

Chapter 4 Siting

Section 401

Flood Elevation Criteria

401.1 Minimum floor elevation of storm shelters. The minimum floor elevations of storm shelters shall be determined in accordance with Section 401.1.1 or 401.1.2, as applicable.

401.1.1 Minimum floor elevation of community shelters. The lowest floor used for the occupied shelter and occupant support areas of a storm community shelter shall be elevated to the higher of the elevations determined by:

1. The flood elevation, including coastal wave effects, having a 0.2% annual chance of being equaled or exceeded in any given year, when determined for the geographic location under consideration; or
2. Two feet One foot above the flood elevation having a 1% annual chance of being equaled or exceeded in any given year, when determined for the geographic location under consideration; or
3. Two feet above the flood elevation corresponding to the highest recorded flood elevation if the area is not in a mapped special flood hazard area designated as a Flood Hazard Area on a community's Flood Hazard Map or otherwise legally designated.; or
4. The maximum inundation elevation associated with a Category 5 hurricane event in an area subject to storm surge inundation.

Exceptions:

1. For other than residential shelters, construction below the flood elevation determined in accordance with this section shall be permitted when design of the shelter incorporates dry flood proofing measures as permitted by the authority having jurisdiction.
2. Item 2 shall not be applicable to residential shelters.

401.1.1 Storm surge flooding. The lowest floor of a storm shelter located in an area subject to storm surge inundation shall be elevated to or above the maximum inundation elevation associated with a Category 5 hurricane event.

Exception: Item no. 1 shall not apply to tornado shelters.

401.1.2 Minimum floor elevation of residential shelters. The lowest floor used for the occupied shelter area of a residential shelter shall be determined by:

1. The minimum elevation of the lowest floor required by the floodplain ordinance of the community; or
2. One foot above the flood elevation corresponding to the highest recorded elevation if the area is not in a mapped special flood hazard area or in a mapped non-participating community.

401.2 Coastal Zone. Areas landward of the Coastal High Hazard Zone (V Zone) and subject to Category 5 storm surge inundation shall be considered to be within a Coastal A Zone.

401.3 Design criteria. Storm shelters or portions thereof subject to flooding shall be designed in accordance with the provisions of this chapter, ASCE 7, Section 5, and ASCE 24.

Chapter 5 Occupancy, Means of Egress, Access, and Accessibility

501.1.1 Occupant Density. The minimum required shelter floor area per occupant shall be determined in accordance with Table 504501.1.1, and this section. The number of standing, seating, wheelchair, or bedridden spaces shall be determined based upon the needs of the shelter determined by the applicable authority having jurisdiction and the designer.

**Table 504501.1.1
Occupant Density – Community Shelters**

Type of Shelter	Minimum Required Usable Shelter Floor Area ¹ in Sq. Ft. Per Occupant	
Tornado	Standing or seated	5
	Wheelchair	10
	Bedridden	30
Hurricane	Standing or seated	20
	Wheelchair	20
	Bedridden	40

Note: 1 sq. ft. = .0929 m²

¹ See Section 501.1.2 for requirements for minimum required usable shelter floor area

501.1.2.2 Alternate Calculation of Usable Floor Area. The usable shelter floor area shall be determined by:

1. ~~Reduce~~ Reducing the gross floor area of shelter areas with concentrated furnishings or fixed seating by a minimum of 50 percent.
 2. ~~Reduce~~ Reducing the gross floor area of shelter areas with un-concentrated furnishings and without fixed seating by a minimum of 35 percent.
 3. ~~Reduce~~ Reducing the gross floor area of shelter areas with open plan furnishings and without fixed seating by a minimum of 15 percent.
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501.4 Emergency escape opening. The emergency escape opening shall be an additional door or an opening that is a minimum of 5.7 sq. ft. (0.530 m²) in area. Such opening shall have a minimum height of 24 inches (610 mm) and a minimum width of 20 inches (508 mm). The emergency escape opening shall be operable from the inside without the use of tools or special knowledge. Where the emergency escape opening is located more than 44 inches above the finished floor level, vertical access to the opening shall be provided by a stair complying with Section 502.3.1 ~~or~~ a ladder complying with Section 502.3.2, or an alternating tread device complying with Section 502.3.3. The emergency escape opening shall be located away from the means of egress door by a minimum distance of 1/3 of the length of the maximum overall diagonal dimension of the area to be served.

502.3 Vertical access. Where required, vertical access to a residential shelter shall be by a stair complying with Section 502.3.1, or by a ladder complying with Section 502.3.2, or an alternating tread device complying with Section 502.3.3.

502.3.2 Ladders for residential shelters. The clear length of rungs for ladders shall be not less than 16 inches (406 mm). Rungs shall be constructed such that a foot cannot slide off the end of the rung. Ladder rungs shall be a minimum of ¾ inches (19 mm) in diameter and shall be spaced uniformly at not greater than 12 inches (305 mm). Ladder wells or cages shall have a minimum of 15 inches clear on either side of the centerline of the ladder and a minimum of 27 inches (686 mm) clear from the centerline of the rungs to a ~~smooth~~ ladder well or cage on the climbing side of the ladder. Where obstructions occur in the ladder well, this distance shall be increased to 30 inches (762 mm). The distance between the centerline of the rungs or steps to the nearest permanent object in back of the ladder (on the toe side) shall be no less than 7 inches (178 mm). Ladders shall have a maximum slope of 90 degrees from horizontal and a minimum slope of 75 degrees from horizontal where measured on the toe side of the ladder.

502.3.3 Alternating tread devices for residential shelters. Alternating tread devices for shall comply with the applicable requirements listed in International Building Code (IBC).

502.3.3.1 Overhead Clearance. The minimum clearance requirements for stairs (including exceptions) listed in section 502.3.1.1 shall also apply to alternating tread devices.

**Table 502.4
Occupant Density—Residential Shelters**

Type of Shelter	Minimum Required Usable Shelter Floor Area ¹ in Sq. Ft. Per Occupant
Tornado	
1&2 Family Dwelling	3
Other residential	5
Hurricane	
1&2 Family Dwelling	7
Other residential	10

Note: 1 sq. ft. = .0929 m²

502.4.1. Usable tornado shelter floor area. The usable tornado shelter floor area shall be the gross floor area, minus the area of sanitary facilities, if any, and shall include the protected occupant area between the shelter walls at the level of fixed seating, where fixed seating exists.

**503
Locks and Latching**

503.1 ~~306.3.3~~ Locks and Latching Mechanisms. Locking and other latching mechanisms shall be permanently mounted on the specimen. Such mechanisms shall require no tools to be engaged in the locked position. Devices such as pins shall be permanently secured to the specimen through the use of chains or wires which must be of corrosion resistant material.

503.2 ~~306.3.4~~ Multi-Latching Systems. Products that are not categorized as means of egress/escape and are provided with more than one single action locking mechanism shall be provided with permanently posted instructions on latching.

503-504

Signage for Community Shelters

504.1 ~~503.1~~ Signage Requirements. Community storm shelter areas shall be marked by signage in accordance with this section. Signage is required within a facility to direct occupants to storm shelter areas.

504.1.1 ~~503.1.1~~ Signage location. At every entrance to a storm shelter, signage indicating "Tornado Shelter", or "Hurricane Shelter", or appropriate symbols as applicable, shall be installed. The sign shall be both tactile and visual, meeting the requirements of ICC/ANSI A117.1. The sign shall be no smaller than 8.5 inches x 11 inches (216 mm x 279 mm). The sign shall be mounted on or adjacent to the door, located in accordance with ICC/ANSI A117.1.

504.1.2 ~~503.1.2~~ Identifying Sign. A sign depicting the general location of storm shelter area(s) and access ways shall be displayed in all of the following locations:

1. Adjacent to access doors on the inside of the storm shelter,
2. The office of the facility manager, where provided,
3. In the designated shelter manager's area within the storm shelter, where provided.

504.1.2.1 ~~503.1.2.1~~ Location of identifying sign. The identifying sign shall be posted in a prominent location 60 inches above the finished floor to the centerline of the sign.

Chapter 6 Fire Safety

Section 601 Fire Resistant Construction

601.1 Fire Separation. Fire barriers and horizontal assemblies separating *spaces or areas* designated as storm shelters from other building areas ~~that are not designated as shelter areas~~ shall ~~be~~ have a minimum fire resistance rating of 2 hours and constructed in accordance with the applicable building code.
