

## SECTION 08390

### WATERTIGHT DOORS

**\*\*Note to Specifier\*\*** This specification contains component and configuration options. Where indicated choose the appropriate choice for your specific project requirements. Delete specifier instructions prior to publishing completed specification.

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Hinged Flood Barrier with frame and hardware.

##### 1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete.
- B. Section 04810 - Unit Masonry Assemblies.
- C. Section 05120 - Structural Steel.

##### 1.3 REFERENCES

- A. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- B. ASTM A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- C. ASTM A 276 - Standard Specification for Stainless Steel Bars and Shapes.
- D. ASTM B 26 - Standard Specification for Aluminum-Alloy Sand Castings.
- E. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- F. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
- G. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- H. AISI CL 304 - American Iron and Steel Institute.
- I. Aluminum Association - Specification for Aluminum Structures, 7th Edition.
- J. ASME Structural Welding Code Section IX.

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- K. FEMA #114 - Engineering Principles and Practices of Retrofitting Flood-Prone Residential Structures.
- L. FEMA Technical Bulletin 3-93 - Non-Residential Flood Proofing.
- M. SEI/ASCE 7-02 - Minimum Design Loads for Buildings and Other Structures.
- N. AWS D1.1 - Structural Welding Code - Steel.
- O. AWS D1.2 - Structural Welding Code - Aluminum.
- P. Aluminum Structures - A Guide to Their Specifications and Design.
- Q. U.S. Army Corps of Engineers, EP 1165-2-314 - Flood Proofing Regulations, 15 December 1995.

#### 1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Design watertight doors to perform under hydrostatic loads (and hydrodynamic or other loads as specified) to control short-term load pressures indicated. All water pressure loads and operating loads are transferred to the building structure.
- B. Standard loading: Standard Flood Barriers are designed for hydrostatic loading, and have no additional allowances included for hydrodynamic loads, wave loads or debris impact loads.
- C. Special loading: Design Flood Barriers for hydrodynamic loads, wave loads, debris impact loads, or other uniform loads as indicated.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [ Product Data ]: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions.
- C. Shop Drawings: Provide shop drawings showing layout, profiles, and product components, including anchorage, hardware, and finishes. Include dimensional plans, applicable material specifications, elevations and sections detailing mounting and connections, and load diagrams.
- D. Calculations: Upon signed finalization and approval of dimensions, mounting location material and configuration, and load requirements;

**\*\*Note to Specifier\*\* Choose one (1) of the following statements.**

- 1. Engineering calculations are not required for this barrier.

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2. Submit stamped calculations by a registered professional engineer from within the state or territory where the project will be constructed or substantially improved, to verify the flood door's ability to withstand the design loading.

E. Closeout Submittals: Provide Operation and Maintenance data to include methods for maintaining installed products, precautions against cleaning materials and methods detrimental to finishes and performance.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

## 1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer must demonstrate a minimum of five years successful experience in design and manufacture of similar flood related closures. Upon request, provide supporting evidence including list of installations, descriptions, name and method of contact.

B. Welder Qualifications: Welders Certified in accordance with American Welding Society Procedures: AWS-1-GMAW-S, WPS No. B2.004.90 for applicable material used in production of specified product.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging container with identification labels intact until ready for installation.

B. Protect materials from exposure to moisture.

C. Store materials in a dry, warm, ventilated weathertight location. If outdoor storage is required, block materials to store at an incline, to prevent pooling of any moisture and promote runoff. Tarp materials in a tent-like arrangement, elevated above the product with open sides to allow airflow. Store all other hardware in a dry controlled environment.

D. Use caution when unloading and handling product to avoid bending, denting, crushing, or other damage to the product.

E. When using forklifts, use forks of proper length to fully support product being moved. Consult shop drawings or consult with factory for proper lift points.

## 1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.9 COORDINATION

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- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Approved Manufacturer: PS Flood Barriers™, which is located at: 1150 S. 48th Street, Grand Forks, ND 58201; Toll Free Tel: 877.446.1519; Email: [4info@psindustries.com](mailto:4info@psindustries.com); Web: [www.psfloodbarriers.com](http://www.psfloodbarriers.com) or [www.psindustries.com](http://www.psindustries.com)
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- D. Obtain all watertight doors and flood barriers assemblies from single manufacturer.

### 2.2 EQUIPMENT

- A. Watertight Doors: Provide the following doors:
  - 1. Hinged Swing Flood Barrier, Single Swing: PS Flood Barriers™ Model HSS-550.
  - 2. Hinged Swing Flood Barrier, Paired Swing: PS Flood Barriers™ Model HPS-555.
- B. Products Details:
  - 1. Sealing Requirements: Flood Barrier and gasket design shall provide an effective barrier against short-term high water situations, to the protection level indicated on Drawings.
  - 2. Operation: Provide with latching operable from one side only (typical).
  - 3. Mounting/Load Transfer: Anchor to existing structure. Flood Barrier designed for specified hydrostatic pressure (and other loads as specified) and will transfer loads to adjacent structure.
  - 4. Frames to be cast-in-place or anchored utilizing mechanical, chemical or other anchor types as designed. Manufacturer to include all anchors, water-stop, and sealants, as designed.
  - 5. Loading Direction Selection:
    - a. Standard: Positive Pressure Loading: (Direction of loading against flood barrier so as to further compress gaskets against flood barrier frame-"seating").
    - b. Optional: Reverse Pressure Loading: (Direction of loading against flood barrier so as to force the flood barrier away from the flood barrier frame-"unseating").
  - 6. Provide rectangular door opening with square corners to facilitate easy passage.
  - 7. Provide compression gasket which requires no inflation.

### 2.3 MATERIALS

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- A. Flood Barrier:
1. Steel: Structural or formed steel shapes conforming to ASTM A 36; tubing conforming to ASTM A 500 Grade B, ASTM A 513; bars conforming to ASTM A 36, M1020; of appropriate size and strength with welded construction.
  2. Stainless Steel: Stainless steel conforming to ASTM A 276.
  3. Aluminum: 6063 alloy conforming to ASTM B 211.
- B. Panel Sheeting: Flood Barrier to be sheeted with steel sheeting or plate, Commercial Quality-Low Carbon ASTM-A-569, ASTM-A-366, ASTM-A-36 welded in place.  
Optional
1. Steel: Commercial Quality-Low Carbon steel conforming to ASTM A 569, ASTM A 366, ASTM A 36; of appropriate size and strength with welded construction.
  2. Stainless Steel: Stainless steel conforming to ASTM A 167, 304 or 316 alloy.
  3. Aluminum: 6063 alloy conforming to ASTM B 209
- C. Gaskets to be factory mounted to flood barrier assembly. Gaskets to be compressible rubber type, typically EPDM unless otherwise noted, and to be field replaceable.
- D. Frame to include jamb, and sill members for field locating and installation on structure. Jamb members to be designed and fabricated with appropriate material as required for the loading.
1. Steel: Structural or formed steel shapes conforming to ASTM A 36 of appropriate size and strength with welded construction.
  2. Stainless Steel: Stainless steel conforming to ASTM A 167 using 304 or 316 alloy.
  3. Aluminum: 6063 alloy conforming to ASTM B 26.
  4. Aluminum: 6061 alloy ASTM B 209.
- E. Threshold:
1. Stainless Steel: Stainless steel conforming to ASTM A 276, 304 or 316 alloy.
  2. Aluminum: 6063 alloy conforming to ASTM B 26.
  3. Aluminum: 6061 alloy ASTM B 209.
- F. Frame Mounting Hardware: Provide anchors, sealant, and water stop, as required.
- G. Operating Hardware: Provide hardware sized for the size and weight of the flood barrier and loads. Hardware to be factory located on jambs and barrier panels, as practical. All loads are transferred to building structure. Latching hardware to be as indicated on Drawings. Flood barrier panel to be factory prepared for applicable latching devices.
- H. Steel Shop Finish: Apply in accordance with manufacturer recommendations and instructions.
1. Primer: One shop coat of manufacturer's standard shop primer (S-W Kemflash Primer E61-R-26).
  2. Finish: Two shop coats of Standard Industrial Enamel (S-W Industrial and Marine Coatings B54 Series)

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- I. Stainless Steel and Aluminum products to be mill finish, welds are ground smooth, not polished, and are factory acid washed, neutralized and rinsed.
- J. Labeling. Each watertight door and frame will be individually identified for matched installation.
- K. Instruction Placard: Provide pictorial and written operation instruction placards on flood barrier.

## 2.4 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's installations instructions, approved shop drawings, shipping, handling, and storage instructions, and product carton instructions for installation.
- B. Frames shall be installed level, square, plumb, and rigid.
- C. Sealants, water-stop, and grouting to be applied per product application directions and in accordance with manufacturer's instructions.
- D. Field Grouting to be completed by appropriate personnel, and in accordance with product application directions and manufacturer's instructions.

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- E. Tolerances: All dimensional requirements must be in accordance with manufacturer's installation instructions and shop drawings.
  
- F. Field Testing:
  - 1. Perform visual dry test for gasket alignment, continuity contact and pre-compression.
  - 2. Construct temporary water barrier and test installed flood barrier.

### 3.4 FIELD QUALITY CONTROL

- A. Products to be operated and field verified including the sealing surfaces to assure that they maintain contact at the correct sealing points.
  
- B. Verify that hinging and latching assemblies operate freely and correctly.
  
- C. Verify all anchorage is in accordance with manufacture's installation instructions and applicable data sheets.

### 3.5 CLEANING

- A. Repair or replace damaged installed products or components.
  
- B. Clean all sealing surfaces.
  
- C. Touch up damaged finish.

### 3.6 PROTECTION

- A. Protect installed products until completion of project.
  
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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