforcement shall be fiberglass mat, continuous roving, chopped roving and/or roving fabric. The fiberglass shall be type "E" and a finish compatible with the resin used.

The interior surface shall be reinforced layer 0.25 mm to 0.50 mm (10 to 20 mils). Reinforcement materials shall be:

1. Chemically resistant
2. Organic Surfacing veil
3. Asbestos

and they must have a coupling agent which will provide a suitable bond between the reinforcement and the resin.

- C. Fillers: Fillers, when used, must not degrade the resin chemical resistant properties as defined in Section 3.A of this specification.
- D. Additives: Additives, such as thixotropic agents, catalyst and promoters may be added as required by the specific manufacturing processes used to meet this standard.
- E. Laminate: (Cured composite including glass fiber reinforcement.) Cured laminate must meet the following conditions:

<u>Property</u>	<u>Test Method</u>	<u>Requirements</u>
1. Glass Content (9% by weight)	ASTM D2584-68	20 + 70 %
2. Compressive Strength	D 695-69	Min. 12,000 psi
3. Flexural Strength	D 790-70	Min. 12,000 psi
4. Flexural E-modulus	ASTM D790-70	Min. 700,000 psi
5. Surface Hardness	ASTM D2583-67	Min. 90% of resin's normal

4. REQUIREMENTS

- A. Manufacturer Submitted: The manufacturer shall file with the Engineer the following prior to approval for installation.
1. Detailed design calculation for all structural components of the wetwell.
 2. Detailed prototype test procedures and test results to include:
 - a. Static Load test for H-20 (16,000 pounds dynamic wheel load incorporating 1.5 impact factor, 1.33 factor of safety with a long term strength retention of 80%.
 - b. Deflection test.
 - c. Stiffness test.
 - d. Soundness test.
 - e. Barcol Harness Cure test.
 - f. Thickness test.
 - g. Chemical Resistance test.

3. Detailed quality control to demonstrate conformance to design values and likeness to prototype wetwell features.
- B. Rejection of Wetwells: Wetwells are subject to rejection on account of any of the following visual defects.
1. Fuzz: Glass fibers loosely adhering to manhole which are not wet out with resin.
 2. Protruding Fibers: Glass fibers sticking out from pipe surface that are not wet out with resin.
 3. Resin Runs: Runs of resin and sand on surface of manhole.
 4. Dry Areas: Areas in laminate with glass not wet out with resin.
 5. Delamination: Separation in the laminate.
 6. Blisters: Light (straw) colored areas resulting from too hot a cure.
 7. Craze: Crack usually star shaped; caused by sharp impact.
 8. Surface Pits or Voids: Small air pockets on the surface or directly, beneath the surface mat.
 9. Wrinkles: Smooth irregularities on the surface.
 10. Torn Edges, End Delaminations and End Gouges: Tears and rips in the edge of cuts.
 11. Ground Areas: Areas around lap-up which have been abraded and not covered by lay-up.
 12. Hand Layup Ragged Edges: Areas at the edge of hand layup that are not rolled down properly and rough.

5. CONSTRUCTION METHODS

- A. General: The wetwell installation should follow the manufacturer's recommended installation procedures.
- B. Excavation: The Contractor shall do all necessary excavation for the wetwell. Such excavations shall be of sufficient size as to permit the proper installation of the base. All such excavating shall conform to the size and dimensions as shown on the drawings, plus a minimum of three (3) feet to permit working room. Care shall be taken to insure that the excavation is not carried to a greater depth than required. If it becomes necessary to shore the walls of the excavated area, such shoring shall be of two (2) inch material. Shoring shall be braced in such a manner as to insure support of the walls and also permit the installation of the wetwell itself without necessitating the removal of any shoring until such time as the entire manhole is completed. No shoring shall be left or backfilled around, unless authorized by the Engineer. Shoring shall remain in place for at least 24 hours after the masonry or concrete work has been completed.
- C. Backfilling: The backfilling around the outside of wetwell shall commence as soon as practical but not until approval is given by the Engineer. All forms, sheeting, shoring, bracing etc., shall be removed as backfilling is accomplished. Such backfill shall be placed in layers of not more than 6 inches and mechanically tamped to a minimum 95% standard proctor density.

6. MEASUREMENT AND PAYMENT

Work provided for by this item shall be measured by each individual structure built, and paid for at the unit price bid per each, of the size, type specified, complete in place, and meeting the approval of the Engineer. "Complete in

place" shall mean all labor, materials, equipment necessary to furnish and install the wetwell.