

SECTION 00 00 00
FIBERGLASS GRAVITY SEWER PIPE (FRPM)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass Reinforced Polymer Mortar (FRPM) Pipe utilized for sanitary sewer systems, storm sewers and industrial gravity service in a direct bury installation.

1.02 REFERENCES

- A. ASTM D3262 – Standard Specification for “Fiberglass” (Glass-Fiber Reinforced Thermosetting-Resin) Sewer Pipe
- B. ASTM D4161 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
- C. ASTM D2412 – Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- D. ASTM D3681 – Standard Test Method for Chemical Resistance of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition
- E. ASTM D638 – Standard Test Method for Tensile Properties of Plastics
- F. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics
- G. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

PART 2 PRODUCTS

2.01 MATERIALS

- A. Resin Systems: The manufacturer shall use only polyester or vinyl ester resin systems with a proven history of performance in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.
- B. Glass Reinforcements: The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade E-CR glass (corrosion resistant and boron free E-glass) filaments with binder and sizing compatible with impregnating resins.
- C. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%.
- D. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally effect the performance of the product.
- E. Elastomeric Gaskets: Gaskets shall meet ASTM F477 and be supplied by qualified gasket manufacturers and be suitable for the service intended.

2.02 MANUFACTURE AND CONSTRUCTION

- A. Pipes: Manufacture pipe by the filament wound process to result in a dense, nonporous, corrosion-resistant, consistent composite structure. Pipes shall be Type 1, Liner 1, and Grade 1 per ASTM D3262.
- B. Joints: Unless otherwise specified, the pipe shall be field connected with fiberglass sleeve couplings or bell-spigot joints that utilize elastomeric sealing gaskets as the sole means to maintain joint water tightness. The joints must meet the performance requirements of ASTM D4161. Joints at tie-ins, when needed, may utilize gasket-sealed closure couplings.
- C. Fittings: Flanges, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays. Properly protected standard ductile iron, fusion-bonded epoxy-coated steel and stainless steel fittings may also be used.
- D. Acceptable Product: Flowtite Pipe or approved equal.

2.03 DIMENSIONS

- A. Diameters: The actual outside diameter of the pipes shall be in accordance with ASTM D3262 Table 3. For unlisted diameters, OD's shall be per manufacturer's literature unless otherwise agreed to between manufacturer and owner.
- B. Lengths: Pipe shall be supplied in nominal lengths of 10 to 40 feet. Actual laying length shall be nominal +1, -1 inches. At least 90% of the total footage of each size and class of pipe, excluding special order lengths, shall be furnished in nominal length sections.
- C. Wall Thickness: The average wall thickness of the pipe shall not be less than the nominal wall thickness published in the manufacturer's literature, and the minimum wall thickness at any point shall not be less than 87.5% of the nominal wall thickness.
- D. End Squareness: All points around each end of a pipe unit shall fall within +/-1/4 inch or +/- 0.5% of the nominal diameter of the pipe, whichever is greater, to a plane perpendicular to the longitudinal axis of the pipe.

2.04 TESTING

- A. Pipes: Pipes shall be manufactured and tested in accordance with ASTM D3262.
- B. Joints: Joints shall meet the requirements of ASTM D4161.
- C. Stiffness: Each pipe shall have sufficient strength to exhibit the minimum pipe stiffness at 5% deflection as required by the Engineer. Stiffness shall be tested in accordance with the test method of ASTM D2412. One pipe shall be tested every 100 lengths of each type, grade, and size pipe produced.
- D. Chemical Resistance: Pipe shall meet or exceed the requirements of ASTM D3262 when tested in accordance with ASTM D3681.

2.05 CUSTOMER INSPECTION

- A. The Owner or other designated representative shall be entitled to inspect pipes or witness the pipe manufacturing.
- B. Manufacturer's Notification to Customer: Should the Owner request to see specific pipes during any phase of the manufacturing process, the manufacturer must provide the Owner with adequate advance notice of when and where the production of those pipes will take place.

2.06 PACKAGING, HANDLING, AND SHIPPING

- A. Packaging, handling, and shipping shall be done in accordance with the manufacturer's instructions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation: The installation of pipe and fittings shall be in accordance with the project plans and specifications and the manufacturer's requirements.
- B. Pipe Handling: Use textile slings, other suitable materials or a forklift. Use of chains or cables is not recommended.
- C. Jointing:
 - 1. Clean ends of pipe and joint components.
 - 2. Apply joint lubricant to pipe ends and the elastomeric seals of the coupling. Use only lubricants approved by the pipe manufacturer.
 - 3. Use suitable equipment and end protection to push the pipes together.
 - 4. Do not exceed forces recommended by the manufacturer for joining or pushing pipe.
 - 5. Joint pipes in straight alignment then deflect to required angle. Do not allow the deflection angle to exceed the deflection permitted by the manufacturer.
- D. Field Tests:
 - 1. Infiltration/Exfiltration Test: Maximum allowable leakage shall not exceed local specification requirements.
 - 2. Low Pressure Air Test: Each run of pipe may be tested with air pressure (max 5 psi). The system passes the test if the pressure drop due to leakage through the pipe or pipe joints is less than or equal to the specified amount over the prescribed time period.
 - 3. Individual Joint Testing: For pipes large enough for man entry; individual joints may be pressure tested with a portable tester to 5 psi max with air or water in lieu of line infiltration, exfiltration, or air testing.
 - 4. Deflection: Maximum allowable long-term deflection is typically 5% of the internal diameter.