**Section 08316 Removable Aluminum Flood Barriers**

**Gasketed Aluminum Flood Log System (Pat. Pend. (PP)) Specifications**

* **Part 1 • General**

# 1.01 Description and general notes

* + - Work Included:
			* Provide flood barrier(s) factory assembled with frame(s) and hardware in accordance with the contract documents.
			* All Barrier heights shall be finished to 12” min. above Base Flood Elevation (BFE) unless otherwise stated by the Architect or Engineer of Record (EOR)
			* BFE and Building Sub Elevations shall be furnished to Barrier Manufacturer by the Architect or Engineer of Record.
		- The structural design of these Removable Flood Panels is generic and has been designed for hydrostatic hydrodynamic and impact debris flood loads with water pressures corresponding to maximum water height and flow speed of 5 ft. /sec. up to 8 ft. /sec. in order to certify minimum required flood elevation to top of Flood Panels.
		- It shall be determined, on a job by job basis, the required Panel height and flow speed for the design of Removable Flood Panels, based on FEMA's criteria (See Note #3) as well as per ASCE 24‐14 Standard. Installation and construction of these Flood Panels for use within flood hazard areas shall be in accordance with the American Society of Civil Engineers Flood Resistant Design and Construction Standard SEI/ASCE 24‐14.
		- Design criteria is for Type 2 Closures in chapter 7, section 70 1.1.2 of the Army Corp of Engineers, EP 1165‐2‐314 12/1195 and based on the 2018 Edition of the International Building Code, the corresponding provisions of ASCE 24‐14, FEMA flood proofing non‐ residential structures manual FEMA 102, FEMA P‐936 and FEMA Technical Bulletin 3‐

21. Design flood loads have been determined in accordance with ASCE 7‐16. Design wind loads have been determined in accordance with ASCE 7‐16 for 180 mph Basic Wind Speed for category 2 building. This flood barrier design criteria is for buildings in an "A" or "AE" flood zone and is not to be used in a Coastal "A" zone or high velocity "V" zone.

* + - Flood barriers shall not be installed within areas where ice flows or ice jams occur.
		- Flood barrier design have tested by an independent testing lab for water infiltration in accordance with FEMA 102 manual for flood proofing of non‐residential structures, specifications Section 8, Page 70. Type 2 Flood closures or barriers are permitted allowable seepage rates. Seepage amounts will vary with building conditions encountered. ASCE 24‐14 chapter 6 states "sump pumps shall be provided to remove water accumulated due to any passage of vapor and seepage of water during the flooding event." Owner acknowledges and is responsible for all drains, piping and sump pumps required to meet ASCE 24‐14 requirements to offset water build up behind the barrier system. These materials and equipment are not provided by Architecture Metals Ltd. or Flood Panel LLC.
		- Flood Panel manufacturer to install and use gaskets and approved sealants following all the recommendations and specifications of the manufacturers respectively.
		- Owner, General contractor or installer to verify all dimensions, wall and floor conditions at site before proceeding with the work, and shall notify this engineer if any discrepancy is found that would alter the structural design of these Flood Panels.
		- Existing slabs and walls adjacent to opening where Flood Panel is to be installed shall be given a surface treatment by means of water proof sealer before flood Panel is installed. Surface must be smooth, square, plumb and level.
		- Existing slabs and walls adjacent to openings where Flood Panels are to be installed shall be structurally designed by engineer of record, to sustain the same hydrostatic, hydrodynamic and impact pressures that correspond to maximum water elevation above finished floor at top of Panel , based on criteria mentioned on Note #3.
		- Drop‐in anchors embedded into concrete for removable support installation shall be covered with a cap or similar device to protect their inside hold from dust, so that machine screws can easily be installed at time of flood warning. Concrete anchors by others.
		- Separation of Panel to window/door shall be measured from back of Panel to window/door including any knob, handle, or protruding device, and shall be 2" minimum.
		- All aluminum extrusions to be 6063‐T6 alloy, and 6005‐T5 alloy.
		- All sheet metal screws shall be as manufactured by ITW/Buildex "TEK Screws", and to be made of non‐corrosive material.
		- All bolts to be galvanized steel ASTM A‐307 designation or 304 Series Stainless Steel.
		- All gaskets installed shall be neoprene per drawings.
		- All welding to conform to the American Welding Society AWS D1.2/d1.4m 2017 Regulations. Use certified welders. Use ER‐5356 Electrodes for aluminum a E70 for steel.
		- The engineer, Architecture Metals Ltd. or Flood Panel LLC. is not responsible for construction safety at site which is the owner, general contractor or installer's responsibility. Flood Panel Manufacturer to be responsible for providing the tenant with shop drawings and proper instructions for the installation of these Flood Panels.
		- Surfaces against which the sealing gasket presses must be built "paper‐smooth" to prevent excessive water extrusion, beyond that allowed by requirements. All surfaces must be plumb, square and level.

# 1.02 Standards

* + - A. Comply with the provisions of (as applicable).
			* 1) AWS Structural Welding Code D1.2/D1.4M 2017 Reg.
			* 2) ASTM A36, A240,
			* 3) ASCE 7‐16, ASCE 24‐14, SEI/ASCE 24‐14
			* 4) FBC Chapter 20, Section 2003.8.4.
			* 5) QA program that is registered to ISO 9001∙2000
			* 6) 2018 Edition of the International Building Code
			* 7) FEMA 3‐21, FEMA 102, FEMA P‐936

# 1.03 Submittals

* + - A. Calculations and signed and sealed drawings:
			* If required: Submit calculations, approved by a qualified engineer, to verify the barrier's ability to withstand the design pressure loading, based on current building code and specified load combinations. Signed and sealed drawings and calculation set available upon request.
		- B. Shop Drawings:
			* Submit shop drawings for flood barriers including dimensioned plans and elevations, sections, connections and anchorage.
		- C. Manufacturers Data:
			* Submit installation and maintenance instructions for flood barriers.
		- D. Warranties
			* Provide manufacturer’s warranty and warranty qualification stating that flood barriers for above project will be free from defects and workmanship for a period of one (1) year from date of substantial completion.
			* Flood Certificate, signed final inspection by Architect or EOR of installed flood barriers and final installation pictures of each opening is required by Flood Panel LLC to issue a warranty.
		- E. Flood Certificate
			* Responsibility for filing the building FEMA "Flood Proofing Certificate" is the responsibility of the owner's architect and/or engineer and not of Architecture Metals Ltd. or Flood Panel LLC.
		- F. Flood Emergency Operation Plan per FEMA 3‐21
			* Responsibility of building owner and design professional
		- G. Inspection and Maintenance Plan per FEMA 3‐21
			* Responsibility of Building Manager

# 1.04 Qualifications

* + - A. Experience:
			* The manufacturer of the flood barrier(s) shall present evidence attesting to at least 5 years of successful experience in the design, manufacture, and site implementation of the flood barrier system type specified.
* **Part 2 • Products**

# 2.01 Acceptable Flood Barrier Manufacturers and Distributors

* + - Flood barriers shall be as manufactured by Flood Panel LLC 5500 Military Trail Ste 22-220 Jupiter FL 33418
		- Acceptable Distributor: Floodproofing.com, Inc 19 Mantua Road Mount Royal NJ 08061 info@floodproofing.com 800-507-0865

# 2.02 Materials

* + - A. Aluminum Flood Log (PP) Panels to be of 6005‐T5
		- B. Intermediate and End Posts:
			* The majority of the post is to be from grade ST37 (S235 JR) or galvanized steel with the exception of below ground supports which are to be of grade 304 stainless steel or equal.
		- C. All steel to be primed with one coat Sherwin Williams Kern Flash rust inhibitive, lead free, primer, or equivalent.
		- D. Base Gaskets to be sandwich composite combination low/high compressed set gaskets mechanically retained in the flood logs; 40D medium compression set gaskets retained mechanically in the top of each flood log and low compression gaskets in the jambs and mid‐span supports.

# 2.03 Design

* + - A. Loads for the design of the Flood Log Flood Panel System (PP) have been determined assuming that the location of the building where the system is to be installed is outside of High Risk Flood Hazard Areas, Coastal High Hazard Areas, and Coastal A zones, per Dry Flood proofing Limitations on ASCE 24‐14, Section 6.2.1.
		- B. This Flood Log System Flood Panel System (PP) has been designed for the loads and load combinations listed on the ASCE 7‐16, Section 2.0 (Combinations of Loads), including the following flood loads according with ASCE 7‐16 Section 5.3.3 (Loads During Flooding):
			* 1) Hydrostatic Loads, caused by water which is either stagnant or moves at velocities less than 8 ft./sec., according with ASCE 24‐14, Section 6.2.1 and ASCE 7‐16, Sections 5.3.3.2 and C5.3.3.2.
			* 2) Hydrodynamic Loads: Hydrodynamic loads not considered since flow of water is moving at velocities less than 8ft./sec., according with ASCE 24‐14, Section 6.2.1 (Dry Flood proofing Limitations).
			* 3) Wave Loads: Only Non‐breaking wave action is considered since Non‐ breaking waves on vertical walls can also be computed as hydrostatic forces, according with FEMA 550‐2006, Section 3.4 (Wave Loads) and ASCE 7‐16 Section 5.3.3.4 (Wave Loads). Breaking waves and broken waves are proper of other areas where Dry‐Flood proofing is not allowed according with ASCE 24‐ 14, Section 6.2.1 (Dry Flood proofing Limitations).
			* 4) Impact Loads: Not considered since Hydrostatic analysis is performed for flow of water moving at velocities of less than 5 ft/sec.
		- C. This Flood Log System Flood Panel System (PP) is designed for a maximum wind load pressure of +/‐ 126 psf, which is the maximum wind load pressure per Structural Drawings.
		- D. Frame(s) and Intermediate post(s) shall have mounting holes for connecting anchors and bolts. Anchor type, size, and method dependent on load capabilities of structure.
		- E. The individual Flood log sections shall be 3” deep by 12.25” tall with a top interlocking gasket slot system which includes gaskets and gasket channels between sections and full height in the jamb channels. Multiple logs are to be stacked to meet or exceed the base flood elevation plus additional 12” or 24” for wave action per the job requirements and location. Embed plates may be required at the sill and jambs based on the condition at the opening and the loads imposed on the system. Jamb supports are to be continuous structural steel channels designed specifically for the Flood log system and are to be anchored and sealed to the condition with embeds or mechanical anchors.

**Part 3 – Execution**

# 3.01 Installation

* + - A. Install flood barriers in accordance with manufacturer's instructions and approved shop drawings.
		- Building contractor to verify that all surfaces against which the sealing gasket presses must be built "paper‐smooth" to prevent excessive water extrusion, beyond that allowed by requirements. All surfaces must be plumb, square and level before installation can begin.
		- All embed plates are to be installed using Dow Corning 995 caulk or equal or waterproof grout at back of support covering full height and width of support and producing squeeze out on all sides to assure proper seal. Sealer by others.
		- Existing slabs, walls and columns adjacent to openings where flood barriers are to be installed shall be waterproofed with a waterproof membrane or a water proof sealer surface treatment prior to the installation of the flood barriers by the contractor.
		- All fixed mill finish aluminum supports must have a protective barrier between the support and the concrete and any dissimilar metals to prevent corrosion.
		- Install all supports true and plumb without racking or warping.
		- For Flood Panel LLC to warranty the product supplied, the Flood Barrier installer must provide photos of each opening during and following installation. Inspection of each opening is required per the Flood Certificate by the architect or engineer of record to verify installation compliance with the manufacturers shop drawings and installation instructions. Installer can then uninstall the barrier system and the building contractor shall move the barriers to a storage location as directed by the Architect or Owners representative.

# 3.01 Cleaning, Inspection and Storage

* + - Inspect all barriers for damaged parts
		- Repair or replace damaged installed products and components
		- Touch up all damaged surfaces
		- Clean all exposed surfaces and let dry before storing

# 3.02 Protection

* + - Building contractor to move all barriers to designated storage location and shall stack the barriers in a manner that does not damage the gaskets. Position all gaskets away from high traffic areas in the storage area to prevent damage to the gaskets.
		- Protect installed product and finish surfaces from damage during handling, storage and installation.
		- Protect all installed product and finished surfaces during normal and general operation.

