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**SECTION 08 39 19**

**WATERTIGHT DOORS (FLOOD BARRIERS)**

**PART 1 GENERAL**

* 1. SECTION INCLUDES
     1. Specialty custom designed Flood Doors, factory assembled with frame(s) and hardware, in accordance with documentation.
        1. Hinged Flood Door (Single Leaf)
  2. RELATED SECTIONS
     1. (ADD APPLICABLE SECTIONS)
     2. Alternates: Similar products of other manufacturers subject to A-E prior approval and must meet the requirements provided by this specification.
  3. REFERENCES
     1. American Society for Testing and Materials (ASTM) - ASTM A36 Standard Specification for Carbon Structural Steel
     2. American Iron and Steel Institute (AISI) - AISI CL 304
     3. Aluminum Association (AA) “Specification for Aluminum Structures”, 7th Edition.
     4. American Society of Mechanical Engineers (ASME) - ASME Code Section VIII, Div. 1, ASME Code Section IX
     5. FEMA Engineering Principles and Practices of Retrofitting Flood-Prone Residential Structures #114
     6. FEMA Technical Bulletin 3-21 Non-Residential Flood Proofing.
     7. American Society of Civil Engineers (ASCE) - SEI/ASCE 7-22 Minimum Design Loads for Buildings and Other Structures
     8. American Welding Society Structural Welding Code (AWS) - AWS D1.1, D1.2
     9. Aluminum Structures: “A Guide to Their Specifications and Design”.
     10. Flood Proofing Regulations, U.S. Army Corps of Engineers, EP 1165-2-314, 15 December 1995.
  4. SYSTEM DESCRIPTION
     1. Provide hinged flood doors, which have been designed and manufactured to perform under hydrostatic loads (and hydrodynamic or other loads as specified) to control short-term load pressures indicated and perform to manufacturers’ criteria. All water pressure loads and operating loads are transferred to the building structure. Building structure design, capacity to accept loads from flood doors, and evaluation of loads and structure is by others.
     2. Except as otherwise indicated, requirements for aluminum flood barriers, terminology, tolerances, standards or performance and workmanship are those specified as Type 2 Closures in Chapter 7, Section 701.1.2 of the U.S. Army Corps of Engineers, EP 1165-2-314, 15 December 1995.
     3. These Type 2 Flood Closures/Barriers shall form essentially dry barriers or seals, allowing only slight seepage during the hydrostatic pressure conditions of flooding to the Regulatory Flood Datum (RFD) or the Design Flood Elevation (DFE). Seepage amounts will vary with conditions encountered. This issue should be addressed by the design professional and usage of sump or bilge type pumps should be used to offset potential water build-up.
  5. SUBMITTALS
     1. General: Provide submittals in accordance with Conditions of the Contract.
     2. (OPTIONAL) Calculations: Submit calculations approved by a qualified engineer, to verify the flood door’s ability to withstand the design loading.
     3. 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.
     4. Installation: Provide installation instructions and drawings detailing installation procedure.
     5. 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.
  6. QUALITY ASSURANCE
     1. Experience: Manufacturer must demonstrate a minimum of Five (5) years successful experience in design and manufacture of similar flood related closures.
     2. Provide evidence to the effect, including a list of installations, descriptions, name and method of contact shall be provided.
     3. 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.
  7. DELIVER, STORAGE, AND HANDLING
     1. Delivery
        1. Deliver materials in manufacturer’s original, unopened, undamaged shipping container with identification labels intact.
     2. Storage
        1. Store all materials in a dry, controlled area to protect them from elements and damage. If outdoor storage is required, block materials to store at an incline, to prevent pooling of any moisture and promote runoff.
        2. Do not tarp tightly, as this will entrap moisture. Instead, tarp materials in a tent-like arrangement, elevated above the product with open sides to allow airflow.
        3. Store all other hardware in a dry controlled environment.
        4. For additional questions on delivery, storage, or handling, contact Flood Panel @ 860-222-3055
     3. Handling
        1. Use caution when unloading and handling products to avoid bending, denting, crushing, or other damage to the product.
        2. When using forklifts, use forks of proper length to fully support product being moved.
        3. Consult drawings or factory for proper lift points.
  8. WARRANTY
     1. Special Warranty
        1. Manufacturer warrants this product and components to be free from manufacturing defects for a period of One (1) year from date of shipment.
  9. MAINTENANCE
     1. Routine inspections and maintenance (Determined by owner).
     2. General housekeeping of Flood Shield immediate area.
     3. Immediate replacement or repair of damaged or missing components.

**PART 2 PRODUCTS**

* 1. MANUFACTURERS & DISTRIBUTORS
     1. Flood Panel
        + 1555 Jupiter Park Drive STE 5
        + Jupiter, Florida 33418
        + 860-222-3055
        + Email: [info@floodpanel.com](mailto:info@floodpanel.com); Web: [www.floodpanel.com](http://www.floodpanel.com)
     2. Floodproofing.com
        + 19 Mantua Road
        + Mount Royal, NJ 08061
        + 800-507-0865
        + Email: [info@floodproofing.com](mailto:info@floodproofing.com); Web: [www.floodproofing.com](http://www.floodproofing.com)
     3. Substitutions not permitted.
  2. PERFORMANCE
     1. Products Details:
        + Special loading: Standard Flood Doors are designed for hydrostatic loading, and have no additional allowances included for hydrodynamic loads, wave loads or debris impact loads. Flood Doors may be designed for hydrodynamic loads, wave loads, debris impact loads, or other uniform loads upon request. Insert Water Protection Height:\_\_\_\_\_\_\_

1. Flood Panel flood barrier design and gasketing will permit an effective barrier against short-term high-water situations. It is not intended that these flood barrier assemblies will perfect a totally watertight barrier, and some amount of leakage (and condensation) should be allowed for. Effectiveness of the sealing capacity will be dependant upon the proper installation of the flood barrier and frame members, the adjacent structure, the care and maintenance of the gasketing, and the placement of the flood barrier in time of need.
2. Except as otherwise indicated, requirements for flood barriers, terminology, tolerances, standards or performance and workmanship are those specified as Type 2 Closures in Chapter 7, Section 701.1.2 of the U.S. Army Corps of Engineers, EP 1165-2-314, 15 December 1995.
3. These Type 2 Flood Closures/Barriers shall form essentially dry barriers or seals, allowing only slight seepage during the hydrostatic pressure conditions of flooding to the Regulatory Flood Datum (RFD) or the Design Flood Elevation (DFE). Seepage amounts will vary with conditions encountered. This issue should be addressed by the design professional and usage of sump or bilge type pumps should be used to offset potential water build-up.
4. Flood Panel recommends that the owner implement an annual maintenance program to check the gaskets and doors. This program may require the replacement of gaskets; touch up painting and accounting for of all the latching devices.
5. Sealing Requirements: Flood Door and gasket design to provide an effective barrier against short-term high-water situations, to the protection level indicated on drawings.
6. Model/Trajectory of Operation Options:
   * + - 1. “Hinged Flood Door”
7. Operational Requirement: Latching: Flood Panel standard Two-Point Latch
8. Mounting/Load Transfer: Anchor to existing structure. Flood Door designed for specified hydrostatic pressure (and other loads as specified) and will transfer loads to adjacent structure. Frames to be anchored utilizing mechanical, chemical or other anchor types as designed. Manufacturer to include all anchors, water-stop, and sealants, as designed, for bolt-in place applications.
9. Loading Direction Selection:
   1. Positive Pressure Loading: (Direction of loading against flood door so as to further compress gaskets against flood shield frame—“seating”).
10. Material requirements: See Section 2.03 COMPONENTS.
11. Provide rectangular door opening with square corners to facilitate easy passage.
12. Provide compression gasket which requires no inflation.
13. COMPONENTS
    1. Attributes
    2. Panel Structure: Flood Door to be fabricated from structural or formed steel shapes, ASTM A36; tubing, ASTM-A-500 Grade C, ASTM-A-513; bars, ASTM-A-36, M1020; of appropriate size and strength, welded construction. Optional materials include Stainless Steel (316)
       * + Panel Sheeting: Flood Door 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 materials include Stainless Steel (316)
         + Gaskets to be factory mounted to flood door assembly. Gaskets to be compressible rubber type, typically EPDM unless otherwise noted, and to be field replaceable.
         + Frame to include jamb, head and sill members for field locating and installation on structure. Jamb members to be formed from appropriate gauge steel as required for the loading, ASTM A36. Optional materials include Stainless Steel (316). The threshold to be formed from Stainless Steel (316) or as referenced in drawings. Frame to be installed as recommended by manufacturer and in accordance with manufacturer’s installation instructions and drawings.
         + Frame Mounting Hardware includes anchors, sealant, and water stop, as designed, and provided by others.
         + Operating Hardware: To be custom sized for the size and weight of the flood door and loads. Hardware to be factory located on jambs and door panels, as practical. All loads are transferred to the building structure. Latching hardware to be as indicated on drawings. Flood door panel to be factory prepared for applicable latching devices.
         + Finish on all exposed surfaces to be one (1) shop coat of manufacturer’s standard shop primer (S-W Kemflash Primer E61-R-26).

Door is to be finished painted on job site by others (Finish paint by others). Recommended paint to be used is two (2) coats of Standard Industrial Enamel (S-W Industrial and Marine Coatings B54 Series) applied in accordance with manufacturer recommendations and instructions. (Note: Touch up of finish will be required as scratches will occur during shipment, handling, and installation. Optional Finish of “Power Coat” is available for an additional fee. Stainless Steel and Aluminum products to be mill finish, welds are ground smooth, not polished, and are factory acid washed, neutralized, and rinsed.

* + - * Labeling. Each flood door and frame will be individually identified for matched installation.
      * Instruction Placard: Provide pictorial and written operation instruction placards on flood door.
  1. SOURCE QUALITY CONTROL
     1. Obtain flood doors assemblies from single manufacturer.

**PART 3 EXECUTION**

* 1. EXAMINATION
     1. Compliance: Comply with all manufacturer’s product data, including installations instructions, reference drawings, shipping, handling, and storage instructions, and product carton instructions for installation.
  2. INSTALLATION/APPLICATION
     1. Flood Door Installation
        1. Install Flood Door in accordance with manufacturer’s installation instructions, shop drawings, and details. Frames shall be installed level, square, plumb, and rigid. Required tolerances to be no greater than 1/16” variation over entire length of frame members or sill member.
        2. Sealants, water-stop, and grouting to be applied per product application directions and in accordance with manufacturer’s instructions.
        3. Field Grouting to be completed by appropriate personnel, and in accordance with product application directions and manufacturer’s instructions. Grout to be nonmetallic and minimum 5000 psi.
     2. Tolerances
        1. All dimensional requirements must be in accordance with the manufacturer’s installation instructions and shop drawings.
     3. Effectiveness
        1. Effectiveness of the sealing capacity will be dependant upon the proper installation of the flood door, frame and sill members, the adjacent structure, the care and maintenance of the flood door and gaskets, and the placement/closure of the flood door in time of need.
        2. Field Testing: Perform visual dry test for gasket alignment, continuity contact and pre-compression, or test with hose or construct temporary water barrier and test installed flood door.
  3. FIELD QUALITY CONTROL
     1. Installation: Product to be installed using good general construction methods and practices, in accordance with manufacturer’s instructions and drawings.
     2. Field Tests/Installation Verification:
        1. Products to be operated and field verify the sealing surfaces maintain contact at the correct sealing points.
        2. Hinging and latching assemblies operate freely and correctly.
        3. Verify all anchorage is in accordance with manufacture’s installation instructions and applicable data sheets.
  4. CLEANING
     1. Repair or replace damaged installed products or components.
     2. Clean all sealing surfaces.
     3. Touch up damaged finish.
  5. PROTECTION
     1. Protect installed product and finish surfaces from damage during handling, storage, and installation.
     2. Protect installed product and finish surfaces during normal and general operation.

GENERAL NOTES based on International Building Code 2014 Edition “IBC”:

1. The structural design of the flood Doors has been designed for hydrostatic flood loads with water pressures corresponding to maximum water height as depicted in the enclosed drawings plus hydrodynamic pressure.

2. It shall be determined, on a job-by-job basis, the required height and flow speed for the design of Flood Door, based on FEMA's criteria (See Note #3) as well as per ASCE 24-05 Standard. Installation and construction of these Flood Doors 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 24-05.

3. Design criteria has been based on the 2014 Edition of the International Building Code, the corresponding provisions of ASCE 24-05, FEMA flood proofing non-residential structures manual FEMA 102, FEMA P-936 dated July, 2013 and FEMA Technical Bulletin 3-93. Design flood loads have been determined in accordance with ASCE 7-22. Design wind loads have been determined in accordance with ASCE 7-22 for 180 mph Basic Wind Speed for category 2 building.

4. Flood Doors shall not be installed within areas where ice flows or ice jams occur.

5. In order to certify flood elevation, Flood Panel design has been 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.

6. Flood Door installer to use gaskets and approved sealants following all the recommendations and specifications of the manufacturers respectively.

7. 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 Doors.

8. Existing slabs and walls adjacent to opening where Flood Door is to be installed shall be given a surface treatment by means of water proof sealer before flood Door is installed. Surface must be smooth, square, plumb and level.

9. Existing slabs and walls adjacent to openings where Flood Doors 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 Door , based on criteria mentioned on Note #3.

10. Concrete anchors by others.

11. All welding to conform to the American Welding Society AWS D1.2. 1998 Regulations. Use certified welders. Use ER-5356 Electrodes.

12. The engineer or Flood Panel. is not responsible for construction safety at site which is the owner, general contractor or installer's responsibility. Flood Door Manufacturer to be responsible for providing the tenant with shop drawings and proper instructions for the installation of these Flood Doors.

18. All surfaces must be plumb, square and level.

19. To receive a warranty for the flood barriers provided by Flood Panel as depicted in this set of drawings, the following information must be provided by the building owner to Flood Panel:

To receive credit for flood proofing, a completed Flood proofing Certificate for Non-Residential Structures is required for non-residential and business buildings in the Regular Program communities, located in zones A1-A30, AE, AR, AR Dual, AO, AH, and A with BFE.

In order to ensure compliance and provide reasonable assurance that due diligence had been applied in designing and constructing flood proofing measures, the following information must be provided with the completed Flood proofing Certificate:

1. Photographs of shields, gates, barriers, or components designed to provide flood proofing protection to the structure installed and deployed on the building.

2. Written certification that the barrier system was inspected during and after initial installation and is installed per the drawings, engineering and instructions provided by the manufacturer.

3. Written certification that the envelope of the structure is watertight with walls substantially impermeable to the passage of water required under 44 Code of Federal Regulations (44 CFR 60.3 (c)(3))

4. A comprehensive Maintenance Plan for the entire structure to include but not limited to:

· Exterior envelope of the structure

· All penetrations to the exterior of the structure

· All shields, gates, barriers, or components designed to provide flood proofing protection to the structure

· All seals or gaskets for shields, gates, barriers, or components

· Location of all shields, gates, barriers, and components as well as all associated hardware, and any

· Materials or specialized tools necessary to seal the structure.

U.S. DEPARTMENT OF HOMELAND SECURITY

FEDERAL EMERGENCY MANAGEMENT AGENCY

National Flood Insurance Program

NFIP Flood proofing

19. Responsibility for filing the building "Flood Proofing Certificate" is the responsibility of the owner's architect and/or engineer and not of Flood Panel.

END OF SECTION

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