

Building Codes

BOCA:

Section 1210.0 Ventilation of Special Places

1210.2 Crawl Spaces

Crawl space areas, other than those used as an under floor plenum, shall be ventilated by an approved mechanical means or by openings in exterior walls. Openings shall be located as close to corners as practicable and shall provide cross ventilation on at least two approximately opposite sides. The openings shall be covered with corrosion resistant mesh not less than ¼ inch (6mm) nor more than ½ inch (13mm) in any direction.

1210.2.1 Opening Size:

Openings shall have a net area of not less than 1 square foot (.093m²) for each 150 square feet (13.95 m²) of foundation space. Where an approved vapor retarder is installed over the ground surface, the required net area of openings shall be reduced to 0.1 square foot (0.093m²) for each 150 square feet (13.95 m²) and the vents shall have manually operable louvers.

BOCA:

Section 3107.0 Flood Resistant Construction:

3107.1 General:

All buildings and structures erected in areas prone to flooding shall be constructed and elevated as required by the provisions of this section.

3107.2 Base Flood Evaluation:

The base flood evaluation shall be used to define areas prone to flooding and shall describe, at a minimum, the depth or peak evaluation of flooding (Including wave height) which has a 1% (100 year flood) or greater chance of occurring in any given year.

3107.4.3 Enclosures Below Base Flood Elevation:

Enclosed spaces below the base flood elevation shall not be used for human occupancy with the exception of structure means of egress, entrance foyers, stairways and incidental storage. Fully enclosed spaces shall be designed to equalize automatically hydrostatic forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement shall either be certified by a registered design professional in accordance with section 3107.12 or confirm to the following minimum criterion: a minimum of two openings having a total net area of not less than 1 square inch (645mm²) for every one square foot (0.1 m²) of enclosed area subject to flooding shall be provided. The bottom of all openings shall not be higher than 12 inches (305mm) above grade. Openings shall not be equipped with screens, louvers, valves, or other coverings or devices unless such devices permit the automatic entry and discharge of floodwaters.

FEMA:

Section 44 CFR 60.3 (C5)

Required for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. **Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.**

International Code Council Specifications

International Building Code

P. 259-1202.3.1 Openings for Under Floor Ventilation. Section 1202.3.2 Line 5 states that: For buildings in flood hazard areas as established in section 1612.3, the opening requirements of ASCE 24 are authorized to be satisfied by ventilation openings that are designed and installed in accordance with ASCE 24.

See ASCE 24 Specification Below

p. 259-1202.1 Ventilation General: Buildings shall be provided with natural ventilation in accordance with section 1202.4 or shall be provided with mechanical ventilation in accordance with the International Mechanical Code.

International Mechanical Code

401.6 Outdoor opening Protection: Air exhaust and intake openings that terminate outdoors shall be protected with corrosion resistant screens, louvers or grills. Openings in Louvers grills, and screens shall be sized in accordance with table 401.6.

Table 401.6

Intake opening in residential occupancies Not <1/4" and not >1/2"

IBC Continued

p.328 1612.5 Flood hazard certificates

1.2.: For fully enclosed areas below the design flood elevation where provisions to allow for the automatic and exit of flood waters do not meet the requirements in section 2.6.11, ASCE 24, certification by a registered design professional that the design will provide for equalization of hydrostatic flood forces in accordance with **2.6.1.2, ASCE 24.**

p. 715 Appendix F Rodent Proof:

F101.2 Foundation wall ventilation Openings: Foundation wall ventilator openings shall be covered for their height and width perforated sheet metal plates no less than .070" thick, expanded metal plates not less than .047" thick, cast iron grills or grating, extruded aluminum load bearing vents or with hardware cloth of .035" wire or heavier. The openings therein shall not exceed 1/4". (A note at the top of this page reads as

follows: The provisions contained in this appendix are not mandatory unless specifically referenced in the adapting ordinance.)

International Residential Code

P. 54 Section R 327

Flood Resistant Construction:

R327.2.2 Enclosed Area below design Flood elevation:

- 1- Be used solely for parking of vehicles, building access or storage.
- 2- Be provided with flood openings which shall meet the following criteria:
 - A. There shall be a minimum of two openings.....
 - B. The total net area of the opening shall be at least 1 sqin per 1 sqft of enclosed area.
 - C. The bottom of each opening shall be 1 foot above the adjacent ground level.
 - D. Openings shall be at lease 3inches in Diameter.**
 - E. Any louvers, screens or other opening covers shall allow the automatic flow of floodwaters into and out of the enclosed areas.
 - F. Openings installed in doors and windows, that meet requirements 2.1 through 2.5, are acceptable; however, doors and windows without installed openings do not meet the requirements of this section.

p.525 Appendix C Exit terminals of mechanical Draft and direct-Vent Venting systems. (There is a note that states that this appendix is informative and is not part of the code) The drawing shows 3” diameter tubes protruding from the foundation 12 from ground level.

ASCE 24-98 (American Society of Civil Engineers) Flood Resistant Design and Construction.

p.8 2.5 Foundation Openings: 2.5.4.1 Required Openings in Load Bearing Foundation Walls: Load bearing foundation walls that enclose an area below DFE, and that do not meet the dry flood proof requirements of section 7.2, shall contain openings to allow for automatic entry and exit of flood waters during design flood conditions. These openings shall meet the requirements of section 2.6.1.

p. 10 2.6.1.1 Non-Engineered Openings in enclosures Below the Design Flood Elevation. Non-Engineered openings shall meet the following criteria:

- 1- There shall be a minimum of two openings on different sides of each enclosed areas; if a structure has more then one enclosed area below the DFE, each area shall have openings on exterior walls.
- 2- The total net area off all openings shall have at least 1 insq for each ftsq of enclosed area.
- 3- The bottom of each opening shall be no more then 1 ft. above the adjacent ground level.
- 4- Openings shall not be less then 3” in diameter.**
- 5- Any louver, screens or other opening covers shall not block or impede the automatic flow of floodwaters into and out of the enclosed areas.**
- 6- Openings meeting requirements 1 through 5 above installed in doors and windows are acceptable; however, doors and windows are not deemed to meet the requirements of this standard.

p. 10 2.6.1.2 Engineered Openings in enclosures Below the Design Flood Elevation. Non-Engineered openings shall meet the following criteria:

Same as 2.6.1.1 except:

- 5- The difference between the exterior and interior floodwater levels shall not exceed 1 ft during periods of maximum rate of rise and maximum rate of fall of the flood waters, and at any other times during the design, or lesser, flood events.
- 6- In the absence of reliable data on the rates of rise and fall, assume a minimum rate of rise and fall of 5.0 ft/h; where an analysis indicates the rate of rise and fall are greater than 5.0 ft/h., the total net area of the required opening shall be increased to account for the higher rates of rise and fall; where an analysis indicates the rates of rise and fall are less than 5.0 ft/h. the total net area of the required openings shall remain the same or shall be decreased to account for the lower rates of rise and fall.