



## FIBERGLASS FLAP GATE

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This section includes all flap gates required for the project.

#### 1.2 REFERENCES

- A. Design, fabricate, and test gates and materials in accordance with manufacturers' recommended procedures and the following codes and standards:
  1. ASTM A193 - Stainless Steel Anchor Bolts
  2. ASTM A276 - Stainless Steel Bars
  3. ASTM D256 - Izod Impact Strength
  4. ASTM D570 - Water Absorption Rate
  5. ASTM D638 - Tensile Strength
  6. ASTM D695 - Compressive Properties of Rigid Plastic
  7. ASTM D696 - Coefficient of Linear Expansion
  8. ASTM D790 - Flexural Properties
  9. ASTM D2583 - Indentation Hardness
  10. ASTM D1056 - Polymer Grade
  11. ASTM D2563-0 - Visual Defects
- B. Manufacturers shall be experienced in the design and manufacture of specific flap gates and accessories for a minimum period of 25 years.
- C. Manufacturer must provide warranty for 25 years against failure due to corrosion of composite materials.

#### 1.3 SUBMITTALS

- A. Submit the following for acceptance:
  1. Approval Drawings
    - a. Showing all critical dimensions
    - b. Showing principal parts and materials

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Ship all flap gates with suitable packaging to protect products from damage.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Gate Body shall be:
  1. Engineered composite FRP material
- B. Flap shall be:
  1. Flap material for 4"-18" shall be one-piece hinge/seal assembly of molded neoprene rubber. The neoprene flap shall have a steel plate vulcanized into it and a raised rounded 1/8" (3mm) wide seating surface.
  2. Flap material for 20"-30" shall be FRP plate bonded and fastened to neoprene rubber.

- C. Hinge shall be:
  - 1. Hinge material shall be one-piece hinge/seal assembly of molded neoprene rubber.
- D. Anchor Bolts shall be **Choose a material**

**2.2 FLAP GATES**

- A. Acceptable Manufacturers:
  - 1. Plasti-Fab a Division of Ershigs, Inc.
  - 2. Or approved equal. Pre-approved by Engineer at least 10 business days prior to bid date.
    - a. Manufacturer must have a qualified Engineer on staff with at least 5 years of experience with flap gates.

**2.3 DESIGN CRITERIA**

- A. Composition of the laminate shall be in accordance with the recommendations shown in the Quality Assurance Report for Reinforced Thermostat Plastic (RTP) Corrosion Resistance Equipment prepared under the sponsorship of the Society of the Plastics Industry, Inc. (SF1) and the Material Technology Institute (MTI) of the Chemical Process Industry for "Hand Lay-up Laminates" and shall meet the specifications for Type I, Grade 10 Laminates shown in Appendix. M-1 of said report.
  - 1. Visual inspection for defects shall be made without the aid of magnification, and defects shall be classified as shown in Table 1 Level II of ANSI/ASTM D2563-0, approved 1977, (or any subsequent revision).
- B. Deflection
  - 1. Deflection across the gate width shall be limited to: L/360 or ¼" (6mm), whichever is less, at the maximum operating head.
- C. Head Pressure
  - 1. Gate shall be designed for head pressure as shown in the contract drawings.
- D. Gate Size
  - 1. Gate diameter as shown on the contact drawings and/or gate schedule.

**2.4 CONSTRUCTION**

- A. Body
  - 1. Each gate shall be molded individually to the exact dimensions specified.
  - 2. Flap gate bodies shall be manufactured of gray fiberglass reinforced polyester (FRP) containing ultraviolet absorbers.
  - 3. The surfaces shall be resin rich to a depth of 0.010-0.020 inches (0.3-.05mm) and reinforced with C-glass or polymeric fiber surfacing material.
  - 4. The surface shall be free of exposed reinforcing fibers.
  - 5. The composition of these layers shall be approximately 95% (by weight) resin.
  - 6. The remaining laminate shall be made of resin and reinforcing fibers in a form, orientation, and position in the laminate to meet the mechanical requirements.
- B. Body Flange
  - 1. Body flange shall be drilled for mounting directly to a **Choose an item** using ½" (13mm) diameter **Choose a material** mounting bolts.
- C. Flap/Seal/Hinge
  - 1. Elastomeric flap/seal/hinge shall be made of molded neoprene having a hardness range of 45 - 65 shore A durometer.

**2.5 PHYSICAL PROPERTIES**

- A. Structural characteristics for a 1/8" (3mm) glass mat laminate shall meet the following minimum physical properties.

Tensile strength	11,000 psi (1034 ksc)
Flexural Modulus	900,000 psi (70307 ksc)
Flexural Strength	20,000 psi (1406 ksc)

Compressive Strength	20,000 psi (1547 ksc)
Impact Strength	8.5 ft-lbs./in.(1.24 kgf.m/25mm)
Water absorption	0.40% (in 24 hours)

- B. Flap/seal/hinge: Neoprene shall have the following physical characteristics.

Specific Gravity	1.25
Hardness	55 - 65 Shore A Durometer
Tensile Strength	1500 psi min. (0.07 ksc)
Elongation	300% min.
Low temperature brittleness	- 40°

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- A. Thoroughly clean and remove all shipping materials prior to setting.  
 B. Install Gates per Manufacturer's recommendations. Consult Operation and maintenance manual.

**END OF SECTION**