

## **Bulletin # 15: Flood Openings**

Date: April 20, 2017

Effective Date: Immediately

Amended: June 01, 2023

To: All Staff

From: Fred Clum, Chief Building Official

Subject: Explanation, Requirements and Procedure for Flood Openings.

Flood openings requirements are found within the Florida Building Code-Residential, Section R322 – Flood Resistant Construction & Florida Building Code-Building, Section 1612 – Flood Loads. Supplemental guidance regarding flood openings rationale and requirements are found within the Technical Bulletin # 1: Requirements for Openings in Foundation Walls and Walls of Enclosures produced by FEMA, March 2020 (TB 1). It is the intent of this bulletin to clarify the requirements of the Building Code, highlighting specific areas of concern.

### **Definitions (per TB 1):**

**Enclosed area (enclosure):** An area below an elevated building that is enclosed by walls on all sides.

**Net open area:** Permanently open area of a non-engineered flood opening.

**Lowest floor:** Lowest floor of the lowest enclosed area of a building, including basement. An unfinished or flood-resistant enclosure that is used solely for parking of vehicles, building access, or storage is not the lowest floor, provided the enclosure is built in compliance with applicable requirements

**Opening, engineered:** Has moving parts and must be designed and certified by registered design professional as engineered flood opening. An engineered opening is an opening that is designed and certified by a registered design professional as meeting certain performance characteristics related to providing automatic entry and exit of floodwaters; the certification requirement may be satisfied by an individual certification or issuance of an Evaluation Report by the ICC Evaluation Service, Inc.

**Opening, non-engineered:** Is a flood opening without moving parts. This opening that is used to meet the National Flood Insurance Program's prescriptive requirement of 1 square inch of net open area for every square foot of enclosed area.



## Florida Building Code-Residential, 7<sup>th</sup> Edition (2020) – Section R322- Flood-Resistant Construction

R322.2.2 Enclosed area below design flood elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation shall:

1. Be used solely for parking of vehicles, building access or storage.
2. Be provided with flood openings that meet the following criteria and are installed in accordance with Section R322.2.2.1:

2.1. The total net area of non-engineered openings shall be not less than 1 square inch (645 mm<sup>2</sup>) for each square foot (0.093 m<sup>2</sup>) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in Section 2.7.2.2 of ASCE 24.

2.2. Openings shall be not less than 3 inches (76 mm) in any direction in the plane of the wall.

2.3 The presence of louvers, blades, screens and faceplates or other covers and devices shall allow the automatic flow of floodwater into and out of the enclosed areas and shall be accounted for in the determination of the net open area.

R322.2.2.1 Installation of openings. The walls of enclosed areas shall have openings installed such that:

1. There shall be not less than two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings.
2. The bottom of each opening shall be not more than 1 foot (305 mm) above the higher of the final interior grade or floor and the finished exterior grade immediately under each opening.
3. Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

R322.3.5 Walls below design flood elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or 7<sup>th</sup> Ed. FBC, Residential (November 2020) 27 of 39
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such

walls, framing and connections shall have a resistance of not less than 10 (479 Pa) and not more than 20 pounds per square foot (958 Pa) as determined using allowable stress design; or 4. Where wind loading values of this code exceed 20 pounds per square foot (958 Pa), as determined using allowable stress design, the construction documents shall include documentation prepared and sealed by a registered design professional that:

4.1. The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the base flood.

4.2. The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by this code.

**5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in Section R322.2.2, Item 2**

#### **LOCATION & MINIMUM NUMBER OF FLOOD OPENINGS**

- Flood openings should be installed in at least two sides of each enclosed area
- In some situations, openings in interior walls or partitions are necessary to ensure that floodwater can reach all enclosed areas and minimize unbalanced hydrostatic loads on interior and exterior walls.
- When openings are used in interior walls, the total number of openings and their net open area should be based on the size of the enclosed area, but openings in interior walls are not counted toward the required total opening requirement based on the exterior measurement of the enclosed area.
- To maintain safe fire separation, flood openings should not be placed in the wall separating a garage from living spaces and crawlspaces unless devices used as flood openings that are designed to satisfy fire-separation requirements are used.

#### **DOCUMENTATION REQUIRED**

The following information is required regarding the characteristics of crawlspaces, enclosures, and attached garages:

- Square footage of the enclosed area, measured on the outside of the enclosure walls
- Number of permanent flood openings within 1.0 foot above adjacent grade
- Total net open area of flood openings
- Whether engineered openings are used

NOTE: Sections A8, A9 and D (comments) of FEMA Elevation Certificate (FEMA Form 086-0-33) are where the necessary information on flood openings is documented/recorded. NOTE: If applicable, provide a copy of the Individual Engineering Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES) (IF ENGINEERED OPENINGS ARE USED)