



HEAVY DUTY STOP LOGS

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes all stop log systems required for the project.

1.2 REFERENCES

- A. Design, fabricate, and test stop log systems and materials in accordance with manufacturer's recommended procedures and the following codes and standards:
 1. ASTM A276 - Stainless Steel Bars
 2. ASTM D256 - Izod Impact Strength
 3. ASTM D570 - Water Absorption Rate
 4. ASTM D638 - Tensile Strength
 5. ASTM D695 - Compressive Properties of Rigid Plastic
 6. ASTM D696 - Coefficient of Linear Expansion
 7. ASTM D790 - Flexural Properties
 8. ASTM D2583 - Indentation Hardness
 9. ASTM D2563-0 - Visual Defects
 10. ASTM D2584 - Resin, Glass & Filler Content
- B. Manufacturer shall be experienced in the design and manufacture of stop logs and accessories for a minimum 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 stop logs with suitable packaging to protect products from damage.
- B. Protect stop logs, lifting pins, guide frames, lifting devices, and storage racks from damage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Stop log panels shall be:
 1. Engineered composite fiberglass reinforced plastic (FRP) completely encapsulating an internal steel reinforcing structure.
 - a. Infusion molded to create a seamless corrosion barrier impervious to moisture
 - b. FRP resin shall be: **Choose a material**
 - c. Internal Steel Reinforcing: Carbon Steel as needed for deflection requirements
 - d. Foam core between steel reinforcing
 - e. Seal material to be EPDM
- B. Guide Frames
 1. Guide Frame Rails to be: **Choose a material**

- C. Lifting Pins
 1. Lifting Pins to be: **Choose a material**
- D. Anchor Bolts (when applicable)
 1. Anchor Bolts to be: **Choose a material**
- E. Lifting Beam/Poles
 1. Lifting Beam/Poles to be: **Choose a material**
- F. Storage Racks
 1. Storage Racks to be: **Choose a material**

2.2 STOP LOGS

- 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' experience with hydraulic control stop logs.

2.3 DESIGN CRITERIA

- A. Visual inspection for defects shall be made without the aid of magnification. 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 stop log width shall be limited to: $L/360$ or $1/4"$ (6mm), whichever is less, at the maximum operating head.
- C. Head Pressure
 1. Stop log system shall be designed for a maximum head pressure as per gate schedule.
- D. Stop log panel size as shown on the contact drawings and/or gate schedule.
- E. Surface Conditions
 1. All stop log panels shall be flat and level.
 2. Warpage throughout the entire stop log panel shall not produce a crown of more than $1/16"$ (1.6mm) in any direction.

2.4 CONSTRUCTION

- A. Stop Log Panels
 1. The stop log shall be fabricated by means of vacuum infusion to encapsulate the internal structural matrix totally and protect it against corrosion from moisture or chemical deterioration with a minimum thickness of $1/4$ inch (6mm) FRP on the front and back facings, and $3/4$ inch (19mm) FRP on the remaining perimeter. Stop logs shall be designed so the maximum fiber stress (ultimate or yield, whichever applies) shall exceed 2.5 times the working stress. Stop logs shall be suitably reinforced to withstand the maximum seating head with a deflection less than $L/360$ of the stop log width or $1/4$ inch (6mm), whichever is less. Stop log covers that are fabricated from pressed or laminated sheet material and/or glued/bonded to a substructure shall not be acceptable. No seams or joints that may allow water intrusion will be acceptable. Each stop log shall be molded individually to the exact dimensions specified.
 2. Stop log shall be manufactured of reinforced thermoset plastic in the form of FRP.
 3. Stop log shall have UV Stabilizing pigment in the resin to provide long-term protection from UV.
 4. The surface shall be resin-rich to a depth of 0.010 inches (2.5mm) to 0.020 inches (5mm) and reinforced with C-glass or polymeric fiber surfacing material.
 5. The surface shall be free of exposed reinforcing fibers.
 6. The composition of these surface shall be approximately 95% (by weight) resin. The remaining laminate shall be made up of copolymer composite and reinforcing fibers in a form, orientation, and position to meet the mechanical requirements.

7. Structural reinforcing shall be utilized to attain the necessary stiffness to meet deflection requirements and shall be well-encapsulated with a laminate not less than ¼" (6mm) thick on each side to ensure against any permeation by water to the core areas. Internal steel structure to be welded per AWS standards, sandblasted, and coated with epoxy vinyl ester resin immediately prior to vacuum infusion to ensure complete bonding with external corrosion barrier.
 8. T-316 stainless steel lifting pins shall be attached to the Stop Log by passing completely through the log. Stainless steel lifting pin shall be fastened to the log with sufficient reinforcing to withstand the lifting force. Lifting pins attached to the surface of the log are not acceptable. The through holes shall not pass through or be in contact with the internal steel reinforcing.
 9. Core material must be 100% resistant to decay and attack by fungus and bacteria and be resistant to hydrocarbons.
 10. To assure maximum service life, the copolymer composite shall be ultraviolet stabilized and seamless to protect inner structural members from corrosion.
 11. Metal, concrete, or wood stop logs subject to corrosion / bacterial breakdown / rot shall not be acceptable alternatives to composite FRP material.
 12. Stop Log panels shall be manufactured using advanced technology vacuum infusion resin transfer processes. The closed mold vacuum process must completely evacuate all air from the mold prior to infusing the mold with premium quality resin as specified. The vacuum infusion process must eliminate the potential of air entrapment and/or voids in the matrix of the stop log panel (which cause defects and performance-detracting irregularities), producing a finished product that is one-piece, seamless, and uniformly impenetrable by fluids, eliminating the chance for interior corrosion. Stop Logs produced by techniques that employ adhesives or mechanical fasteners to attach individual panels to a pre-fabricated framework, resulting in seams along vertical and horizontal axes of the stop log, shall not be allowed, as they create stress-potential areas, portals for fluid infiltration, subsequent de-lamination, and product failure due to corrosion.
- B. Seals
1. The stop logs shall be equipped with elastomeric bottom seals to seal between the logs. Vertical seals shall be mounted on the face at the ends of the stop logs positioned to contact the inside of the guide rails. Seals shall be made of molded EPDM, having a hardness of 55 – 65 Shore A durometer, with a maximum compression set of 25% and low temperature brittleness to meet suffix F-17 (- 40°F/C).
- C. Guide Frames
1. Guide frames shall be styled for **Choose a item** as shown on the contract drawings and/or stop log schedule.
 2. Guide frames shall be fabricated from **Choose a material** and shall have a slot suitable for mating with the stop log panels.

2.5 PHYSICAL PROPERTIES

- A. Structural characteristics for FRP glass mat laminates shall meet the following minimum physical properties:

Tensile strength	15,000 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	9.0 ft-lbs/in. (1.24 kgf.m/25mm)
Water absorption	0.12% (in 24 hours)

- B. Seals: Extruded EPDM seals shall have the following physical characteristics:

Specific Gravity	1.25
Hardness	55 – 65 Shore A Durometer
Tensile Strength	1500 psi min. (0.07ksc)
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 stop log systems per Manufacturer’s recommendations.

END OF SECTION